

# PRELIMINARY ASSESSMENT OF POTENTIAL 2016-2018



► **March 10, 2015**

[www.ma-eeac.org](http://www.ma-eeac.org)

# EXECUTIVE SUMMARY



- ▶ **Compiled information from multiple sources indicates achievable potential of 3.0% electric, 1.5% gas**
- ▶ **Recent MA-specific EM&V studies provide little to no evidence that efficiency potential is waning**
- ▶ **Regional studies are conservative, yet still indicate achievable potential higher than recent program performance**
- ▶ **Draft small PA penetration studies, also conservative, show savings potential consistent with other regional studies**
- ▶ **Cost to achieve savings relatively constant as savings achievement has doubled**

# CONTEXT FOR STUDY



- ▶ **Green Communities Act requires an assessment of “all available energy efficiency...resources that are cost effective or less expensive than supply”**
- ▶ **Previous assessments correctly identified achievable potential used in setting goals for previous plans**
- ▶ **This assessment is**
  - A synthesis of many data sources
  - Not a measure-level potential study
  - Not a formulaic construction
  - Not PA-specific

# SOURCES

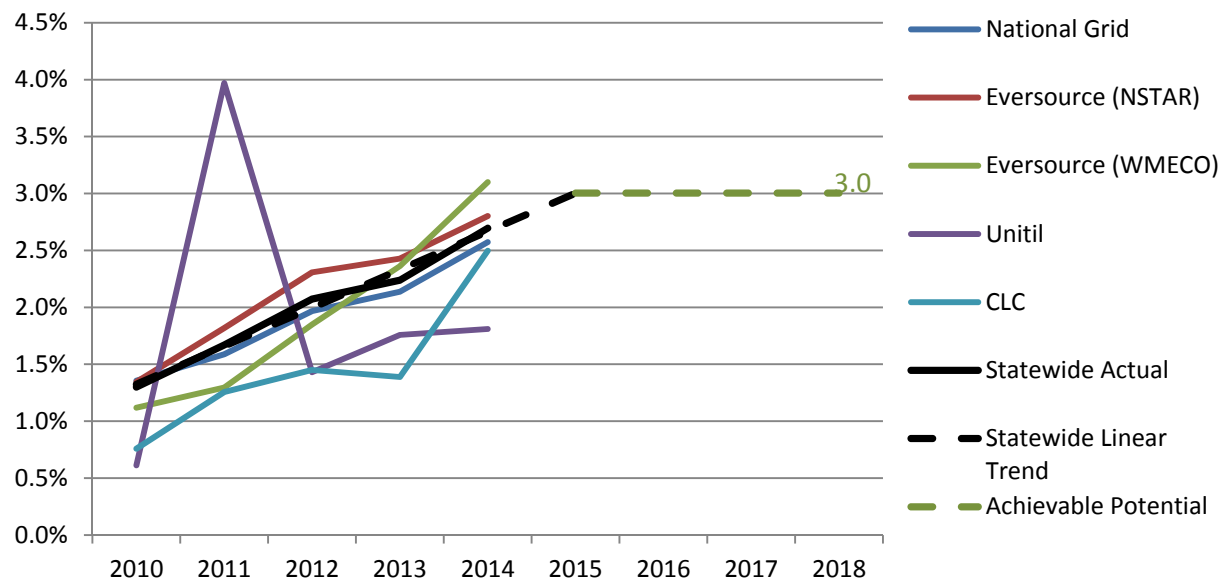


---

- ▶ **Historical EE program performance data**
- ▶ **Recently completed Massachusetts EM&V studies**
- ▶ **Potential studies from other jurisdictions**
- ▶ **Potential studies for 4 small PAs**

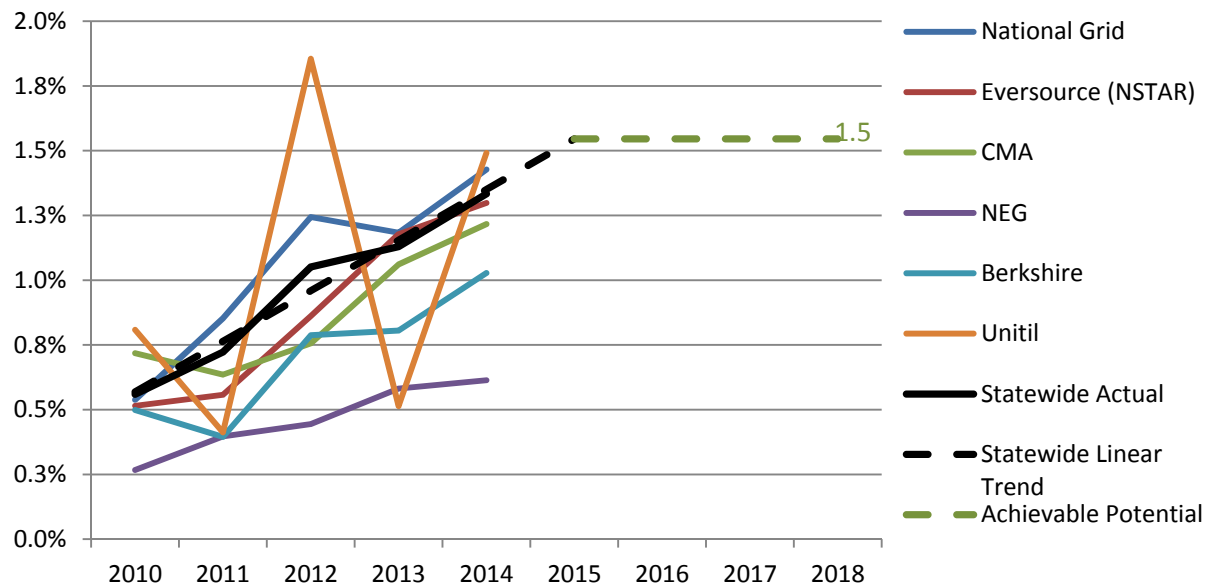
# CURRENT TRAJECTORY IS STARTING POINT

- ▶ Performance is tracking goals
- ▶ Statewide 2014 results exceed 2015 goals
- ▶ Trend points to 3.0% electric, 1.5% gas



# CURRENT TRAJECTORY IS STARTING POINT

- ▶ Performance is tracking goals
- ▶ Statewide 2014 results exceed 2015 goals
- ▶ Trend points to 3.0% electric, 1.5% gas



# SUPPORT FROM EM&V STUDIES

- ▶ **Existing Buildings Market Characterization**
  - Over half of C&I customers unaware and rarely engage
  - Low residential customer awareness of some EE brands
- ▶ **C&I Customer Profile**
  - Mid-sized customers opportunity
  - Small PAs have addressed customers representing a smaller fraction of overall sales
- ▶ **“PA Differences” Study**
  - Economic conditions not a driver of differences
  - Small PAs are reliant on larger customers, even though they represent smaller portion of their sales
- ▶ **The program success is commendable, and there is still room for additional savings...**

# DATA FROM OTHER JURISDICTIONS

State	Author	Study Date	Analysis Period	Sector	Cumulative Achievable Potential
<b>Electric</b>					
Pennsylvania	GDS/Nexant	2012	2014-2023	<b>Total</b>	<b>17.3%</b>
				Residential	19.0%
				Commercial	18.7%
				Industrial	10.9%
Delaware	Optimal Energy	2014	2014-2025	<b>Total</b>	<b>23.3%</b>
New York	Optimal Energy	2014	2013-2032	<b>Total</b>	<b>18.0%</b>
<b>Natural Gas</b>					
Delaware	Optimal Energy	2014	2014-2025	<b>Total</b>	<b>12.5%</b>
New York	Optimal Energy	2014	2013-2032	<b>Total</b>	<b>11.0%</b>
Vermont	Optimal Energy	2015	2015-2029	<b>Total</b>	<b>8.2%</b>
				Residential	9.7%
				Commercial/Industrial	7.4%
Maine	GDS	2014	2015-2024	<b>Total</b>	<b>14.3%</b>
				Residential	16.8%
				Commercial	14.4%
				Industrial	13.4%
<b>Oil / Petroleum Fuels</b>					
Delaware	Optimal Energy	2014	2014-2025	<b>Total</b>	<b>19.8%</b>
New York	Optimal Energy	2014	2013-2032	<b>Total</b>	<b>20.0%</b>
Vermont	Optimal Energy	2015	2015-2029	<b>Total</b>	<b>9.3%</b>



# RATE OF SAVINGS



- ▶ **Potential studies focus on long-term cumulative savings**
- ▶ **Retrofit savings typically spread uniformly over analysis period of 10 or more years**
- ▶ **Current PA achievement exceeds simple calculated “annual” rate**
  - Electric studies “annual” range is 1.0% to 1.9% per year
  - Gas studies “annual” range is 0.6% to 1.4% per year
- ▶ **Alternative: Compare three-year potential against cumulative potential from study**
  - Electric: 9.0% vs. average 20% cumulative
  - Gas: 4.5% vs average 12% cumulative

# ADDRESSING CONSERVATISMS

- ▶ **Incentive budgets and penetration constraints**
- ▶ **Combined Heat and Power**
- ▶ **Codes and Standards support**
- ▶ **LED street lighting**
- ▶ **Behavioral initiatives**
  
- ▶ **Residential lighting considerations**
  - “[W]hile the lighting market continues to rapidly evolve, efficient lighting will continue to be an important and cost efficient resource in PAs’ residential portfolios.”

# DATA FROM SMALL PA STUDIES

- ▶ **Preliminary results from DRAFT penetration studies for three small Massachusetts PA service territories**
  - Until (electric/gas), Liberty Utilities (gas), Berkshire (gas)
- ▶ **Three-year analysis period (2016-2018)**
- ▶ **“Likely Achievable” and “High Case” achievable potential**
- ▶ **Even the High Case is conservative**
  - Measure mix (e.g., strongly weighting CFLs over LEDs)
  - Participation rates (subset of current awareness)
  - New technologies and programs (e.g., behavioral, LED “tubes”, LED street lights)
  - Additional retrofit opportunities
  - Codes and standards initiatives

# DATA FROM SMALL PA STUDIES

- ▶ **With adjustments, electric achievable potential ranges from 3.22% to 3.66%. Gas potential ranges from 1.47% to 1.74%.**

## Adjusted Electric Achievable Potential

	2016	2017	2018
<b>GDS High Case Estimate of Potential</b>	<b>2.69%</b>	<b>2.86%</b>	<b>3.03%</b>
<b>Adjustments</b>			
Missing Measures Adjustment	0.10%	0.15%	0.20%
PA Differences study/Retrofit	0.10%	0.10%	0.10%
2013 Customer Profile/Participation	0.10%	0.10%	0.10%
Codes and Standards	0.01%	0.01%	0.01%
Behavioral Programs	0.10%	0.10%	0.10%
LED Street Lighting	0.07%	0.07%	0.07%
New Technologies	0.05%	0.05%	0.05%
<b>Total Estimated Potential</b>	<b>3.22%</b>	<b>3.44%</b>	<b>3.66%</b>

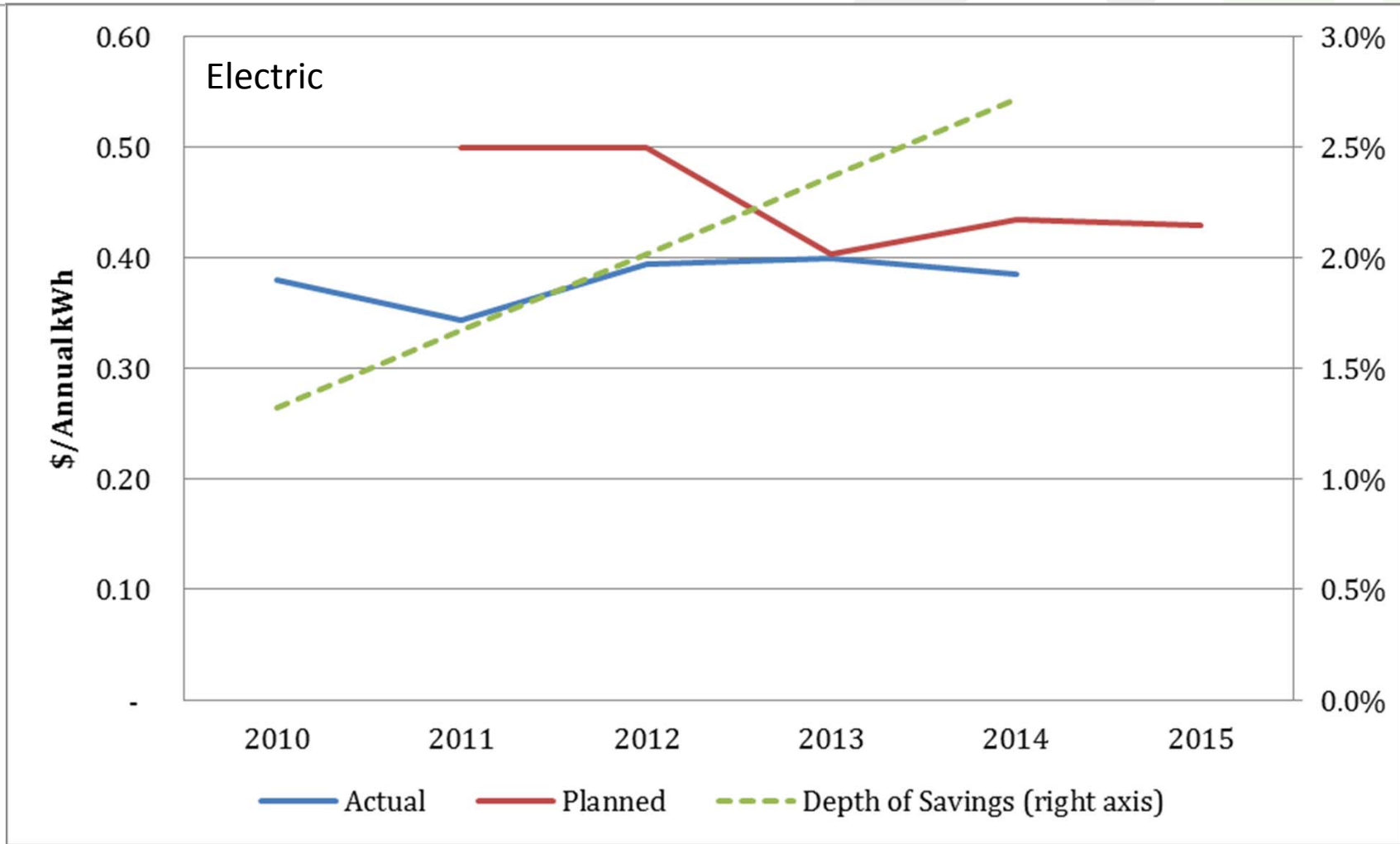
# DATA FROM SMALL PA STUDIES

- ▶ **With adjustments, electric achievable potential ranges from 3.22% to 3.66%. Gas potential ranges from 1.47% to 1.74%.**

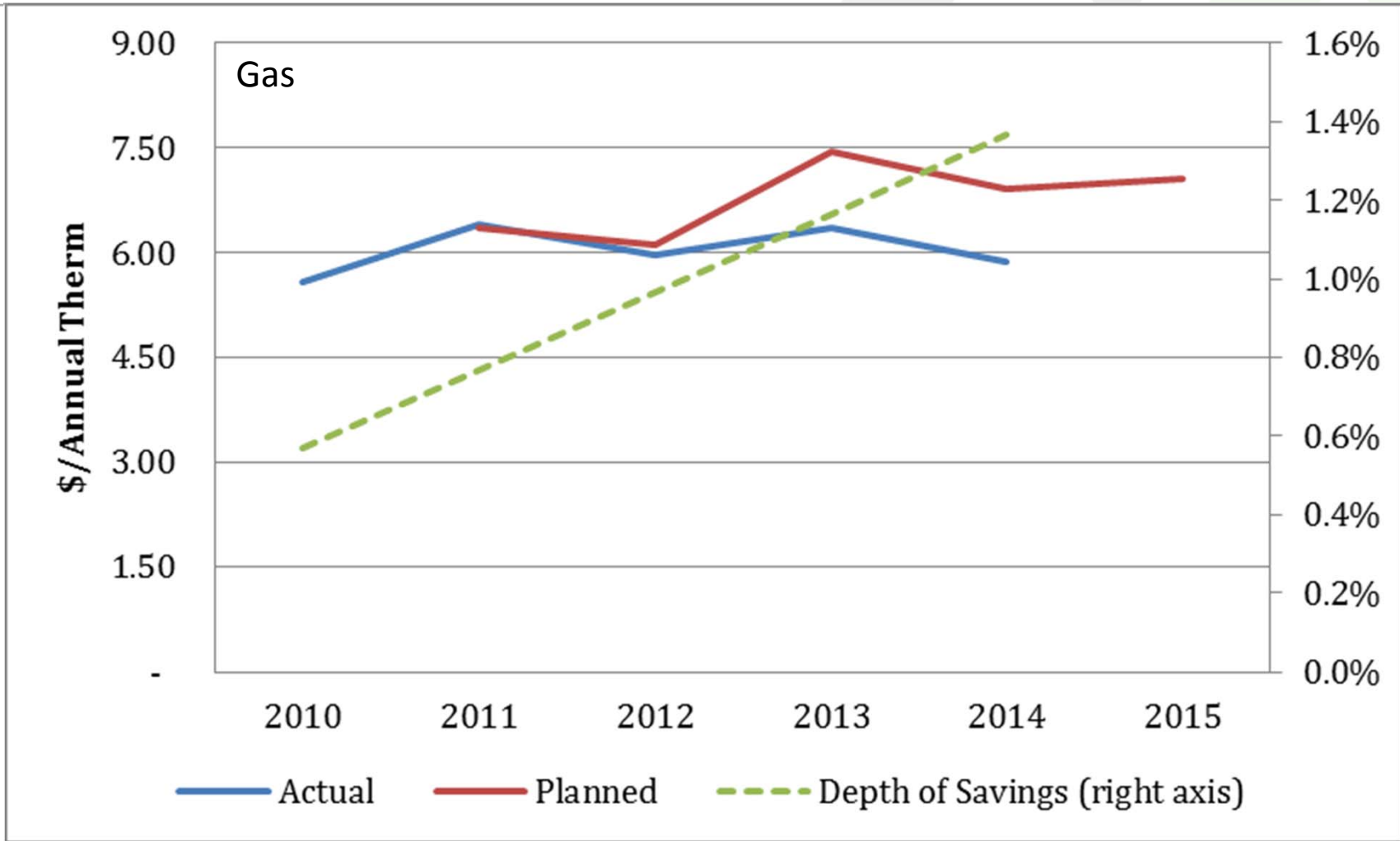
## Adjusted Gas Achievable Potential

	2016	2017	2018
<b>GDS High Case Estimate of Potential</b>	<b>1.18%</b>	<b>1.23%</b>	<b>1.29%</b>
<b>Adjustments</b>			
Missing Measures Adjustment	0.07%	0.10%	0.13%
PA Differences study/Retrofit	0.07%	0.09%	0.11%
2013 Customer Profile/Participation	-0.01%	0.00%	0.01%
Codes and Standards	0.01%	0.01%	0.01%
Behavioral Programs	0.10%	0.13%	0.15%
New Technologies	0.05%	0.05%	0.05%
<b>Total Estimated Potential</b>	<b>1.47%</b>	<b>1.61%</b>	<b>1.74%</b>

# COSTS LARGELY CONSTANT



# COSTS LARGELY CONSTANT



# CONCLUSION



---

- ▶ **Savings trajectory points to annual savings of 3.0% electric, 1.5% gas**
- ▶ **Available evidence from a variety of sources supports the hypothesis**
  - MA-specific EM&V studies
  - Potential studies from other states
  - Potential studies for small MA PAs
- ▶ **Cost to achieve savings is stable**



# QUESTIONS?

▶ **March 10, 2015**

[www.ma-eeac.org](http://www.ma-eeac.org)

# DATA FROM SMALL PA STUDIES

## “High Case” Achievable Potential (Unadjusted)

State (PA)	Author	Study Date	Analysis Period	Sector	Cumulative Achievable Potential
<b>Electric</b>					
Massachusetts (Unitil)	GDS	2015	2016-2018	<b>Total</b>	<b>8.6%</b>
				Residential	5.6%
				Commercial/Industrial	11.3%
<b>Natural Gas</b>					
Massachusetts (Unitil)	GDS	2015	2016-2018	<b>Total</b>	<b>3.3%</b>
				Residential	3.7%
				Small and Med C&I	3.5%
				Large C&I	2.9%
Massachusetts (Liberty)	GDS	2015	2016-2018	<b>Total</b>	<b>3.8%</b>
				Residential	5.0%
				Small and Med C&I	2.2%
				Large C&I	1.7%
Massachusetts (Berkshire)	GDS	2015	2016-2018	<b>Total</b>	<b>3.8%</b>
				Residential	4.8%
				Small and Med C&I	4.2%
				Large C&I	1.5%

# OTHER MEASURES OF SAVINGS

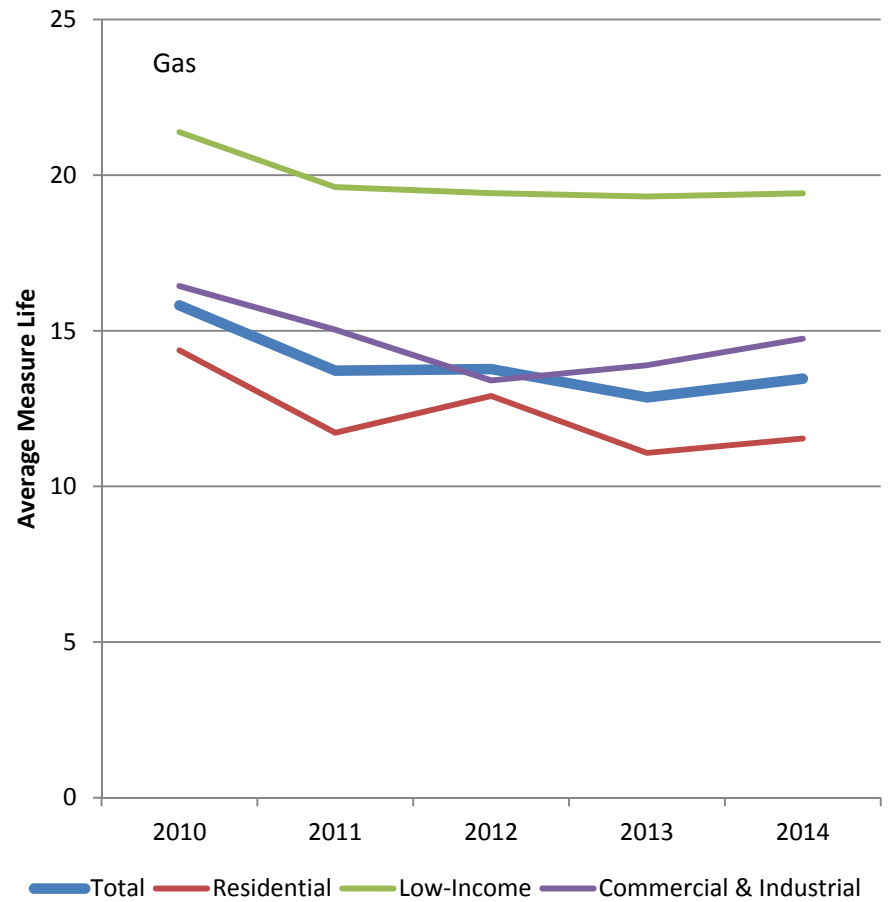
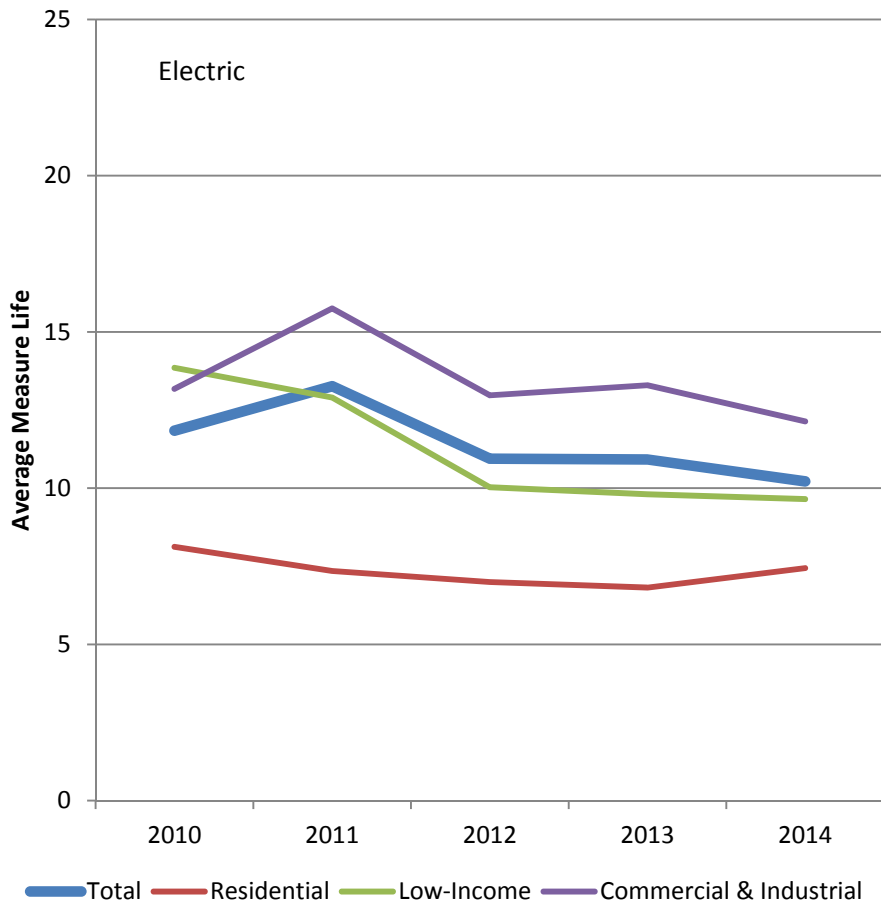
## ▶ **Peak demand reduction**

- Analyzed as ratio of peak savings to energy savings (MW/GWh)
- Overall, consistent from 2013 to 2014
- Residential increased, C&I decreased
- Some outliers among PAs

## ▶ **Lifetime savings**

- Puts focus on measures with longer lifetime = more savings
- Small declines in average measure life over past 5 years

# AVERAGE MEASURE LIFE



# DEMAND SAVINGS RATIOS

- ▶ Demand savings normalized to energy savings (ratio of demand to energy)
- ▶ Consistent with ISO reporting
- ▶ Inverse of kWh/kW ratio

	MW/GWh ratio	
	2013	2014
Statewide		
Residential	0.10	0.13
Low-Income	0.10	0.10
C&I	0.17	0.13
Total	0.14	0.13
Minimum of any PA		
Residential	0.09	0.13
Low-Income	0.10	0.09
C&I	0.16	0.12
Total	0.13	0.12
Maximum of any PA		
Residential	0.15	0.16
Low-Income	0.35	0.17
C&I	0.43	0.17
Total	0.36	0.16