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CEE[SM] Strategic Energy Management Minimum Elements

Purpose

The CEE[SM] Strategic Energy Management (SEM) Minimum Elements describe, from the energy efficiency program perspective, the minimum conditions that an industrial company or facility should have in place in order to effectively and continuously improve their energy performance. The Elements do not describe efficiency program strategies or delivery approaches; these are detailed in the CEE SEM Program Case Studies. SEM has been effectively applied to many types of organizations and end uses; these Minimum Elements refer to the application of SEM to industrial businesses.

SEM as it is being practiced today is a relatively new approach to industrial energy efficiency. There is confusion currently regarding what exactly SEM is, which is intensified by the proliferation of program names and terms different market actors are using to describe similar ideas, including CEI, SEP, and ISO 50001. Additionally, because the term "energy management" has been used for more than 25 years in the US to describe audits and classic retrofit projects, there is a real need to be able to intelligently speak to all audiences about the differences between SEM and the more common, less strategic, project centered approach to energy efficiency.

By establishing a simple, clear description of what it means for an industrial site to be practicing SEM, these minimum elements provide a basis for consistent communication about SEM with industrial end users, which will improve market awareness and acceptance of SEM and help bring it to scale. For that objective to be achieved, program administrators, program implementers, and energy management service providers, who often are the communicators of the business case for SEM, need to come together around relatively straightforward language to describe what it is.

Definition

Strategic Energy Management can be defined simply as taking a holistic approach to managing energy use in order to continuously improve energy performance, by achieving persistent energy and cost savings over the long term. It focuses on business practice change from senior management through shop floor staff, affecting organizational culture to reduce energy waste and improve energy intensity. SEM emphasizes equipping and enabling plant management and staff to impact energy consumption through behavioral and operational change. While SEM does not emphasize a technical or project centric approach, SEM principles and objectives may support capital project implementation.

SEM Minimum Elements

1. Customer Commitment

In an industrial organization, clear commitment is vital for SEM to succeed. This commitment consists of the following activities by senior management:

a. **Policy and Goals** Set, frame, and communicate long-range energy performance objectives through an energy policy and energy reduction goals.
b. **Resources** Ensure that SEM initiatives are properly resourced for goal attainment, including assigning responsibility or accountability to an individual energy champion, energy team, or supporting employee engagement activities.

2. Planning and Implementation

Planning provides the starting point or foundation for the customer to strategically manage energy. Implementation is the translation of planning into actions that improve efficiency or reduce energy consumption. Planning and implementation consists of the following activities by the energy champion or team:

a. **Energy Management Assessment** Assess current energy management practices by using a performance scorecard or facilitated energy management assessment (EMA)[1].
b. **Energy Map** Develop a breakdown or map of energy end uses and costs across the company. This should include all significant end use systems, as well as other relevant variables of energy consumption such as production, weather, and product mix.
c. **Metrics and Goals** Establish clear, measurable goals for energy performance improvement according to one or more Energy Performance Indicators (EnPIs). EnPIs should be based on an analysis of the baseline energy consumption along with any relevant variables of energy consumption.
d. **Project Register** Describe the actions to be undertaken over the course of one or more years. These actions can include capital projects, improvements to operations and maintenance practices, and execution of awareness programs and procurement procedures for energy efficient equipment. Each project identified in the project register should include estimated energy savings and costs, and the project register should include relative priority of actions and an implementation timeline.
e. **Employee engagement** Develop and implement a plan to educate employees about the energy impacts of their activities, empower individuals to take energy improvement actions within their work areas, and encourage ideas for solutions beyond their own work areas.
f. **Implementation** Complete measures documented in the project register. Improve business processes, such as standard operating procedures, and then ensure that operational changes persist by engaging employees affected by these processes.
g. **Reassessment** Periodically review energy performance by comparing actual energy consumption to expected energy consumption. Reassess goals, metrics, and planned projects to ensure that these align with business and energy performance priorities.

[1] Examples of energy management practices score cards and energy management assessments are available from ENERGY STAR® for Industry, The Carbon Trust, and from EnVinta.

3. System for Measuring and Reporting Energy Performance

By regularly measuring and analyzing energy inputs and production outputs, companies can better manage their operations and improve their energy performance over time. Industrial organizations should monitor and report energy performance according to EnPIs and regularly analyze actual consumption against estimated consumption.

a. **Measurement** Regularly collect—via automated or manual means—robust performance data to understand energy use. While utility billing meter data are often used, where necessary, facilities may consider purchase and installation of permanent submetering of key processes. Systematic measurement should capture all relevant variables of energy consumption, such as production and weather.
b. **Data Collection and Availability** Collect and store energy performance measurements and improvements versus EnPIs and goals in commonly available formats, to facilitate data availability over time.
c. **Analysis** Conduct analyses of energy data, and data for relevant variables of energy consumption. A baseline can be established based on consistency of energy consumption and relevant variables of energy consumption. With the baseline set, a model can be created that will predict energy consumption based on changes in the significant energy consumption drivers. This baseline should be reestablished when changes occur that are outside of the norm of the model. There are several analysis methodologies currently used by programs and evaluators to establish models, and to determine savings based on comparisons of actual energy consumption with estimated energy consumption values from the model. These methodologies and approaches will be discussed in detail in 2013 CEE SEM Case Studies.
d. **Reporting** Regularly communicate the results of energy performance improvements and achievements in terms of agreed upon EnPIs to internal and external stakeholders, such as senior management, operations, energy team, and shareholders, as necessary.