



CADMUS



# Persistence of Energy Management Activities and Savings in Commercial Office Buildings

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# Program Background

- NEEA's **Commercial Real Estate Strategic Energy Management** Initiative began in 2007
- Targets commercial office building owners and managers
- Encourages adoption of activities that track and reduce energy consumption
- Multi-year program
  - Consultant works with the owner to develop a plan
  - Regular check-ins on progress



# Strategic Energy Management

- Adoption of a **management-approved energy performance improvement goal** at the firm, portfolio, and/or building level
- Documentation of **planned activities** to achieve the goal
- **Allocation of resources** (staff and training, capital, or both) toward the goal
- **Implementation** of planned activities
- Regular management **review of progress** toward energy performance goal and the effectiveness of SEM practices



# Market Partners Program Cohort

Firm	Year Firm Joined MPP	Participating Buildings in 2013		Number of Buildings with Billing Data	Primary Location
		Number	Square Feet		
1	2011	3	442,440	3	Spokane, WA
2	2009	2	233,073	2	Seattle, WA
3	2012	3	362,504	3	Seattle, WA
4	2011	3	249,566	3	Portland, OR
5	2011	11	764,538	8	Seattle, WA
6	2011	13	911,345	13	Spokane, WA
7	2009	6	561,021	6	Boise, ID
8	2008	3	85,950	3	Boise, ID
9	2007	6	2,707,433	5	Seattle, WA
10	2012	2	113,657	0	Seattle, WA
11	2009	3	885,130	0	Seattle, WA
<b>Total</b>		<b>55</b>	<b>7,316,657</b>	<b>46</b>	<b>ID/WA/OR</b>

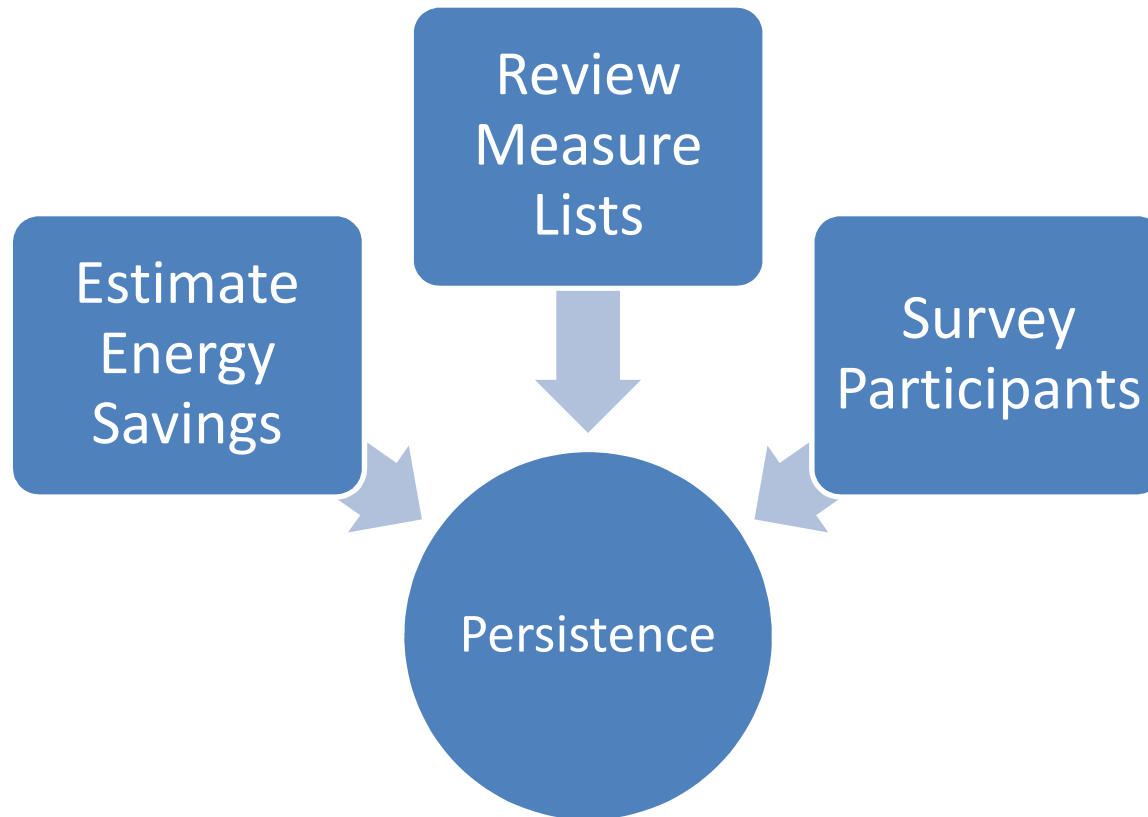
# Research Questions

- How long are SEM activities continued?
- How do annual energy savings change as participants progress in the program?
- Is there a relationship between SEM activity persistence and savings?

SEM programs are relatively new; NEEA's SEM Initiatives were the first and have been around the longest

Persistence research will inform cost effectiveness analyses

# Examining Persistence



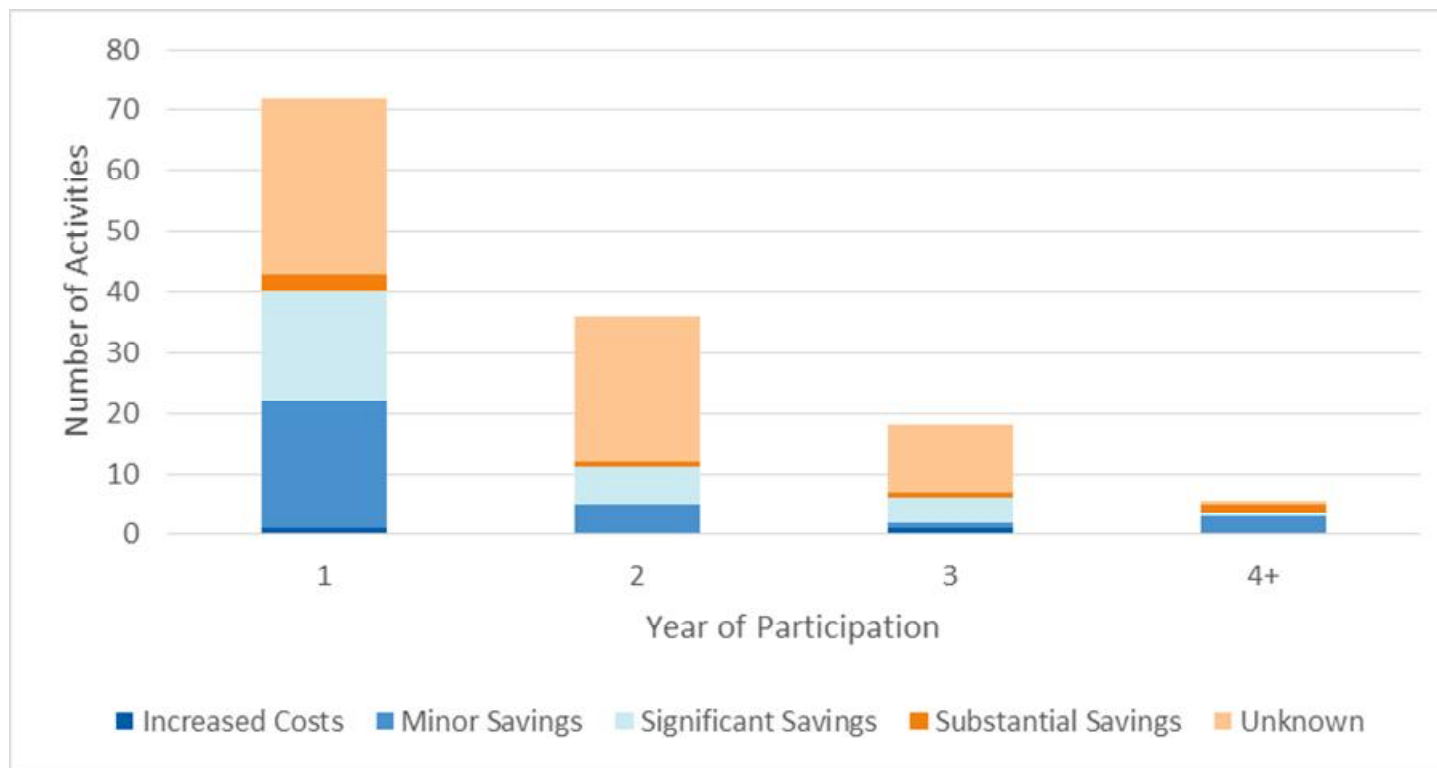
# Results – Savings by Year of Participation

Savings are highest in year one, lowest in year two, then stabilize at just over 3%

Years in the MPP	Number and Square Feet of Buildings Used in Analysis	Avg. Monthly Savings (kWh per sq. ft.)	90% Confidence Interval		Percentage Savings
			Lower Bound	Upper Bound	
One Year	30	0.0634	-0.048	0.174	4.70%
	2,594,596				
Two Years	30	0.0040	-0.119	0.127	0.29%
	2,594,596				
Three Years	35	0.0471	-0.082	0.177	3.39%
	3,026,186				
Four or More Years	16	0.08003	-0.201	0.362	3.47%
	3,248,951				

# Results – Activities Implemented by Year of Participation

55% of activities were implemented during the first year, 27% of activities during the second year, 13% during the third year, and 4% during the remaining years





# Results – Persistence of SEM Activities

71% of the activities were confirmed as still in place

Year of Participation that Activity Was Implemented	Activity Still in Place?			% of Activities Confirmed
	Yes	No	Don't Know	
1	11	1	2	79%
2	12	2	4	67%
3	6	0	2	75%
4	4	0	1	80%
5	2	0	3	40%
6	2	0	0	100%
<b>Total</b>	<b>37</b>	<b>3</b>	<b>12</b>	<b>71%</b>

11 of the 12 activities that respondents were unsure about were equipment measures so there is a high probability that they are still in place.

# Results – Persistence of SEM Activities

Level of cost savings level do not appear to influence whether an activity was continued

Level of Cost Savings	Activity Still in Place?			% of Activities Confirmed
	Yes	No	Don't Know	
Minor	9	1	2	75%
Significant	9	0	1	90%
Substantial	7	0	3	70%
Unknown	12	2	6	60%
<b>Total</b>	<b>37</b>	<b>3</b>	<b>12</b>	<b>71%</b>



# Conclusions

It's complicated...

- The timeline of activity implementation suggests that energy savings should be highest during the first year and then gradually decrease in subsequent years
- Persistence of implemented SEM activities appears to be high
- Electricity savings trend was not explained by the measure analysis or survey responses
- Identifying which factors influence energy savings is difficult because there are too many variables



# Recommendations

- Including a control group in the regression analysis may explain changes in energy consumption that currently available data cannot explain



# Questions?

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