



July 29, 2015

REPORT #E15-292

# Opportunities for Action on Energy Management Information Systems for Industrial Customers

## A Report for Program Administrators

Prepared by:

Chad Gilliss

Richard Hart

EnerNOC, Inc.

116 New Montgomery Street, Suite 700

San Francisco, CA 94105

Northwest Energy Efficiency Alliance

PHONE

503-688-5400

FAX

503-688-5447

EMAIL

[info@neea.org](mailto:info@neea.org)

**TABLE OF CONTENTS**

- 1 Summary.....1**
- 2 Introduction.....2**
  - 2.1 EMIS Definition.....2
  - 2.2 Methodology .....2
  - 2.3 Terminology.....3
- 3 Research Findings.....4**
  - 3.1 The Industrial EMIS Market in North America.....4
    - 3.1.1 General Market Size.....4
    - 3.1.2 Typical Purchasers .....4
    - 3.1.3 Value of EMIS to End-Customers .....6
    - 3.1.4 Barriers to Adoption.....8
    - 3.1.5 EMIS Pricing .....9
    - 3.1.6 Market Direction.....10
    - 3.1.7 Comparison to Commercial Market.....10
  - 3.2 Current EMIS Programming.....11
    - 3.2.1 Critical EMIS Roles in Programs.....11
    - 3.2.2 EMIS Incentives.....12
    - 3.2.3 EMIS Selection .....14
    - 3.2.4 Program Combinations .....15
    - 3.2.5 Summary of Current EMIS Programs.....18
    - 3.2.6 Key Lessons.....21
- 4 Program Administrator Options for Action in the EMIS Market .....23**
  - 4.1 Market Segments .....23
  - 4.2 Options for Action .....24
    - 4.2.1 Categories of Action .....24
    - 4.2.2 Ideas to Explore .....27
  - 4.3 Program Considerations.....34
  - 4.4 Final Options to Pursue.....34
- References .....36**
- Appendix A – Overview of Deliverables .....37**
- Appendix B – Training Outlines.....40**
- Appendix C – Tools Outlines .....42**
- Appendix D – Case Study Recommendations .....44**
- Appendix E – Interview Guides.....45**
- Appendix F – Industry Sources .....50**

## 1 SUMMARY

This report builds on NEEA's 2014 report titled *Inventory of Industrial Energy Management Information Systems (EMIS) for M&V Applications*, referred to in this report as “the EMIS Inventory.” Readers should refer to that report for a full definition of EMIS and for descriptions of EMIS features that are important to industrial customers and to program administrators.

As the EMIS Inventory states, “Utilities are seeing the potential of EMIS ... in the commercial and institutional sectors. However, application of EMIS in utility programs or pilots for industrial customers is rare.” Some program administrators in the Northwest are building their experience of EMIS across dozens of customer implementations, while others have not started down this path.

The goal of this report, then, is to help NEEA's funders and other program administrators determine how to move forward with EMIS. For those program administrators that have some experience, the report offers ideas for the future; for those with little or no experience, the report provides some immediate next steps. In particular, the report helps program administrators with the following tasks:

- Understand the potential benefits of EMIS within energy efficiency (EE) programs for industrial customers, including energy savings, persistence of savings, and customer engagement and satisfaction
- Review the different ways that EMIS is currently integrated into energy efficiency programs across North America
- Determine options for EMIS integration in current and future industrial EE programs, in ways that increase benefits and reduce risks

The report is accompanied by two guides, which program administrators can distribute to their customers to help customers make the most of EMIS: the first guide helps customers determine if EMIS is right for them, and if so, how to select the EMIS tool that meets their needs; the second helps customers implement and use EMIS effectively in their organizations.

Appendices in the report provide outlines for training, tools, and case studies that program administrators can develop to accompany each guide.

The intended audience for this document includes but is not limited to:

- Program planners and designers at NEEA's funders who are currently implementing or are considering implementing EMIS-based programs or EMIS program options
- NEEA staff who are determining EMIS barriers which may be appropriate for region-wide or other solutions
- Planners at other program administrators across North America who have similar needs

## 2 INTRODUCTION

### 2.1 EMIS DEFINITION

The EMIS Inventory described EMIS as “software tools that store, analyze, and display energy consumption data” and as “enabling tools that support users’ efforts to improve the energy efficiency of their facilities.” One program administrator summarized EMIS as “aggregated, processed, [and] attractive energy data.” In this report, EMIS does not include tools used exclusively by program administrators without end-use customer interfaces.

Our research uncovered some disagreement among market participants on the details of the EMIS definition: while most of our interviewees assumed that EMIS for industrial firms describes software that is specifically written to support energy efficiency through data capture, analysis, and display, we also saw three sources of divergence:

- EMIS includes general business software that is adapted for energy use, where the most common example is a sophisticated Excel spreadsheet.
- EMIS supports demand management, where the customer wants to change their load profile in addition to reducing overall energy intensity
- EMIS is not standalone software but is integrated into materials resource planning (MRP), automation, or environment, health and safety (EH&S) packages

In this report, as in the EMIS Inventory, we assume EMIS refers to **standalone software for energy management**, typically, though not necessarily, delivered as a web-based system. The software may include demand management capabilities but these are not discussed below. Where any interviewees use a different definition, we make that clear below.

### 2.2 METHODOLOGY

The process for this report followed four phases to arrive at the final deliverables:

1. Gather Data
2. Explore Opportunities for Action
3. Define Specific Options
4. Develop Customer Guides

Phase 1, Gather Data, began with surveys with 21 EMIS market participants, including program administrators, national energy efficiency organizations, third party consultants, and EMIS vendors. The interview guide is in Appendix E. The list of interviewees is in Appendix F. The interviews were carried in person and via email during November and December 2014.

The interviews provided deep insight into the EMIS market in North America. While the focus of this report is the Northwest region, all of the EMIS vendors operate across North America, so the broader market affects options in the Northwest. The market insight extends to market size, typical purchasers, value to end-use customers, barriers to adoption, pricing, and market direction.

In Phase 2, Explore Opportunities for Action, we used this market insight to develop a broad range of options for action by program administrators across four main categories: activity-based incentives, performance-based incentives, training and one-on-one interactions, and case studies and customer resources.

With input from program administrators, we developed 36 options in these categories (and a couple more that had to be added). We then assessed the options against critical considerations for EMIS programs, such as customer acceptance, implementation complexity, and customer success.

The goal of Phase 3, Define Specific Options, was to narrow down these 36 options to a set of actionable deliverables. Based on the program considerations that program administrators deemed most critical, the list of options was reduced to 12 for funder consideration. Representatives from NEEA funders reviewed the 12 options and prioritized the three options that they expected to deliver the most value.

Phase 4, Develop Customer Guides, represents the synthesis of funder input, which led to the expressed need for guides to help customers prepare for EMIS and then use EMIS. These guides accompany this report as key deliverables from the project. The appendices provide outlines of training, tools, and case studies that enrich the program administrator's EMIS programming.

### **2.3 TERMINOLOGY**

We use program administrator in this document to describe organizations that administer energy efficiency programs for industrial customers in the Northwest, including investor-owned utilities, public utilities, Energy Trust of Oregon, and Bonneville Power Administration

## 3 RESEARCH FINDINGS

### 3.1 THE INDUSTRIAL EMIS MARKET IN NORTH AMERICA

This section summarizes the results of interviews and reviews of a few public reports. It is not intended to be a comprehensive review of the market. Although this report is intended for program administrators in the Northwest, this section covers North America because vendors operate across the continent and because many program participants are part of organizations that span multiple regions.

#### 3.1.1 *General Market Size*

Vendors describe this market as relatively immature, evolving quickly, and in the early adopter phase. In the US, according to the U.S. Energy Information Administration's Manufacturing Energy Consumption Survey (MECS) survey, industrial firms spend \$75 billion on electricity and \$36 billion on gas (some of the gas is used as a raw material not a fuel). Even if firms were to limit expenditure to 1% of annual electricity cost alone, the market size would be \$750 million, not including Canada. While vendors did not provide sales figures, all agreed that industrial firms are not spending this amount annually on EMIS.

EMIS is typically applicable across all industrial segments, although no single industrial segment has adopted EMIS wholeheartedly. It is worth distinguishing between process and discrete manufacturers: broadly speaking, energy is a higher percentage of costs for process firms so they already have some form of energy management in place, while discrete firms are increasingly interested in this area.

Following are three perspectives from NEEA funders:

- Bonneville Power Administration (BPA) stated that the Energy Smart Industrial program has reached 1,000 end-users of EMIS across a spectrum from full integration down to billing analysis
- Energy Trust of Oregon (Energy Trust) believes that Industrial EMIS has barely scratched the surface of potential users
- PacifiCorp believes there are 400-500 appropriate customers in their operating states

#### 3.1.2 *Typical Purchasers*

In the current market there appear to be two key customer roles for EMIS adoption:

- Senior leader who is looking for operating or sustainability improvements
- Champion who is tasked with driving sustainability, energy or energy efficiency initiatives

The typical organization that purchases EMIS is already managing energy in some form. These organizations vary from large, well-known multinationals to single sites with large spend; most interviewees see much more interest from multi-site firms. The purchasing

decision is typically driven by operations departments, from the COO down to the regional VP Operations and down to the plant manager.

The champion may be a plant manager, maintenance manager, or someone with “energy” in their title. It is important to note that maintenance managers tend to be fighting fires and have less training on continual improvement through data, making them less ideal to champion EMIS. For EMIS to be implemented at the plant level, it typically must have the approval of the plant manager. For EMIS to have long-term success, the firm must have a culture of improvement using data.

There was general agreement that the current EMIS market consists of firms that spend at least \$1 million annually on energy. This threshold is a size indicator that is a proxy for three factors:

- Price point of the software is not insignificant and thus the firm will need to have a large enough energy spend to justify the capital investment
- Ease of use of software compared to level of understanding of customers below that threshold
- Larger firms may be more likely to have staff available to actually use the software consistently

Interviewees generally agree that this threshold will decrease over time due to the factors in the Market Direction section below.

Firms are willing to pay a single digit percentage of annual energy spend on an EMIS solution. They typically expect EMIS software to manage a variety of fuels, especially electricity and natural gas.

Firms’ finance and IT groups may need to sign off on the purchase decision but are not primary drivers. Depending on the overall EMIS cost, final procurement may come from the plant level or from a centralized procurement organization.

Finally, all vendors report that customers across North America are purchasing EMIS outside of incentive programs (the limited number of incentive programs could not support the large number of EMIS vendors). In the Northwest, however, the majority of EMIS use is happening within incentive programs.

### 3.1.3 Value of EMIS to End-Customers

The primary value of EMIS is to reduce energy costs through better visibility of how energy is consumed, driving better decisions within and across facilities. The following kinds of visibility and decisions were discussed:

**Table 3-1. Aspects of EMIS contributing to improved visibility and decision-making**

	Visibility	Decision
Management	Benchmarking of consumption within a portfolio and in comparison with other firms	Prioritize resources to meet energy goals
	Actual energy consumption at multiple facilities (“single version of the truth”)	Prioritize resources to reduce waste and meet energy or sustainability goals; understand and potentially optimize distributed generation resources
	Financial reporting	Prioritize resources across all operations; assign energy costs accurately to product lines; determine options for energy supply
Supervisory	Performance tracking against energy or sustainability goals	Maintain course or adjust resources
	Monitoring and verification (M&V) of energy projects, including both capital and operational projects	Justify past investments; build business case for future investment
	Understanding of energy drivers	Determine options to increase efficiency
	Load profiles over time	Reduce demand charges; determine options for demand response participation
Control	Current energy use (i.e. over the past few seconds or minutes) at the system or equipment level, often within a control chart	Change operations to control energy consumption
	Alerting when certain conditions occur	Change operations to control energy consumption and/or demand

Program administrators have mostly found that performance tracking is a very effective value proposition when getting customers to adopt EMIS as part of participating in their EE program.



Finally, while firms may be able to justify EMIS investment based on energy savings alone, they may need to find other values to make a purchase decision. EMIS can have benefits that go beyond energy reduction, including the following:

- Save time
  - Manage the increasing quantity of energy data coming from sensors and meters
  - Reduce the time to create sustainability reports
  - Reduce time to find and pay energy bills
- Improve management
  - Plan future projects
  - Coordinate efforts between teams
  - Allocate energy costs more accurately
  - Help make the transition to more sustainable energy solutions
- Simplify compliance
  - Support ISO 50001 conformance
  - Comply with regulatory requirements
- Improve plant efficiency
  - Improve reliability through increased monitoring of plant operations
  - Conduct fault detection/isolation and root cause analysis
  - Reduce waste of other utilities such as water

### ***3.1.4 Barriers to Adoption***

According to interviewees, the biggest barrier to EMIS is that firms are not required to have EMIS in place, so adoption and implementation may lose to other priorities. The following issues were cited by interviewees:

- Lack of interest in energy in general
  - Lack of interest in energy costs or consumption as a performance indicator, so long as production is meeting goals
  - Prioritization of investments in production, quality, or health and safety
  - Lack of understanding that energy is a controllable cost
  - Low pain from low energy costs in the Northwest
- Lack of interest in EMIS
  - Lack of understanding of how EMIS will lead to reduced energy spend and improved efficiencies overall
  - Preference for equipment changes to save money

- Lack of resources
  - Difficulty in getting champion to present business case in an effective way
  - Inability to integrate production data with energy data
  - Lack of appropriate people and processes to make good use of the EMIS
  - Lack of culture of using information for continual improvement
- Risk too high
  - Risk of unknown costs of deployment and ongoing support/maintenance
  - Real or perceived insufficiency of detailed energy data combined with associated cost of submetering; this risk is not understood upfront by many firms
  - Concerns that there are too many vendors and not all will survive
  - Unwillingness to proceed unless there is a program incentive

These barriers apply to different firms at different times. The fact that firms continue to adopt EMIS suggests that the barriers are surmountable, so long as the values in the previous section are clearly stated and understood.

### ***3.1.5 EMIS Pricing***

The focus of this report is program administrator action in the EMIS market, and pricing plays an important role in determining what program administrators can offer to customers. A limited survey of vendors revealed a wide distribution in pricing from \$3,000 per year to \$48,000 per year, typically based on three-year contracts and including setup fees.

This wide variation in price covers many different deployment options. Program administrators interested in understanding price in more detail should discuss the following factors with vendors:

- Energy data sources (automated interval data or manual data entry)
- Production data sources (automated or manual, also frequency of update)
- Fuels included (electricity, or gas and electricity)
- Length of contract
- Number of facilities included in contract
- Frequency of payment (annual versus full payment upfront)
- Inclusion of additional services such as analysts or engineers
- M&V requirements

### 3.1.6 *Market Direction*

Interviewees generally agreed that the market for industrial EMIS will expand in the next five years. Some of the factors mentioned (in no particular order) were:

- Increased cost-effectiveness
  - Increased price and volatility of energy costs, especially natural gas as it becomes more widely used for power generation and export
  - Reduced cost of submetering and sensor technology
  - Reduced cost of utility meter data
  - Reduced cost of data integration at the plant through standardization of interfaces with SCADA and PLC control systems
- Improved market drivers
  - Increased adoption of Strategic Energy Management (SEM)
  - Evolution of software to meet more customer needs with easier-to-use features
  - Increased interest in EMIS from program administrators who are looking for more savings with more persistence at greater cost effectiveness, especially as the wave of savings from LEDs subsides
  - Improved EMIS capabilities to handle the “big data” of industrial energy consumption
  - The EPA’s implementation of the Clean Air Act, Section 111(d) may drive states to use energy efficiency as their cheapest option, thereby increasing attention to energy in the industrial sector
- Simplified market
  - Increased information about EMIS available to customers through efforts such as the NEEA EMIS Inventory
  - Consolidation in the EMIS vendor market

### 3.1.7 *Comparison to Commercial Market*

Four key differences between commercial and industrial EMIS emerged from the interviews:

- The industrial EMIS market is much more fragmented than the commercial EMIS market because industrial uses of energy are so divergent.
- It can be harder to describe the industrial EMIS market, because energy management is a discrete activity for commercial buildings but not for industrial plants.
- Commercial EMIS can include some control options (e.g. adjusting HVAC setback temperatures) while industrial EMIS typically does not because control of manufacturing processes is so complex.
- An industrial facility has far more involved, complex systems than does a commercial facility.

Any action by program administrators in the EMIS market should take these key differences into account.

## 3.2 CURRENT EMIS PROGRAMMING

### 3.2.1 Critical EMIS Roles in Programs

EMIS features were discussed at length in the NEEA EMIS Inventory. This report focuses on key roles that EMIS plays in energy efficiency programs. Note that interviewees had different priorities in the following list of EMIS roles:

- **Improve customer relationship.** Program administrators typically see EMIS as a way to increase each customer’s engagement in energy management and improve the relationship with the customer. A vibrant EMIS program or program component shifts the customer perception of the program administrator from a transactional organization to a service organization.
- **Work with a baseline.** This is the most important EMIS requirement since performance determination requires a baseline. EMIS can have varying capabilities related to baselines, including how models are determined in baseline time periods as well as in how baseline time periods are established. Some EMIS software automatically calculates models and establishes optimal baseline time periods, while other EMIS software provide the ability to import models created elsewhere and to establish baseline time periods via system configurations. This is an area that will continue to evolve as customer’s needs mature and solidify across the EMIS market.
- **Provide visibility that leads to Operations and Maintenance (O&M) savings.** Customers often have no insight to O&M savings opportunities. EMIS can point the way to investigations that lead directly to O&M savings.
- **Track savings opportunities.** EMIS can be a valuable tool for recording both O&M and capital opportunities, tracking progress against them, and understanding their impacts on actual performance.
- **Ensure persistence of savings.** Energy Trust described this function as the “holy grail” of EMIS. However, very few customers have got to the point of true persistence. According to Energy Trust, EMIS has the potential to increase measure life for operational changes from 1 year to 3 or 5 years. If the customer provides regular reports from EMIS, or the program administrator has access to the customer EMIS instance, the program administrator can determine whether or not to intervene to get the customer back on track.
- **Provide M&V of savings.** The EMIS Inventory makes the critical point that “M&V using EMIS presents a potential solution to one of the energy efficiency industry’s biggest challenges: making energy savings reporting more transparent, more reliable, and less costly.” NEEA continues to investigate this point for the long term. Interviewees confirmed that EMIS does deliver reliable savings and measurement data. In addition, firms need a different level of M&V internally: they use EMIS to demonstrate that capital and operational projects delivered savings so that future projects are supported. This report does not investigate the M&V aspects of EMIS.

- **Manage and track projects.** EMIS can be a repository for managing energy projects and activities (e.g. notes from meetings). It can be the energy team's system of record in face of constant change. EMIS is useful also for tracking energy savings opportunities.

Vendors with national scope point out that the world of EE programs is more dynamic now than it has been in the past. Customers are adopting distributed generation, storage, and electric vehicles in large numbers. Any EMIS solution should be flexible to deal with changing programs and changing customer needs.

### 3.2.2 *EMIS Incentives*

#### **Common Approaches**

Program administrators have a general understanding that customers need support in the following areas to have a successful deployment:

- Software purchase, which may consist of first-year costs only or multiple years.
- Management planning to ensure that EMIS implementation is successful
- Deployment services, such as data integration, configuration, and initial training
- Continued training, provided by EMIS vendors or third-party consultants
- Ongoing management support to help the customer continue to get value from EMIS after deployment (note that technical software support is always provided by the vendor)

Deployment services and training are specific to the particular EMIS in use by the customer, while other professional services, like planning and management support, are tightly linked to SEM. Typically all of the services are covered by SEM incentives.

Incentives are nearly always provided as upfront payments rather than performance-based payments delivered after savings M&V. Program administrators recognize that upfront payments are a key way to reduce customer risk.

Program administrators have not determined if customers will continue to pay for the software after the incentive payment ceases, although vendors report that large customers are purchasing EMIS solutions even when no incentives are available.

Sixteen program administrators recently responded to CEE's 2014 SEM Program Case Studies Report. Of these respondents:

- 8 offer an incentive for software purchase
- 7 offer an incentive for hardware costs
- 7 offer an incentive for deployment services
- 2 offer an incentive for ongoing support of the EMIS service contract

The size of the incentive and the exact terms and conditions of its award vary widely between programs. Typically, where an incentive is offered, public utility commissions agree that there are no free riders so the cost-effectiveness ratio is 1 or higher.

It is worth noting that larger customers probably have the necessary capital in place to pursue EMIS on their own. However, the program administrator incentive improves the business case, reduces the risk, and provides support for the champion when presenting EMIS to executives.

### **EMIS Audit and Planning Support**

Where program administrators allow customers to select from multiple EMIS options (see the EMIS Selection section below), there is recognition that customers may not have the skill set to determine their requirements for the EMIS at their firm, so customers might select a system they don't really need.

Ontario Power Authority (OPA), Efficiency Nova Scotia (ENSC) and Efficiency New Brunswick (ENB) offer an incentive that is specifically directed at an initial EMIS audit and implementation plan. With ENSC and ENB, customers cannot proceed with the deployment until they have completed both the audit and planning stages. As ENSC states, they must yield energy savings for all incentive expenditures; therefore it is crucial that potential customers are properly screened prior to inclusion in the program

BC Hydro believes it is important to offer a flexible incentive that allows the customer to meet their specific needs. Their Energy Monitoring and Targeting (EM&T) Level 2 incentive can be used for any aspect of EMIS where the customer needs help, from an EMIS audit to planning to software costs to submetering costs.

BPA's offer for its Performance Tracking System includes design and verification of the system, payment for hardware, software and data integration costs, and a maintenance budget.

Natural Resources Canada provides a variant of this support by providing regular EMIS training sessions for customers as part of the Dollars to Cents Workshops.

### **Submetering**

Vendors report that industrial customers often believe that the EMIS solution can only be effective with extensive submetering. While this is not usually the case, customers may be looking for submetering support.

One vendor provided specific guidance on how submetering should be included in EMIS deployment:

- Establish a goal to capture enough data to add value
- Capture that data, get it in front of the customer, and teach the customer how to use the data to get the expected value
- Add further layers of data incrementally at a pace that people can handle

Depending on the jurisdiction, some program administrators can provide incentives for submetering while others cannot. Customers may already have submeters in place that were included as part of custom projects or that were purchased independently. Submetering may

be an area that continues to evolve as its value to energy efficiency becomes solidified, which will make incentives more consistent across jurisdictions.

### **Incentive Recipients**

There are minor differences in who receives the incentives. Most programs provide the incentive directly to the end customer, with possible assignment directly to the vendor. Energy Trust provides incentives only to vendors to simplify the process for customers (although, Energy Trust is now exposing customers to the full cost of the EMIS incentive so that customers understand the value they are receiving).

### **Performance-based Payments**

Programs typically reduce customer risk by providing upfront cash payments. One vendor reports that gas companies are providing upfront incentive money as well as payments for the reduction at the back-end. The only program that provides just performance-based payments for EMIS is the Custom O&M program offered by Energy Trust, where EMIS is an eligible expense covered by a \$/kWh incentive – in this case, EMIS helps ensure the persistence of savings that are largely dependent on operator behavior over the long haul.

Performance-based payments for EMIS suffer from two main difficulties:

- EMIS does not directly lead to energy savings so it is not clear who is actually driving savings and should therefore receive incentives (e.g. if the vendor does most of the work to drive successful EMIS deployment, should the customer receive all of the incentive?).
- From a rate-payer funded program, it might be misaligned if most of the money went to large organizations who have the process in place with lots of energy to save, even though the EMIS investment was not that much higher than smaller organizations.

### **3.2.3 EMIS Selection**

Program administrators have chosen three different options for EMIS selection in order to balance customer choice with program risks and branding:

- Any technology that the customer selects, so long as it meets program requirements. For example, Snohomish PUD allows the customer to select an appropriate EMIS but only within the Resource Conservation Management and SEM programs.
- A limited range of EMIS options that have been carefully screened by program administrators according to clear criteria. For example, BC Hydro offers six different EMIS options to customers.
- A single EMIS that is closely tied into the program. For example, Energy Trust offers one EMIS in its Refrigeration Operator Coaching (ROC) program.

## Private Labeling

Many EMIS vendors allow their software to have a private, non-vendor brand on the user screens and reports. Program administrators have different perspectives on private labeling of EMIS with their own brand:

- This option can make sense, especially if the program administrator has already converged on one or two EMIS vendors for a program. A single solution is much easier for program staff to learn and therefore to train with customers. If the program administrator does commit to this path, it is preferable for the EMIS solution to offer back-end access for program staff to monitor customer activity and review customer data for possible savings.
- This option can be problematic because there is no one-size-fits-all solution so it can be too limiting to pick one or two vendors. There is a chance that the selected system would fail to deliver the maximum energy savings for all customers: the solution the facility selects is probably the one the facility will use the most. Customers may also want to run a single EMIS across multiple sites in different service territories.
- This option could be very useful in a fully deregulated market where the program administrator is looking for value-added services or could even make money from the software.

All interviewees agreed that no matter how the selection is offered, the customer should own and operate the EMIS.

## The Program Administrator-Vendor Partnership

Vendors are naturally very supportive of program administrator engagement in the industrial market, and would welcome more incentive programs.

Vendors are expecting to sell EMIS solutions both in and out of EE programs. It is in everyone's interest for EMIS deployments to be very successful. For this reason, both program administrators and vendors should take care with customer targeting, marketing, sales, and deployments. The partnership depends on a history of successful deployments to ensure that EMIS is perceived as delivering value in the market.

In addition, multi-site firms get much more value when all plants use the same EMIS solution. There is the potential for program administrators and vendors to collaborate in maximizing customer value by ensuring that the same EMIS is used at multiple sites.

### 3.2.4 Program Combinations

EMIS is commonly combined with three program types:

- **SEM.** This appears to be the optimal program to combine with EMIS. SEM sets up a management system that develops staff capacity and processes necessary for EMIS success. EMIS is particularly helpful at maintaining baseline models that can be hard to maintain manually. Program administrators that offer SEM have found that this combination is effective at delivering savings from energy management. Energy Trust



is currently requiring every participant in one of its SEM cohorts to use the provided EMIS solution.

- **Energy Manager.** Some program administrators pay for a portion of the salary of an onsite Energy Manager. This incentive is often but not always combined with an SEM program. The subsidized energy manager plays the role of the Champion mentioned above.
- **System-oriented O&M Programs** (e.g. re/retro-commissioning, persistent commissioning, system operation coaching, and custom O&M). System-oriented O&M programs target measures that restore systems to their optimal settings or outline new measures that refine systems based on current needs. EMIS provides a means to estimate savings from these programs when narrower savings approaches (e.g. retrofit isolation) are not appropriate. In addition, EMIS can support the organization to enable these measures to persist over time. Ideally, EMIS also motivates the organization to continue to identify new measures.

EMIS was also mentioned as a potential combination with two other programs (these have not been implemented):

- Compressed air
- Productivity studies

PG&E made the point that in California, it is hard to get any incentive for non-residential software through their Public Utility Commission, because there is not enough data to get statistical accuracy. The solution is program bundling where EMIS is positioned as an enabling tool, with no incentive for the software per se.

### **The ENSC and ENB approach**

This section focuses on these two program administrators because their approach differs from that of most other SEM programs. Instead of recruiting customers with an SEM offering that includes EMIS, the programs recruit customers with an EMIS offering that becomes SEM. This difference warrants special attention by program administrators familiar with traditional program designs.

The two program administrators use EMIS as the entry point for energy management with industrial customers. EMIS is initially framed as a technology project, so that it feels familiar to customers. ENSC and ENB then build energy management capacity incrementally through the customer's engagement with EMIS.

ENSC will not provide incentives toward an EMIS project which does not include both the technical components and organizational components (training, management system assessment and recommendations, communications, awareness building, employee engagement, etc.).

ENSC provides incentives for the following stages of EMIS deployment:

- EMIS audit that asks how the company would manage energy more effectively with better information from EMIS and what the financial return would be
- EMIS implementation plan which includes detailed design, information flow, budgets, staff roles, and goals
- EMIS implementation including installation of hardware, connection to other systems, and configuration (paid in phases, with 25% of incentive paid when customer submits the first quarterly energy savings report)
- Ongoing operational support after the EMIS is implemented

Funding is up to 50% at each of these stages, and is determined on a case by case basis. The first two incentives are paid when the customer moves to the next step (although if the audit finds that EMIS would not meet the customer's financial criteria, ENSC pays the incentive). The audit is performed by a third party, unaffiliated with the vendor, so that the audit is not a method for arriving at a vendor proposal. The implementation planning stage is seen as critically important to help the customer think through what to measure, and where the actual opportunities lie so that the value is recognized right away.

The program design allows for decision points for the customer to exit along the way. ENB used a similar design – their experience was that over 50% of customers completed the implementation. Of 26 large facilities in the province:

- 22 completed the audit
- 15 completed the implementation plan
- 14 completed implementation

Finally, both ENSC and ENB do not see EMIS as a distinct piece of software but rather as an information management system that gathers relevant data into whatever system is most likely to drive action, which may be a historian, an existing system, or a spreadsheet.

**3.2.5 Summary of Current EMIS Programs**

The table below is not a comprehensive list of EMIS programs. Rather, it is a list of programs for which we were able to gather details during December of 2014.

**Table 3-2. Overview of current EMIS programs**

Organization	Program or Program combination	Type of customer	EMIS options	EMIS Incentive
BC Hydro	SEM + Energy Manager	Large Industrial	Shortlist vetted by program	Lump sum for customer-selected mix of consulting, metering, and software for advanced modelling, real time monitoring, and system monitoring
Bonneville Power Administration	Track and Tune	Industrial	Any	Design and verification of system; payment for hardware, software and data integration costs as well as a maintenance budget
Bonneville Power Administration	SEM with Performance Tracking System	Industrial	Any	Design and verification of system; payment for hardware, software and data integration costs as well as a maintenance budget

Organization	Program or Program combination	Type of customer	EMIS options	EMIS Incentive
Efficiency New Brunswick	Standalone	Large Industrial	Shortlist vetted by program	100% of customer costs up to cap for EMIS audit 50% of customer costs up to cap for EMIS implementation plan 50% of customer costs up to cap for EMIS implementation
Efficiency Nova Scotia	Standalone (not offered with SEM or RCx programs)	Large Industrial	Shortlist vetted by program	50% of customer costs up to cap for EMIS audit 50% of customer costs up to cap for EMIS implementation plan 50% of customer costs up to cap for EMIS implementation
Efficiency Vermont	SEM / CEI	Large Industrial	Single option selected by program	75% of cost of getting EMIS up and running (includes software, integration, and support), paid on milestones
Energy Trust of Oregon	SEM	Large Industrial	Single option selected by program	EMIS paid for by Energy Trust for duration of participation in program
Energy Trust of Oregon	SEM	Medium Industrial	Single option selected by program	EMIS paid for and required by Energy Trust
Energy Trust of Oregon	Refrigeration Operator Coaching	Food processors & cold storage	Single option selected by program	EMIS paid for by Energy Trust (based on performance)

Organization	Program or Program combination	Type of customer	EMIS options	EMIS Incentive
Hydro Quebec	SEM	Large Industrial	Any	50% of the cost of hardware and software for permanent submetering
National Grid	Standalone	Large commercial, especially customers who are not participating in EE programs	Shortlist vetted by program	Pay for performance based on implementation of O&M measures
OPA	Energy Manager	Industrial or institutional	Any	80% of actual eligible costs up to \$75,000 per site for monitoring and targeting system. Participant must: have an energy manager; demonstrate specific peak demand and energy savings; implement projects with <1-year payback; and provide annual reports of opportunities implemented.
Pacific Gas & Electric	Whole building	Large commercial	Shortlist vetted by program	Pay for performance of EE and DR based on implementation of O&M measures
Snohomish PUD	Resource Conservation Management (may include subsidized energy manager)	Commercial and Industrial	Any	Cash payment for EMIS at customer option

### 3.2.6 Key Lessons

As stated by Kim Crossman of Energy Trust, “This machine has no brain”. In other words, savings come from people taking action based on EMIS support. Market participants all recognize this point.

- **Plant-Level Lessons**

- **Deployment is critical to success.** An EMIS allows for possibilities, but it all depends on how it is configured, programmed and implemented. Any consultants or trade allies involved in the deployment need to understand energy management and software as well. In the words of one program administrator, “EMIS is not a project, software, or a technology; it is an organizational commitment to systematically manage energy. When treated as a software or technology project, in my experience, the result is a standalone system which doesn’t get used.”
- **Excessive focus on submetering is not helpful.** Vendors see EMIS implementations go wrong when the customer tries to put hundreds of submeters in all over the facility without first establishing value for the data and a process to manage the data.
- **EMIS is scalable within a plant and within a program.** Deployment can begin with one area of the plant with high opportunity (e.g. the waste water treatment system within the plant) and expand from there. Multi-site customers learn from deployments at one plant to make subsequent deployments more efficient/effective.
- **EMIS can build on other systems.** Plants are often using similar tools for quality or EH&S. It is easier for an organization to use Cumulative Sum charts (CUSUMs) and control charts if they are already using these in other areas.

- **Program-Level Lessons**

- **EMIS must offer configurable baseline energy models.** The last thing a program administrator wants is a system with a poor energy model used to estimate energy savings. Customers must be able to adapt the energy model in the EMIS to their specific needs.
- **EMIS cost-effectiveness must be managed.** Since EMIS does not directly generate savings, the additional costs of EMIS must be carefully managed. Program administrators have so far been successful with this balancing act in the industrial sector.
- **EMIS can introduce delays in SEM programs.** It is important to be careful about how program administrators structure the offering alongside the finite time constraints of an SEM program. This issue can be pronounced in a cohort setting, where the time requirements to setup multiple cohort participant facilities within a fixed time period introduces program complications.

- **EMIS is not universally adopted by customers.** Even when the program administrator offers EMIS incentives, firms do not all use the software to its potential, especially over time.
  - **EMIS at lower granularity can still be useful.** EMIS software typically uses interval data at the daily, hourly, or 15-minute level. However, if the facility only has monthly data available, EMIS can still deliver value.
  - **EMIS for smaller firms may need to use spreadsheets.** Efficiency New Brunswick is expanding the EMIS program to include smaller firms that typically use Excel spreadsheets rather than invest in software. In this case, EMIS has “a capital M (management) and small i (information/data)” to increase cost-effectiveness of the program.
  - **Program Administrators should manage the deployment of EMIS audits to maximize program cost effectiveness.** Like other forms of audits, if EMIS audits are offered, program administrators should assume that not all customers will implement EMIS after the audit. As a result, some program administrators may choose not to pay for the complete cost of an EMIS audit. Others may pay for the full amount, but plan for a certain number of customers to successfully complete deployment. Finally, it is important to note that good screening can increase the realization/conversion rate of EMIS audits into EMIS deployments.
  - **Customer education and training are critical.** Customers typically do not understand EMIS value, so education at every step is hugely important to ensure that EMIS is relevant for the plant manager. Facility-wide training helps staff understand what EMIS is, how it should be used, and the roles of all relevant staff.
  - **EMIS vendors and program administrators should set the right customer expectation.** Vendors may overstate some of the benefits as part of the sales process, while program administrators are very cautious about savings. Customers need to get an accurate understanding of what the EMIS solution can do, so vendors and program administrators should make sure they collaborate on customer sales.
- **Software Features**
    - **EMIS must be easy to use.** EMIS solutions should offer a great user experience. Software that’s built for energy engineers or geeks is typically not for the average user.
    - **EMIS must be adapted for industrial use.** In the words of one program administrator, “Unless EMIS can speak to the relationship between production and energy use then it is useless.” The EMIS Inventory evaluated many EMIS solutions on the market and found a number of them that are very well adapted to the requirements of industrial customers.

## 4 PROGRAM ADMINISTRATOR OPTIONS FOR ACTION IN THE EMIS MARKET

### 4.1 MARKET SEGMENTS

There are many ways to segment the industrial market. For simplicity, this study used the sizing segmentation developed by the NW Industrial SEM Collaborative’s Market Analysis and Planning (MAP) Team.

**Table 4-1. Industrial Sizing Segmentation**

Segment	Consumption (1 aMW = 8,760 MWh)	# of facilities in NW
Very Large	3+ aMW	170
Large	1 – 3 aMW	350
Medium	1,000 MWh – 1 aMW	2,150
Small	< 1,000 MWh	15,000

Notes: Customer segmentation presented at the Third Annual NW Industrial SEM Collaborative Workshop. Slides retrieved from <https://conduitnw.org/pages/file.aspx?rid=2266>

Program administrators typically use the following criteria for determining if a segment is attractive for EMIS deployment:

- Customers can generate significant savings to cover EMIS costs, especially from repeat projects that emerge from analysis
- Customers have resources on site to use an EMIS tool
- Customers are unlikely to have a tool already

In general, **attractive customers are clustered around the Large segment**, with some Very Large and many Medium customers being included in the sweet spot for EMIS.

The largest customers are likely to have tools in place or have formal processes that slow down EMIS adoption across the organization. Medium customers can see the value but the smaller end of this segment may not have sufficient consumption to generate projects every year.

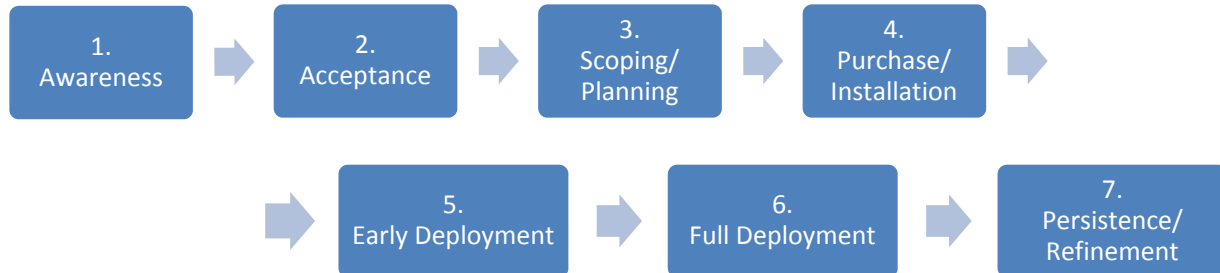
It is worth noting that this is a dynamic situation that depends, as one interviewee said, on “the evolution of EMIS and energy management programs”.



## 4.2 OPTIONS FOR ACTION

Program administrators can work with their customers at multiple stages in the process of adoption and use of EMIS:

**Figure 4-1. Adoption process outline**



As shown in Table 3-2. Overview of current EMIS programs, most program administrators that provide EMIS incentives are providing lump-sum incentives or providing the EMIS free of charge for a certain period. These incentives address the Purchase/Installation stage. The Deployment and Persistence stages may be addressed by third-party coaching as part of SEM, Energy Manager or System-Oriented O&M programs.

### 4.2.1 Categories of Action

In this context, we considered four alternative categories of program administrator action for EMIS.

#### 1. Activity-based incentives

<b>Examples</b>	<ul style="list-style-type: none"> <li>• Incentive for uploading production data or finalizing regression model in EMIS by certain milestone in program</li> <li>• Incentives for EMIS use activities (e.g. # of log-ins in a month, % of items placed in opportunity register that migrate to CUSUM charts)</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Get customers to focus on activities that have been proven to lead to use, deployment, and persistence</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Activities can be hard to measure objectively</li> <li>• Regulators may not be willing to allow these incentives until the links between action and savings is proved out by evaluators</li> <li>• A particular activity will lead to very different benefits in different customers so a single incentive structure may not work</li> </ul>

## 2. Performance-based incentives

<p><b>Examples</b></p>	<ul style="list-style-type: none"> <li>• Incentive up to 75% of EMIS costs if hit 3% savings, 100% if hit 5%</li> <li>• Base incentive of 25% for EMIS + 25% for 1 year of SEM program + 25% per year for 2 years if show results and persistence</li> </ul>
<p><b>Advantages</b></p>	<ul style="list-style-type: none"> <li>• Links EMIS incentive to delivered savings that can be evaluated</li> <li>• Helps direct customers who have started to use EMIS towards energy savings</li> <li>• Fits well with performance incentives in SEM</li> </ul>
<p><b>Disadvantages</b></p>	<ul style="list-style-type: none"> <li>• At the adoption stage, the customer bears all of the risk of EMIS payment</li> <li>• Successful EMIS deployment can take many months, so the incentive for savings is out of sync with customer payment for EMIS</li> <li>• Different customers using EMIS in the same way may still see very different timing of their savings</li> <li>• Customer that does not achieve savings may see the lack of an incentive as a loss that diminishes their interest in overall program</li> </ul>

### 3. Training and one-on-one interactions

<b>Examples</b>	<ul style="list-style-type: none"> <li>• Training program for potential users for half day (considerations, implementation, use)</li> <li>• EMIS promotional tour (real or virtual) to visit successful sites</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Moves customers from awareness to acceptance</li> <li>• Helps customers who have started to use EMIS to move to full deployment</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Customers may use the training but not adopt EMIS</li> <li>• Cost of training can get very high, especially as it becomes more customized to each industry sector and each type of user</li> <li>• Region-wide training could be confusing because of different EMIS solutions and different programs adopted by program administrators</li> </ul>

### 4. Case studies and customer resources

<b>Examples</b>	<ul style="list-style-type: none"> <li>• Detailed case studies of successful implementations</li> <li>• Report on cost/value of EMIS and submetering – real results</li> </ul>
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• Moves customer from awareness to acceptance</li> <li>• Scales well with relatively low cost of development</li> <li>• Provides material for program administrator account managers</li> <li>• Allows customer to understand benefits beyond energy savings</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• May not be read by busy customers</li> <li>• Lacks emotional connection to move people to action</li> </ul>

Program administrators generally preferred categories 3 and 4 (training and case studies), which we explore in more detail below.

Program administrators see categories 1 and 2 (activity-based and performance-based incentives) as less effective for three main reasons:

- The cost of EMIS is typically low compared with all other program costs so the EMIS portion does not merit complex design
- In the early stage of this market, it is better to have customer-friendly design
- The disadvantages are significant.

Two program administrators made suggestions to counteract these problems:

- One program administrator strongly preferred performance-based incentives, with the suggestion that the program administrator pay for EMIS upfront and then withhold regular incentive payments until the payments cover the cost of EMIS.
- One program administrator suggested an activity-based incentive where the program administrator withdraws coverage for the following year if the customer does not achieve activity thresholds in the current year.

Finally, unrelated to the issues around incentives, another program administrator suggested a fifth category for **Standards**, in order to drive consistency, in the same way that ASHRAE's voluntary standards drive consistency in auditing and equipment design.

#### 4.2.2 *Ideas to Explore*

In the interests of sparking creative thinking in the Northwest, we include all 36 ideas that were raised in the brainstorming process. Many of these were rejected fairly quickly in the process but may nevertheless provoke some ideas in the reader. The list is organized into six categories: the four discussed in detail above, and standards, and miscellaneous ideas.

- Activity-Based incentives
  - Payment for EMIS for upcoming year dependent on threshold of activity in current year
  - Payment for 100% of EMIS costs each year, if in SEM or implementing capital projects of a certain size
  - Tiered incentives depending on level of implementation (e.g. set-up, features used, # of external data points)
  - EMIS incentive tied to specific equipment retrofit – show savings on equipment over time, then add more parts of plant/systems, integrate into maintenance flow.
  - Base EMIS incentive (e.g. 50% of cost) + adder for integration into existing SCADA + adder for reporting systems
  - Incentive for developing a company-specific business case and delivering it to the decision-maker
  - Incentive for some or all of system license following proof that integration prep work has been completed, and further payment when data is flowing
  - Incentives for uploading data by certain milestones into EMIS
- Performance-based incentives
  - Payment for EMIS upfront, followed by retention of other incentive payments until the payments cover the cost of EMIS
  - Incentive up to 75% of costs if hit 3% savings, 100% if hit 5%

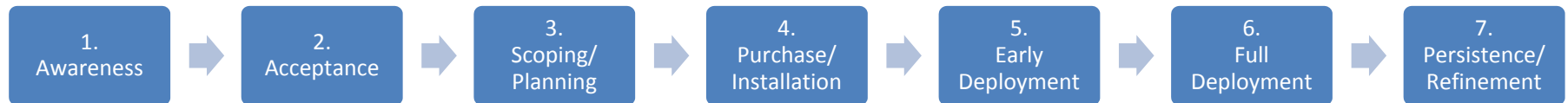
- Base incentive of 25% for EMIS + 25% for 1 year of SEM program + 25% per year for 2 years if show results and persistence
- EMIS incentive after SEM if customer achieves target level of savings from SEM
- Incentive of 50% of cost in first year if target savings achieved, then 75% cost, increasing over time
- Energy Manager + EMIS package – phased over multiple years, contingent on performance
- Incentives for EMIS usage activities (e.g., # of log-ins in a month, number or % of items placed in opportunity register that migrate to CUSUM charts, automated reports generated and emailed.)
- Training & Customer Resources
  - Simple how-to guide for facility manager to vet options, deploy EMIS, use EMIS
  - Training program before adoption for half or full day (what to look for when buying EMIS, implementation, use, )
  - Tools to guide customers through adoption process (EMIS fit with organization, EMIS options and approximate costs for different facility scenarios, feasibility analysis)
  - Training on how to use EMIS to present information that provides business intelligence
  - Monthly check-ins with customer (by SEM contractor) that focus on EMIS use and deployment
  - Demonstration by one customer to other customers in SEM cohort on how they are using a particular aspect of EMIS
  - Follow-up refresher training, based on what customer has learned, what shortcuts they use, what problems they have run into
  - EMIS users group in each metro area (sharing of best practices, results, etc.)
  - Share project documentation through EMIS platform
- Marketing & Case Studies
  - Report on cost/value of EMIS and submetering – real results
  - EMIS promotional tour (real or virtual) to visit successful sites
  - “Pain Points” document targeted at executives that highlights risks and waste from not doing EE, SEM, EMIS
  - Detailed case studies of successful implementations
  - Report on cost/value of EMIS and submetering – real results
  - EMIS promotional tour (real or virtual) for prospects to visit successful sites (could be live or recorded)
  - Presentations on EMIS at NW industrial conferences
- Standards

- Common standards for EMIS created by stakeholders, using ASHRAE or CEE as a template for how to do this
- Miscellaneous
  - EMIS integrated into long-term (or continuous) SEM program with customers
  - Energy data pre-populated into EMIS between registration and beginning of energy management program
  - Integration of customer's utility data and production data is standard part of contractor's SOW
  - All program and project documentation shared on EMIS by program administrator, contractor, and customer

Conversations with program administrators led to further analysis of 21 of the options which is shown on the next page.

It is useful to assess how different ideas affect the process of adoption and use at customers. The process was laid out at the beginning of this section and is repeated here.

**Figure 4-1. Adoption process outline**



**Table 4-2. Analysis of 21 of the brainstorming options**

Category	Idea	Affected stage in process	Barriers addressed
Activity-based			
	Payment for EMIS for upcoming year dependent on threshold of activity in current year	6.Full Deployment 7.Persistence	Risk too high
Performance-based			
	Payment for EMIS upfront, followed by retention of other incentive payments until the payments cover the cost of EMIS	4.Purchase/Installation 5.Early Deployment 6.Full Deployment	Risk too high
Training and one-on-one interactions			
	Training program before adoption for half or full day (considerations, implementation, use)	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Lack of resources Risk too high

Category	Idea	Affected stage in process	Barriers addressed
	Training session on what to look for when buying EMIS	3.Scoping/Planning 4.Purchase/Installation	Lack of interest in EMIS Risk too high
	Training on how to use EMIS to present information that provides business intelligence	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation 5.Early Deployment 6.Full Deployment	Lack of resources
	Monthly check-ins with customer (by SEM contractor) that focus on EMIS use and deployment	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation 5.Early Deployment 6.Full Deployment	Lack of resources
	Demonstration by one customer to other customers in SEM cohort on how they are using a particular aspect of EMIS	2.Acceptance 4.Purchase/Installation 5.Early Deployment	Lack of resources
	Follow-up refresher training, based on what customer has learned, what shortcuts they use, what problems they have run into	5.Early Deployment 6.Full Deployment 7.Persistence	Lack of resources
	EMIS users group in each metro area (sharing of best practices, results, etc.)	5.Early Deployment 6.Full Deployment 7.Persistence	Lack of interest in EMIS Lack of resources
Case studies and customer resources			



Category	Idea	Affected stage in process	Barriers addressed
	Tools to guide customers through adoption process: <ul style="list-style-type: none"> <li>• Initial filter (“Is EMIS right for me?”)</li> <li>• EMIS options and approximate costs for different facility scenarios</li> <li>• Feasibility analysis</li> </ul>	1.Awareness 2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Lack of interest in EMIS Lack of resources Risk too high
	Simple how-to guide for facility manager to vet options, deploy EMIS, use EMIS	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Lack of interest in EMIS Risk too high
	Report on cost/value of EMIS and submetering – real results	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Lack of interest in EMIS Risk too high
	EMIS promotional tour (real or virtual) for prospects to visit successful sites (could be live or recorded)	1.Awareness 2.Acceptance 3.Scoping/Planning 4.Purchase/Installation 5.Early Deployment	Lack of interest in EMIS Risk too high
	Presentations on EMIS at NW industrial conferences	1.Awareness 2.Acceptance	Lack of interest in EMIS Risk too high
	“Pain Points” document targeted at executives that highlights risks and waste from not doing EE, SEM, EMIS	1.Awareness 2.Acceptance 4.Purchase/Installation	Lack of interest in energy Lack of interest in EMIS Risk too high

Category	Idea	Affected stage in process	Barriers addressed
	Detailed case studies of successful implementations	1.Awareness 2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Lack of interest in EMIS Risk too high
<b>Standards</b>			
	Common standards for EMIS created by stakeholders, using ASHRAE or CEE as a template for how to do this	2.Acceptance 3.Scoping/Planning 4.Purchase/Installation	Risk too high
<b>Miscellaneous program additions</b>			
	EMIS integrated into long-term (or continuous) SEM program with customers	4.Purchase/Installation 5.Early Deployment 6.Full Deployment 7.Persistence	Lack of resources
	Energy data pre-populated into EMIS between registration and beginning of energy management program	2.Acceptance 3.Purchase/Installation 4.Early Deployment	Lack of resources
	Integration of customer's utility data and production data is standard part of contractor's SOW	2.Acceptance 4.Purchase/Installation 5.Early Deployment	Lack of resources
	All program and project documentation shared on EMIS by program administrator, contractor, and customer	5.EarlyDeployment 6.Full Deployment 7.Persistence	Lack of resources

### 4.3 PROGRAM CONSIDERATIONS

Program administrators were asked to consider twelve relevant factors for including EMIS in their programs. As seen in the table below, the overwhelming factors center on customers’ acceptance of EMIS and their subsequent experience and success.

In this table, “C” = critical (i.e. any program idea must address this consideration) and “I” = important (i.e. any program idea should address this consideration).

**Table 4-3. EMIS Program Considerations**

Consideration Factor	Respondent						
	1	2	3	4	5	6	7
Customer acceptance	C	C	I	C	C	C	C
Customer experience and success	C	I	I	C	C	C	C
Existing and future industrial programs	I	I	I	I	C	I	
Implementation complexity	I	I	I	I	I	I	I
Desired depth of customer relationship	I		I	C			I
Customer equity			C		I		C
Savings timing (1 year vs 2 year)	C	I	I				
Savings Risk	C	I					I
Total cost effectiveness	I	I			I		I
Regulatory restrictions	I	I		I			
Market and software changes over next 5 years		I		I			I
Program administrator EE Budgets		I	I				

### 4.4 FINAL OPTIONS TO PURSUE

As discussed in the introduction to this report, the full list of brainstorming options was filtered through the critical program considerations above to create a final list of twelve options for further consideration. Representatives from NEEA funders reviewed the twelve options and each one selected the top three options that they expected to deliver the most value.

The synthesis of funder input led to the development of two guides: one to help customers select an EMIS vendor and one to help them use EMIS. These guides accompany this report as key deliverables from the project.

Specifically, the final outcome of the projects includes nine components that enrich the EMIS programming for program administrators, as shown in the table below.

**Table 4-4. Components of work within the final deliverables**

Component	Directed At
Guide to selecting EMIS	End customers (used by program administrators)
Training outline for selecting EMIS, based on the guide	Program administrators
Tools outline for selecting EMIS for end customers	Program administrators
Guide to using EMIS	End customers (used by program administrators)
Training outline for using EMIS, based on the guide	Program administrators
Tools outline for using EMIS for end customers	Program administrators
Recommendation for case study contents	Program administrators
Recommendation for steps to create case study	Program administrators
Overview of deliverables and process for using them	Program administrators

The guides are separate documents, while the remaining components are included as appendices in this document.

## REFERENCES

- Greenwald, Robert; Wallace, Kevin. June 2007. *Monitoring, Targeting and Reporting: a Pathway to Continuous Improvement in Energy Management*. Fifth Conference on Energy Efficiency in Motor Driven Systems. Beijing, China. Retrieved from <http://prismengineering.com/sites/default/files/upload/Prism-Fact-sheet-Monitoring-targeting-and-reporting-in-industry.pdf>
- Herron, Beth; Bassett, Peter. 2011. *The Role of Partnerships in the Efficiency New Brunswick Large Industrial Program*. American Council for an Energy Efficient Economy (ACEEE), 2011 ACEEE Summer Study on Energy Efficiency in Industry. Retrieved from <http://aceee.org/files/proceedings/2011/start.htm>.
- NW Strategic Energy Management Collaborative. September 23, 2014. Presentation Slides from Third Annual NW Industrial SEM Collaborative Workshop in Portland, Oregon. Retrieved from <https://conduitnw.org/pages/file.aspx?rid=2266>
- PECI. June 2014. *Inventory of Industrial Energy Management Information Systems (EMIS) for M&V Applications*. Northwest Energy Efficiency Alliance (NEEA). Report #E14-295. Retrieved from [https://neea.org/docs/default-source/reports/e14-295-nea-industrial-emis-inventory-report-final-2014-08-25\\_kw-edited\\_5.pdf?sfvrsn=8](https://neea.org/docs/default-source/reports/e14-295-nea-industrial-emis-inventory-report-final-2014-08-25_kw-edited_5.pdf?sfvrsn=8)
- Russell, Christopher; Young, Rachel. October 25, 2012. *Understanding Industrial Investment Decision-Making*. American Council for an Energy Efficient Economy (ACEEE). Research Report IE124. Retrieved from <http://aceee.org/research-report/ie124>.
- Smart Process Manufacturing Engineering Virtual Organization Steering Committee. November 2009. *Smart Process Manufacturing: An Operations and Technology Roadmap*. NSF Engineering Virtual Organization (Jim Davis UCLA PI and Tom Edgar UT-Austin Co-PI). Retrieved from [https://smartmanufacturingcoalition.org/sites/default/files/spm\\_-\\_an\\_operations\\_and\\_technology\\_roadmap.pdf](https://smartmanufacturingcoalition.org/sites/default/files/spm_-_an_operations_and_technology_roadmap.pdf)
- Verdantix. September 26, 2014. *What Is the Outlook for US Energy Management?*. Retrieved from [http://www.verdantix.com/index.cfm/papers/Products.Details/product\\_id/719/complementary-report-what-is-the-outlook-for-us-energy-management-/-](http://www.verdantix.com/index.cfm/papers/Products.Details/product_id/719/complementary-report-what-is-the-outlook-for-us-energy-management-/-)

## APPENDIX A – OVERVIEW OF DELIVERABLES

Deliverable	Overview	How to use it	When to use it
Guides	<p>The guides are for end-use customers, particularly those who are part of (or will be part of) an EMIS-related program; they provide information for the customer’s EMIS-related team to select, plan, deploy, and maintain their EMIS.</p> <p>Note: the guides are in separate documents from this report.</p>	Energy efficiency project managers (EEPMS) should deliver the guides to the customer’s EMIS project manager	The customer’s EMIS project manager should review the Guides as soon as possible after being assigned to manage the EMIS deployment. Ideally, other members of the Energy Team, including the executive program sponsor, should also read the guides. The EMIS project manager should factor information from the Guide into their EMIS selection and deployment project plans
Training Outlines	<p>These outlines describe what information would be covered in EMIS training for an EMIS project manager and their project team.</p> <p>These outlines are in Appendix B.</p>	The bullets in the outlines could be equated to PowerPoint slides. The training sessions would last approximately 2-4 hours, depending on the EE program design, the customer need, and the desired outcomes.	The EEPMS should develop the training content at program launch, and determine how to integrate the training into the SEM program. Training is most likely to be successful if it includes the customer’s EMIS project manager and their project team.

Deliverable	Overview	How to use it	When to use it
Tools Outlines	<p>These outlines lay out a series of documents, plans, and spreadsheets which can be created to handle potential situations arising during an EMIS deployment.</p> <p>These outlines are in Appendix C.</p>	<p>EEPMs can prioritize the tools that fit with their program design, and then work with internal staff or contractors to develop the tools for customer use</p>	<p>The tools outlines can be used at any point during the program cycle</p>
Case Study Recommendations	<p>These recommendations provide the outline of an EMIS case study, and suggest how to put the case study together</p> <p>These outlines are in Appendix D.</p>	<p>EEPMs can work with their marketing teams to complete the case studies.</p>	<p>The recommendations can be used at later stages in the program cycle when customers have some success to report.</p>

## APPENDIX B – TRAINING OUTLINES

### Selecting

- “The need for EMIS”
  - Why companies that are serious about energy management deploy EMIS
- Confirming organizational fit with EMIS
  - Value points for EMIS
  - Fit with your organization
    - Goals
    - Alignment with energy program
    - Job impacts
  - Preparing the organization
    - EMIS scope and phasing
    - Business case
    - Executive support
- Selecting the right system
  - Building requirements
  - Engaging a selection team
  - Contacting vendors
  - Scoring the proposals
- Finalizing the details
- Role of your Energy Efficiency Program Administrator

### Using

- “The need for EMIS”
  - Why companies that are serious about energy management deploy EMIS
- Defining success for EMIS
  - Describing what success looks like for an EMIS deployment
  - Confirming Executive Expectations
  - SMART goals
  - Milestones
- Planning the Deployment
  - Initial Project Planning
  - Confirming Involved Personnel and other Stakeholders at each phase of the deployment
  - Confirming EMIS Users at each phase of the deployment



- Training the Organization on EMIS
- Measuring Performance
  - Evaluating Energy Performance
    - Models
    - Baselines and Baseline Time Periods
    - Savings Estimation
  - Evaluating EMIS Integration
    - Gathering usage data
    - Querying the organization
- Data Quality
  - Managing automated data and manual data
  - Process for ensuring data quality
- Alerts and Thresholds
  - Overview of their usage
  - Initial thresholds and alert settings, with timeline for review/revision
- Reporting
  - Reporting to Execs and other groups
  - Report auto-generation and delivery
- Increasing EMIS Usage
  - Phased roll-outs to parts of organization
- Ensuring EMIS provides optimal value
  - Performance reporting to employees
  - Management status reporting
  - Event tracking
  - Project management
  - Document management
- Reviewing EMIS Value Over Time
  - Reviewing EMIS within Energy Program Reviews
- Role of your Energy Efficiency Program Administrator

## APPENDIX C – TOOLS OUTLINES

### Tools for Selecting EMIS

Tool Name	Purpose	When Used
Scope and Phasing Template	Helps EMIS project manager determine how to set the correct scope for EMIS and phases that make sense for the organization	Throughout selection process
Business Case Template	Provides space for all relevant costs and benefits to help project manager build the best internal case for EMIS	Early in selection process
Requirements Template	Includes example requirements that can be modified by project manager. Provides a sample grid for scoring vendors.	Early in selection process
Vendor checklist, pre-proposal	Helps project manager get all required info from vendors with one request. Provides list of open-ended questions that project managers can ask vendors.	Middle of selection process
Vendor checklist, negotiations	Helps project manager understand all of the options that can be included in negotiations for purchase	End of selection process

## Tools for Using EMIS

Tool Name	Purpose	When Used
Success Document	Provides examples of what success could look like for customer, as well as sample SMART goals and milestones to achieve them.	Project initiation
EMIS Organizational Deployment Project Plan	Provides a sample plan, with guidance on common configurations of the plan and options in the deployment process.	Project initiation through to deployment completion
RACI Matrix	Provides a sample matrix of deployment tasks with staff who are Responsible, Approver, Consulted, or Informed, for each task.	Project initiation through to deployment completion
Executive EMIS Report	Provides sample executive-level report for EMIS project manager to use for status reporting	Post deployment
EMIS Survey	Provides sample questions to use to query the organization at different phases of deployment	During latter stages of deployment and regularly thereafter
EMIS Engagement Tracker	Provides sample tracking tool for organizational engagement with EMIS,	During latter stages of deployment and regularly thereafter
EMIS-focused Employee Engagement Campaign Materials	Helps the EMIS project manager use different communications media to engage the organization.	Post deployment
Threshold/Alert “Organizer” Tool	Helps the EMIS project manager track what thresholds are set, who is watching for alerts, what they will do based on alerts, and what the escalation procedure is.	Post deployment
Threshold Process Flow	Helps the EMIS project manager finalize the process for alerts	Post deployment
Energy Program Review	Helps the EMIS project manager conduct a comprehensive review of EMIS performance	6-12 months after deployment

## **APPENDIX D – CASE STUDY RECOMMENDATIONS**

### **Outline of case study contents**

- Overview
- Why EMIS – why a customer moved forward with EMIS deployment
- Planning for EMIS – How they created the business case, developed their requirements, decided what features were critical to them
- Steps Taken to Deploy EMIS – what the customer did to deploy, including timeline, planning process, project launch, project meetings, employee engagement, and key decisions made during deployment
- Results and Benefits
- Lessons Learned
- Conclusion
- Sidebar 1 – Snapshot of Customer
- Sidebar 2 – Snapshot of Project
- Callouts – Executive quotes

### **Outline of steps to create case study**

- Determine target customer and gain approval(s) from customer, program administrator, etc.
- Conduct case study kickoff call with customer and program administrator; confirm outline in call
- Conduct interview calls and/or visits with customer, including with their executive(s)
- Conduct interview call with vendor or deployment contractor to get their perspective
- Develop content for case study
- Conduct content review(s) with customer, program administrator and NEEA
- Finalize content and apply marketing templates/reviews

## **APPENDIX E – INTERVIEW GUIDES**

A standard guide was used for all interviews. We include below two variants of this guide: one for EMIS vendors and one for program administrators.

### **Vendor Interview Guide**

#### **Market Characterization**

1. How would you characterize the market for EMIS in the industrial sector? (If necessary, prompt for industry sector, company size, energy as % of costs, etc.)
2. Do you have any estimates of the size of this market? Are the estimates broken down at all (e.g. by geography, or sector)?
3. Who is buying EMIS in the industrial sector (allowing for confidentiality concerns)?
  - a. Types of firms
  - b. Typical buyer role in org (e.g. plant manager, CFO)
4. Why are customers buying EMIS? Key value proposition of EMIS for the buyer
5. Why are they not buying? Barriers to customer adoption
6. How might the market change over the next 5 years (e.g. different customer types, different requirements, legislation, technology advances)?

#### **Program administrator Action**

1. Clarify functions of EMIS in EE programs. Here are 6 typical functions. Does this list make sense to you? Would you add anything? Which of these roles are critical for you?
  - a. Creating and maintaining a baseline
  - b. Finding savings opportunities
  - c. Tracking projects
  - d. M&V (Measurement & Verification) of savings
  - e. Persistence of savings (performance tracking)
  - f. Capital project justification
2. Program administrator Incentives. We're going to review a list of possible incentives offered by program administrators. Here's the initial list:
  - Incentive for planning / audit
  - Incentive for software purchase
  - Incentive for hardware costs (e.g. meters)
  - Incentive for deployment services (e.g. data integration, configuration, training)
  - Incentive for ongoing support

Let's drill into the details:

- a. Does incentive for software purchase make sense to you (i.e. fits into your sales and marketing process; positively impacts customers)?
  - b. Does incentive for hardware costs make sense to you?
  - c. Does incentive for deployment services make sense to you?
  - d. Does incentive for ongoing services make sense to you?
  - e. Have we missed an incentive that you think is important?
  - f. For these incentives as a group:
    - i. Which market participant should receive the incentives (customer, vendor, systems integrator)?
    - ii. What kind of customers should be targeted with the incentives?
    - iii. How would or do these incentives affect customer purchasing?
    - iv. How would or do these incentives affect customer satisfaction?
3. Program combinations. We're going to review a list of possible combinations of EMIS with existing programs. Here's the initial list:
- o Combining EMIS with an energy management program (e.g. Strategic Energy Management, retro-commissioning )
  - o Combining EMIS with a training program (e.g. Operator Certification)
  - o Combining EMIS with an equipment program (e.g. custom measures)

Let's drill into the details:

- a. Does combination with SEM/RCx make sense to you?
  - b. Does combination with training make sense to you?
  - c. Does combination with equipment make sense to you?
  - d. Have we missed a combination that you think is important?
  - e. For these combinations as a group?
    - i. What kind of customers should be targeted with these combinations?
    - ii. How would these combinations affect customer purchasing of EMIS?
    - iii. How would these combinations affect customer satisfaction with EMIS?
4. What's your opinion on performance-based subsidies for EMIS?
5. What's your opinion of private labeling of EMIS with a program administrator brand?
6. Do you have any concerns about program administrator involvement in this market?

## **Program Administrator Interview Guide**

### **Market Characterization**

1. How would you characterize the market for EMIS in the industrial sector? (If necessary, prompt for industry sector, company size, energy as % of costs, etc.)
2. Do you have any estimates of the size of this market in your territory? Are the estimates broken down at all (e.g. by geography, or sector)?
3. Who is buying EMIS in the industrial sector?
  - a. Types of firms
  - b. Typical buyer role in org (e.g. plant mgr, CFO)
4. Why are customers buying EMIS? Key value proposition of EMIS for the buyer
5. Why are they not buying? Barriers to customer adoption
6. How might the market change over the next 5 years (e.g. different customer types, different requirements, legislation, technology advances)?

### **Program Administrator Action**

1. Clarify functions of EMIS in programs. Here are 6 typical functions. Does this list make sense to you? Would you add anything? Which of these roles are critical for you?
  - a. Creating and maintaining a baseline
  - b. Finding savings opportunities
  - c. Tracking projects
  - d. M&V (Measurement & Verification) of savings
  - e. Persistence of savings (performance tracking)
  - f. Capital project justification
2. Program Administrator Incentives. We're going to review a list of possible incentives that you might offer. Here's the initial list:
  - Incentive for planning / audit
  - Incentive for software purchase
  - Incentive for hardware costs (e.g. meters)
  - Incentive for deployment services (e.g. data integration, configuration, training)
  - Incentive for ongoing support

Let's drill into the details:

- g. Does incentive for software purchase make sense to you (e.g. positively impacts customers, is attractive to vendors)? Do you offer this incentive?
  - h. Does incentive for hardware costs make sense to you? Do you offer this incentive?
  - i. Does incentive for deployment services make sense to you? Do you offer this incentive?
  - j. Does incentive for ongoing services make sense to you? Do you offer this incentive?
  - k. Have we missed an incentive that you think is important? Do you offer this incentive?
  - l. For these incentives as a group:
    - i. Which market participant should receive the incentives (customer, vendor, systems integrator)?
    - ii. What kind of customers should be targeted with the incentives?
    - iii. How would or do these incentives affect customer purchasing?
    - iv. How would or do these incentives affect customer satisfaction?
    - v. How would this incentive fit with your portfolio of programs?
3. Program combinations. We're going to review a list of possible combinations of EMIS with existing programs. Here's the initial list:
- o Combining EMIS with an energy management program (e.g. Strategic Energy Management, retro-commissioning )
  - o Combining EMIS with a training program (e.g. Operator Certification)
  - o Combining EMIS with an equipment program (e.g. custom measures)

Let's drill into the details:

- a. Does combination with SEM/RCx make sense to you? Do you offer this combination?
- b. Does combination with training make sense to you? Do you offer this combination?
- c. Does combination with equipment make sense to you? Do you offer this combination?
- d. Have we missed a combination that you think is important? Do you offer this combination?
- e. What about standalone EMIS as an offering?
- f. For these combinations as a group:
  - i. What kind of customers should be targeted with these combinations?
  - ii. How would these combinations affect customer purchasing of EMIS?



- iii. How would these combinations affect customer satisfaction with EMIS?
  - iv. How would this combination fit with your portfolio of programs?
4. What's your opinion on performance-based subsidies for EMIS?
  5. What's your opinion of private labeling of EMIS with a program administrator brand?
  6. Should program administrators have the same types of EMIS programs in the commercial and the industrial markets? Which attributes of these markets are similar and which are different?
  7. What are the lessons learned from the EMIS programs that you are familiar with?

## APPENDIX F – INDUSTRY SOURCES

We are grateful to the insight from the following individuals who contributed to this report.

Name	Organization
Nick Leritz	Northwest Energy Efficiency Alliance
Greg Baker	VEIC
Peter Bassett	EPS Energy
JP Batmale	Energy Trust of Oregon
Steve Brooks	Bonneville Power Administration
Dan Brown	Cascade Energy
Jess Burgess	Consortium for Energy Efficiency
Leo Carrillo	Pacific Gas & Electric
Kim Crossman	Energy Trust of Oregon
John DuPont	EnerNOC
Bob Fraser	Natural Resources Canada
Jessica Granderson	Lawrence Berkeley National Lab
Rob Greenwald	Prism Engineering
Bill Harris	Snohomish PUD
Andrea Henwood	Efficiency Nova Scotia
Amit Kulkarni	National Grid
John Laughlin	EnerNOC
Clay Monroe	PacifiCorp
Beth Pollock	Efficiency New Brunswick
Christopher Reid	Energent
Ethan Rogers	ACEEE
Kevin Wallace	BC Hydro