Continuous Energy Improvement
Market Evaluation: Executive Summary

YEAR 2

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ES.1 Program Description

The Continuous Energy Improvement (CEI) Initiative comprises three pilot programs:

- The On-Site Energy Manager (OsEM) pilot will demonstrate the value proposition of hiring an OsEM to champion and implement energy and process efficiency improvement projects.
- The Strategic Energy Management (SEM) pilot will provide a dedicated energy coach to help facilities adopt SEM practices.
- The Energy Management Information Systems (EMIS) pilot will identify qualified EMIS providers and will subsidize the EMIS assessment and installation for participating facilities to overcome barriers to information about EMIS and the upfront cost of installation.

ES.2 Methods

In Year 2, Market Evaluation Team's primary data collection activities included interviews with five EMIS providers and convening a Delphi panel to estimate the baseline market adoption forecast for EMIS. In addition, the Team developed an approach to estimate indirect benefits resulting from the Initiative. Finally, the Market Evaluation Team conducted a comparison analysis of its assessment tool, used to estimate SEM adoption, and the NYSERDA program team's energy management assessment (EMA) tool. (To avoid survey fatigue, the Market Evaluation Team did not repeat the data collection activities, conducted in Year 1, required to assess initiative market progress indicators [MPIs]. MPIs will be updated in Year 3.)

ES.3 Market Evaluation and Methodology Updates

EMIS Providers: Key Results

The Team interviewed five EMIS providers qualified by NYSERDA to participate in the EMIS pilot. All five providers offer software-provided quantification of energy savings by comparing real-time energy usage from metered and submetered systems to a baseline usage model, calculated through regression analysis. All five providers offer employee training on the EMIS, and ongoing EMIS support. Four of the five offer support services through time-based contracts; these providers reported that about 90% of customers renew their contracts annually.

Providers relied on direct marketing and existing relationships to promote their products and reported that firms deploying EMIS tend to be larger companies, often with multiple facilities. They reported targeting firms in energy-intensive industries, such as refrigerated storage, food and beverage production, chemical production, and plastic injection molding.

Interviewees agreed that a primary market barrier is lack of information and understanding among potential clients. They noted that facility managers typically prioritize production goals, quality, and safety over energy management, and may not ever see utility bills or know how much energy they use. A related challenge is obtaining buy-in and support for installing and using the system, at different authority levels (facility and upper management), and within different departments (operations and accounting). All providers reported the EMIS readiness assessment is a critical tool for developing buy-in, because it provides the data to make the business case.

EMIS Baseline Market Adoption Forecast

Figure 1 shows the Delphi panelists' final estimates and the consensus adoption curve.

Figure 1. Market Adoption Forecast through 2037 for EMIS
Source: CMAT
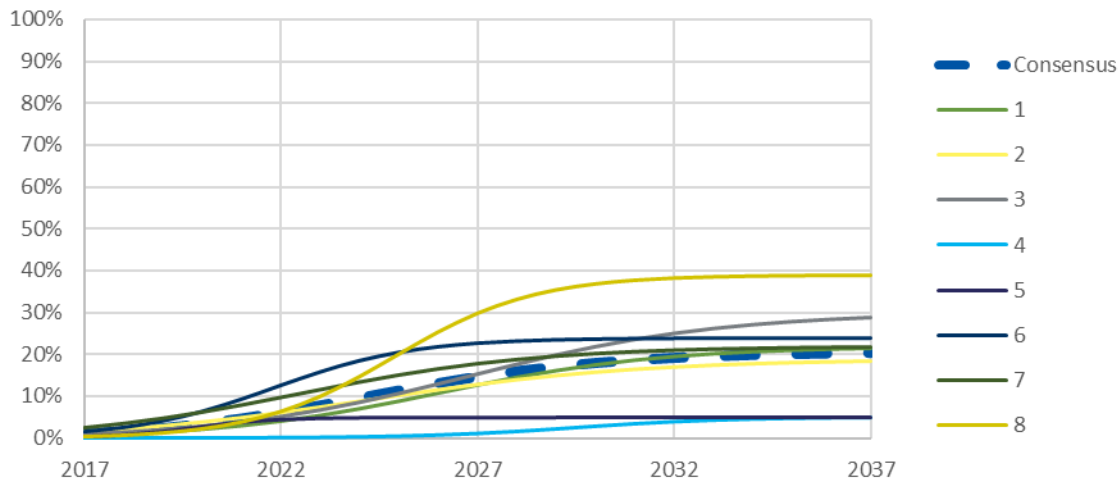
The Delphi panel process resulted in a consensus adoption curve that reaches 20% market adoption by 2037. This estimate is lower than the maximum market shares forecast for SEM (25%) and OsEM (38%) over the same 20-year timeframe and reflects the consensus opinion that the market potential and business case for EMIS is limited to industrial facilities with the highest energy consumption and demand.

Continuous Energy Improvement Indirect Impacts Methodology

The Market Evaluation Team developed the following algorithm to estimate indirect benefits from each of the three CEI Initiative components—OsEM, SEM, and EMIS:

$$Indirect\ benefits_t = [(Nonparticipant\ Adoption - NOMAD) + Direct\ Influence\ Participant\ Adoption]_t * UEB$$

Where the equation's variables have the following definitions:

- **Nonparticipant Adoption:** Units of adoption of the technology or practice by nonparticipating targeted end users
- **Naturally-Occurring Market Adoption (NOMAD):** Estimated end users that would have adopted the technology or practice absent NYSERDA's intervention, by type of end user
- **Direct Influence Participant Adoption:** Additional units of adoption by participant companies after they are no longer receiving incentives or direct support from NYSERDA
- **Unit Energy Benefit (UEB):** Energy savings (MWh or MMBtu) or CO_2e reductions per unit of adoption of OsEM, SEM and/or EMIS, by type of end user

The Market Evaluation Team will use the research activities and the estimation approach for each variable summarized in Table 1. The Team will incorporate UEBs estimated by NYSERDA.

Table 1. Indirect Benefits Algorithm Variables and Research Activities

Algorithm Variables	Research Activity/Source	Estimation Method
(1) Nonparticipant Adoption	Industrial Facility Manager Survey	The estimated proportion of industrial facilities adopting OsEM/SEM/EMIS multiplied by the total number of facilities.
(2) NOMAD	• Delphi panel/CMAT • Facility survey	Average of the Delphi panel estimate and the industrial facility survey NOMAD estimate
(3) Direct Influence Participant Adoption	Participant Survey (annual)	Additional units of adoption by participant companies after they are no longer participating
(4) UEB	As provided by NYSERDA	Unit energy savings and CO_2e reduction values will be applied for OsEM, SEM, and EMIS, by facility type

The Team will report on indirect impacts beginning in 2019—Year 3 of the market evaluation.

ES.4 Key Findings and Recommendations

Finding 1

Findings from the Delphi panel and the EMIS provider interviews corroborate many market

barriers documented in the CEF Industrial Plan logic model, including lack of understanding by facility managers, high upfront cost, and the need for buy-in across departments. Providers confirmed the readiness assessment is a critical tool for motivating a facility to move forward with an EMIS. Both providers and Delphi panelists stated that market potential for EMIS is limited to the largest facilities. Additionally, providers said that energy-intensive industries are the best candidates for EMIS, with one provider citing cold storage warehousing as an example.

Recommendation 1

In the next iteration of the CEF Industrial Chapter, NYSERDA should clarify its assumptions regarding populations that may benefit from uptake of EMIS systems. While the CEF Industrial Chapter defines the target market as firms in energy intensive industries with organization and management able to support the structured long-term engagement necessary for CEI practices, findings from this study suggest the target market is further limited to facilities with the largest energy expenditures—at least $500,000 in annual energy expenditures. In addition, the Market Evaluation Team is currently defining the industrial population as those facilities having an NAICS code of 31 through 33, which is specific to manufacturing. NYSERDA should consider expanding the population of analysis to include cold storage warehousing and purchasing data for facilities in this subsector, to inform the market evaluation.

Finding 2

Indirect benefits estimation requires estimation of four variables for each measure: nonparticipant adoption, NOMAD, direct influence adoption, and UEB. The input values used for each of the first three variables must correspond to the measure UEB values. For example, if NYSERDA intends to use two different unit energy savings values to estimate savings associated with OsEM adoption in medium and large facilities, the Market Evaluation Team also should estimate adoption variables separately for medium and large facilities. NYSERDA's CEF Industrial Chapter identifies separate OsEM UEB values for medium and large facilities, while the CEI Budget and Benefits workbook (BAB) currently uses a single value for unit energy savings, for all three CEI components.

Recommendation 2

To ensure the Team performs the data collection and analysis necessary to calculate indirect benefits, NYSERDA should clarify how, and for which segments of the market, it intends to estimate UEB values. To ensure effective evaluation of energy savings, NYSERDA should

clearly document sources and assumptions for benefits forecasts in its BAB workbook.

Finding 3

Although the market assessment tool and the EMA tool use different scales, it is likely that they would provide similar indications of SEM adoption at a population level, and similar year-to-year incremental progress from no or low-level SEM adoption to full SEM adoption at a minimum level.