



CLEAResult

Hitting a Moving Target: Impacts of Changing Baselines

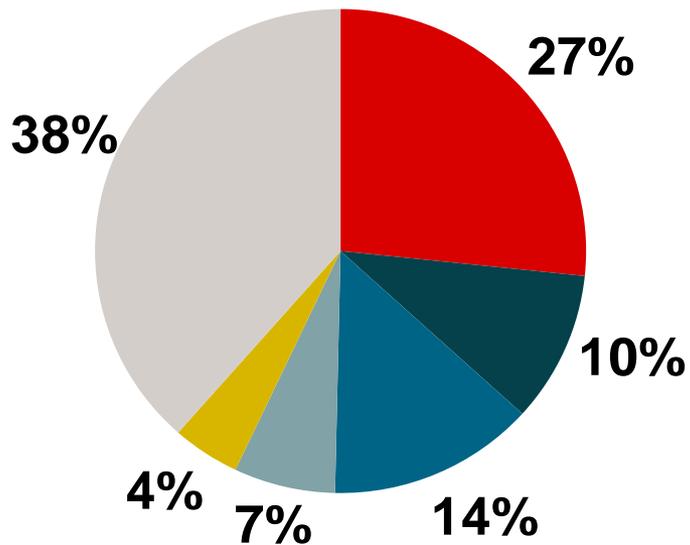
Rebecca Troutfetter
January 20th, 2015

▲ Agenda

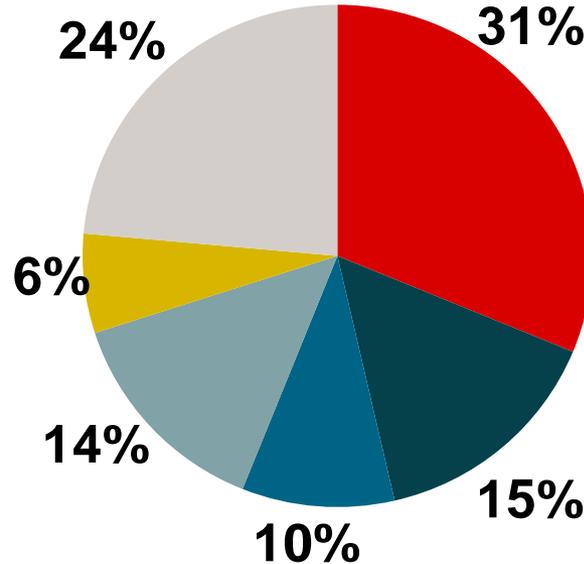
- Energy end-uses
- Measure savings, nationally
- Baseline shifts
- Savings potential implications
- Cost-benefit impacts
- Now what?

Energy End-Use

Commercial



Residential



- Space Heating
- Space Cooling
- Lighting
- Water Heating
- Refrigeration
- Other

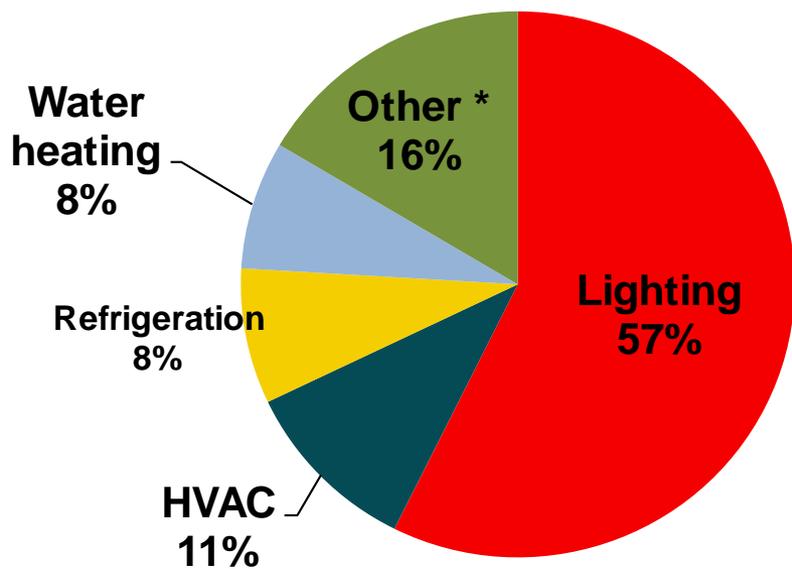
“Other” includes:

- Electronics and Computers
- Cooking
- Ventilation
- Wet Cleaning
- Energy Adjustments

Electricity Savings from Energy Efficiency

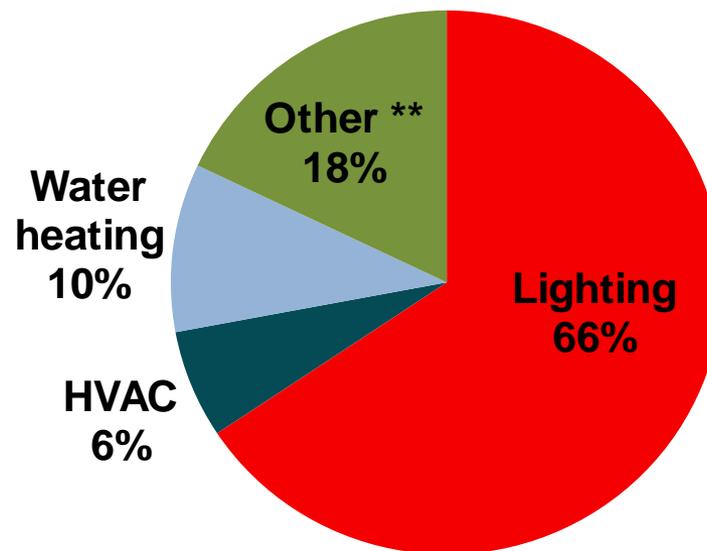
Programs - Current

Commercial



* Other includes IT, Appliances, Custom

Residential

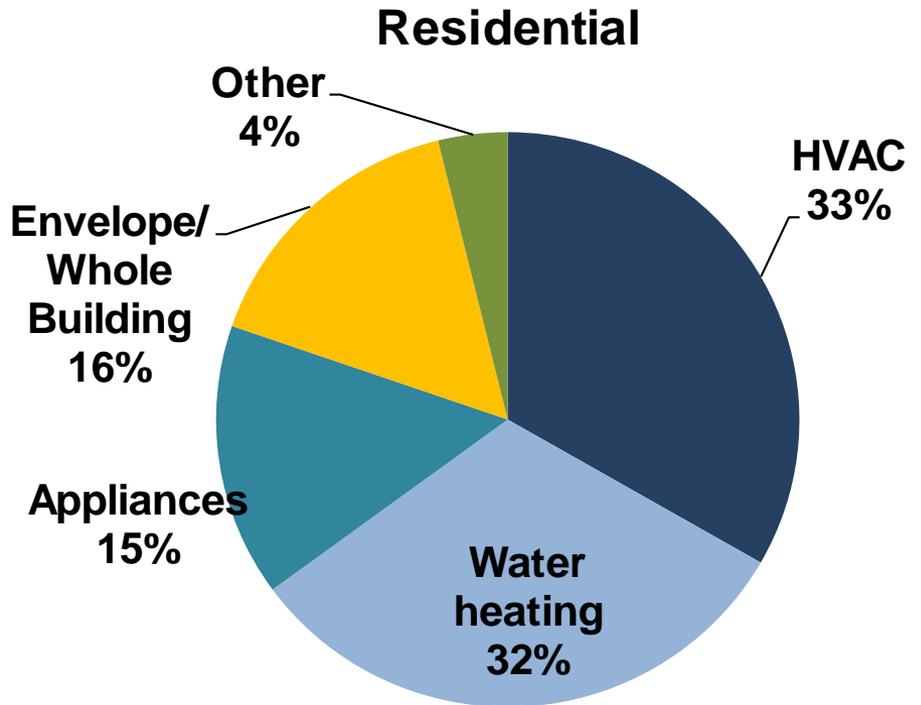
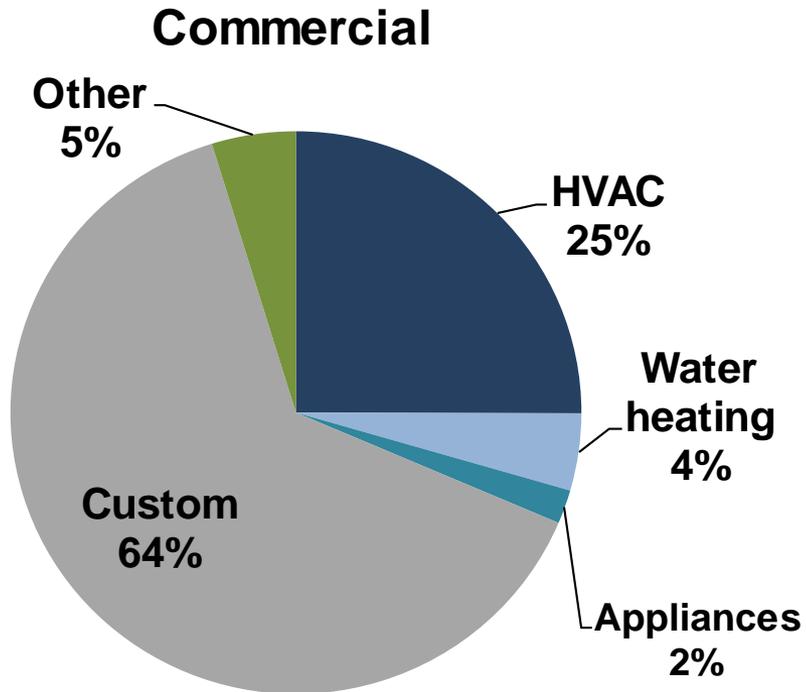


** Other includes Appliances, Envelope/Whole Building, Plug loads

Sources: Program evaluations from 2010-2013 from CA, MI, NV, AR

Natural Gas Savings from Energy Efficiency Programs - Current

Programs - Current



Sources: Program evaluations from 2010-2013 from CA, MI, NV, AR

Changes in Federal Standards

Commercial and Industrial Sector

- Small Electric Motors
- CAC & HP <65kBtu/hr

Refrigeration Equipment

- CAC & HP 65-760 kBtu/hr
- Water heaters
- Furnaces

2014

2015

2016

2017

2018

2019

2020

Linear
Fluorescent
Systems

Electric
Motors

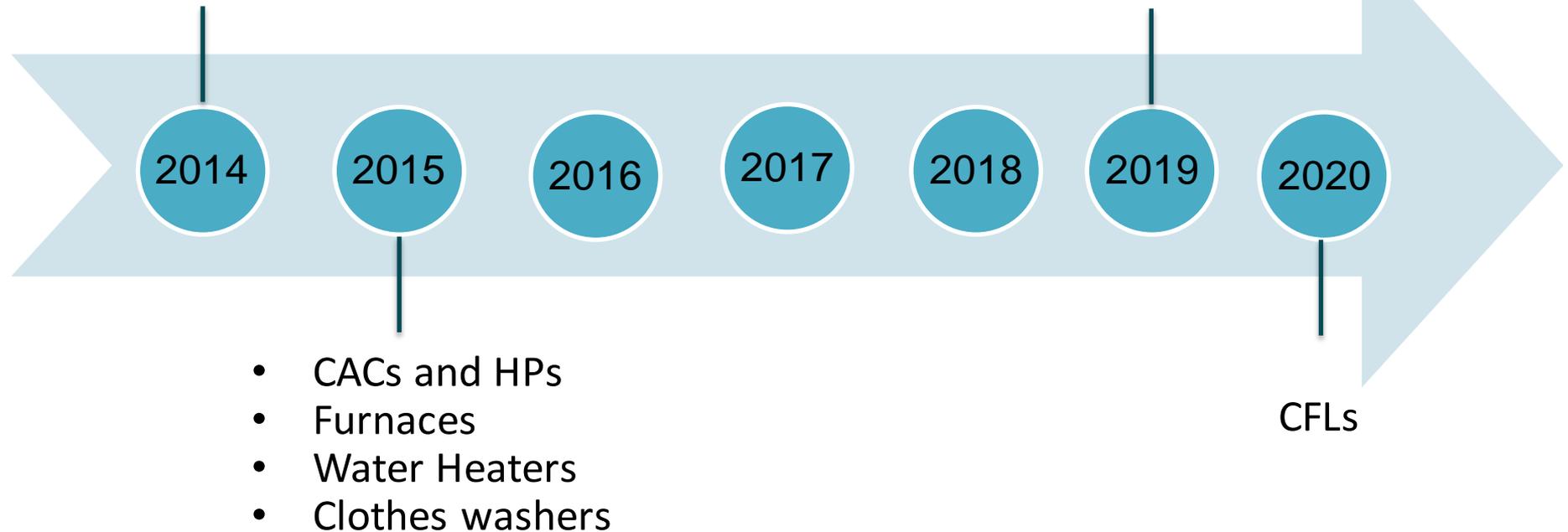
- Boilers
- Packaged Terminal AC & HP

Service
Lamps

Changes in Federal Standards

Residential Sector

- Room Air Conditioners
- Compact Fluorescents
- Refrigerators & Freezers



Changes in Federal Standards: Commercial

	Measure Type	Effective	Standard Change	Potential Energy Savings Reduction
Commercial	Air Conditioners and Heat Pumps (65,000 - 760,000 Btu/hr)	2019 (proposed)	Standards require \geq IEER 12.3 to 14.8 depending on equipment type and capacity	25-30%
	Air Conditioners and Heat Pumps (<65,000 Btu/hr)	2015	Standards require \geq SEER 14 for split system CACs in South and Southwest. For HPs, standards require and for \geq SEER 14 and HSPF 8.2 for heat pumps in all regions	35%
	Linear fluorescent systems	2012	Standards raised baseline to T8 lamp and electronic ballast	30-40%
	2014	Eliminates majority of T12 electronic ballasts and less-efficient T8 and T5 programmed-start ballasts		

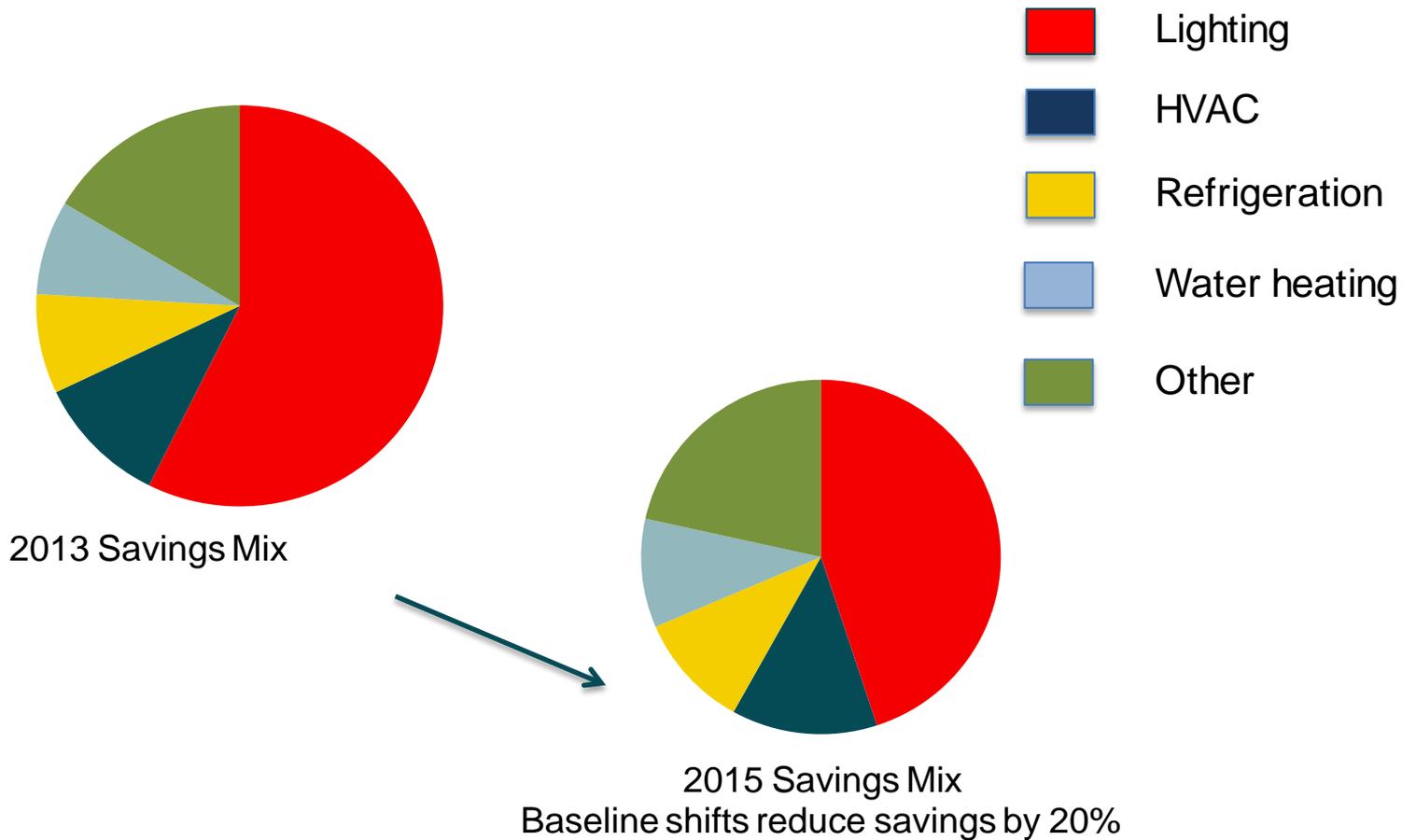
Changes in Federal Standards: Residential Heating/Cooling

	Measure Type	Effective	Standard Change	Potential Energy Savings Reduction
Residential	Central Air Conditioners (CACs)	2015	Standards require \geq SEER 14 for split system CACs in South and Southwest	35% S & SW
	Heat Pumps	2015	Standards require and for \geq SEER 14 and HSPF 8.2 for heat pumps in all regions	35%
	Furnaces	2015	Standards require AFUE of 80% in all regions for gas furnaces, and 83% in all regions for oil furnaces	0-18%
	Gas-Fired & Electric Storage Water Heaters	2015	For < 55 gal: EF increase based on tank volume, ex. 40 gallon gas water heater EF raises from 0.59 to 0.62 For > 55 gal: Standards effectively require heat pumps for electric storage and condensing for gas storage	45% < 55 gal 90% > 55 gal

Changes in Federal Standards: Residential Lighting

Measure Type	Effective	Standard Change	Potential Energy Savings Reduction
Compact Fluorescent Lamps	2012	100W incandescent must be \leq 72W with rated lumens of 1490-2600	40%
	2013	75W incandescent must be \leq 53W with rated lumens of 1050-1489	40%
	2014	60W incandescent must be \leq 43W with rated lumens of 750-1049	40%
	2014	40W incandescent must be \leq 29W with rated lumens of 310-749	40%
	2020	CFLs become baseline technology due to efficacy requirements	100%

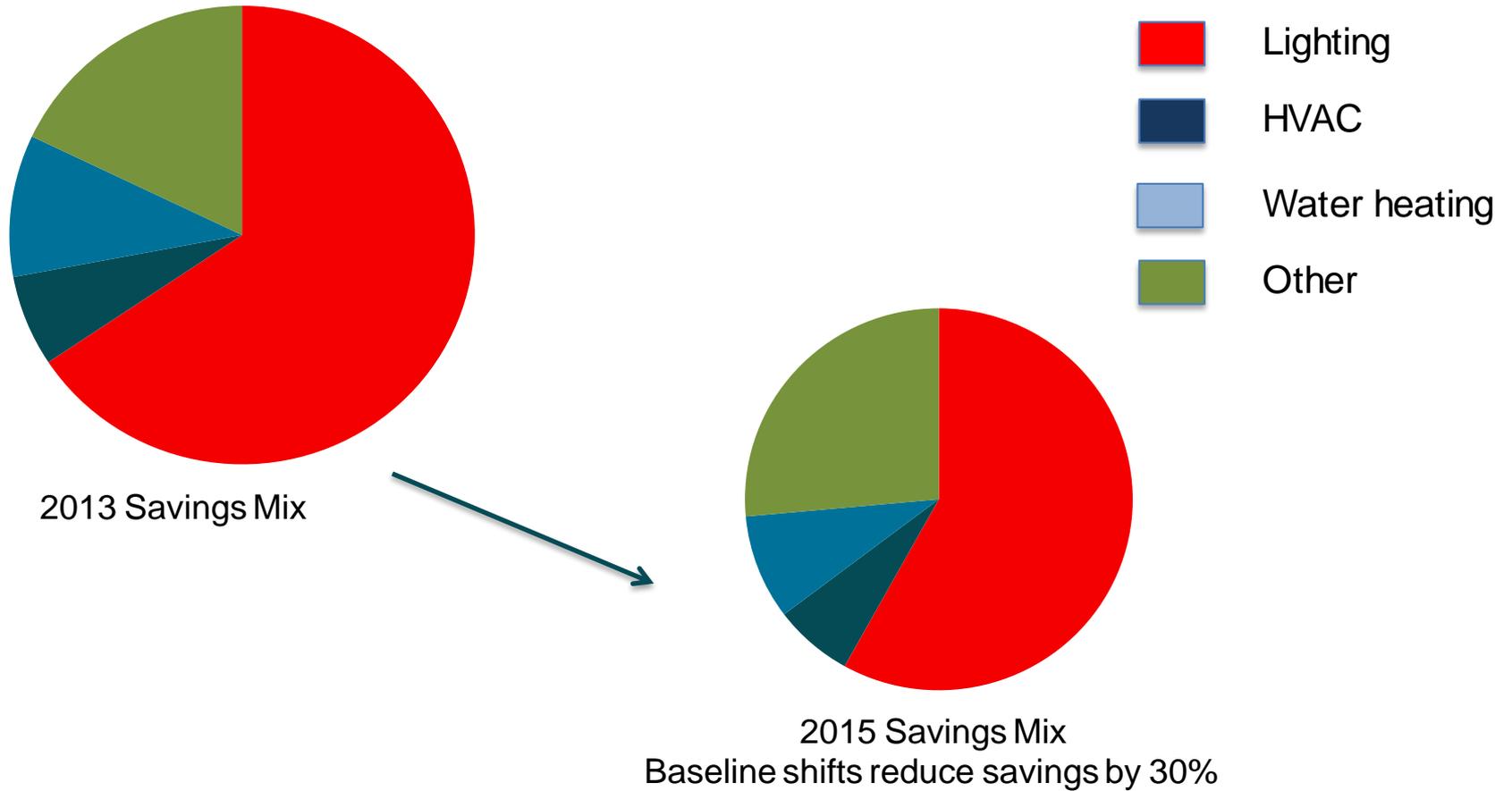
Commercial Electric Effects for 2015



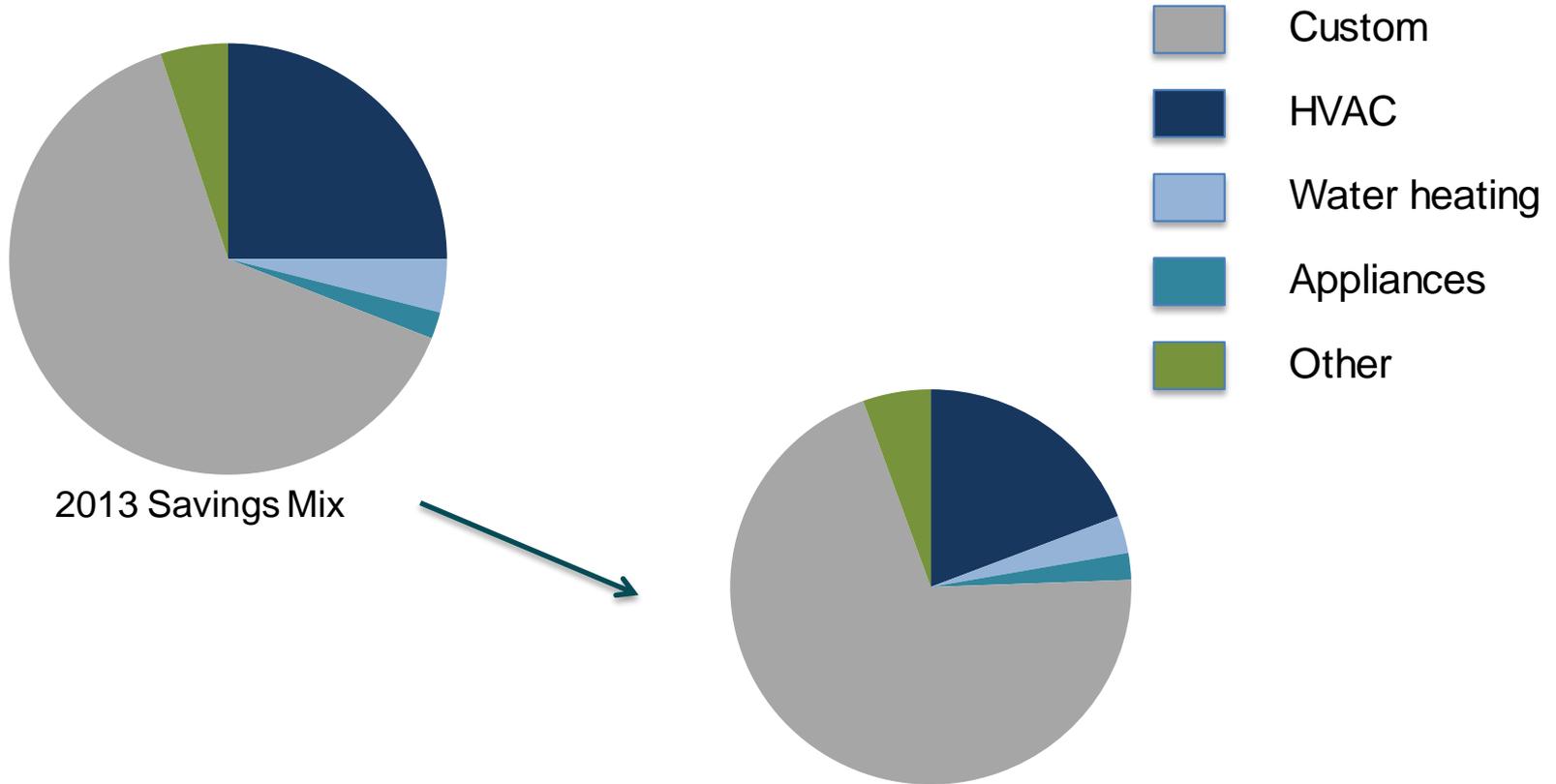
Electric Effects - Lighting

% of Linear Lighting in Programs*	Reduction in Total Program Savings Due to Lighting Baseline Shift
40%	16%
50%	20%
60%	24%
70%	28%
80%	32%

Residential Electric Effects for 2015



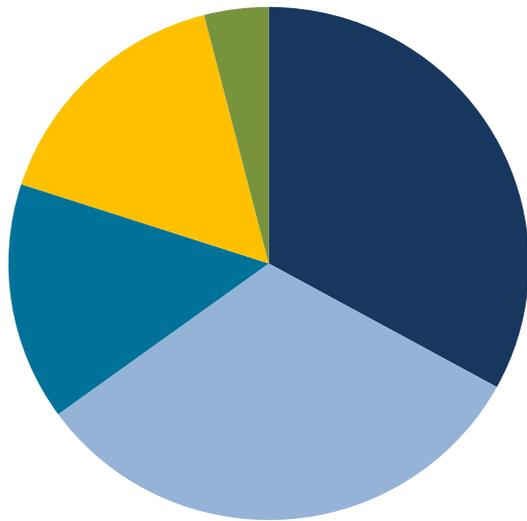
Commercial Gas Effects



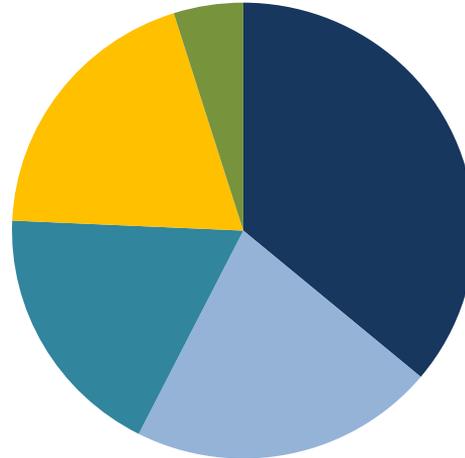
2019 Savings Mix
Baseline shifts reduce savings 10%

*No adjustments made to custom since measures are unknown
Thus impacts are likely higher.

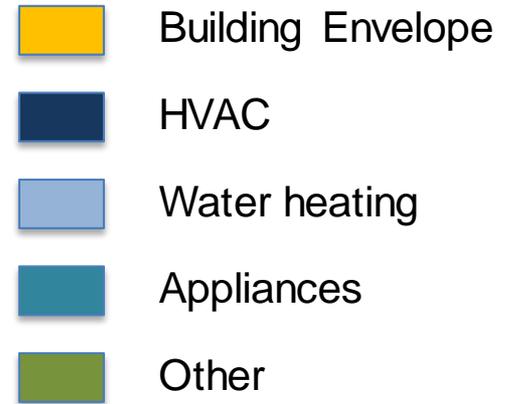
Residential Gas Effects for 2015



2013 Savings Mix



2015 Savings Mix
Baseline shifts reduce savings by 17%



▲ Cost Implications due to Baseline Changes

- Reduced savings
- Increased incremental cost
- Increased program costs
- Decreased program cost effectiveness



Utility Cost Test/Program Administrator Cost Test

Benefits	Costs
Energy Savings Avoided reduction in transmission, distribution, generation, and capacity	Overhead Program administration, marketing, measure research, tool development, project processing, and evaluation
	Incentives paid to the customers
Avoided power plant construction	Increased supply costs for periods of increased load

Total Resource Cost Test

Benefits	Costs
<p>Energy Savings Avoided reduction in transmission, distribution, generation, and capacity</p>	<p>Overhead Program administration, marketing, measure research, tool development, project processing, and evaluation</p>
<p>Avoided power plant construction</p>	<p>Utility equipment, installation, and operations and maintenance</p>
<p>Additional resource savings</p>	
<p>Applicable tax credits*</p>	<p>Customer incremental equipment, installation, and operations and maintenance</p>
<p>Monetized environmental and non-energy benefits*</p>	

*when applicable

▲ Cost Benefit Analysis

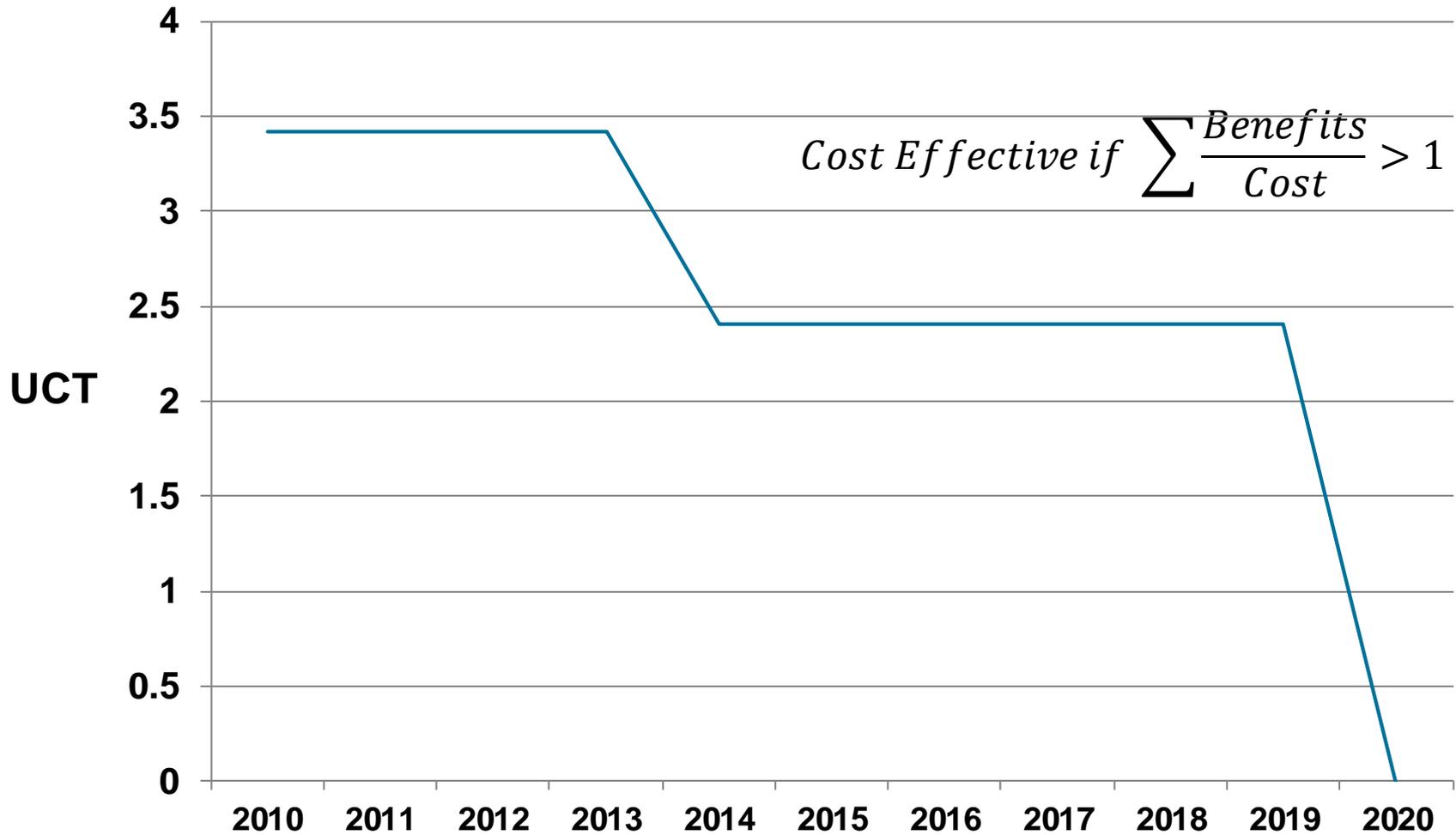
- Simple Example
 - CFLs, using MEMD data

Measure	Baseline	Net To Gross	EUL (yrs)	kWh	kW	Incentive	Incremental Cost	Program Admin Cost
60 watt equiv. CFL Pre 2014	60 watts	82%	9	38.2	0.0046	\$1.20	\$1.20	\$3/lamp*
60 watt equiv. CFL Post 2014	43 watts	82%	9	23.9	0.0029	\$1.20	\$1.20	\$3/lamp**

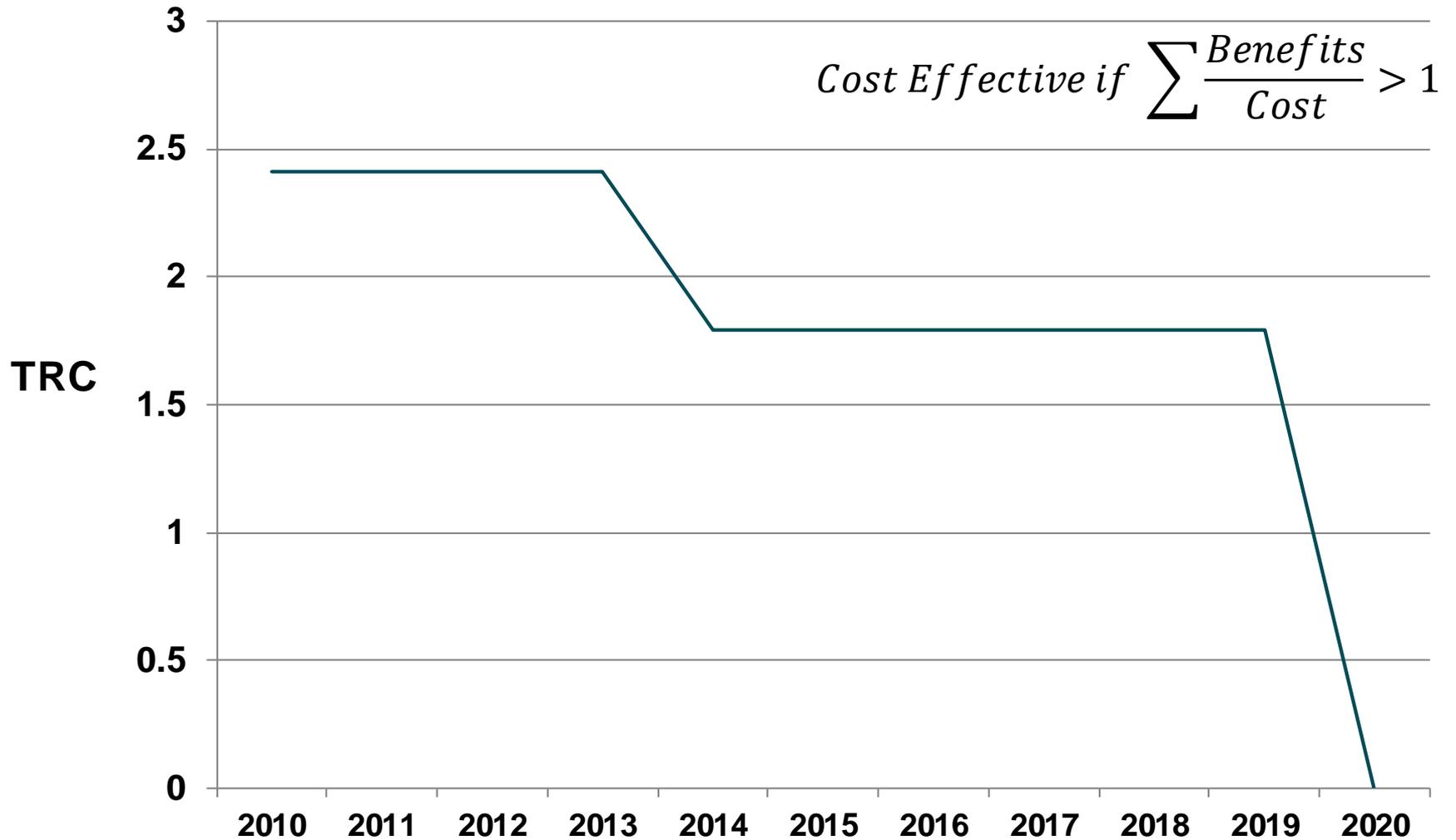
*Based on review of Midwest program costs in multiple states

**Assume program admin cost to remain the same per lamp

UCT – CFLs



TRC – CFLs



Changes in Program Cost – Lighting Example

Measure	\$/kWh (incentive & admin)	% Increase in Program Cost
CFL Pre-2014	\$0.11	n/a
CFL Post-2014	\$0.17	54%

Changes in Program Cost – Lighting & Appliance

Retail Program Example

Lighting & Appliance Program	\$/kWh
Pre 2014	\$0.05
Post 2014	\$0.08

- Program Includes: CFLs, LEDs, advanced power strips, appliances, and window air conditioners
- Baseline change reduces savings 35%
- Cost per kWh saved increased by more than 50%

▲ Now What?

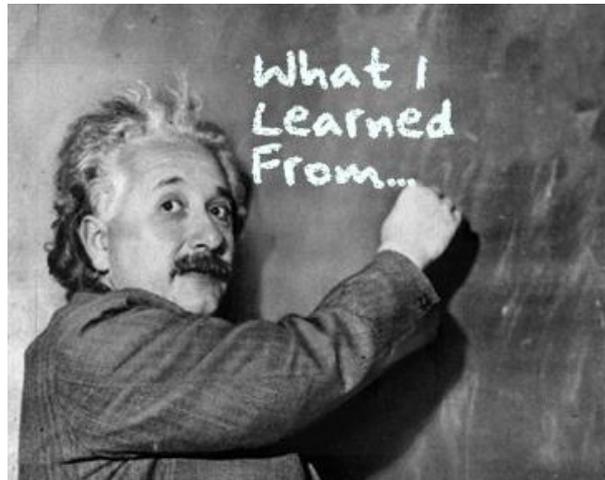
- Prepare for battle!



- New technologies
- Program Redesign
- Be brilliant at the basics - use the MEMD savings to the fullest for cost effective measures

Conclusions

- Prepare for baseline changes!
- Capture easy prescriptive measures
- Embrace program redesign
- Monitor industry trends & look for new opportunities



Questions



Contact Information

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