North American SEM Summit

AUGUST 17, 2020

NORTH AMERICAN SEM COLLABORATIVE
See your phone number? Merge me!

Andrew Whitlock: Sending you words of wisdom

Greg Baker: Looking for your words of wisdom
Thank You to our NASEMC Allies
Thank You to Our Summit Sponsors
Team Work Makes the Dream Work

Zoom Queen
• Anne Joiner

Team Wrangler
• Andrew Whitlock

MentiMaster
• Chad Gilless

Hall Monitor
• Greg Baker

Worry Wort
• Wendy Gibson
Agenda

Welcome and introduction
National support
Helping you helping others
More brains are better than one
Participant insights: SEM for all!
Housekeeping

We will be recording the summit

Your opinion matters: Mentimeter

Let’s make this interactive: Chat me up

Getting to know each other: Breakout groups
Who’s here?
State your organization type (Program Admin, Consultant, Evaluator, NGO, Government, Participant)
NA SEM Collaborative Objectives

Understand strategic priorities and needs of SEM stakeholders.

Create and convene a community of SEM practitioners to define and share best practices.

Be a mechanism for communicating the interests and perspectives of the SEM community in North America.

Support the expansion of existing infrastructure and resources to assist with SEM program uptake, measurement, and evaluation.
2019 SEM Summit
Better Together

Name

Company

What’s the first thing you are going to do when things are back to “normal”?

What is your favorite SEM moment?
What's one thing you learned about someone in your small group?

- SEM is for gamblers
- Lots of folks brand new to SEM
- Kids off to college
- She's trapped in Minnesota instead of her home in the UK because of covid
- I learned about NMEC (?) and how there's overlap with SEM
- Lots of great work happening!
- The Danish govt has reps in CA.
- Ready for concerts and high fives again!
- Traveling is a much-missed activity
- Kids are challenging with Covid
- We all miss the same things
- A lot of Kale!
Go to www.menti.com and use the code 8624856

What's one thing you learned about someone in your small group?

- that everyone wants to travel
- XCEL Energy has an SEM pgm that is improving
- Just got married
- There are a lot of folks interested in 50001 Ready
- No one is traveling in last 6 months
- Community choice aggregators are adopting SEM
- Someone is working out of a travel trailer in northern Michigan.
- Want to go to concerts
- Childhood dog had my same name
- Ohio has a complicated SEM world
- Hiking in the Redwoods
What's one thing you learned about someone in your small group?

- Everyone is looking forward to visiting family.
- You can make a faux background on your video.
- we all want to get out and see people again.
- Ohio has a complicated SEM world.
- movies!
- We all miss traveling.
- like to travel also like live music
- Hiking in the Redwoods.
- Patti is traveling to Greece once this is over!
- People sure miss their grown kids.
- Some plants increased production in pandemic.
What's one thing you learned about someone in your small group?

I learned Walt has been working on SEM for a long time - and people aren't treating him like he's crazy these days.

Everyone wants to go to the movies.

State budgets are being affected by COVID.

Looking forward to family visits

Kanchen had to postpone her wedding :(.

ISO 50009

Missing live concerts and travel!

Public sector SEM going well

Big difference in university openings

that I knew everyone in the group
What's one thing you learned about someone in your small group?

- Nearly a decade of an industrial program!
- Community engagement via a school in Oklahoma
- Zach P. has pig roasts!
- That it's hard to define SEM.
- People want in-person meetings
- We can't wait to travel!
- Zoe - noted competitions between industrial costs on saving energy
- People making new, "non-traditional" friends through SEM.
- Missing the music. We want LIVE music!
- SEM for commercial clients
- Years of experience in SEM
- One young lady recently got married
Go to www.menti.com and use the code 8624856

What's one thing you learned about someone in your small group?

- That it's hard to define SEM.
- We are all missing the NORMAL 😊
- Ladders are necessary
- Getting new participants into SEM is universally exciting/a favorite part of
- People making new, "non-traditional" friends through SEM.
- One young lady recently got married and is waiting for her honeymoon in New Zealand.
- Need a way to hear more quickly from everyone
- There are dynamite people entering the field of SEM! Michelle Keller shared an example, and two young professionals in my group are tackling SEM in their studies and early career.
- So happy to be learning about SEM
- One of our group members trying to do SEM on a Covid budget!
What's one thing you learned about someone in your small group?

<table>
<thead>
<tr>
<th>universally exciting/a favorite part of this work</th>
<th>So happy to be learning about SEM</th>
<th>One of our group members trying to do SEM on a Covid budget!</th>
</tr>
</thead>
<tbody>
<tr>
<td>People are concerned about COVID</td>
<td>SoCAL Edison achieved 100% of target savings in their first industrial cohort - Wing Hon</td>
<td>Extra time with kids</td>
</tr>
<tr>
<td>We all miss going out</td>
<td>David's MacArthur Genius Grant</td>
<td>customer experiences - lesson learned</td>
</tr>
<tr>
<td>SEM makes awesome impacts with the participants - The results are amazing to watch.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
What's one thing you learned about someone in your small group?

SEM makes awesome impacts with the participants - The results are amazing to watch.

Traveling is the first activity after the pandemic

Think about the small steps; they often can make big differences.
National Support
National Support

Environmental Protection Agency
  – Walt Tunnessen

Department of Energy
  - Ethan Rogers
ENERGY STAR Updates

2020 SEM Summit

Walt Tunnessen
US EPA
Tunnessen.walt@epa.gov
Energy Treasure Hunt Campaign
Treasure Hunt Resources

www.energystar.gov/TreasureHunt
New Commercial Buildings Initiatives

▸ ENERGY STAR Tenant Space Recognition
  ▪ Late October 2020
  ▪ Initially for office space – plan to expand to other space types
  ▪ Recognition application via Portfolio Manager

▸ Greenhouse Gas Calculator
  ▪ Early 2021
  ▪ Estimates past, current, and projected GHG emissions
  ▪ Functionality to import data from Portfolio Manager & web services
  ▪ Will allow for custom emission factors

▸ Benchmarking and Building Performance Standards Toolkit
  ▪ Geared for state & local governments

www.energystar.gov/buildings
ENERGY STAR Certification

- EPA recognizes that Covid-19 can impact certification

- New guidance for commercial buildings

- Some flexibility granted

- Check Portfolio Manager for more guidance and updates
Challenge for Industry Recognition

- Updated resources to support regression-based energy performance models used by SEM programs

- If you work with industrial customers, encourage them to take the Challenge!

- Challenge offers recognition to industrial plants that improve energy performance by 10% within 5 years or less

www.energystar.gov/industrychallenge
50001 Ready Program & Navigator Update
2020 SEM Summit
August 17th, 2020

U.S. Department of Energy
Technical Partnerships
Advanced Manufacturing Office
DOE: How are you or other utilities leveraging the 50001 Ready program?

- Not
- Using as outreach engagement tool to recruit Cohort participants.
- Not currently leveraging
- As a stepping stone for SEM
- Guide for tasks and resources
- Don't know. Tell me more.
- Customers are starting to ask about 50001, so wondering how to serve them best.
- This is integrated into program work
- Offering it as an additional resource to our SEM cohort participants - which help them hit most of their major milestones as part of their participation in the OG&E Continuous Energy Improvement Program.
- Not yet.
DOE: How are you or other utilities leveraging the 50001 Ready program?

- As a leave-beyond/engagement tool to provide resources to customers.
  - We are not piloting it.

- An opportunity for experienced SEM participants to take it to "the next level".
  - Some as a suggested resource, some as a requirement, some not at all.
  - Helping customers develop own energy management program.
<table>
<thead>
<tr>
<th>Participants to take it to &quot;the next level&quot;</th>
<th>As a requirement, some not at all</th>
<th>Helping customers develop own energy management program.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not yet</td>
<td>Not yet</td>
<td>Not</td>
</tr>
<tr>
<td>We are delivering a training cohort for fed facilities</td>
<td>Not a current user</td>
<td>Gap analysis and North Star</td>
</tr>
<tr>
<td>To demonstrate the structured approach of SEM to senior</td>
<td>Helping Participants recognize through their participation in SEM 60-80% of their 50001 Recognition is already completed.</td>
<td>Added to SEM continuation</td>
</tr>
</tbody>
</table>
DOE: How are you or other utilities leveraging the 50001 Ready program?

- I want to learn more.
- Not yet
- Additional resource

- Adding it as another resource to our SEM participants.
- Training, training, training
- Not really underway

- Learning about it now.
- Not yet
- We are performing gap analysis for customers, assisting them to identify what they need to meet the requirements
DOE: How are you or other utilities leveraging the 50001 Ready program?

- Partner platform and supporting SEM participants who are interested in 50001 Ready
- Introducing it to new 2020 cohorts.
- We are not
- Not really underway
- Providing planning support and serving as a resource
- Pointing customers to the self direct Navigator
- Engaging Federal facilities in DC in a 50001 Ready cohort engagement through the DCSEU
- We managed pilot that involved five companies in the NW beginning
- I know of it but don't know much about how to use it
- customers, assisting them to identify what they need to meet the requirements
DOE: How are you or other utilities leveraging the 50001 Ready program?

- We are not using it as the backbone of a self-serve/non-cohort program.
- We managed a pilot that involved five companies in the NW beginning 50001 Ready in 2019. Haven't heard of others using it since then, but could very well be happening.
- Implementing 50001 Ready into a number of cohorts including with 14 large energy users in Canada (power plants, refineries, etc).
- Still trying to align 50001 Ready with utility program goals.
- Not yet: early discussions.
- 50001 Ready cohort engagement through the DCSEU.
- Next step or complimentary activity for sites in SEM engagements.
- Would like to see this guidebook.
- Promoting it to SEM participants.
DOE: How are you or other utilities leveraging the 50001 Ready program?

- Implementing 50001 Ready into a number of cohorts including with 14 large energy users in Canada (power plants, refineries, etc)
- Thinking about leveraging it. It apparently needs to be adapted for Canada.
- Still trying to align 50001 Ready with utility program goals.
- Not yet; early discussions
- I have not
- Would like to see this guidebook
- Promoting it to SEM participants
- Support school RCMs to work with students more
DOE: Please describe features of the 50001 Ready Partner Platform that are valuable to utility programs?

- No cost
- Organize and view customer progress into cohorts
- The online tool is awesome! Easy to navigate, and full of wonderful resources.

- Sharing information with others
- Playbook
- Sharing

- Template documents, like energy plan and engagement ideas.
- Customer engagement and relationship management
- Implementation progress tracking dashboard

- Not the 14 character password required to login.
**DOE: Please describe features the 50001 Ready Partner Platform has that are valuable to utility programs?**

<table>
<thead>
<tr>
<th>Examples of documents?</th>
<th>free!</th>
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<tbody>
<tr>
<td>web based navigator</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Don't know</th>
<th>Great collaboration with the team responsible for 50001 Ready</th>
</tr>
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<tbody>
<tr>
<td>The platform can be branded with utility or program brands</td>
<td></td>
</tr>
<tr>
<td>not familiar with this platform</td>
<td>online dashboard at site and portfolio level</td>
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<table>
<thead>
<tr>
<th>Rolling it out to the whole organization</th>
<th>Allows the program implementer to help oversee the progress of the</th>
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</table>
DOE: Please describe features the 50001 Ready Partner Platform has that are valuable to utility programs?

- Supports customers who may not be eligible for a typical SEM (large C&I).
- The step by step tasks seem to be very helpful.
- More outreach.
- Case studies.
- Help oversee the progress of the customer.
- Not a utility. Have not heard about this from our utility or Industrial SEM contractor (ESI).
- Training with examples.
- Continuing to listen and learn from others.
DOE: In the last DOE utility sector webinar, we discussed almost a dozen training slide deck resources. How many of these can you name?
DOE: What would be valuable to you (resources, trainings, webinars) from DOE?
Moving Forward Together
Helping You Helping Others

What more could be done to include DEI in SEM Work?

How can we leverage SEM to create more meaningful and impactful professional growth for minorities and women?

Cohorts targeting environmental justice areas to improve the overall facility energy performance and support the community.
Pre-Survey: Does your organization/client have SEM programs that do the following:

- Have DEI requirements for contractors?
- Use a DEI lens to inform program marketing?
- Use a DEI lens to inform curriculum?
- Consider cultural adaptations for prog. design and impl.?
- Consider DEI in workforce development?

Legend:
- Don't Have
- Slowly Developing
- Deploying Soon
- Have Now
- Not Sure
DEI: What do you feel is your next step?
SEM High School Internship Program

- BRIDGING THE GAP IN STEM
Our Mission

Objectives:

- Provide Educational Enrichment
- Create Professional Development Opportunities
- Expand Access to more Students
- Encourage Underrepresented Students to get Involved
What are your next steps?
Have a Break
SEM M&V
COVID Impacts to SEM

ANDREW BERNATH, ROUJ ENERGY ANALYTICS
THE IMPACT OF COVID-19 ON SEM SAVINGS ESTIMATION

Presenter: Andrew Bernath, Rouj Energy Analytics

A collaboration by:
Andrew Bernath, Rouj Energy Analytics (andrew.bernath@roujenergy.com)
Andrew Wood, DNV GL (andrew.w.wood@dnvgl.com)
Dustin Bailey, Guidehouse (dustin.bailey@guidehouse.com)
Holly Farah, Rouj Energy Analytics (holly.farah@roujenergy.com)
1. The Challenge: What are we up against?
2. Methodology: What tools are available?
3. Savings Estimation: Can we rewrite the instruction manual?
4. Conclusion: How do we put it all together?
First, let’s **zoom out** and see what we want

**What is Strategic Energy Management?**

- Energy savings **education** and **behavioral coaching**
- Uses **past behavior** and **billing data** comparisons to estimate savings
- **Meter based** program considers **whole-facility** energy usage
COVID-19 is **changing the landscape** of SEM savings estimation

Since SEM programs use **meter level data** to calculate savings, the **unrelated impacts** from COVID-19 may masquerade as “savings”

- Sectors may be impacted **disproportionately**
- Impacts may also vary at the **business type** and **individual facility** levels
- **Accounting for** these impacts requires a **Non-Routine Event** (NRE) adjustment

We **know** that customers **have been impacted** by COVID-19
Now we **must consider** how we can **account for** this using NRE adjustments
Our goal:

Develop a defensible method to estimate savings attributed to SEM program activity

Under ideal circumstances the previous techniques are sufficient

We require alternative methods when:

- We cannot accurately develop an estimate of baseline consumption
- A disruption in energy usage occurs after program implementation
Two statistical modeling frameworks:

1. **Forecast**
   a. *Most commonly* used in SEM evaluation
   b. Model is specified using *baseline* energy consumption data
   c. *Energy consumption* in the baseline and post-implementation periods are *compared*
   d. Can *model NRE’s* occurring in the *baseline* period
   e. This model is *unreliable* when NRE’s occur in the *post* period

2. **Pre-Post**
   a. Model is specified using *all available* energy consumption data
   b. Uses an *indicator* to identify the post-implementation period
   c. *Coefficient* of the indicator is an estimate of the *per-period savings*
   d. Indicator can be *interacted* with other variables to *account for* combined effects
   e. Can typically *model NRE’s* occurring in both the baseline and post periods
Two statistical modeling frameworks:

1. **Forecast**
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   d. Indicator can be interacted with other variables to account for combined effects
   e. Can typically model NRE’s occurring in both the baseline and post periods
1) **Short Term Changes Removed:**
   a) Disruption occurs for a set period of time in the post-period
   b) Disruption period is short relative to measurement period
   c) After disruption, facility operation “went back to normal”

2) **Post-Installation Modeling:**
   a) Disruption occurs in the post-period
   b) Disruption period is longer than a few measurement periods or occurs at random intervals
   c) Disruption has a strong impact on site usage

3) **Engineering Model:**
   a) Disruption affects specific equipment or operations for a set period
   b) The magnitude of the disruption is not large relative to the savings estimates
   c) Energy usage estimates are available for the affected equipment or operations
Savings Estimation
Handling NRE’s

1) **Short Term Changes Removed:**
   a) Remove the period that includes the disruption and re-annualize the savings estimate
   b) **Seasonality** should be considered but if the change was brief this is the simplest way to account for short term changes

2) **Post Installation Modeling:**
   a) Model the disruption using an **indicator variable** in a pre-post model
   b) The indicator variable will often be a **statistically significant** variable
   c) The **impact of the indicator** variable can then be isolated and estimated

3) **Engineering Model:**
   a) Use **engineering estimates** of the equipment or operations to directly remove the estimated energy impact from the model results
   b) This may require **detailed understanding** of site equipment and operations
1) **Short Term Changes Removed:**
   a) If the facility has strong seasonality in energy usage, re-annualized savings may **not be accurate**
   b) If the disruption lasts longer than a **few observation periods** this method is not appropriate

2) **Post Installation Modeling:**
   a) The disruption should last for **more than a few** observation periods, or the statistical model might not estimate **significant impacts**
   b) This method is not appropriate when the disruption occurs **at or near program implementation**

3) **Engineering Model:**
   a) If the disruption has a **large effect** on usage, removing energy impacts from engineering estimates may result in **zero or negative savings** estimates
   b) This method is only appropriate if **established estimates** for the specific equipment or operations are **available**
CONCLUSION
What should you do?

Our **proposed approach** to account for impacts due to COVID-19:

1. **Understand** what is driving site usage at the **customer level**
2. Assess risks from COVID-19 on energy usage at **each site**
3. Identify the **appropriate methods** to account for COVID-19’s impact on energy usage
4. **Isolate** the identified impacts
5. Ensure SEM **savings align with activities** occurring at the site

Remember to **seek engagement** with implementation, evaluation, and site energy management team **as early as possible**, if you have questions.
FEEL FREE TO REACH OUT; WE LOVE NERDY CHATS:

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Andrew Wood, DNV GL (andrew.w.wood@dnvgl.com)

Dustin Bailey, Guidehouse (dustin.bailey@guidehouse.com)

Holly Farah, Rouj Energy Analytics (holly.farah@roujenergy.com)
Funded Research

PETER THERKELSEN, LBNL
Fundied Research Project

NORTH AMERICAN SEM COLLABORATIVE RESEARCH TEAM
LBNL - PETER THERKELSEN PH.D, HEIDI FUCHS AND BILL MILLER PH.D
ACEEE - ED RIGHTOR PH.D AND ANDREW WHITLOCK
NASEMC
Research
Purpose

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>Accelerate</td>
<td>Accelerate SEM adoption &amp; enhance effectiveness.</td>
</tr>
<tr>
<td>Improve</td>
<td>Improve estimation of impacts of future program offerings.</td>
</tr>
<tr>
<td>Inform</td>
<td>Inform SEM practitioners, program administrators, and regulators with performance-based information.</td>
</tr>
<tr>
<td>Answer</td>
<td>Answer key questions raised by the SEM community</td>
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</table>
Research Approach - Cost Effectiveness and Persistence

- Assemble SEM evaluations and program descriptions.
- Assess SEM program terminology.
- Interview program administrators.
- Identify links between program design structures and effectiveness.
Step 1: Information Gathering

Define SEM for research purposes

- Any program self-identified as SEM

Collect and Review Reports

- Program evaluations are released sporadically
- Some programs are in-progress or recently completed
- SEM may be evaluated as part of a larger program
Menti-meter Question #1

Are cost-effectiveness and energy savings persistence a function of the maturity of energy management business practices fostered by an SEM program?

1. Of course!
2. What?
3. Does it matter? Those practices only serve to increase energy savings now.
4. That smells like market/customer transformation and efficiency programs aren’t evaluated that way.
5. Really? On a Zoom call? Let’s talk about it later over a socially distanced beer.
Are cost-effectiveness and energy savings persistence a function of the maturity of energy management business practices fostered by an SEM program?
Step 1: Report Findings

**Persistence:**
- Persistence seldom discussed.
  - When discussed, a focus on savings persistence.
  - Few focused on energy management systems.
- Evaluations that stated savings persistence had an expected useful life of between 1-10 years.

**Cost-effectiveness:**
Various cost-effective tests vary and are often determined by PUC, DEQs, or similar agencies.
Step 2: Interview Topics

**Overall Design**
- Goal/Objectives
- Duration
- Approach
- Relation to other programs
- Incentives
- Support for EMIS

**Energy Savings**
- Method
- Levels achieved
- Approach
- History of persistence

**Cost-effectiveness**
- Test type
- Authority
- Projected vs achieved

**Management Practices**
- Foundation
- How assesses
- Consideration of persistence
8 interviewed to date
Targeting about 30
Want to participate?
Email: ptherkelsen@lbl.gov
Interview Observations: Diversity

Program design & support
Energy management framework
EUL selection
Persistence evaluation of participants’ energy management activities
How cost effectiveness is evaluated
Menti-meter Question #2

Brainstorm: What approaches should be taken to get these results in front of regulators and other stakeholders?
Thank you!

Within the framework of SEM:
- How would research be useful to additional audiences?
- Who else should we interview?
- What are we not asking?
- What research areas would be good next steps?

Email: ptherkelsen@lbl.gov
North American SEM Collaborative’s Negative Savings Focus Group Results

Presented by
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Dustin Schneider (Dustin.Schneider@leidos.com)
Alexander J. Dodd (ALEXANDER.J.DODD@leidos.com)
How does your program account for negative SEM savings?

We completed an interview with 24 program administrators and implementers (from 14 states) to understand how negative savings is normally handled. Our results were fairly split with some zeroing out the savings, and others accounting for the negative savings at the customer or program level.

Additional highlights from the survey:
- Only 3 of the customers handled year two savings differently than year one
- **Measure life** varied greatly from 1 to 10 years
**Problem statement**

Historical data suggest that SEM participation rarely causes an increase in facility energy intensity. However, when non-routine events are not identified nor accurately captured, the energy model shows an increase in energy use. Utilities and implementers report this information in inconsistent ways (sometimes zeroing them out and sometimes including the negative savings at the customer or portfolio level).

**Impact of Non SEM measures**

Process/Operation changes

Behavior same as base- Non Engage
Non-SEM activities must be carefully accounted for in order to not “double count” savings. Usually ex ante program savings for other projects completed at the site is taken out of the results of the SEM claimed savings.

Sometime this ex-ante savings is inaccurate, resulting in the difference being captured in the SEM model. Some IC’s and utilities have used SEM models as a continuous commission tool calculating the impact of measures being installed at the site in real time.

Other times these measures may have time sensitive issues. They may be reversed or not properly commissioned resulting in strange behavior in the SEM model.

This can often be accounted for by carefully understanding the other measures installed at the site.
The SEM model is designed to compare historic operational data to current operation. If current operation is very different than historic operation the model may no longer be accurate at estimating energy savings. This could be due to issues such as new products, much higher flow, new machinery or other site wide operational changes.

If this is a short-term issue, the period of time when this change occurred may be removed and the savings could be re-annualized. If this is a long-term issue, a new model may be needed or a different calculation approach may be needed.
Some customers will not engage in the SEM program. Although they attend training or have an audit, they choose not to put recommendations into action. In this case, the model will reflect this lack of change and show a post period behavior that is very similar to the pre case as show here.
Recommendations from the focus group

• The SEM industry should consider the definition of Negative Savings as when an increase in energy intensity is seen in the statistically robust energy model after the program has accounted for all identified externalities.

• If negative savings are experienced in the first year (after accounting for known externalities), the assumption should be that unknown externalities caused the negative savings unless the negative performance can be linked to actions taken by the energy team. Zero savings should be claimed.
  • *We believe this recommendation does not bias claimed savings, based on the assumption that SEM activities do not cause an increase in energy intensity.*

• An incremental loss of savings in future years compared to claimed positive SEM savings in prior years within the measure life should be recorded and claimed as negative customer savings, while the top down modeling remains statistically robust and the program has accounted for all identified externalities. Negative savings should not be reported for energy intensity increases above and beyond baseline, unless the negative performance can be linked to actions taken by the energy team, due to the same assumption that SEM activities do not cause increased energy intensity.

• Our survey provided insight into varying degrees of persistence levels for SEM savings, and the group realizes that persistence is interrelated with whether or not to claim negative savings. *This should be studied further* to make any recommendations.
Mentimeter Question

How does the recommendations from the Negative Savings Group’s presentation affect your understanding on the topic?

• Amazing work and now this topic seems clear and straightforward and am better able to talk about the topic.

• I like the way the presentation laid out different paths to negative savings, but I am still a bit unclear how this will impact my program.

• Good presentation but my understanding of negative savings did not change.
How does the recommendations from the Negative Savings Group’s presentation affect you understanding on the topic?

- Amazing work and now this topic seems clear and straightforward and am better able to talk about the topic. 35
- I like the way the presentation laid out different paths to negative savings, but I am still a bit unclear how this will impact my program. 18
- Good presentation but my understanding of negative savings did not change. 13
We Want Your Feedback!

Participant Insights
Commercial/SMB SEM Barriers

Discuss some of the reasons you and/or your program has not begun to incorporate commercial/SMB into SEM.

OR

If you do incorporate commercial/SMB in your SEM programs, what are some of the reoccurring barriers or struggles you see from your commercial/SMB participants?
Mentimeter Question

What are some of the barriers that your groups came up with?
What are some of the Commercial/SMB SEM barriers that your group came up with?

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Barrier</th>
<th>Barrier</th>
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<tbody>
<tr>
<td>cost</td>
<td>cost effectiveness</td>
<td>cost</td>
</tr>
<tr>
<td>Data inaccessibility</td>
<td>Competitor owns the space</td>
<td>less energy usage</td>
</tr>
<tr>
<td>Tough to be cost effective.</td>
<td>Engagement takes $</td>
<td>Cost Effectiveness</td>
</tr>
<tr>
<td>Leadership</td>
<td>Cost</td>
<td>variation in needs</td>
</tr>
</tbody>
</table>
What are some of the Commercial/SMB SEM barriers that your group came up with?

- Dedicated staff
- Scalability of methods and tools
- Mixed incentives.
- Lack of staffing, monetary resources to justify investment
- Recruitment challenges, Owners don't have time!
- Programs designed to target large customers
- Limited staff and cost effectiveness
- One participant said that COVID has...
- Savings and cost effectiveness
- Capacity issues
- Cost
- Time commitment by SMB owners.
What are some of the Commercial/SMB SEM barriers that your group came up with?

- Lack of staffing, monetary resources to justify investment
- Cost
- Business is short-term focused, not horizon
- Cost-effectiveness
- Time commitment by SMB owners.
- One participant said that COVID has been a barrier.
- Time to participate
- Utilities incentives kWh saving and it's hard to get that out of SMB
- Fewer resources/staff
- Cost effectiveness
- Finding the right person
What are some of the Commercial/SMB SEM barriers that your group came up with?

- They don't think it worth the effort in saving. :)
- Challenge simplifying enough for SMBs
- Don't own assets. High employee turnover. Property manager (not company) manages the building.
- Cost effective delivery
- Alignment of management focus on SEM
- Cost effectiveness of cohort model & Tenant vs. owner engagement
- Relatively few staff members.
- Small energy teams and limited resources/people
- When you are a hammer, everything is a nail
- Disruption
- Low savings (relatively large, but not as large as larger users)
What are some of the Commercial/SMB SEM barriers that your group came up with?

- Don't own assets. High employee turnover. Property manager (not company) manages the building.
- Cost effectiveness
- Non-standard building management makes M&V difficult
- Relatively few staff members.
- Cost effectiveness, one on one approach doesn't work
- Tenant vs ownership
- Low savings (relatively large, but not as large as larger users)
- Cost, complexity, not enough time/resources, interest, potential savings ($)
- SMB not enough energy for standard SEM
What are some of the Commercial/SMB SEM barriers that your group came up with?

- makes M&V difficult
- capacity to implement is lacking
- Cost of M&V
- In person engagement takes time
- Small team
- The savings to them are lower, so motivating them might be more of a challenge in some instances.
- tenant vs ownership
- To move to SMB, need to simplify modeling and approach,
- distributed operations makes it even harder (lots of micro mini buildings)
- Statistical models often fail to predict energy consumption in buildings
- SMB not enough energy for standard SEM
- Owners don't have time/Dedicated staff
- Siloed internal groups
What are some of the Commercial/SMB SEM barriers that your group came up with?

- Cost of M&V
  - In person engagement takes time
  - Small team

- The savings to them are lower, so motivating them might be more of a challenge in some instances.

- Owners don't have time/Dedicated staff

- Distributed operations makes it even harder (lots of micro mini buildings)

- Siloed internal groups

- We need more Mahshas!

- Statistical models often fail to predict energy consumption in buildings correctly
Goodwill Industries

Who we are?
- 1927 Opened in Portland
- 2019 Opened 53rd Retail Location

How we are Participating?
- 2015 Started with Energy Trust SEM Program
- 2020 tracking 43 retail stores through SEM

No matter what facility upgrade we perform a sustainable energy management requires change in an organization’s culture in all levels

GICW is only 1 of 160+ different Goodwill organizations in North America
City of Tacoma WA
Strategic Energy Management
Office of Environmental Policy and Sustainability
Perry Spring, Resource Conservation Manager
August 17, 2020
City Stats: population ~ 220,000, employees ~ 3,500

Municipal Building Portfolio: 113 buildings, 2.7M SqFt FA

Building energy: 211,693 MMBTU in 2019

Industrial SEM:
- Tacoma Power’s H-PEM, 2014 to present,
- Central Treatment Plant, electricity only

Commercial SEM:
- Tacoma Power’s pilot cohort, 2018 – 2020,
- Convention Center – 8,470 MMBTU baseline, 2,484,207 kWh)
- Police –Fleet Campus – 6,866 MMBTU baseline (2,013,800 kWh)
CUSUM = Cumulative Savings (resets annually)

Achieve or exceeded 3% savings goal annually since year 3.

Now in 2nd cycle of 4 years

Process oriented, highly regulated = active monitoring and investment (time & $)

1 Energy Champion, senior management (ADM, S&E)
Year 1 – Team building, Building Energy Scans, Cohort Workshops, Opportunity Register, nominal savings

Year 2 – Significant progress on BAS controls tuning (both), new job classification- controls specialist

Program suspension at 19 months due to COVID

SAVINGS over 19 months:
Convention Center @ 2.7%, Police – Fleet Campus @ 3.9%
Solution Time!

What did you learn during the panel that triggered some good ideas or solutions for the barriers we discussed?
What did you learn at the SEM Summit that will inform how you go forward?

People to chat to!
Good ideas abound!
made new contacts!
The importance for all of us at all levels of the SEM world to be thinking about DEI.

Negative savings and public sector implementation
New connections
Good DEI direction
Need a champion but need a culture to make it last

Still plenty of opportunity for growth!
Internships!
crunchy nutbutter only.
Who to email with questions

Go to www.menti.com and use the code 8624856
What did you learn at the SEM Summit that will inform how you go forward?

M&V challenges

SEM isn't just for Industrial facilities!

Data debates!

customer feedback

I like the idea of regional energy champions/sem alums

Potential for SMB engagement

Evaluators support zeroing out negative Energy savings.

Ca-Caw advances slides!

Cleared understanding of how to measure savings, negative too

The future is SEM, all in!
What did you learn at the SEM Summit that will inform how you go forward?

- Customer feedback
- Non-routine adjustments...Let's get to work!
- Love the high school internship program!
- Ca-Caw advances slides!
- Small-mid size commercial customers are of particular interest and are particularly difficult to engage
- The hazards of kale
- Importance of building infrastructure for SMB
- Measure savings, negative too
- That there's a NW SEM collaborative
- Keep learning and talking!
- DEI!
- There is more work to be done
What did you learn at the SEM Summit that will inform how you go forward?

- Importance of building infrastructure for SMB
- DEI
- There is more work to be done
- That some of these M&V folks don’t already know each other and we need a site-level working group!
- Created an alumni mindset from the onset!
- Looking forward to research findings!
- DEI can help solve many of these issues of organization engagement. Just have to get over the hurdle of making it happen
- Learned more about the wide DOE portfolio of tools, and now need to think about how to integrate them into SEM curriculum
- Inclusion, internships, alumni network planning, and SMB ideas
What did you learn at the SEM Summit that will inform how you go forward?

- I have a lot of wonderful peers in this space. Glad to be in this together!
- How 50001 Ready is starting to be used
- 50001 Ready valuable tool
- Insight on negative savings,
- Look for ways to capture evidence of activity that supports persistence like giving a raise to employees who support and participate consistently.
- Potential and pitfalls of pre/post models to estimate COVID impacts.
- We are missing SEM programs!
- The negative savings subcommittee endorses a position that is not consistent with impact evaluation practices.
- Great direction for applications in public sector.
What did you learn at the SEM Summit that will inform how you go forward?

<table>
<thead>
<tr>
<th>Tool</th>
<th>Insight</th>
</tr>
</thead>
<tbody>
<tr>
<td>50001</td>
<td>Ready valuable tool</td>
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<tr>
<td></td>
<td>Potential and pitfalls of pre/post models to estimate COVID impacts.</td>
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<tr>
<td></td>
<td>Great direction for applications in public sector.</td>
</tr>
<tr>
<td></td>
<td>Insight on negative savings, opportunities to address commercial</td>
</tr>
<tr>
<td></td>
<td>market barriers, incorporating small medium business in large cohorts</td>
</tr>
<tr>
<td></td>
<td>for cost effectiveness, potential K-12 engagements.</td>
</tr>
<tr>
<td></td>
<td>We are missing SEM programs!</td>
</tr>
<tr>
<td></td>
<td>SEM stakeholder collaboration, SEM, Targeting business in at-risk</td>
</tr>
<tr>
<td></td>
<td>heath communities</td>
</tr>
</tbody>
</table>
Wrap Up
We want you!
How to be involved

Join the LT!
- Survey out this week
- Apply by September 1
- Decision end of October

Support NASEMC
- General Support
- Deliverable Support

Event Sponsor
- SEM Summit
- Webinars
Leadership Team Recruitment
Leadership Team Makeup

- 2-4 SEM program administrators
- 2-4 SEM professionals
- 1-2 representatives of REEOs
- 1-3 other SEM-related roles
- At least one representative from each region of North America
- At least 4 members from traditionally under-represented populations
Commitment

- Monthly LT Meetings
- Serve on ad hoc committees
- Partake in annual SEM Summit
- Support fundraising efforts
- Term is three years
Recruitment Process

Announce
- SEM 2030 Webinar
- Email week of 8/17

Respond
- Fill out survey!
- Close on 9/1

Select
- LT review responses
- Decision 10/1

Transition
- Initial meeting November
- Begin January 1
Learn from successes of your peers

Engage in research & discussions that further the practice of SEM

Better serve your customers

Expand and establish SEM best practices

Support the future of the Collaborative
Thanks for coming!
An update on the 50001 Ready Program and Navigator platform

Options and resources for utility programs and implementers
The 50001 Ready program is designed to be used by program administrators and implementers in whatever way fits their goals.

A Wide Spectrum of Utility Programs with varying needs

**DIY**
Offer 50001 Ready tools to customers as a program they can implement on their own

**Train**
Offer training to customers on how to use 50001 Ready tools

**Supplement**
Supplement existing custom or O&M programs with 50001 Ready tools

**SEM**
Develop and offer an SEM Program using 50001 Ready tools and reference designs
50001 Ready Program for Utilities and Implementers

50001 Ready resources can be used in whatever way is best for each program

- **Copy Exactly**
  Use the 50001 Ready resources without changes

- **Re-Brand**
  Use the 50001 Ready resources and brand with your own look

- **Modify**
  Use the 50001 Ready resources as a base, editing where needed

- **Rewrite**
  Use the 50001 Ready resources as a starting place but rewrite with your own content

A Wide Spectrum of Utility Programs with varying needs
Guidance

Materials

Samples

To help utilities and implementers easily develop custom materials

To give utilities and implementers ideas on potential program designs

To help utilities and implementers make decisions when designing programs
To learn more about the 50001 Ready Partner Program, visit the Better Buildings Solutions website at: Energy.gov/50001Ready. “50001 Ready for Program Administrators & Implementers”, ”DOE’S 50001 Ready Partner Program” section at top of page

The Partner Program features an open and flexible system to work with your business structure and current set of offerings to support your customers with 50001 Ready and EnMS implementation.

To sign up, click the link to fill out a Partner Requisition form

https://betterbuildingssolutioncenter.energy.gov/iso-50001/50001Ready/50001-ready-program-utilities-admin-implementers
Link found on the Better Building Solution site or https://navigator.lbl.gov/partnerEnrollmentForm

*You’ll want to set up an account in the Navigator first.

Just complete this form and the 50001 Ready Help Desk will contact you with next steps!
Partner Dashboard

Banner indicates your location within the tool

Add or Update General Tips

Add or Update Cohort Tips

Track projects, task progress, cohort assignments and notes
Partner Dashboard - Update General Information

Partner Contact Details

Partner: ABC Utility
General Contact Information

TITLE
ABC Utility

REFERENCE CODE
ABC Utility

PARTNER PUBLIC CONTACT NAME
Peter Therkelsen

PARTNER PUBLIC EMAIL ADDRESS
ptherkelsen@bl.gov

PARTNER PUBLIC PHONE
5104855645

PARTNER PUBLIC WEBSITE
www.bl.gov

ADDITIONAL PUBLIC INFORMATION ABOUT PARTNER SUPPORT
This is the general update

PARTNER LOGO (DISPLAYED AT THE TOP OF THE PAGE)
SELECT LOGO FILE BROWSE

Update Contact Information

Manage Associated Users Access Levels

Associated User: Peter Therkelsen
email: ptherkelsen@bl.gov

Full Administrator Access: ON

Access Level for Associated Users Table

<table>
<thead>
<tr>
<th>Cabinet</th>
<th>Access Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC Cohort Pilot Program</td>
<td>Full Access</td>
</tr>
<tr>
<td>ABC Cohort 2019</td>
<td>Full Access</td>
</tr>
</tbody>
</table>
Tips and Customization - General Tips

Partner tips are seen by all projects associated with the partner. They are only overwritten by cohort specific tips.
## Tips and Customization - Cohort Specific Tips

### Partner: ABC Utility | Cohort: ABC Cohort 2019

**Manage Energy! Task Tips**

### Planning

<table>
<thead>
<tr>
<th>ID</th>
<th>Short Title</th>
<th>Task</th>
<th>Partner Tip</th>
<th>Update Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Scope and Boundaries</td>
<td>Task 1: We have defined, documented and approved the Scope and Boundaries of our 50001 Ready energy management system</td>
<td>Currently Providing This General Partner Tip: This tip goes to all cohorts. Welcome to the cohort! Please bring your last 12 months worth of energy bills to your kick off workshop.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Energy Policy</td>
<td>Task 2: We have developed an energy policy statement, which has been approved by top management</td>
<td>This Cohort Tip currently overrides the General Tip: Many organizations have policies that could be augmented to a full energy policy! Bring to the June workshop any sustainability, environmental or other policy statements you think might serve as the basis for an energy policy.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Management Commitment</td>
<td>Task 3: Our top management has expressed its commitment to the 50001 Ready system, and are aware of their roles and responsibilities</td>
<td>This is a Cohort Specific Tip (no General Tip): Commitment can be verbal, email, or other. The energy policy we are working on in June should help solidify and document commitment.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Energy Team</td>
<td>Task 4: We have established an energy team that meets regularly and includes a management representative. Roles and responsibilities have been defined for the energy team and all affected personnel.</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Legal Requirements</td>
<td>Task 5: We have identified energy-related legal requirements that apply to our operations, have a process to evaluate and update these over time, and evaluated our compliance with them</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
</tbody>
</table>

### Energy Review

<table>
<thead>
<tr>
<th>ID</th>
<th>Short Title</th>
<th>Task</th>
<th>Partner Tip</th>
<th>Update Tip</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Data Collection</td>
<td>Task 6: We have identified all our energy sources and uses and accurately collected the related energy consumption data</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Data Analysis</td>
<td>Task 7: We have analyzed our energy consumption data at the system/equipment level</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Significant Energy Uses (SEUs)</td>
<td>Task 8: We have determined our Significant Energy Uses (SEUs) and determined their energy performance, estimated future consumption and have a plan for reviewing and updating them.</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Relevant Variables</td>
<td>Task 9: We have determined the relevant variables that affect energy consumption of each SEU and collected the associated data.</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Performance Indicators (EnPIs)</td>
<td>Task 10: We have identified energy performance indicators (EnPIs) and developed a methodology for determining and updating them.</td>
<td>no specific tip for this task</td>
<td></td>
</tr>
</tbody>
</table>

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**Optimize efforts and accelerate progress using tips for each task**

**Cohort tip page highlights when a tip is being provided from the Partner Tips or Cohort Tips**
Provide immediate client support to your customer every step of the way.

Tips distributed to all cohorts display in the bar above the detailed guidance for each task.

Customers can still add their own notes for each task.
Tips and Customization – Customer View

Customer sees the Partner’s logo and tips.

Logo defaults to Partner logo – can be replaced with cohort specific logo.

The tools customizable interface helps you and your customers with supporting, observing, and reporting on your EnMS progress.
Cohorts

Clients can join a cohort using **Referral Links** for quick registration.

**Reference Codes** can be customized to your preferences.
**Energy Management System and 50001 Ready Introduction Materials**

- 50001 Ready Brief Introduction for End-Users
- 50001 Ready General Introduction for End-Users
- Energy Management System Informative Training
- Energy Management System Informative Training for Utility Program Administrators
- 50001 Ready Multi-Site Implementation Distance Learning for Central-Office Staff

**50001 Ready Task Education Materials**

- 50001 Ready Training for Utility Energy Efficiency Staff
- 50001 Ready In-plant Training for Manufacturers

**50001 Ready Implementation Materials**

- 50001 Ready Distance Learning Series for All Organizations
- 50001 Ready Distance Learning Series for Federal Organizations

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**50001 Training Categories**

- Material Introduction
- Task Education
- EnMS Implementation
Utilities and Partners already engaged with 50001 Ready:
Questions + what’s coming up

Visit the 50001 Ready website at energy.gov/50001Ready
• Download sample utility partner profiles and program implementation guides
• Find links to the Navigator and EnPI Lite

Stay informed
• CONTACT ethan.rogers@ee.doe.gov to add others to this utility network distribution list.
• Sign up at energy.gov/50001Ready for email updates about ISO 50001 and related DOE energy management programs.
Test Baseline Validity

Evaluators will test if the baseline used by the program is valid for the period measured. Several tools available:

1. Established (will source):
   a. Fractional Savings Uncertainty (FSU)
   b. Net Determination Bias (NDB)
   c. CV(RMSE)
   d. t-Tests for individual variables
   e. Adjusted $R^2$
   f. Model F-Statistic

2. Additional statistical tools:
   a. AIC/BIC for model comparisons
   b. Mean Absolute Percentage Error (MAPE) for within-sample
   c. k-Fold MAPE for out-of-sample
   d. Median Percentage Error
   e. Mahalanobis’ Distance (to identify outliers)
   f. Data visualizations (added variable plots, error distribution, leverage & influence plots)
Short-Term Changes

This site had a major shutdown for repairs that impacted several buildings. This event occurred between points A and B, resulting in significantly less energy usage during this period. Once the building repairs were complete, the site continued to show energy savings but at a much lower rate than what is seen between A and B.

In order to account for this short-term operation change, the energy savings between A and B were removed and the savings that occurred during normal operation was annualized in order to represent a typical year.

This approach is useful when changes are temporary and short lasting (perhaps 3 months maximum). Some examples are equipment malfunction, site shutdown, or other temporary site wide changes.
This project has a known production issue that arises throughout the year. The energy model tends to underestimate SEM savings when this production issue occurs, resulting in a large reduction in the final savings estimates. In order to account for this, the post data is modeled with an indicator variable to represent periods where the production change is active. In this case, the indicator coefficient is statistically significant and allows evaluators to account for the production effect and remove it from the final savings estimates.

This approach is most useful for consistent long-term change or changes that occur randomly throughout the year. Often, this method is used to model disruptions or changes that could be considered as a variable (e.g., occasional shutdowns or weekend operation) but that did not occur in the pre-period however, pre-period disruptions can be modeled using this method as well.
Engineering models can be developed to represent savings from specific measures or equipment operation. These calculations should be driven by onsite collected data and, when possible, pre-post operation and trend data.

Often these models are created as a secondary approach to estimating savings and do not have the same rigor that is normally associated with other statistically-based approaches. The amount of information that is needed to justify these calculations can be burdensome but even simple calculations can be used with other methods to explain observed changes in energy usage.

This approach is useful to estimate savings that are not easily measured by the model or that occurs alongside other activities that may mask the impact of the measures. The impact of capital projects are often directly removed from the SEM savings using similar methods.