



Institutionalizing Continuous Improvement

Module 4 in the “Benchmarking and Energy Management for K-12 Facility and Energy Managers” Course

November 7, 2023

Today's Presenter

Andrew Schulte

Mr. Schulte is a Director in ICF's Energy Efficiency and Sustainability group, with nearly 18 years of experience. In support of the U.S. Environmental Protection Agency's (EPA's) ENERGY STAR Buildings program, Mr. Schulte assists partners seeking to integrate ENERGY STAR tools and resources, including the Guidelines for Energy Management and Portfolio Manager, into organization-wide energy and sustainability strategies. He has also led the development, delivery, and evaluation of the ENERGY STAR Buildings training program, and has presented hundreds of benchmarking and energy management trainings over the course of his career. Mr. Schulte also supports engagement with service and product providers that are helping building owners and operators to develop and execute energy management projects.



Today's Agenda

- Welcome and Introductions
- Learning Objectives
- Emphasizing Continuous Improvement
- Best Practices for Operations & Maintenance
- Engaging Students and Other Stakeholders to Drive Continuous Improvement
- Measuring and Verifying Outcomes
- Wrap-up and Q&A

Overview of the Benchmarking & Energy Management Course

- October 17, 2023: Introduction to Energy Management
- October 24, 2023: Energy Tracking and Benchmarking
- October 31, 2023: Developing Energy Efficiency Projects
- **November 7, 2023: Institutionalizing Continuous Improvement**
- November 14, 2023: Benchmarking & Energy Management Cohort

All sessions will take place from 3:00 – 5:00 PM (Eastern)

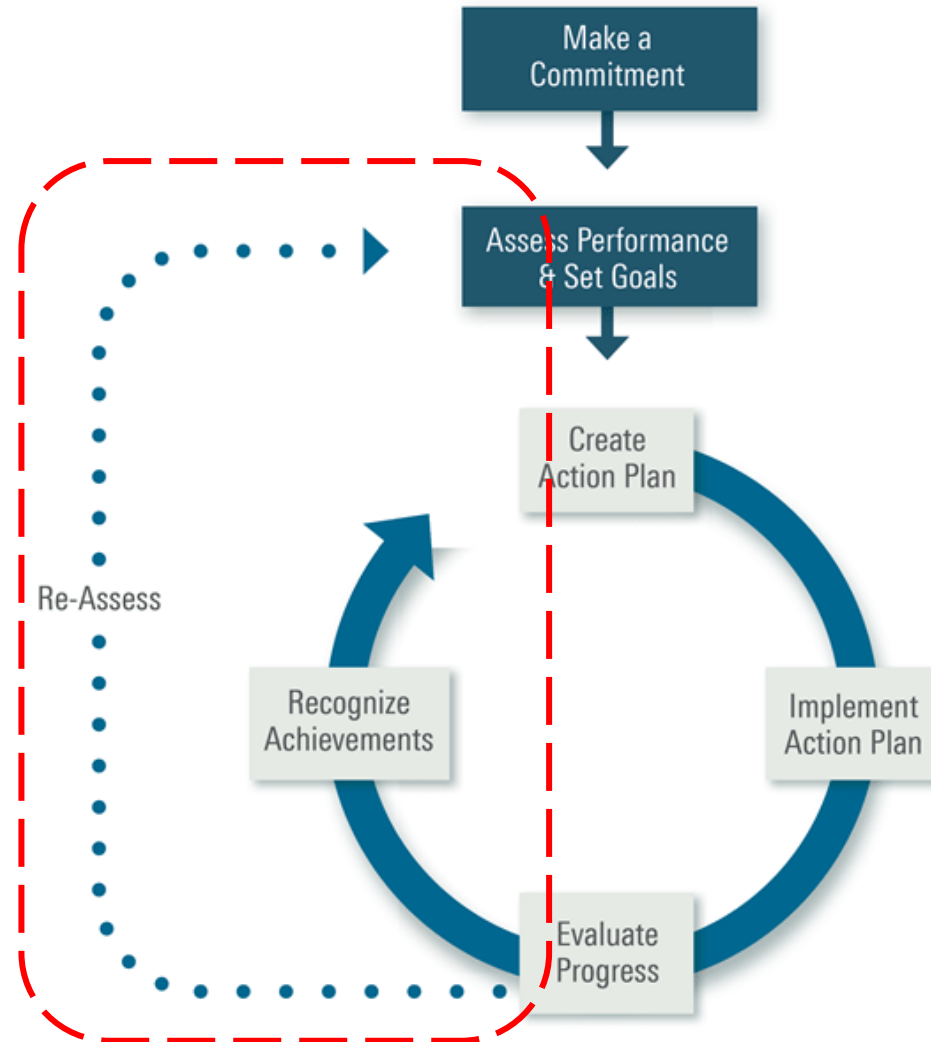
Learning Objectives

- In today's session, attendees will:
 - Emphasize the continuous/ongoing (rather than linear) nature of energy management.
 - Understand the importance of operations & maintenance best practices to maximize the impact of improvement projects.
 - Explore opportunities for engaging students and other key stakeholders in order to drive continuous improvement
 - Become more familiar with approaches to measurement and verification of energy improvements

Emphasizing Continuous Improvement

Situating This Module Within the Energy Management Process

ENERGY STAR® Guidelines for Energy Management



We Got Our Project(s) Installed...Aren't We Done Now?

- Not if you want your savings to persist!
- Building system performance can degrade over time.
- New technologies may become available.
- New priorities may emerge at the District or school level.
- Establishing a pathway for continued improvement can deliver further savings in energy/cost/emissions.

Maintaining Engagement is Key

- Energy management requires people, not just equipment.
- Processes and checklists won't help if they're not followed.
- Successful processes need to be maintained, even as school staff and/or district leadership changes.
- Don't underestimate the importance of recognizing success and sharing best practices.
- Energy management is not just about fixing what's broken; it's also about identifying, promoting, and celebrating what is working!

Best Practices for Operations & Maintenance

- From the [Advanced Energy Retrofit Guide](#) (pg. 76):
 - “O&M is the **combination of mental (operations) and physical (maintenance) activities** that are required to keep a building and its energy systems functioning at peak performance.”
 - “Operations focus on the **control and performance optimization** of equipment, systems, and assemblies.”
 - “Maintenance...refers to routine, **periodic physical activities conducted to prevent the failure or decline** of building equipment and assemblies.”

Understanding O&M In Greater Detail, cont'd.

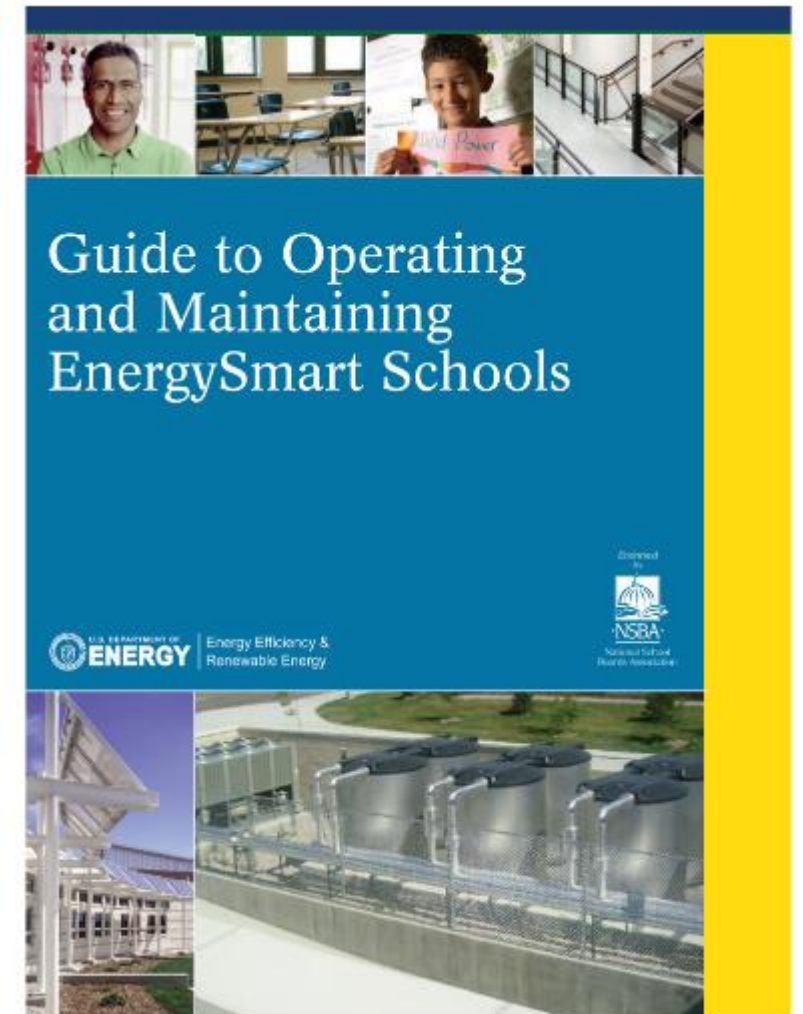
- O&M can be viewed strategically.
 - Proactive vs. reactive.
 - Requires staff capacity, training/education, and administrative support.
- O&M can be an in-house or outsourced activity.
- Technical solutions also exist (e.g., “ongoing” or “continuous” commissioning; fault detection and diagnostic (FDD) platforms) – but they need to be **part of the O&M strategy, not the strategy itself.**

Establishing an O&M Plan

- Document all equipment, settings, and standard operating procedures in a manner that can be easily located, understood, and taught.
- Review and update O&M plans as needed when building upgrades or enhancements are made.
- Establish performance-based goals and outcomes – not just a “box-checking” approach.
- Communicate and engage with all relevant stakeholders.

O&M Planning Resources

- DOE's [Guide to Operating and Maintaining EnergySmart Schools](#)
 - Entire technical resource focused on O&M
 - Discussions of O&M best practices associated with a full range of K-12 school building systems
 - Questions to help assess existing O&M programs and policies
 - Critical factors for O&M program success
- [Advanced Energy Retrofit Guide – K-12 Schools](#)
 - Chapter 6: Continuous Improvement Through Operations and Maintenance



O&M Planning Resources, cont'd.

- ENERGY STAR [Operations and Maintenance Best Practices for Energy-Efficient Buildings](#)
 - High-level guide, broken down by categories
 - Tune it Up
 - Turn it Off
 - Check it Out
- [ENERGY STAR Checklists of Energy-Saving Measures](#)
 - See “Low-Cost Measures”
- [DOE’s School Operations and Maintenance: Best Practices for Controlling Energy Costs](#) (older resource)

Building Operator Certification

- Program offering from the Northwest Energy Efficiency Council
- Offers both training and certification:
 - Fundamentals of Energy Efficient Building Operations
 - Level 1: Building Systems Maintenance
 - Level 2: Improving Building Operational Performance



- Does your District have a proactive plan for facility operation and maintenance?
 - No, each property typically takes a reactive (as-needed) approach to O&M
 - Yes, we have a plan – but it's more of a suggestion than a standard requirement
 - Yes, we have a plan that is being actively implemented by all schools in our District
 - Other (please identify)

Engaging Students and Other Stakeholders to Drive Continuous Improvement

Integrate Energy Management With Your Educational Mission

- The energy management process provides significant opportunities for student engagement and educational activities.
 - In-class/for credit (may fit within existing STEM curricula)
 - Extracurricular/volunteer opportunities
- ENERGY STAR offers a [K-12 Energy Efficiency Student Toolkit](#)
- DOE offers [Clean Energy Resources for Educators](#), and supports the [National Energy Education Development \(NEED\)](#) project to develop and disseminate free energy education resources



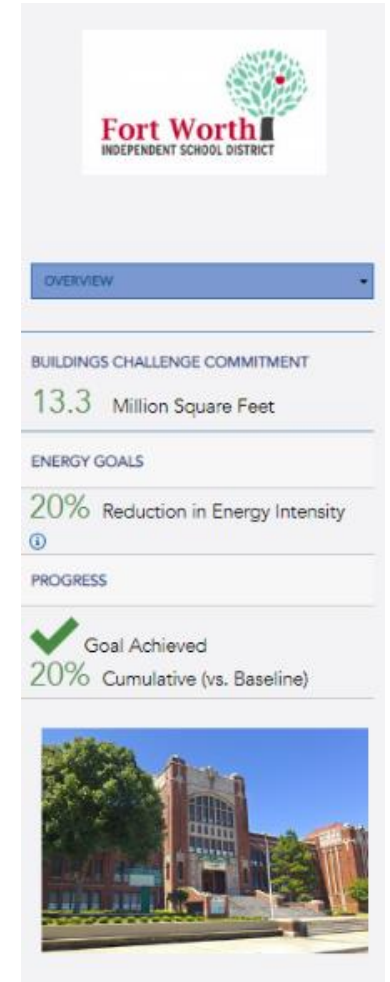
ENERGY STAR Resources for Engagement

- Treasure Hunts (discussed in prior module)
- Energy-Saving Competitions
 - Building Competition Guide
 - Activity Kits
 - Communications Resources
 - Co-Branding



Recognizing Achievements

- Everyone appreciates recognition, and it can be a critical factor in sustaining interest, motivation, and engagement.
- Some recognition opportunities include:
 - Case studies and best practices to call out and encourage successful approaches
 - Energy competitions
 - Districtwide awards
 - Better Buildings Challenge Goal Achievers
 - DOE Efficient and Healthy Schools recognition
 - ENERGY STAR Certification (don't need to be a partner)
 - ENERGY STAR Awards (for program partners)



[Fort Worth Independent School District | Better Buildings Initiative \(energy.gov\)](#)

- Which of the preceding engagement strategies have you used within your District (select all that apply)?
 - Inclusion of energy-related content in classroom curricula
 - Inclusion of students as participants in energy management activities
 - Energy reduction competitions between schools
 - Energy treasure hunts
 - Social media
 - Awards/recognition
 - Other (please describe)

Measuring and Verifying Outcomes

Understanding Evaluation, Measurement, and Verification

- Goal is to confirm and demonstrate the effectiveness of your project, in terms of results achieved for resources expended.
 - Differing levels of detail/complexity depending on needs of project sponsor and project implementer (e.g., ESCO vs. utility vs. self-funded upgrade).
 - Evaluations can look at process, impact, or both.
- Key Questions
 - Were all measures installed correctly?
 - Did your project(s) achieve the expected savings?
 - Were the savings the direct result of your project, or were there other contributing drivers (e.g., weather, occupancy)?
 - Would these savings have occurred in the absence of your efforts?

Using Portfolio Manager for Basic EM&V

- Once you've established a benchmarking record for your school(s), you should continue to update those records:
 - As new energy bills are received; and
 - As material changes occur to core property use attributes (gross floor area, number of workers on main shift, weekend operations, etc.).
- The ENERGY STAR 1-100 Score already normalizes for weather and property operations.
- For properties eligible to earn the 1-100 score (like K-12 Schools), metrics such as site and source energy use/EUI can be adjusted to reflect operating attributes and weather for the current period (i.e., an adjusted baseline).

More Advanced EM&V

- Typically conducted by professional evaluators.
- May entail specialized metering of new/upgraded systems or equipment (“retrofit isolation”) and/or the development of regression analyses or calibrated simulations (“whole-building”).
- Rigor of EM&V approach typically aligned with the magnitude of savings expected, as well as the type of measure(s) being evaluated.
 - Are the upgrade measures well-known/documented?
 - Is there a possibility for significant variation in project savings from one installation to another?
 - Advanced Energy Retrofit Guide offers recommendations for M&V approaches for common measures.

Evaluating Savings From O&M and Behavioral Measures

- Not all energy improvements can be directly metered – but that doesn't mean they aren't delivering and/or reinforcing savings!
- A whole-building analysis approach such as benchmarking in Portfolio Manager can account for all aspects of your energy management activities and projects, including those that are less easily quantified.

Don't Forget the Non-Energy Benefits!

- Reductions in energy, cost, and greenhouse gas emissions may be the most immediate/observable impacts, but the potential benefits can include much more!
 - Occupant health
 - Occupant comfort
 - Student performance
 - School spirit and pride
 - Community engagement

Use EM&V Results to Fine-Tune Your Energy Management Plan

- Continuous improvement requires the willingness and ability to adapt and evolve your strategy as needed.
- EM&V can help you to better assess:
 - Did a project implementer/vendor deliver what they said they would?
 - Is this kind of project likely to reinforce or detract from decision makers' trust in the benefits of energy efficiency upgrades?
 - Should projects implemented successfully at one school be considered for district-wide deployed?
 - Was a given project the best use of limited funding, or should other approaches be prioritized in the future?
 - What public claims can we make about the impact/outcomes of our efforts?

- How does your District assess the results of energy improvement projects/initiatives (select all that apply)?
 - Ongoing benchmarking (via Portfolio Manager or another platform)
 - Formal process evaluation
 - Formal impact evaluation
 - Other

Questions?

We look forward to working with you!

