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Savings through energy efficiency

PA Key Driver Presentation 7-21-15

nationalgrid

EVERSOURCE

Columbia Gas of Massachusetts
A NiSource Company

Unitil

BLACKSTONE GAS COMPANY

Liberty Utilities

berkshire gas
A UIL HOLDINGS COMPANY

Cape Light Compact

Topics

- Consultants Recommendations & Supporting Data
- Residential Lighting
- Residential Behavior
- C&I Lighting
- CHP
- Potential Studies
- Bill Impacts
- Low Income Savings Goals

Consultant Recommendations & Supporting Data

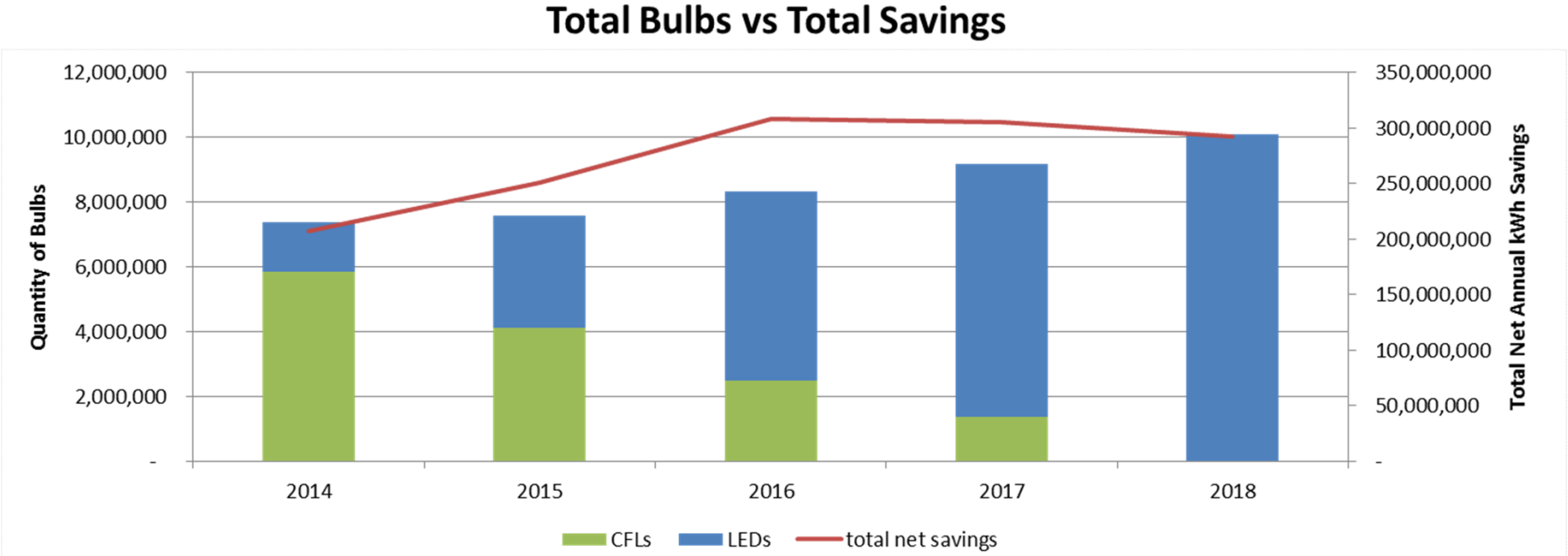
- Consultants and PAs largely in agreement on savings factors for key drivers
- The key drivers gap analysis focuses on consultant opinion on how much PAs can achieve year over year
  - Primary recommendation is 10% more in most programs
- Data backing up recommendations is high-level and not supported by primary data sources

Res Lighting	• 10% increase to bulbs per household in each year
Behavior	• Increase participation 10% each year • Increase savings per participant 5% each year
HES (Gas)	• Increase participation by 10% each year • Increase savings per participant 10% each year
C&I Lighting	• Identified 124,000 & 154,000 Municipal Owned lights, respectively • Targeting Linear LED opportunity

Consultants Recommendation on Residential Lighting

		2016	2017	2018	
Retail Lighting					
Units/Housing units		3.0	3.3	3.6	Starting at 3.0 units/Housing unit in 2016 and incrementing up 10%/yr
% LEDs		70.0%	85.0%	100.0%	
CFL					
Gross kWh/unit		47.6	45	41.7	Measure weighted values calculated from PA BCR models
NTG		61%	60%	60%	Measure weighted values calculated from PA BCR models
# of CFL units		2,532,182	1,392,700	-	
Savings (MWh)		73,524	37,603	-	
LED					
Gross kWh/unit		41.6	39.7	38.1	Measure weighted values calculated from PA BCR models
NTG		92%	83%	74%	Measure weighted values calculated from PA BCR models
# of LED units		5,908,426	7,891,968	10,213,136	
Savings (MWh)		225,390	259,735	289,117	
Total units		8,440,608	9,284,669	10,213,136	
Total Retail Lighting MWh		298,914	297,338	289,117	

Consultant's Proposal calls for a massive increase in LED uptake



Consultant increase recommends

- 550% increase in LEDs from 2014 actuals
- 185% increase in LEDs from *estimated* 2015

Consultant Forecast

- No CFLs by 2018
- LEDs replacing CFLs on a 1 for 1 basis
- Increasing Quantity of Bulbs

Consumer Shift to Energy-efficient Bulb

MA's households are installing CFLs and LEDs in an increasing number of sockets.

Today, LEDs, CFLs, and tube fluorescents together fill 45% of sockets in Massachusetts homes, and, for the first time in 2014, incandescent bulbs filled **fewer** than 50% of sockets.

Data Shows households tend to replace inefficient bulb types with CFLs and LEDs

Saturation will only continue to increase over time.

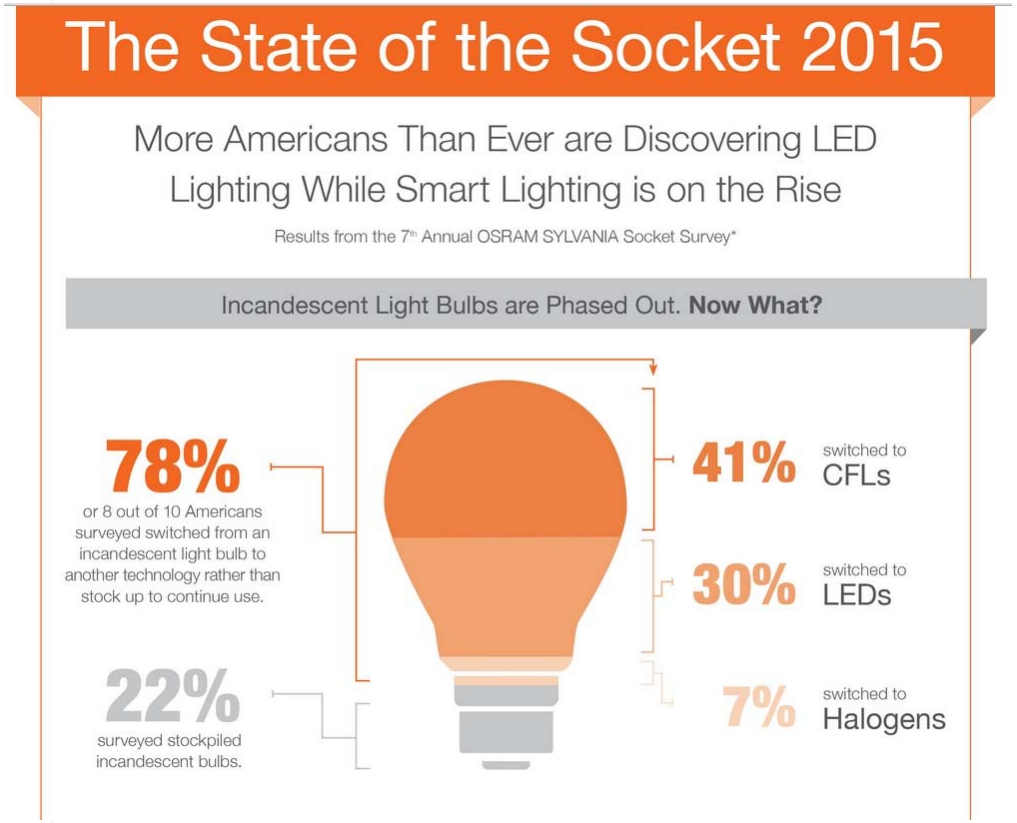
While helping consumers to save energy and reduce demand, the shift to efficient bulbs improves the baseline and **reduces** long term program opportunity.

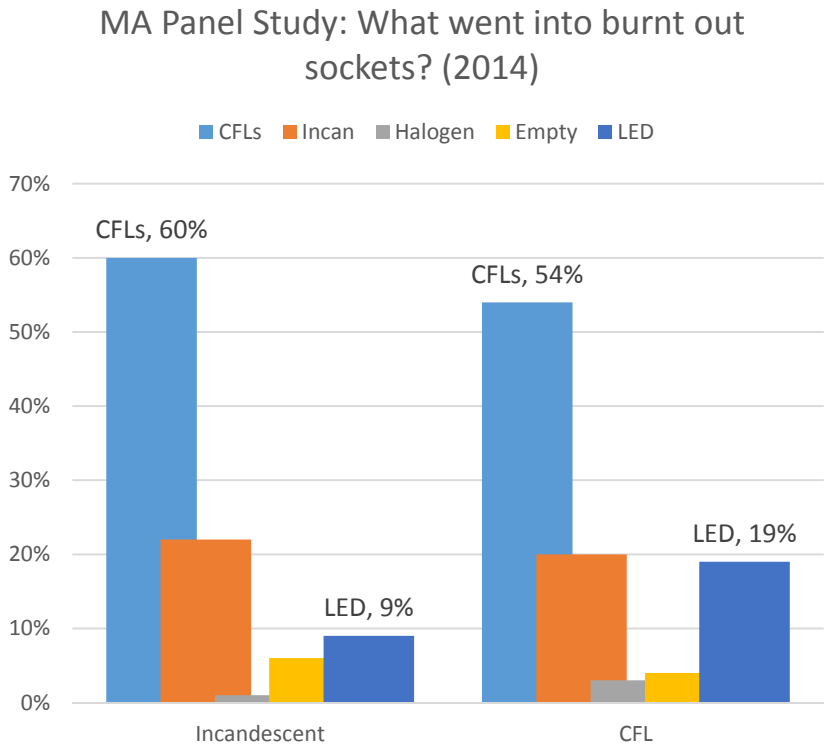
Prior saturation levels will influence efficient bulb sales

Longer lifetimes for efficient bulbs leads to less frequent bulb replacements of all bulb types being sold

Is it reasonable to expect increased sales and savings?

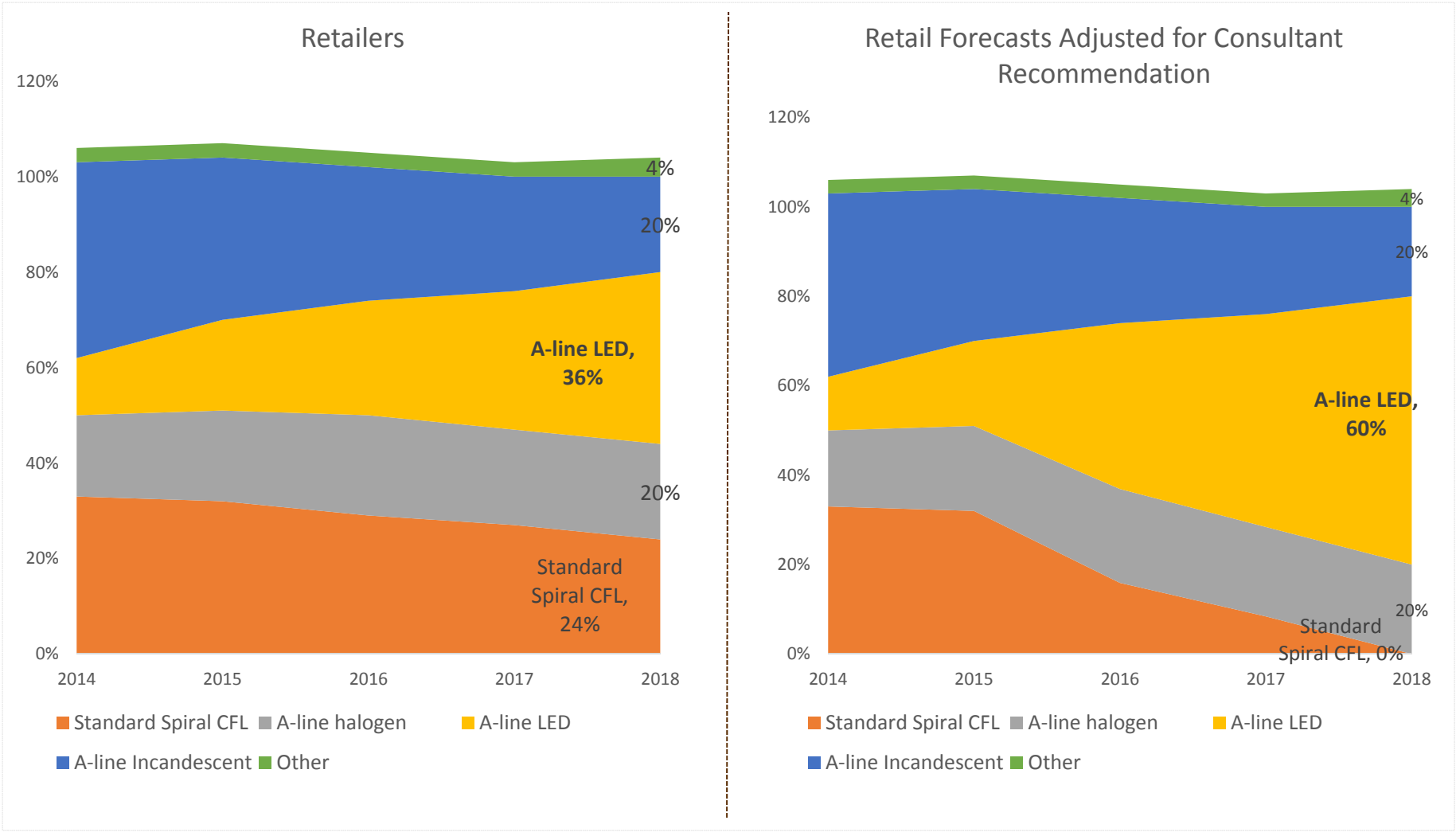
Why are consultants expecting CFLs to go away?



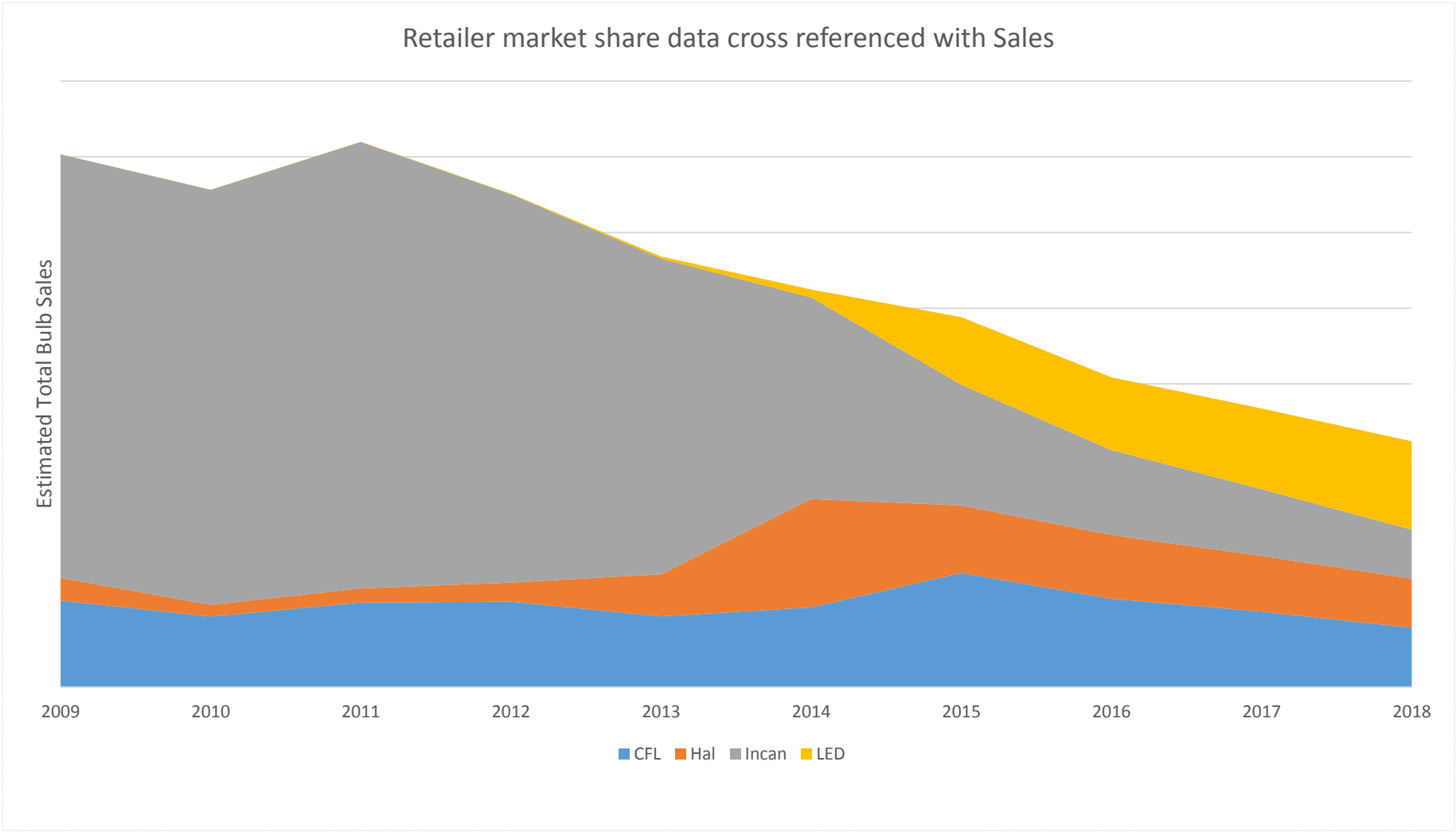


http://www.osram-americas.com/en-us/tools-and-resources/surveys/Pages/socket-survey.aspx

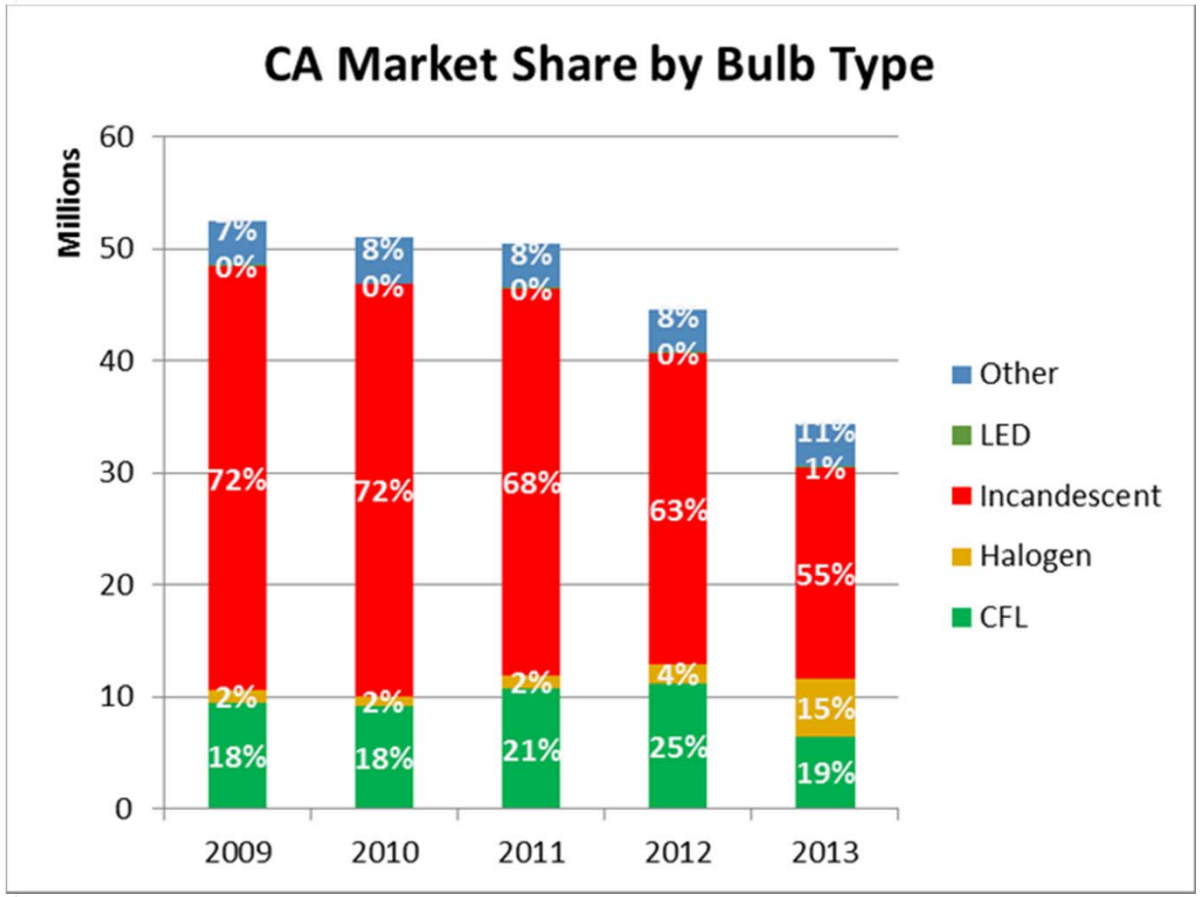
Retailers view vs EEAC consultants View



Retailer View: Total Lighting sales down



Change is Coming:
EISA Phase out decreased sales in CA



- Reflects actual sales data Evaluation team purchased*
- CA instituted EISA earlier than any state, eliminating 60 watt incandescent bulbs in 2013
- The result was a precipitous drop in sales of all bulbs
- In 2013, LEDs represent 1% of overall sales in these channels

*This data is representative of trend, but not the total market

Behavioral

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Consultants Assumptions for Behavioral Electric

- 142 GWh Gap between PAs and consultants' behavior savings numbers
- This gap is based on two consultant assumptions
- 1) A 10% increase in behavioral participation each year
- 2) A 5% increase in savings each year

Behavioral	2016	2017	2018
Participation	1,051,743	1,156,917	1,272,609
Savings/participant	129	136	143
NTGR	100%	100%	100%
Savings (MWh)	136,065	157,155	181,514

Assumes 10% increase/yr over 2014 participation

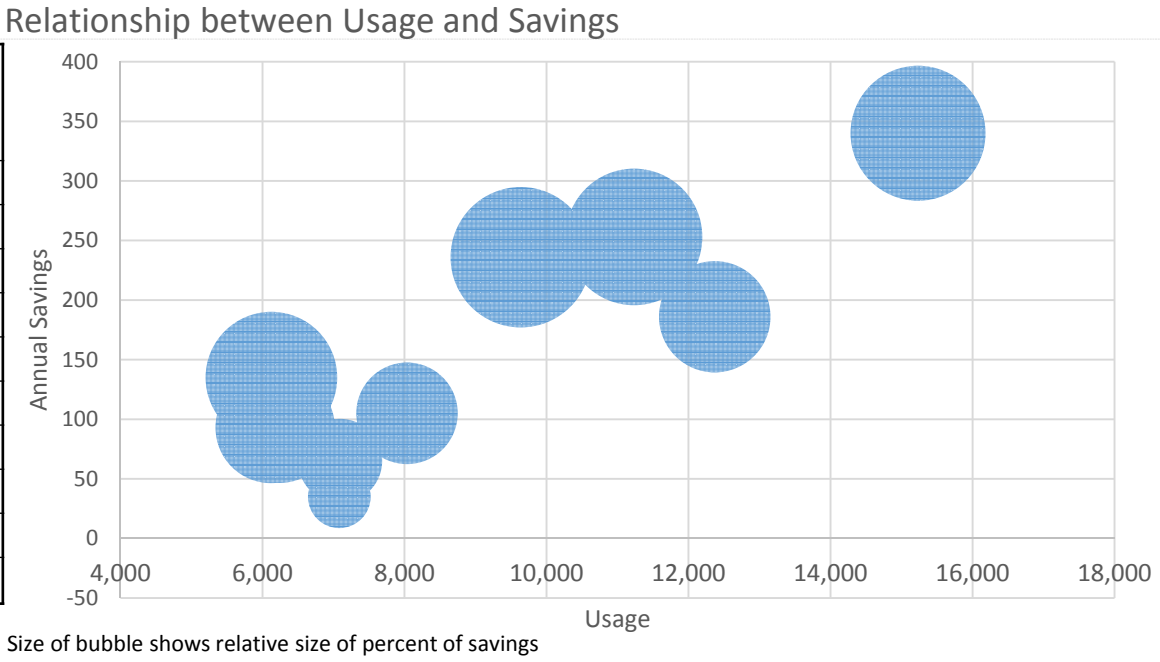
Assumes 5% increase per year over 2014 statewide average

- If you accept growth in participation, but eliminate assumption of 5% increased savings per participant, the gap is reduced to less than 2 GWh
- As pool of participants expands, savings per participant will *decline*, not increase

Behavioral	2016	2017	2018
Participation	1,051,743	1,156,917	1,272,609
Savings/participant	117	111	105
NTGR	100%	100%	100%
Savings (MWh)	122,896	128,071	133,051
New Total GWh 384			

High Use Participants see more savings

Cohort	Baseline Usage	Average Annual Savings	Percent Savings
NGRID 1	11,233	253	2.4%
NGRID 2	12,370	186	1.6%
NGRID 3	15,232	340	2.3%
NGRID 4	9,638	236	2.5%
NGRID 5	6,121	93	1.6%
NGRID 6	6,126	135	2.2%
NGRID 7	6,239	93	1.6%
NGRID 8	8,036	105	1.3%
NGRID 9	7,082	35	0.5%
NGRID 10	7,093	65	0.9%

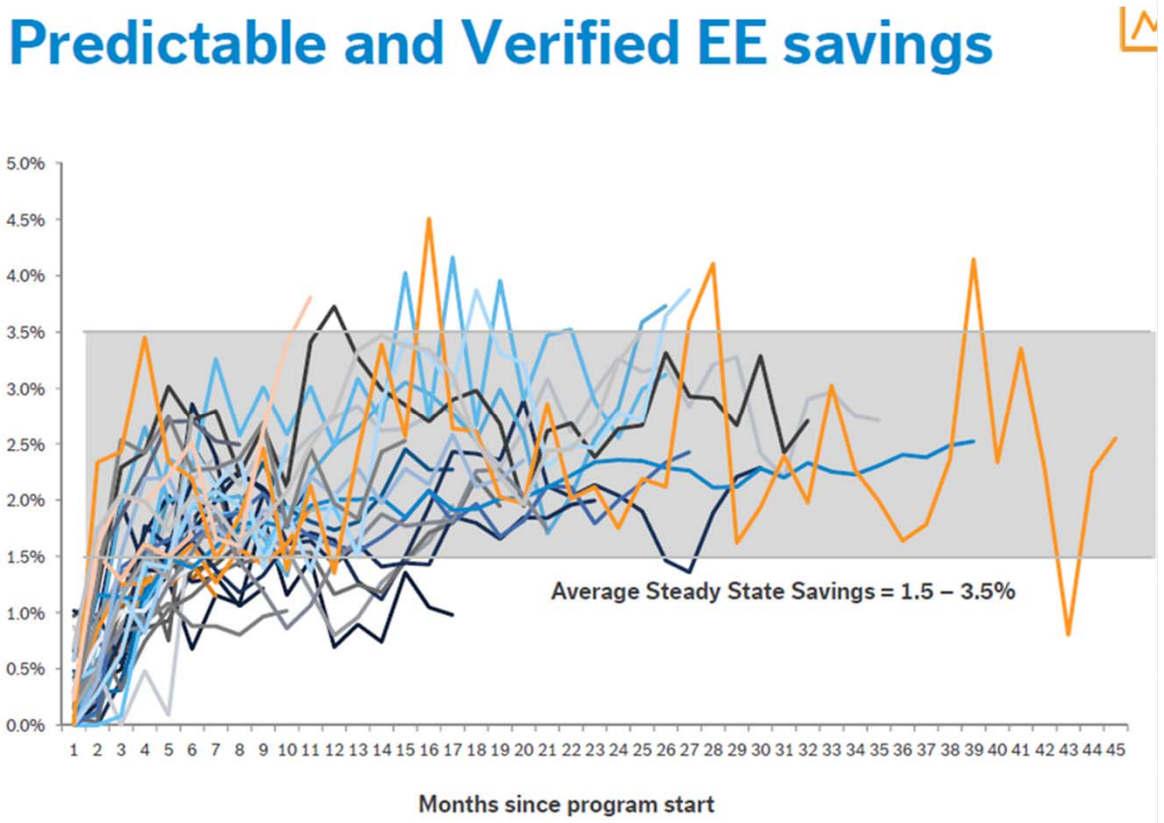


Size of bubble shows relative size of percent of savings

- Evaluations have shown that as the program increases participation, average savings declines.
  - New participants will have lower baseline usage
  - Lower usage means lower savings per participant

Consultants Claim of 5% increase in savings is not supported by data

- **Savings plateau** – research across multiple deployments show that savings ramp up quickly and then plateau
- Behavioral programs in MA are relatively mature and have already gone through the ramp up stage
- Evaluation has not seen (nor would expect to see) consultant estimated increases in savings rates on a per household basis going forward



C&I

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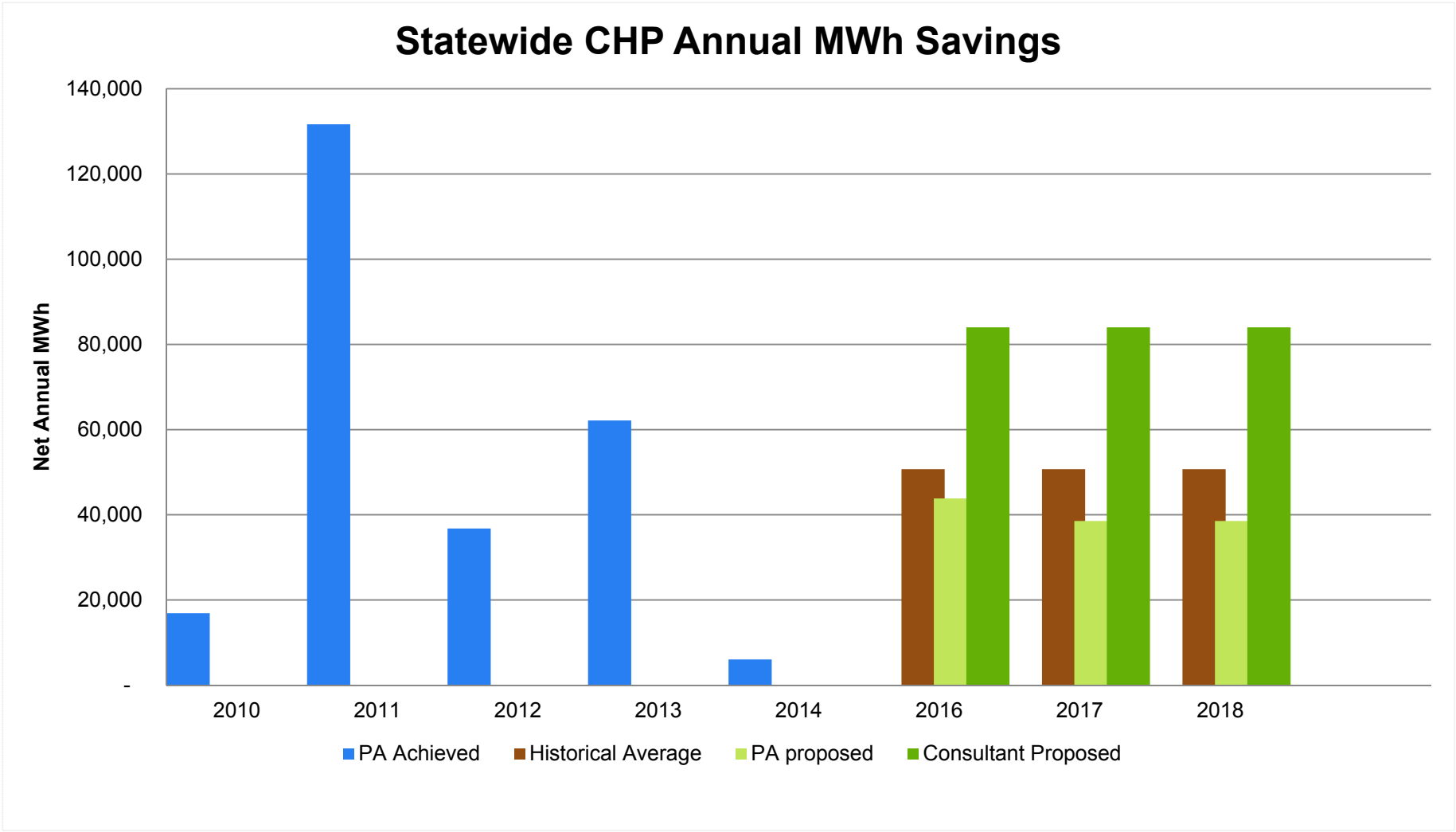
C&I Lighting

Topic	Consultants	Market Reality	Over-estimate
Linear LED	Assume Linear LED will account for 59% of all Linear sales by end of 3YP	• After 4+ years experience, high performance T8s account for only 54% of linear sales • Efficient T8s & T5s represent 40% of installed linear lamps which are unlikely to replaced in near-term thereby capping maximum penetration 60% • Technology “issues” remain a factor – e.g., recent unprecedented recall of 700,000 linear LED lamps • EM&V Consultant conclusions re: lighting market development: (1) “Rapid Technological Change Creates Major Risks That Need to be Managed”; (2) "Prices of these are falling, but they have not yet gained traction in the market"	64,105 MWhs
Municipally Owned Streetlights	Assume 100% will be converted to LED within the 3YP period, despite barriers	• Despite strong interest from many, and in some cases even despite 100% incentives, less than 10% of municipalities have typically converted in any one year due to financial constraints, long decision making processes, etc.	19,475 MWhs
Utility Owned Streetlights	Assume 50% will be converted to LED within the course of the 3YP, despite barriers	• Given timelines for filing/approval of LED tariffs, lengthy municipality decision-making processes, and time required to perform installations results in more likely 10% per year, consistent with historical trends, conversion beginning in 2017	15,290 MWhs
TOTAL	**TOTAL**	**TOTAL**	**98,870 MWhs**

Consultant CHP recommendations vs past performance



Potential Studies

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Potential Studies provide value

- PAs utilized the potential studies in the planning process, but by no means exclusively
- In April, PAs savings goals were generally higher than the potential studies' Achievable Case.
- Three different vendors coming to similar findings in territories demonstrated accurate and reliable findings
  - CLC and National Grid both showing downward sloping potential on electric

Small PAs Focus
- Economic Conditions
- Employment Rates
- Limited Customer Capital

Location Matters
- Urban vs Rural vs Semi Rural
- Seasonality of Customers

Cost to Achieve
- Smaller C&I base
- Different costs for small PAs vs Large PAs

Bill Impacts

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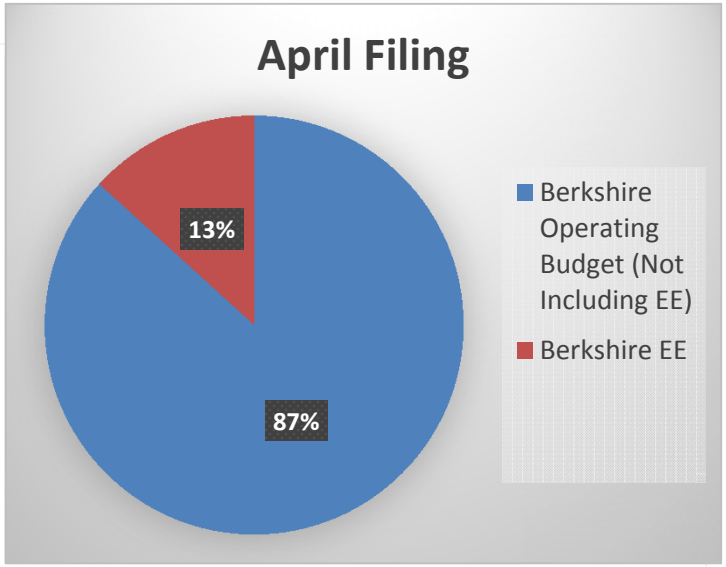
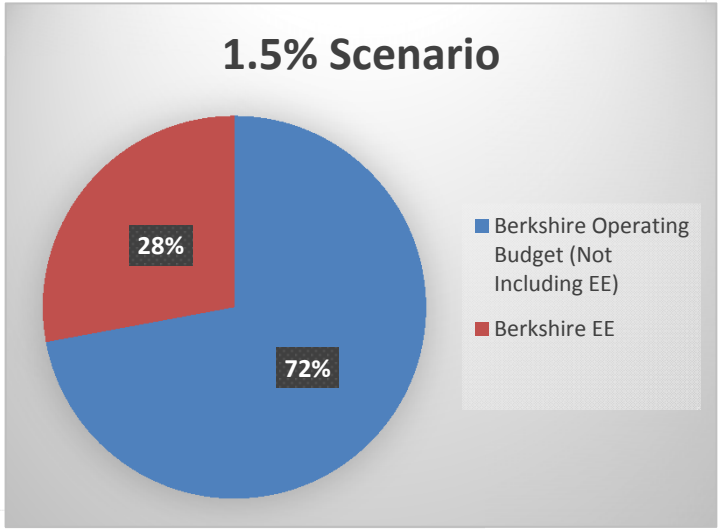
Consultant Recommendations will have large impact especially for Small PAs

Berkshire Gas - 1.5% scenario

2016	Sales Forecast (therms)	Budget	Annual Savings (therms)	Percent of Sales	$/Annual therms
Residential	26,297,849	$ 7,241,051	525,957	2.00%	$13.77
Low-Income	4,897,701	$ 1,418,878	63,670	1.30%	$22.28
C&I	41,779,017	$ 1,862,349	501,348	1.20%	$3.71
Total	72,974,568	$ 10,522,278	1,090,975	1.50%	$9.64



	Budget April	Budget 1.5%	Percent Increase (April)	Percent Increase (1.5%)
Residential & Low Income	$ 3,337,688	$ 8,659,929	3%	168%
C&I	$ 1,076,964	$ 1,862,349	-10%	56%



Low Income Savings Goals

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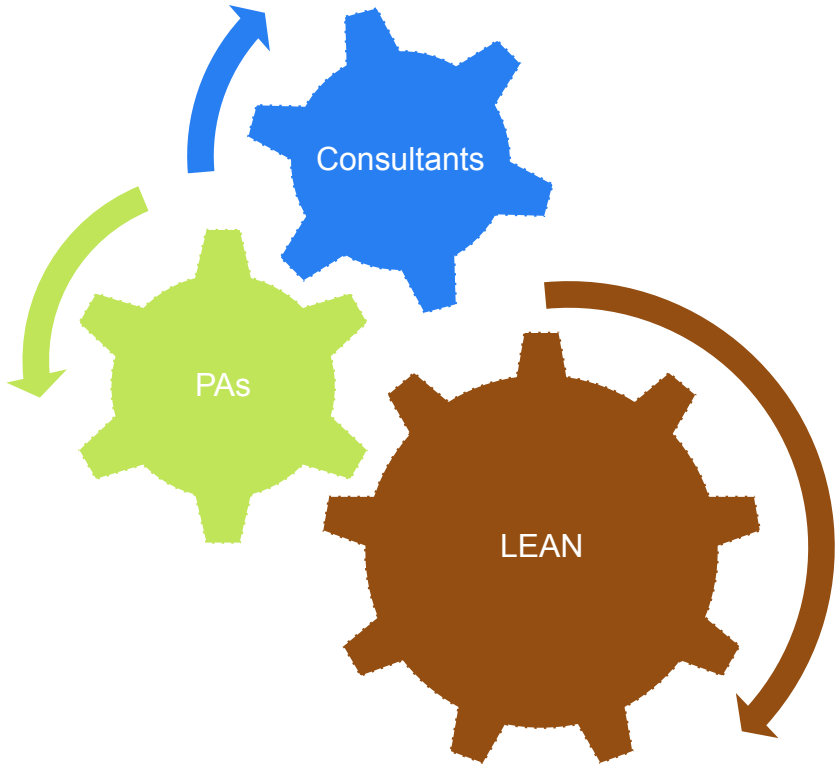
Low Income Savings Goals



- LEAN has statutorily been required to implement low-income programs
- PAs and LEAN have coordinated on savings goals
- PAs do not understand why there is a low-income savings gap

Appendix

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Consultant Recommendations

10% Increase

Residential Lighting
- Number of Bulbs Per Household

Residential New Construction
- Lighting & High Rise

Multifamily

HVAC

Behavior
- 5% increase in savings on top of production

7.5% Increase

HES Gas

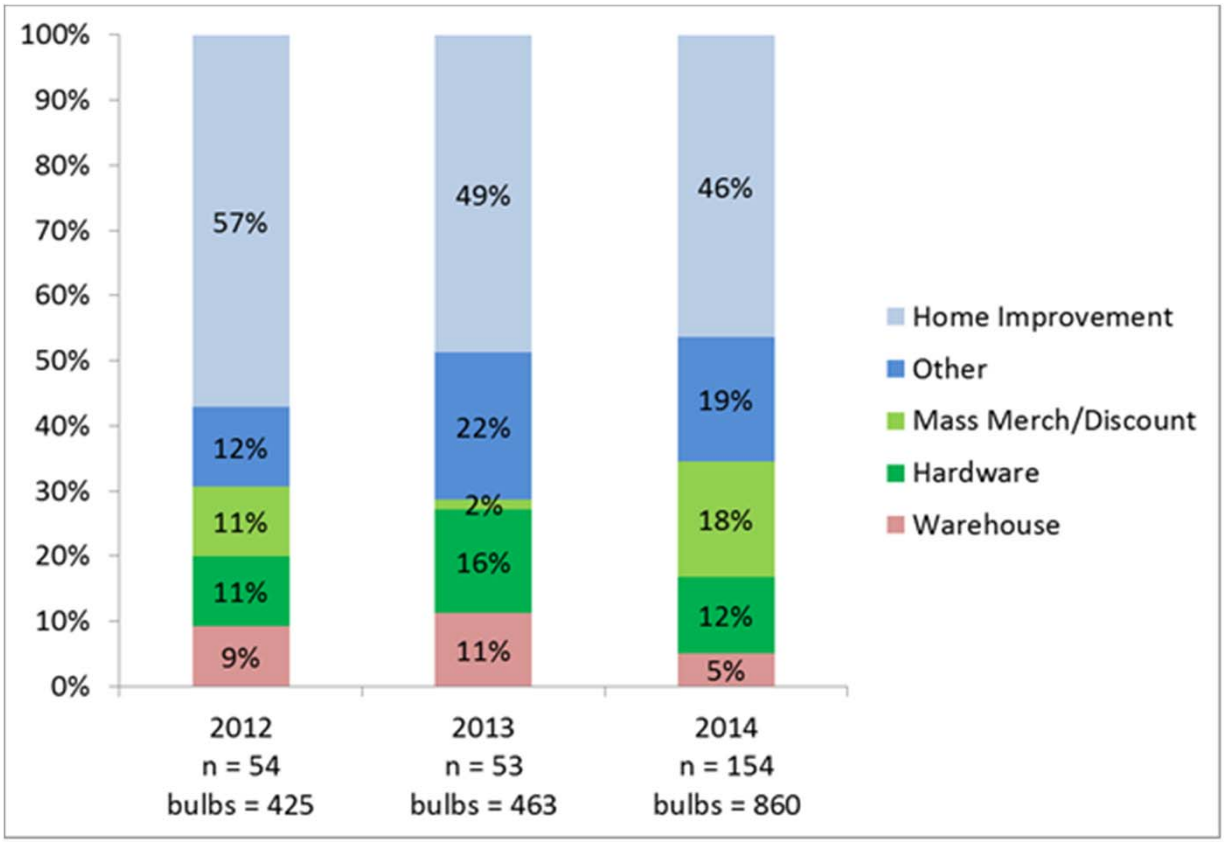
5% Increase

Consumer Products

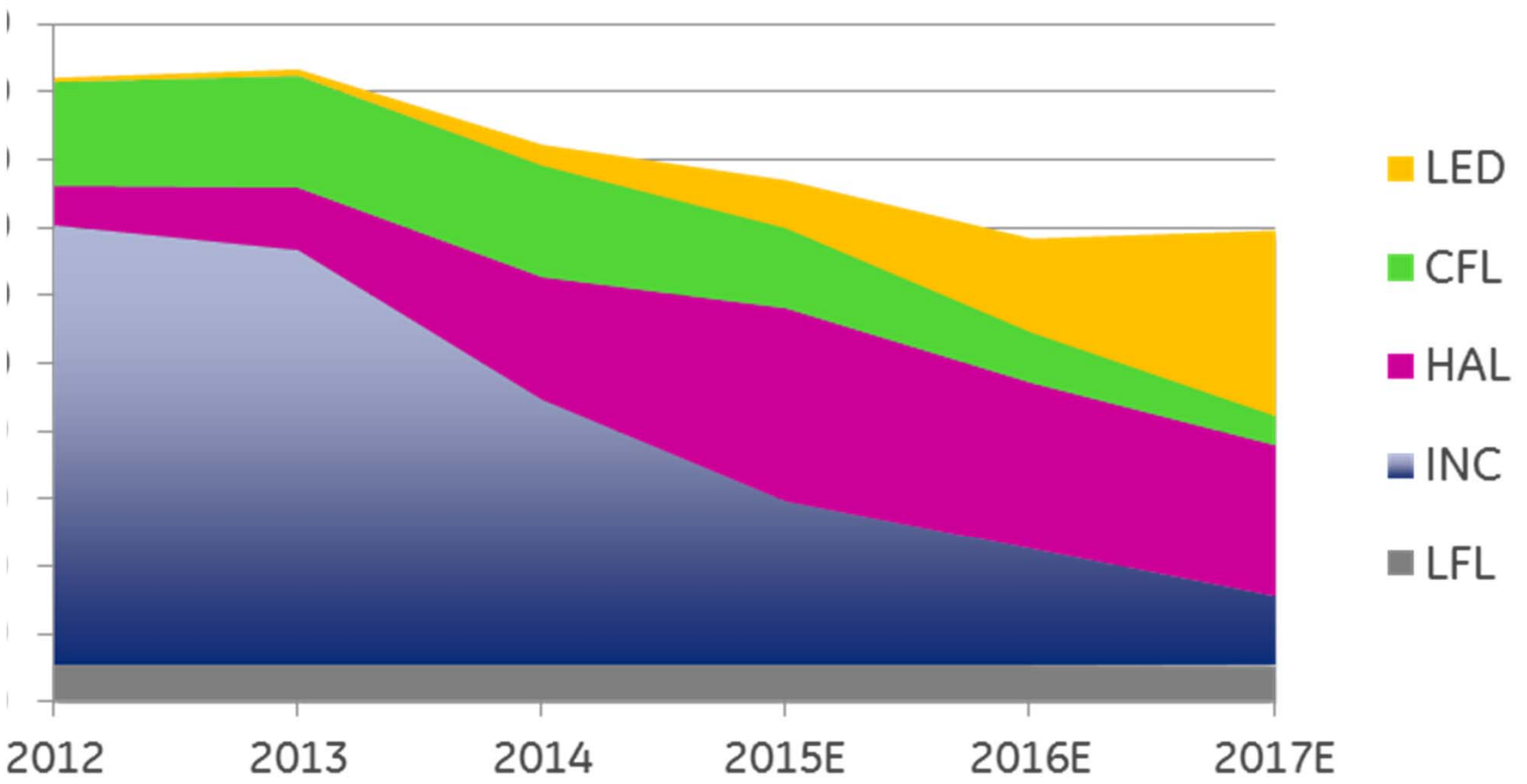
HES Electric

Res New Construction
- Low Rise

Where were bulbs purchased?



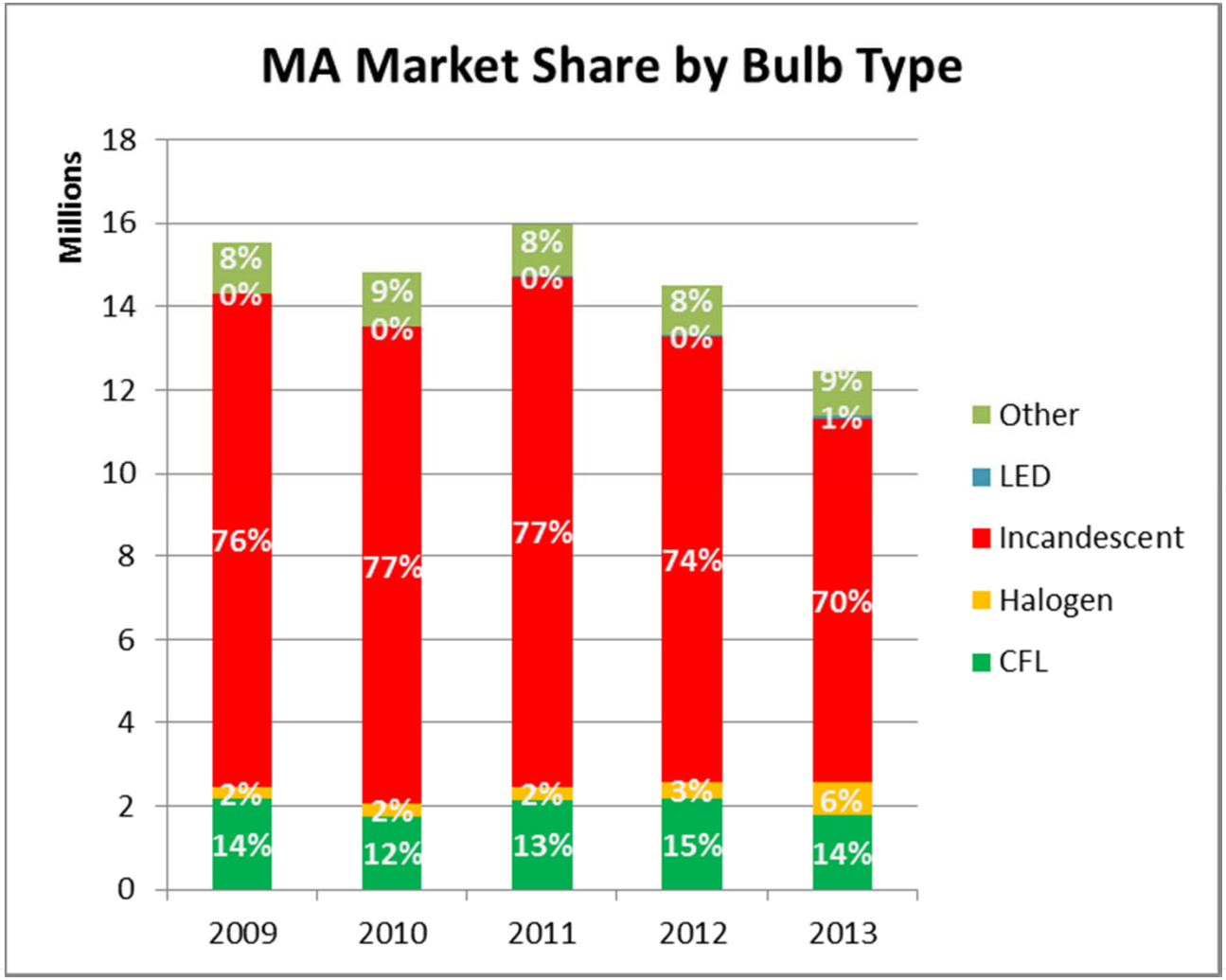
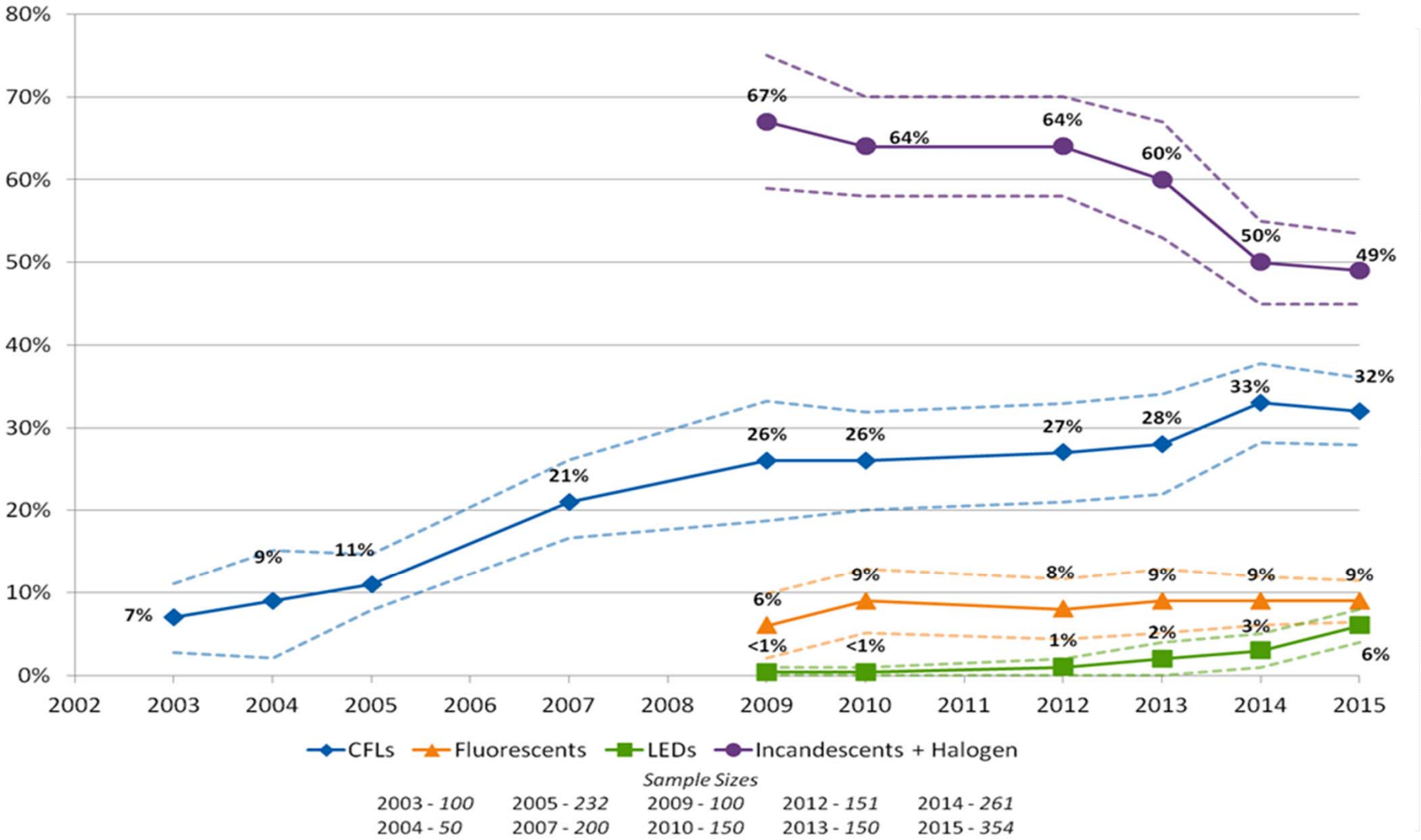
GE estimate of Market Share



CFLs burnouts expected to decline in 2016

Year after Purchase	Failure Rate*	Year	Market-Level Purchases	Newly Installed in Given Year**	Burned out in a Given Year***
First	4%	1998	305,216	235,016	9,039
Second	9%	1999	554,077	457,161	38,674
Third	8%	2000	530,006	494,034	79,202
Fourth	15%	2001	979,811	862,863	149,326
Fifth	10%	2002	892,859	838,483	241,637
Sixth	8%	2003	3,565,495	2,932,698	397,649
Seventh	10%	2004	4,565,862	3,961,549	715,159
Eight	5%	2005	6,308,402	5,670,605	1,110,896
Ninth	5%	2006	10,426,466	9,115,805	1,842,610
Tenth	4%	2007	13,330,771	11,938,180	2,815,756
Eleventh	3%	2008	4,248,761	5,647,270	3,675,034
Twelfth	3%	2009	8,447,382	8,262,437	4,385,247
Thirteenth	2%	2010	10,870,314	9,639,756	5,292,905
Fourteenth	2%	2011	6,611,870	7,022,909	5,483,572
Fifteenth	2%	2012	7,370,732	7,423,682	5,827,452
Sixteenth	2%	2013	11,697,650	10,405,451	**6,347,726**
Cumulative			90,705,674	84,907,900	38,011,673

Same Trend in Massachusetts



What's going on in 2014 and 2015?