



## Northeast SEM Collaborative Workshop, NYC, Nov 8, 2017

### Meeting Notes

#### Introductory Context by NRDC:

See NRDC Report: *America's Clean Energy Frontier* – Four strategies combined can achieve 80% emissions reduction by 2050: Energy Efficiency; Renewables; Electrification; and Biofuels/other clean fuel technology. Note that EE is responsible for 40% of reduction; of that, the Industrial sector = 20% of the 40%.

#### Dave Lis, Workshop Objectives: Share expertise; raise questions; foster growth of SEM

#### Greg Baker, VEIC and Dave Lis, NEEP– 2017 Summer Study Takeaways

1. M&V less of a focus; SEM has moved beyond worry about existence of savings
2. Scope is expanding to include commercial space, wastewater, and SEM-lite; this trend is nationwide
3. Development of binational collaborative will need to explore how best to overlay the many collaborative processes – NW, NE, CEE
4. SEM is trending toward focus on people/cultural focus – e.g. World Energy Engineering Conference (WEC) has also moved towards employee engagement

#### NYSERDA Program Overview, Katie D, NYSERDA

A cohort of 8 facilities from throughout the state was launched in September; 2018 plans include a wastewater cohort, and likely more geographically-targeted cohorts. NYSERDA's recruitment generated a waiting list of companies not ready yet.

Key program design features: One year engagement period; 6 cohort meeting sessions, 4 individual workshops, and 2 webinars. Second year of tech assistance support also included – bimonthly check-ins and support for modeling; Treasure; Eligibility criteria was > or = to 500,000\$ per year on fuel (any/all fuels combined) and industrial only – though pharmaceutical participant is a test case on commercial-only.

Non-energy aspects (benefits) are only being tracked if a participating facility has interest – this aspect is not in NYSERDA program plans.

There is some high level benchmarking of expected savings by activity or measures - by industry type - to set expectations based on existing rules of thumb.

Facility manager needs include help with what actions to focus on and whom to look to (vendors) to realize savings. An "Angie's List" for vendors was suggested, although NYSERDA cannot point to specific vendors. Biggest benefit of SEM is methodized process to develop a culture.

#### Stewart Moulder: EnVinta Energy Management Assessment (EMA), (diagnostic tools)



Envinta resources include typical questions asked in an EMA; a database of practices nationally; examples of EMA plans

This tool helps identify opportunities to improve: consistent design, effectiveness of different approaches. It further offers the potential for a common framework for SEM in the Northeast and would enhance ability to track effectiveness of SEM in the region.

### **Peter Therkelsen, LBNL, CA Insights on its Ongoing Process**

Energy Master Plans can/should integrate with SEM – they are not typically the same as SEM. An energy Master Plan is a long-term look at how energy is used in a facility, including plans for equipment replacement. For wastewater treatment it can be a 20-30 year view, for example. However, Peter suggests SEM should move in the direction of master planning. He further suggests SEM should move toward ISO 50001 practices.

Currently SEM is limited by fact that it focuses on low cost/no cost. Future expansion could also include renewables, other resources. The focus on measurement drives the SEM process in place currently. As a concept SEM should/could run on indefinitely. He encourages SEM programs to “meet customer wherever the customer is at.”

CA considered whether to count capital investments in SEM savings or not. One challenge with SEM is the program-focus of IOU energy efficiency delivery, when SEM blurs the lines and adds challenge to presenting cost-effectiveness. Peter envisions that the SEM program will need to adapt and evolve beyond the introductory version of the program. He further suggests that programs apply a light touch/reminders in later years and continue monitoring whether deterioration is an issue. He suggests that figuring out cost-effectiveness should be an evolving effort.

Tom Coughlin (National Grid MA) observed there are differences between the “philosophical” components of SEM vs the “process” (going on now) of how to implement; the utility’s focus is on solving process issues.

Ethan Rogers (ACEEE) noted that previously there was investment in continuous improvement from various funding sources (federal agencies for energy, labor, environment, investment) and that the siloed sources presented challenges. “As long as agencies do not mind comingling of funds SEM can happen.”

Non-energy impacts are very important to customers and utilities’ current direction to focus on energy only are constraining SEM delivery.

Getting data from facility people is really hard – having a financial incentive for providing data helps.

CA program elements of note: Common program design and M&V guide for industrial SEM in CA are developed; Program will launch in 2018. Each IOU has third party operation and has multiple 2 year engagement periods which in theory can run forever. CA SEM does not encourage best practices; they encourage what can be done in short run by the company with some evolution toward longer run opportunities. Business practice is the driver. CA IOUs have traditionally focused on things and best practice but there has been lack of support for bringing people up to standard practice. Implementers have responsibility for recruitment – pressure for early success. Cohort size is not a fixed number. Attribution was a big deal in CA – can assume NTG = 1 but need to



document to show Commission the influence of program on business practices – qualitative. The purpose of the M&V guide is for common agreement on what savings are. Attribution is still to be tested. It is not necessarily pass/fail. The hope is that with clear expectations attribution will not be a problem.

Protocol – The EMV Guide created for CA predates UMP. It is a publicly available at <https://Pda.energydataweb.com/#/>

There is a lot of talk around evaluation, less around M&V. Key principles in the CA protocol and the UMP are same/similar.

Area up for debate – there is an unfortunate but natural siloing of M&V between commercial and industrial. Concepts playing out in M&V2.0 and big data. For industrial facilities – not necessity for automated program routinely. Important to match up M&V requirement with facility and its context. Production cycles, for example.

Capital savings are backed out of regression. Looking ahead, Peter noted interest/desire for one accounting of savings with all savings combined – not there now.

#### **Peter Therkelsen, LBNL and Alice Napoleon, Synapse: Introduction to 50001 Ready – the DOE SEM Tool**

The 50001 Ready strategy is to provide data-driven metrics instead of document-driven metrics. 50001 standards are useful internationally, as the international community embraces standards to demonstrate that facilities are good environmental stewards.

Turkeys are disruptive at LBNL

Schneider Electric and 3M and Nissan track data from ISO and SEP certifications versus uncertified facilities and demonstrate a correlation between higher savings and certification.

The first recognized 50001 Ready facility is Four Seasons Produce, Inc. in PA. It was recognized in June (The process took 5 weeks engagement period and 80 hours)

DOE wants to increase the number of facilities adopting a 50001 based energy management system; its program design grows from OR and CA efforts and also weaves in 50001. The hope is that at end of a 2 year intervention a facility could become 50001 certified. It encourages consistency in program design which is relevant for companies with facilities located in many states/countries. DOE's goal diverges from SEM program designs. DOE sees that the international market could ultimately impact supply chains. Facilities often "sell" SEM on the basis of non-energy impacts. The certification is part of sustainability branding.

One of the advantages of the DOE program is that it marries SEM speak (utility language) with 50001 information.

DOE has prioritized utilities and states without existing SEM programs as ideal candidates to adopt the 50001 program design (N Grid, MA, TVA, and Duke as identified targets)

Comments:



DOE's design guide is more flexible than the CA design guide – to account for variety in states. There are details in the CA guide that may not be applicable to others.

Facilities who have already “done” SEM need not be excluded from certification; they just have to go the extra few steps. Some implementers use the DOE navigator behind the scenes to keep customers on track.

The certification is not restricted to an industrial focus, even though there is some industrial bent focus. Owner-occupied and institutional organizations are moving toward ISO certification as well. Peter suggests that the language should be revised to be more agnostic. LBL invites feedback on the language.

**Jim Stewart, Cadmus, Evaluation Perspective** – see slides for description of the Uniform Method Protocol (UMP) for SEM.

Measure life/persistence is the most discussed topic relating to SEM impacts; there is need for further development of methodologies to estimate this parameter.

Evaluation challenges include: a potential for double counting of savings due to the fact that SEM “lifts” participation in other energy efficiency programs; there is uncertainty about SEM measure life; savings are low % of consumption.

Note that the UMP does not address peak savings or process evaluation.

Is there a minimum R-square? – No, the adequacy of a model depends on the model specification (unexplained factors relative to expected savings). If R-square is .6 and you expect 1% savings it is unlikely the model can detect savings.

Non-routine adjustments are necessary in some cases but should be used sparingly and based on engineering calculations

For an overview of evaluation practices used for SEM programs, see the CEE database which shows that most programs follow the UMP guidance; in 2015/2016 all used billing data; most use pre-treatment data as baseline.

Advanced software (with machine learning) and AMI data are both a curse and a blessing; they uncover patterns, avoid overfitting, improve baseline establishment, but they can require a large number of candidate variables and functional forms; the true model may be complex. Barriers to adoption of these include: data availability and regulatory acceptance.

Jessica Granderson of LBNL is doing pioneering work on advanced software for commercial facilities and research on non-routine adjustment. Economist Katherine Wolfram and her colleagues at UC Berkeley have applied an econometric method to energy performance in schools that could also be applicable to SEM.

Measure life assumptions – range from 1 to 5 years. Not necessarily based on hard empirical data. Many measure life calculations for SEM programs are weighted averages of O&M and SEM-behavioral impacts.

Jim noted that SEM measure life should be quantified by looking at savings persistence rather than activities. A recent Navigant study is an example of the approach in which measure life is based on a decay rate. In this



approach measure life, defined as the ratio of lifetime savings/annual savings, deduces lifetime savings based on information on annual savings and decay. An Ohio program estimated a decay rate of 20%/year (Navigant study). Multiple years of observations are needed for this type of analysis.

Jim suggested one research approach would be to randomize length of SEM engagement in order to apply randomized control trial methods to estimation.

Discussion noted it is feasible that there is no decay but on average some decay is expected. Discussion further noted challenges associated with decay of equipment performance which could be difficult or impossible to disentangle from SEM performance in a holistic analysis.

Open EE Meter is an example of Advanced M&V software which is “in the same universe” as the SEM whole building measurement approaches. Jim Stewart expects that AMI will become primary way to measure savings.

Measure life is important to implementers because it has a significant bearing on cost-effectiveness.

It was suggested that the industry should think about other ways to provide cost-effectiveness – beyond just working on measure life estimation. For example, crediting other program uplift to SEM, as a strategy to better represent the cost-effectiveness and influence of the program.

### **John Balfe, NEEP, Waste Water and SEM**

Great opportunity exists in this sector – see slides for stats. Barriers include lack of priority for energy; culture in which operations and decisions are separated; and trust issues with utilities.

One observation is that wastewater treatment staff can be very engaged and able, but programs may still need to overcome staff’s literacy challenges.

NY is targeting wastewater treatment due to its large opportunity; ¾ of the 605 facilities use most of the energy in the sector; NY Water Environment Association annual meeting in early February is opportunity to connect and find innovators. What is the appropriate volume threshold to set for participation in SEM?

There was a suggestion to consider equity in planning for wastewater treatment SEM. By batching small and large treatment facilities/communities, the program can stay cost-effective over time and serve more communities, rather than risk leaving out the small communities altogether by starting with or prioritizing large savings opportunities.

Net zero can be achieved by inclusion of high strength organics in the waste stream. Gloversville Johnstown facility is an example. It is a large 15 MGD capacity facility which sold some of its excess capacity to a yogurt and cheese plant and thereby achieved net zero.

Vermont’s “sweet spot” in this industry has been midsize facilities. Big ones are too bureaucratic, small ones too resource constrained. A size threshold would not succeed in Vermont.

### **Take-Aways**

#### **1. Wastewater (WWT) is a good area for focus**



2. **(Katie Dooley NYSERDA) SEM is converging on similar thought process across programs; this is different from where it was a few years ago.**
3. **(Tom Coughlin National Grid MA) How can we make SEM more sustainable? – Can we find ways to reduce investment over time and need to explore ways to maintain the culture after all has been done. ISO 50001 ready could benefit mature programs and need more talk about this. If we walk away, in the worst case, what will we leave behind? (This used to be called Market Transformation)**
4. **It would be helpful to increase awareness of examples of 50001 Ready co-branding. How can NY co-brand something together across utilities in order to get others involved and get ready for 50001?**
5. **One attendee with no background in SEM did not know SEM was a program and came in thinking this was just a strategic discussion. He suggests that SEM do outreach to embrace other resources that can help value the SEM results: GRESB – global real estate benchmarking – standard across multiple asset classes - has an infrastructure element and finance focus. It would be valuable to explore synergies of SEM and other activities that would help facility owners see SEM as an investment in organization over time and asset improvement. Is that part of SEM already?**
6. **Recruiting is a big challenge. Customers see the value proposition differently from utilities. Cascade (SEM implementer) would benefit from regional dialogue and more sharing of best practices.**
7. **The industry currently does not have numbers, just anecdotes for most if not all non-energy impacts; it would be helpful to have more data and information.**
8. **This group is perfect to move conversation and deal with evaluation obstacles; while this group knows these programs drive capital improvements regulators need convincing, as do utilities who design the programs. It would be helpful to focus on non-energy impacts within this group as a way to help advance that conversation and try change the paradigm. Dave Lois notes other regions are also working on these issues.**
9. **(Ethan Rogers ACEEE) – SEM is becoming a platform upon which other services are offered. Ideally portfolios would be evaluated and approached as a whole; in that case attribution would not pose the challenges that it does currently. How can the industry move toward the energy efficiency program portfolio perspective? Such a move could simplify things for customer. NYSERDA customers are an example; if they get acquainted with energy efficiency via a NYSERDA program they tend to come to NYSERDA for EVERYTHING because of outreach. Customers do not think program by program, they just want help for all related problems. We have to drive more conversation with regulators about this issue which includes addressing how to measure effectiveness and capturing platform benefits in a way that can be quantified.**