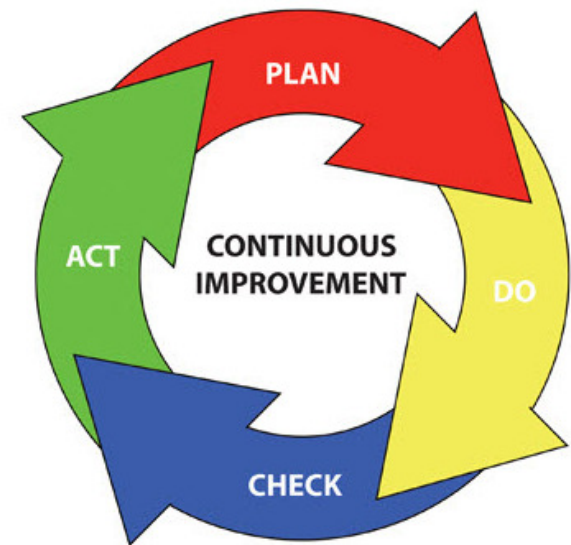


# Strategic Energy Management Potential in the Northeast

George Lawrence  
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# What is Strategic Energy Management (SEM) ?

- ▶ Holistic approach to managing energy use in order to continuously improve energy performance
- ▶ Establishment of an Energy Management System (EnMS)
- ▶ Plan
  - Energy Policy
  - Energy Objectives (Goals)
- ▶ Do
  - Measurement, Analysis and Reporting
  - Documentation
- ▶ Check
- ▶ Act
  - Make Changes



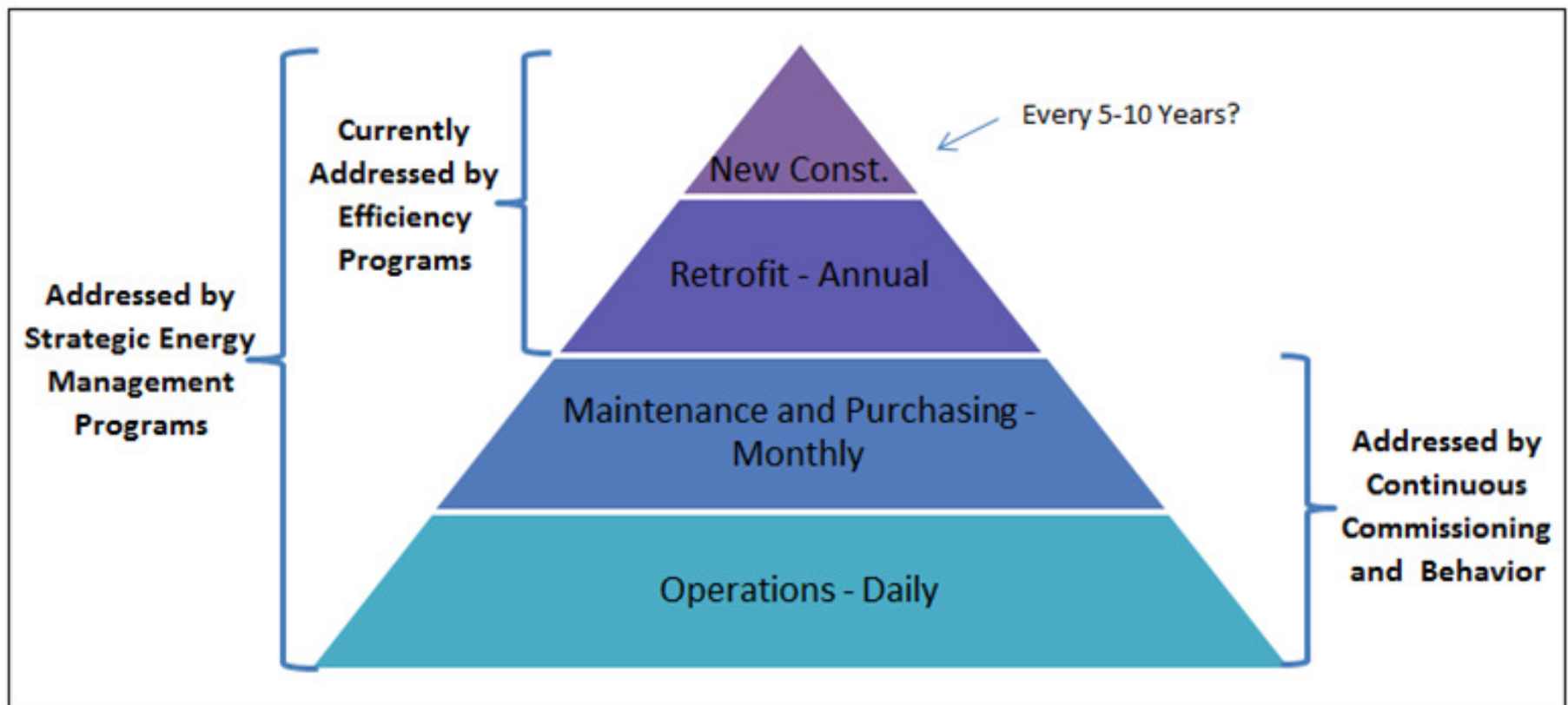
## How is SEM Different from MBC<sub>x</sub> or RC<sub>x</sub> ?

- ▶ SEM requires setting up an energy management structure and process, and regular review
- ▶ SEM involves all customer employees
- ▶ RCx requires a limited team of facility and external people
- ▶ Identify and use Energy Performance Indicators (EnPIs) kWh/unit

Program Element	MBCx or RCx	SEM
Requires senior management support	Yes	Yes
Requires a self-assessment of energy management practices	No	Yes
Requires setting a baseline by means of a statistically relevant model of energy performance	Maybe	Yes
Requires setting a goal	Maybe	Yes
Requires developing an energy management plan	No	Yes
Requires the involvement of all facility occupants	No	Yes
Incorporates both operations and behavior changes	Maybe	Yes
Track improvements	Yes	Yes

# Why is SEM important - Opportunity Pyramid

- ▶ Anyone who can turn something on or plug something in has purchasing authority



# Different Program Models

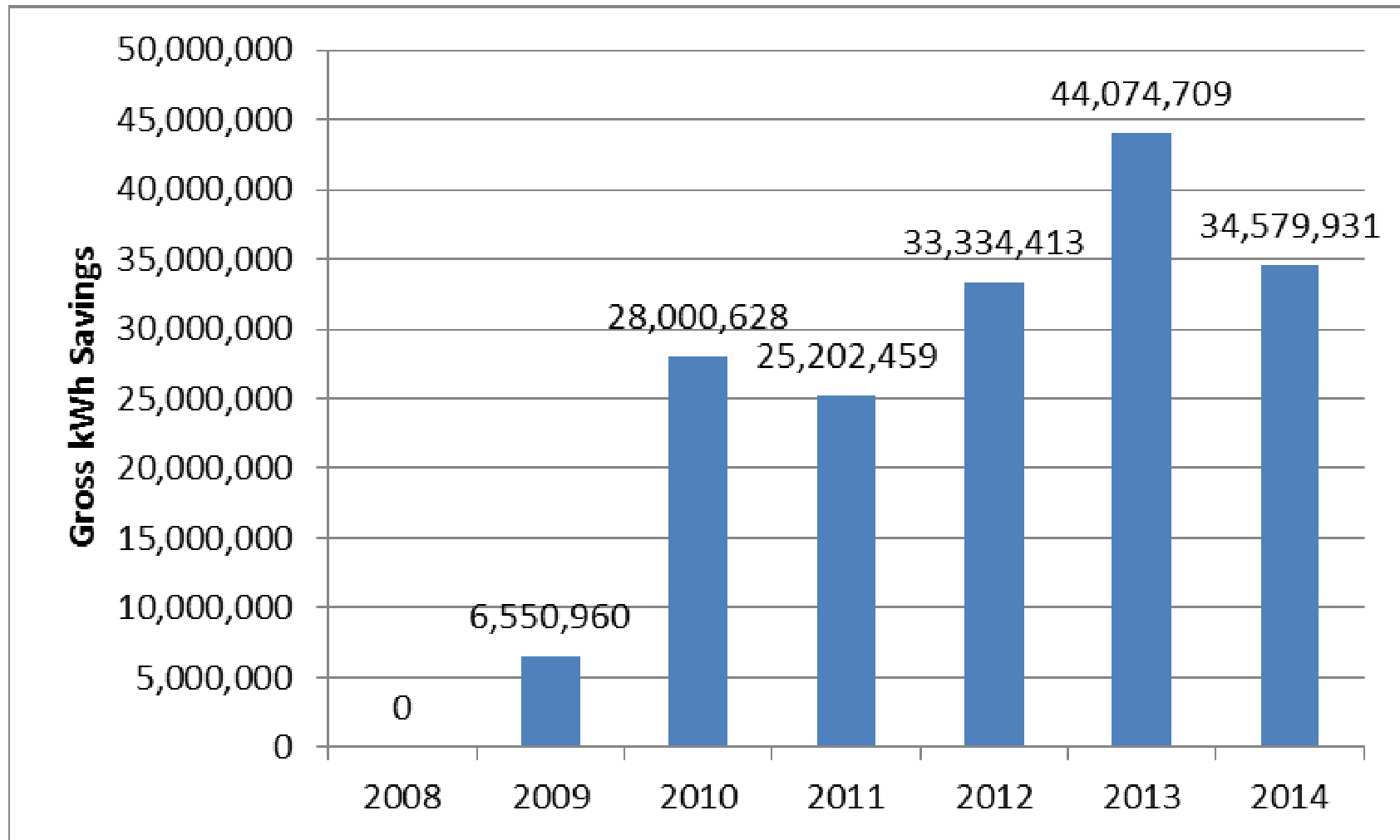
## ▶ Oregon:

- Cohort model: Ind. Energy Improvement (~10 customers per cohort)
- 1 Year engagement
- Calculate savings based on end of year performance
- Claim savings for three year life
- Average savings 8% for electric

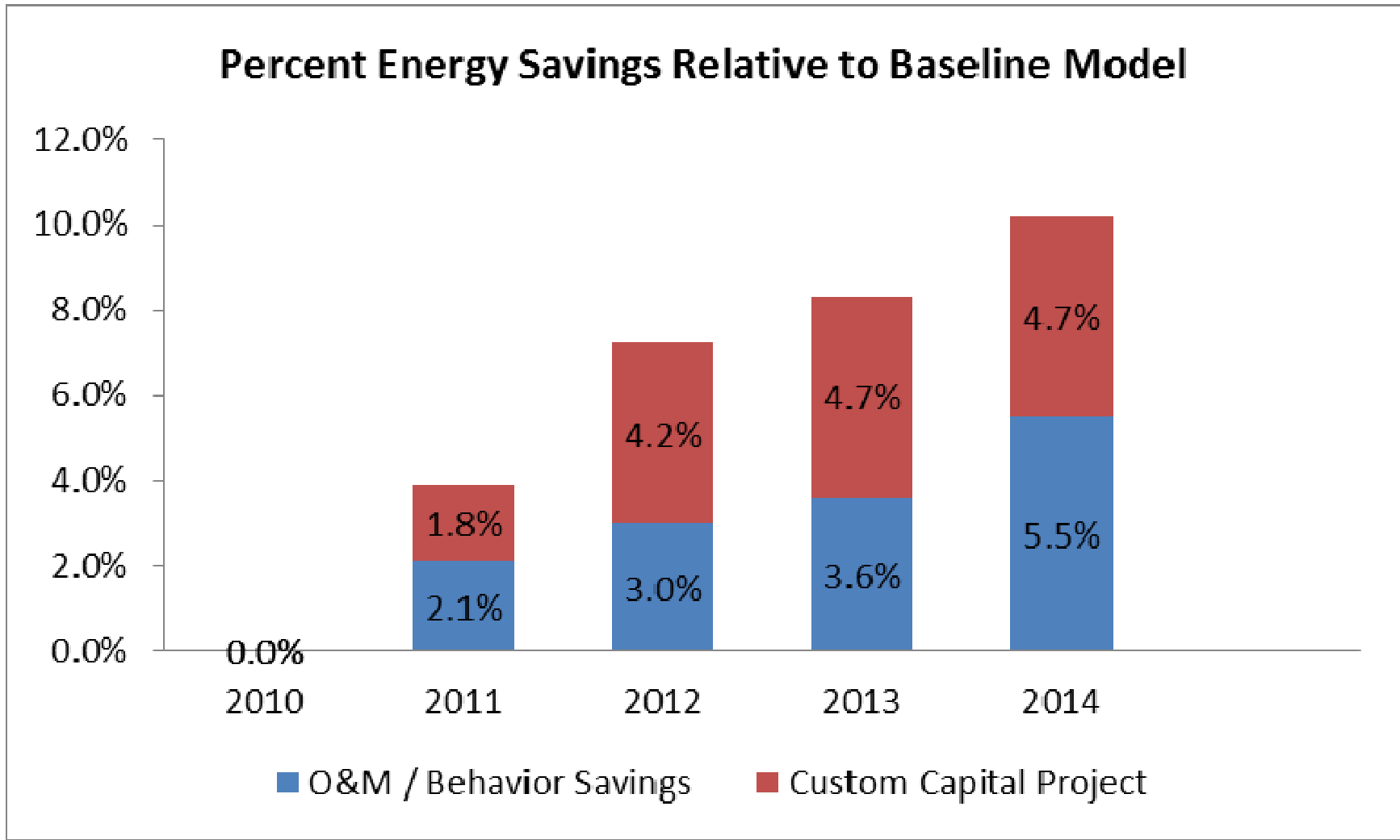
## ▶ Bonneville Power Administration

- Cohort (High Perf. Energy Management) or single (Track and Tune)
- 3 or 5 Year engagement (now consecutive 2 year engagements)
- Claim annual savings for each year of engagement
- Claim ten year measure life at end of engagement
- Average savings 2.7% annually for electric

# Oregon Energy Trust Savings From SEM



## Bonneville Power Administration Savings from SEM



## Massachusetts Customers

- ▶ Massachusetts has a good pool of large customers
- ▶ We can assume a mix of customer sizes in a cohort of 10 customers
- ▶ We can assume 1 cohort per year

Usage Size Category (millions of kWh)	Number of Billed Customers In Massachusetts in 2014 <sup>18</sup>	Assumed Number of Customers per Cohort
5.0 – 9.0	386	4
10 to 25	231	3
25 – 50	58	2
> 50	10	1
Totals	685	10

- ▶ Assume 6% O&M savings in the 5<sup>th</sup> year



## Massachusetts Estimated SEM Savings in GWh

Cohort	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Total GWh
1	4.81	6.88	8.25	12.61	13.75										46.30
2		4.81	6.88	8.25	12.61	13.75									46.30
3			4.81	6.88	8.25	12.61	13.75								46.30
4				4.81	6.88	8.25	12.61	13.75							46.30
5					4.81	6.88	8.25	12.61	13.75						46.30
6						4.81	6.88	8.25	12.61	13.75					46.30
7							4.81	6.88	8.25	12.61	13.75				46.30
8								4.81	6.88	8.25	12.61	13.75			46.30
9									4.81	6.88	8.25	12.61	13.75		46.30
10										4.81	6.88	8.25	12.61	13.75	46.30
Sum of Annual Energy Savings	4.81	11.69	19.94	32.55	46.30	46.30	46.30	46.30	46.30	46.30	41.49	34.61	26.36	13.75	463.01
Lifetime Energy Savings	4.81	11.69	19.94	32.55	170.08	170.08	170.08	170.08	170.08	170.08	165.26	158.39	150.14	137.53	1,700.7

## Regional Estimated Potential SEM Savings

- ▶ North West Power Plan Methodology – 7<sup>th</sup> Power Plan
- ▶ Annual savings, five year potential
- ▶ NW Power plan provides estimates of costs
  - Commercial SEM Weighted Ave is \$44 per MWh
  - Industrial SEM Weighted Ave is \$36 per MWh

5 Year Potential	Commercial SEM Annual MWh	Industrial SEM Annual MWh
CT	91,915	50,502
MA	125,203	109,502
ME	28,081	50,412
NH	31,906	29,447
NY	542,257	262,536
RI	26,189	11,987
VT	14,229	21,059



Questions?

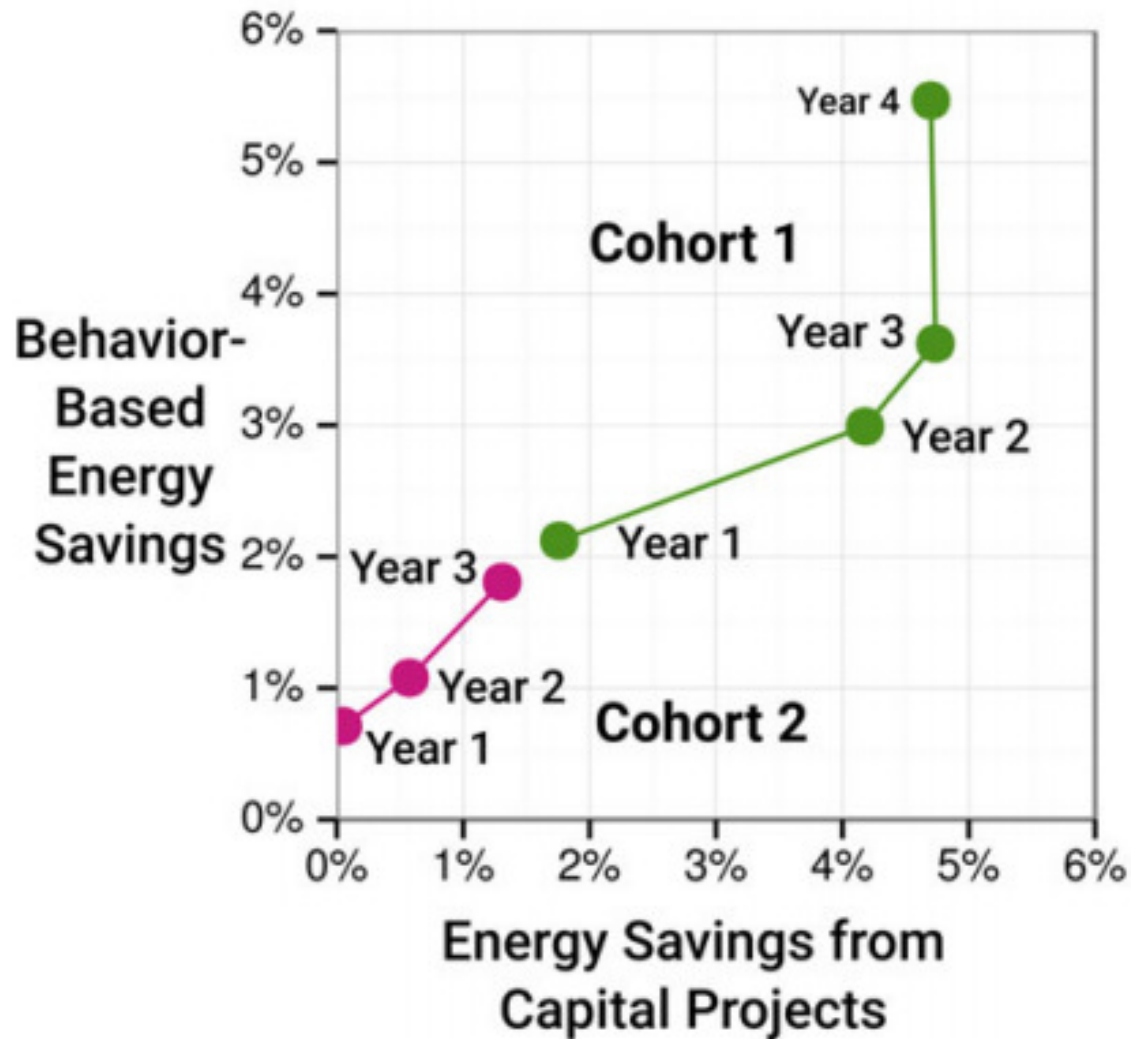
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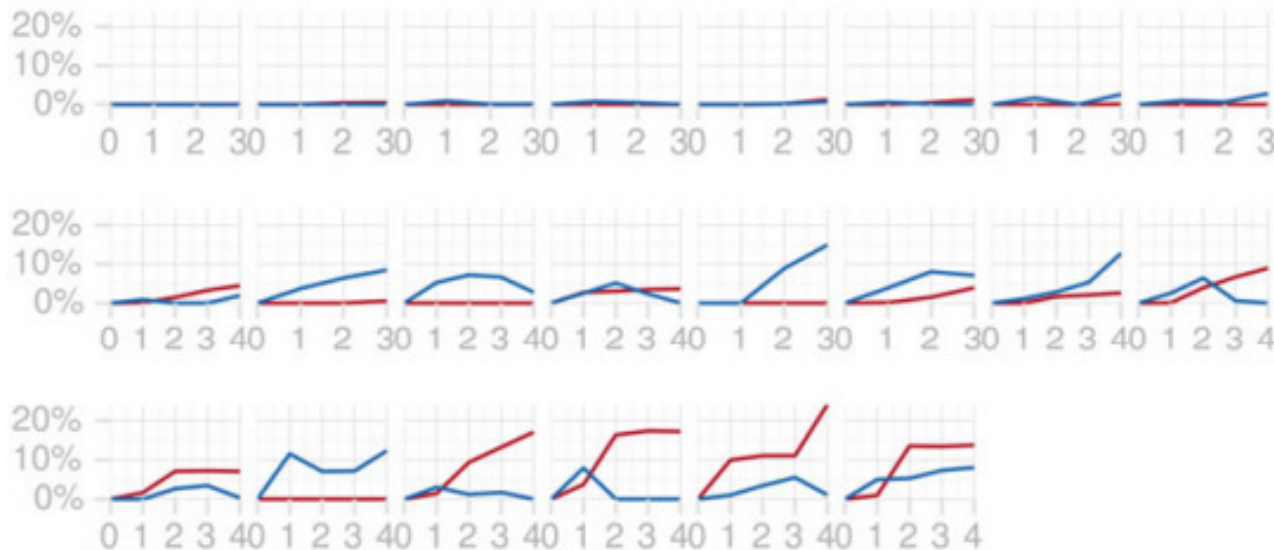


# Bonneville Power Administration Savings from SEM



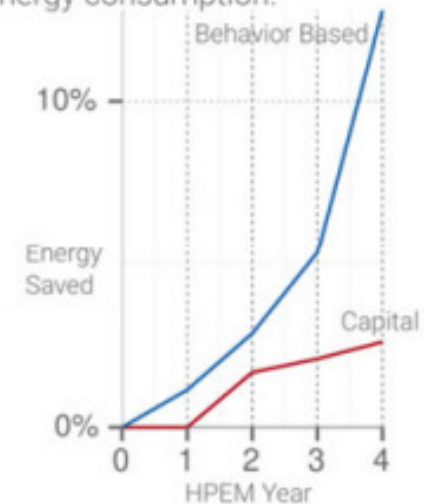
# Bonneville Power Administration Savings from SEM

**HPEM Savings Trends Year-by-Year, by Participant**



**How to Read:**

Each participant is a separate chart. Energy saved is a percent of baseline energy consumption.



The energy saved by each HPEM participant is plotted above. Energy performance varied. Sites vary in their rate of adoption, relative emphasis on capital or behavior-based energy savings. Some sites made incremental improvements each year, while other sites struggled to maintain their performance.

# Oregon Energy Trust CORE Program

- CORE Customer Size 750,000 to 7.5M kWh or 50,000-1M Therms
- Expect average savings of 5% or better

Type of Business	Number of Employees	Annual kWh	Annual Therms
Knife Manufacturer	193	1,768,800	6,131
Bicycle Components	98	1,186,250	2,081
Meat Processor	76	2,106,200	38,857
Nutritional Supplements	100	2,057,000	35,000
Electrical Connectors	175	6,850,200	25,159
Waste Water Treatment*	24	2,500,000	21,500
Industrial Laundry	134	2,211,900	526,231
Painting Equipment	286	2,598,400	36,155
Laboratory Equipment	108	962,636	58,040
Winches	129	4,383,779	86,653
4WD Hubs	96	4,861,770	22,221
Frozen Yogurt	104	5,756,062	208,434
<b>Total</b>	<b>1,523</b>	<b>37,242,997</b>	<b>1,066,461</b>

## AEP Ohio Savings from SEM

	Months in program	Number of participants	Segment type of participants	2014MWh Savings	2015MWh Savings to date	Total MWh Savings to date	Average Savings as a % of load
<b>Cohort 1</b>	24	14	Large Manufacturing	21,100	20,700	41,800	8.6%
<b>Cohort 2</b>	20	7	Large Manufacturing	7,000	10,000	17,000	7.5%
<b>Cohort 3</b>	17	7	Large Manufacturing	4,000	2,600	6,600	4.2%
<b>Cohort 4</b>	16	9	Large Manufacturing	8,000	4,400	12,400	2.4%
<b>Cohort 5</b>	4	14	Large Manufacturing	-	-	NA	NA
<b>Cohort 6</b>	1	22	Hospitals and Universities	-	-	NA	NA
<b>Cohort 7</b>	Recruiting	NA	Mid-Size Manufacturing	-	-	NA	NA
<b>Cohort 8</b>	Recruiting	NA	Mid-Size Manufacturing	-	-	NA	NA