Continuous improvement of energy performance: How policy makers can support ISO 50001 implementation for industry

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Abstract

This paper describes experiences and lessons learned with the creation of an energy saving pilot program for a large utility in the USA (6.5 million customers), to be employed at their customers. It addresses incentive program deciders and administrators, utilities and industry representatives.

The utility runs a framework program to reduce the energy consumption of their industrial customers with several individual programs already available ("rate payer model")[1]. To further improve the overall saving results of the framework program, the utility had a pilot program developed that helps their industrial customers to implement Energy Management Systems (EnMS) according to ISO 50001 to foster a holistic approach to energy saving. Even further, the pilot shall lead customers to certification according to Superior Energy Performance (SEP) standards. The pilot differentiates between large and small/medium customers, the small/medium customers receiving a "light" version of the services for large customers. Participants receive incentives, free consultancy and they save energy.

The work consist of developing the overall program outline and processes, creating the required associated documentation, describing the required associated services, and applying the program at customers. However, the project is at a stage where all documents, processes and framework are determined but no outreach has taken place yet, and therefore no actual experiences with the application of the program can be reported.

The main challenge within this project is to make the program attractive enough to motivate industrial companies to enter into the program and to keep up the momentum until they are ready for certification. Aspects that shall be presented:

- Application and intake procedures;
- Factsheets, handbook (including policy), checklists, schedules, data scheme, organigram, software;
- Energy Audit, Review and reporting;
- Trainings, workshop;
- Management involvement, purchasing, accounting, incentives.

Introduction

UTILITY AND PROGRAM BACKGROUND

Under some USA state legislation[2], utilities are required to achieve energy savings at their customers. This is usually done by offering energy efficiency incentive programs to the customers. Whereas most of these programs address specific efficiency measures such as optimization of compressed air installations, the approach described in this paper uses the holistic method of an Energy Management System. That method does not only

1. "Rate payer model" refers to the fact, that the costs of the incentive programs for the utilities are paid for via the energy bills of the customers.

2. e.g. in Michigan Public Act 295 of 2008 and in Pennsylvania, Act 129 of 2008.

include the identification of individual saving potentials but also ensures that the implementation results in an ongoing process with an appropriate framework and energy performance improvements.

The programs usually include outreach/intake steps, planning steps, implementation steps, and verification steps. Many utilities have these programs developed or even administered by service providers. In this case, the utility asked DNV KEMA to develop the program.

If the pilot program will be transformed into a regular program of the utility with administration and verification is undecided yet. Therefore, no actual experiences can be presented with the application of the pilot program or any barriers that might be met. However, the approach is likely to work as quite some support is given for free (incentives and free consultancy support) and the expected savings, using the ISO 50001 approach, are usually twice as high as when using the conventional bottom-up approach.

ENERGY MANAGEMENT SYSTEMS (ENMS)

ISO 50001 was released in August 2011. In January 2012, it replaced the European standard EN 16001 and seems to turn into the most relevant EnMS standard globally. Management systems have in common that they require a Manager, that they influence technical, organizational and procedural matters, and that they must be monitored, reviewed and documented.

ISO 50001 is based on the same principles as ISO 9001 and 14001 to facilitate a migration. ISO 50001 does not establish absolute requirements for energy performance beyond the commitments in the energy policy of the organization and its obligation to comply with applicable legal requirements and other requirements.[3]

Besides obvious benefits[4], the implementation of an EnMS results in:

- More rational economic decisions concerning energy use, consumption, supply and corporate purchasing
- By an EnMS, risks with regards to energy and product costs developments, supply risks and unplanned outages are reduced
- (Multinational) organizations have access to a single, harmonized standard for implementation and operation across the organization and throughout the supply chain

DNV KEMA's daily and global experience shows that more and more entities are interested in ISO 50001, not only the manufacturing industry but also communities and commercial companies.

The pilot program

COMPONENTS

The task was to develop an incentive program with the following aspects:

1. Schedules for the program development and for a program application at a customer
2. Development of milestone definitions, incentives associated with attaining the milestones, milestone checklists
3. Process and materials to attract and enroll customers in the program
4. Application tools, customer assessment method, program application effort estimation tool, Memorandum of Understanding (MoU), individual work plan
5. Planning tools and materials like factsheets on public links and tools or Energy Performance Indicators, workshop/training, energy audit, gap analysis, all this resulting in an Energy Action Plan,
6. Implementation tools like energy efficiency measures (technical, organizational, processual), EnMS handbook, migration checklists,
7. And associated tools and documents like amendments to the program framework policy, reports to the utility, internal trainings and more.

The program was to be divided into two paths:

1. A certification path, intended for large customers (annual total energy consumption > 2000 MWh)
2. A streamlined path, intended for small/medium customers (annual total energy consumption between 300 and 2000 MWh)

However, no path is excluded for any entity. Even if large entities are sought to go after the certification path, they will not get parts of the incentives if they stop before certification. The effort for small businesses pursuing the streamlined path is smaller. Relatively there is more focus on Energy Audit, Energy Review, Action Plan and energy saving compared to the certification path where the focus is on certification.

PHASES

Intake phase

During the intake phase, the consultant is leading the effort. The flexibility in the effort is limited. There is no fundamental difference between Certification Path and Streamlined Path in level of effort for these activities. It is advisable to employ telephone/mail intake interviews, otherwise an onsite visit has to be scheduled.

The purpose of the intake and associated activities with the customer is to get a full understanding of the customer's EnMS intensions, its quality management culture and the energy performance headlines and provides answers to further customer questions. With the help of an Intake Checklist and requested supporting materials, an outreach team collects the information desired about each customer interested in the program.

After the intake interview an EnMS status assessment identifies what is needed to get ISO 50001 (and SEP) certified[5]. It

3. Different from SEP, which takes ISO 50001 as a base requirement and adds the requirement of absolute savings, thus exceeding ISO 50001.

4. Reduction of global warming, energy consumption and emission reductions, better sustainability profile.

5. It should be noted that SEP certification requires data for at least the last three years. That means that if this data is not available, SEP certification cannot be reached within the 27 months foreseen by the program for SEP certification.

also makes clear what the main areas of attention are expected to be. The EnMS status is assessed by means of the filled out Application Form, the EnMS Intake Checklist and the intake interview and results in a recommendation to the utility about the participation of the customer.

Next is a memo to the customer outlining the key findings of the intake, necessary activities for certification and preliminary estimates of effort needed on behalf of the consultant and the customer to achieve milestones and/or certification. The memo is the base for the Assistance Plan, i.e. an agreement on the consultancy assistance.

An MoU and the Assistance Plan are prepared by the consultant, and sent for approval to the utility and the customer. If needed, outside the scope activities are also identified. Signing of the MoU is considered as the project start, the training is considered as the project Kick-Off.

Planning phase

Energy planning (see 4.4 in ISO 50001) covers all energy activities, starting from describing the existing situation (baseline), the future situation and its related energy targets and the indicators needed to manage the transition towards lower energy consumption in the future. The first activity in the planning phase is to draft a fit for purpose Energy Policy, showing an organization's commitment. An energy planning process follows to assess energy use and identify opportunities. Planning related activities (led by either the customer or consultant) include:

1. Energy Management Training
2. Energy Audit
3. Energy Review
4. Energy Management Staff: set up a cross-divisional energy management team, led by an Energy Manager
5. Setting boundaries, base line, benchmarking
6. Identify a set of suitable energy performance indicators
7. Assess the Energy Data monitoring system

Energy planning

- Shall lead to activities to improve energy performance
- Is consistent with the energy policy
- Establishes "significant energy uses", accounts for relevant variables (e.g. weather), identifies energy performance improvement opportunities
- Sets the expectation for performance improvement through objectives, targets, and action plans
- Presents a "data driven" approach. Actions to improve energy performance are developed and prioritized based on analysis of measured and other data.

Consultancy assistance on this task helps to set up a sound and realistic energy planning. The customer has to take the lead in energy planning. Additionally, the framework of the EnMS implementation will be documented in an EnMS handbook by the customer, containing the Energy Policy, the role description of the Energy Manager the system boundaries, the EnPIs, the processes and organization issues involved in the implementation of an EnMS in the organization, the monitoring and reporting schemes and all other aspects involved. A template for an EnMS handbook will be provided at the training[6]. With the support of the consultant, it shall be adapted to the organization's specific situation in the training and improved continuously by the customer. During the planning phase, the consultant and the customer lead the effort together.

Implementation phase

The implementation phase starts with a workshop and ends with milestone 2, the Certification Readiness Check. Implementation related activities (led by either the customer or consultant) include:

1. Workshop
2. Define Energy Action Plans (milestone 1)
3. Implement energy measures, monitoring and verification, improvement of Energy Performance
4. Certification Readiness Check (milestone 2)

Finally, minor consultancy assistance is given within the certification path to reach

5. ISO 50001 certification (milestone 3).

During the implementation phase, the customer leads the effort.

Certification phase

The certification phases to the certification path only, not to the streamlined path.

KEY ELEMENTS

Energy policy

The requirements of ISO 50001 with respect to the Energy Policy are stated in chapter 4.3 in the standard. The energy policy is the organization's official commitment to manage energy and improve the Energy Performance. The energy policy must take the following points into consideration:

- The commitment of a customer's or plant's management to a continuous increase of energy efficiency and the diligent handling of energy must be addressed
- It has to define the extent and the boundaries of the EnMS
- It must demonstrate the willingness of the corporate executive management to provide information and resources required to reach the strategic and operative targets
- It has to include the self-commitment to comply with all legal requirements concerning energy aspects.

The Energy Policy should be communicated to all employees, to all customers, and to all suppliers[7]. It must be checked and amended on a regular basis; and it can be integrated into other

6. All figures, tables, charts, schedules may be provided to the customer as editable original files (i.e. organigram, data scheme, time schedule, and the handbook itself).

7. The communication to the employees is mandatory. The communication to suppliers and customers is not mandatory but it is recommended.

reporting schemes. It can apply to any energy-autonomous extent of a company or plant (e.g. several production sites) and it should be phrased in a way that it can be understood externally and internally. The policy should define goals that are within reach and they must be published.

Consultancy assistance consists of providing an example for an Energy Policy, helping to check the soundness of the energy policy statement, reviewing draft policy to ensure that all necessary elements are in the policy and that they are appropriate, specific and sufficient for the organization.

Training

The training conducted by the consultant consists of two parts; one for the Energy Manager and one for the Energy Team, each taking half a day. Purpose of the training conducted by the consultant is to prepare the Energy Manager and the Energy Team of the participant on the ISO 50001 implementation and certification process. Customer staff is trained at the start of the planning phase. The training is considered as the project Kick-Off. For time efficiency reasons and depending on the number of participants, both training parts may be combined to one session.

In the training, the program and the EnMS standards are outlined to the participants. The use of the tools and templates provided under the program is explained and how to establish a baseline. The training enables the customer to support the consultant with the Energy Audit and detail what is needed for a baseline. Guidance is given on how to proceed to the next milestone(s). The training completes the knowledge and understanding of EnMS, giving insight to the standards, their requirements and their implementation.

The training should include an interactive tour through the company helping to understand the energy situation. The training relates to the companies specific situation. For example, when performance indicators are discussed in general, attention is paid on which ones are applicable for the customer. At the end of the training, it is discussed in more detail what the consultancy assistance should look like and how the customer can organize its own activities.

Audit

The consultant takes the lead on conducting the Energy Audits, working closely together with the customer. The customer is responsible for supplying information and giving feed back on audit findings.

The audit is made to identify not only simple and low-cost improvements but also a list of energy conservation measures to orient the future detailed audit. This inspection is based on visual verifications, study of installed equipment and operating data and detailed analysis of recorded energy consumption collected during the benchmarking phase. Resulting from the audit, a long list of potential energy measures and areas of attention will be made by the consultant in close cooperation with the customer. Measures will be based on mature technology, commonly used in the sector the customer is belonging to.

During the implementation phase, the chosen energy measures will be executed, fine tuned and updated by the customer. Over time, the long list is converted in a short list of feasible measures remaining; also new measures can be added.

Review

The Energy Review is conducted after the audit by the consultant in close cooperation with the customer and will help to set the targets according to

- the Energy Policy,
- the findings of the EnMS assessment, and to
- the findings of the Energy Audit

As for most company branches, benchmark numbers are publicly available[8], the review should also indicate the position of the customer in its sector related to the specific energy consumption.

This Energy Review identifies the actual status of the customer related to quality and energy management, thus making clear what is needed to get ISO 50001 (and SEP) certified (the targets). It thus defines the energy action plan. It also makes clear what the main areas of attention are expected to be in relation to ISO 50001 implementation. The EnMS review status can be assessed by means of the EnMS milestone 1 checklist

Staff

One of the first steps of implementing ISO 50001 is the initiation by the customer management and identifying key energy management staff, see 4.2 in ISO 50001. The training (see 6.1) can be used for launching this step. Consultancy assistance on this task is minor and as needed to help create an appropriate Energy Management Team with respect to team size, member qualification, and the size and energy situation of the organization.

The necessary roles within the company are outlined below[9]:

Top management

See 4.2.1 in the standard. The top management (CEO) is responsible for the implementation of ISO 50001. They initiate the ISO 50001 process, define the scope of the ISO 50001 related activities and finally they review progress (performance improvement).

Energy Manager

See 4.2.2 in the standard. The top management has to appoint a management representative, called the Energy Manager. The Energy Manager should be identified when applying for the pilot project. The formal appointment has to take place before the workshop.

Energy Management Team

See 4.2.1 in the standard. Depending on size and structure, additional organizational entities should support the Energy Manager, such as an Energy Council (decision body for e.g. the purchase of Green Electricity, self generation, printer types to be purchased or their standard configuration etc.), designees for cross-sectional Technologies such as pressurized air, lighting etc. or Green Teams in very large organizations. Issues like communication channels, trainings, staff awareness for energy

8. E.g. ODYSSEE database, National Energy Agencies, numerous branch associations.

9. The EnMS handbook provides guidance with respect to the Energy Manager and the Energy Team.

matters and more are to be addressed and executed by the Energy Management Team. The reporting scheme is of special importance, making sure that the necessary decision powers are taken into account and that everyone in the organization is always up-to-date according to the scheme.

System boundaries

The system boundaries of the EnMS have to be set by the customer, see also 4.1 and 4.2 in ISO 50001. The boundaries are set in such a way that on one hand the system can be compared with benchmark figures and on the other hand all important energy consuming process that can be influenced are included. That means specifically that the system boundaries must be chosen such that there is energy autonomy inside the boundaries.

Benchmarking and Energy Performance Indicators (ENPIs)

With a given baseline, an energy performance qualification can be derived. Benchmark figures are needed to do so. When no insight is available on the energy performance in similar situations or companies the energy performance qualification can not be set. In this case energy targets have to be set based on a bottom up approach using a long list of potential energy measures for a given customer.

The consultant provides information and examples to the customer where and how to research benchmark data and reviews the benchmarking information for plausibility and usefulness. The consultant provides benchmarking information as available to him for each particular industry branch and conceptual advice on how to benchmark.

Energy performance indicators (EnPI, see 4.4.5 in ISO 50001) representative for the sector the customer is to be defined by the customer. Often the EnPI is the ratio between energy consumption (kWh_e GJ heat, ton steam) and the product output of a customer, also called the specific energy consumption.

Subdivisions can be made, for example the energy consumption by buildings per sq ft or the compressed air consumption per ton of output. Subdivisions make sense when specific actions are defined for the improvement of the energy performance in specific areas like for example the energy use in buildings or the use of compressed air. Preferably, an EnPI is defined in such away that in can be used for comparison in benchmarks. EnPIs can also be linked to the associated CO_2-emission and use of primary energy sources.

When the product output of a customer is diverse, other or additional EnPIs may have to be defined. This should then be in a non product related way, for example the energy consumption or cost per $ of turnover or added value. When product portfolio changes are expected in the near future the EnPIs may have to be redefined. Special attention has to be paid to changes over time in order to assess the comparability of energy figures before and after the change. More information on EnPIs can be found in the factsheet "Energy Performance Indicators".

Targets (see 4.4.6 in ISO 50001) are specific goals related to a change in the EnPIs over time. They have to be set in a realistic way and have to be based on energy measures applicable in the company. Setting targets is an iterative process, starting with an ambition and ending with a realistic roadmap on how to implement measures over time, see also "Energy Action Plan".

The company can set energy targets in two ways:

- Top down: Increasing the energy performance by x % a year or aiming to belong at the top y % of the benchmark in z years or reducing the energy consumption in z years below a certain value of the EnPI.
- Bottom up: Based on an identification of a realistic energy measure, the reduction of the energy consumption is calculated and thus the improvement of the EnPI.

The top down approach usually results in more measures and better results, fostering the approach of "continuous improvement" until the targets are met. Depending on the customer's ambition, and their experience in the past with improving the energy performance, a target is set. The customer needs to confirm the appropriateness of the target(s) through a sanity check based on the Energy Action Plan, see "Energy Action Plan, milestone 1". Targets are set in terms of EnPI-values for a certain year.

Energy data monitoring system

A monitoring protocol (see 4.6.1 in ISO 50001) has to be developed by the customer describing which energy flows have to be monitored at which frequency and accuracy in order to monitor the development of the energy performance and its indicators. The protocol is compared with the actual situation making clear what changes have to be made. Changes can relate to the measurement scheme (e.g. additional measurements, different use of measurements), to the data handling (e.g. evaluations, calculations, controls, visualization, storage), data integration (software, reporting) or composition of energy flows (process and energy grouping).

Attention has to be paid to the existing data infrastructure and if it does offer the functionality needed to present the energy performance and its underlying figures in the right way.

The consultancy assistance on this task helps to adapt the organization's energy monitoring scheme to the requirements of an EnMS. The focus is on reviewing the draft strategy and advising where instrumentation should be altered or added, what instrumentation types are suitable, how to compute the data and data derivations, and how to report the data.

Workshop

To prepare for a successful attainment of milestone 1, ideally a workshop led by the consultant should be scheduled approximately one month after the Energy Review was issued by the consultant.

In the workshop the consultant addresses:

- The results of the Energy Audit and Energy Review will be discussed
- Customer progress will be checked (performance improvement)
- Coaching on the long list of measures will be provided
- Consultancy on the use of program tools and templates will be provided
- It will be explained what documents are required from the customer, to be submitted to the consultant for the Certification Readiness Check
- Coaching on further progress up to milestone 2 will be provided

All internal stake holders of the customer should be involved in the workshop, including the CEO. The number of participants will typically be up to around 10.

Energy Action Plan, milestone 1

Setting up an energy action plan is the final activity of the energy planning phase within ISO 50001, see chapter 4.4.6 in the ISO 50001 standard. The Energy Action Plan outlines the steps to be taken and details the measures to be pursued from the Energy Audit and Energy Review. It also includes the commitment for execution. The customer has the lead in making up the energy action plan. Information for the action plan is generated in previous tasks. Prioritization of measures is necessary to clarify which measures will be implemented before certification and which are planned for later. Abatement curves are commonly used to help with prioritization.

The Action Plan describes which measures are going to be implemented (energy measure), what the expected effect is (energy target, arising from energy objective), how this is monitored, when implementation takes place, who is responsible, as well as how is it organized and financed. The Energy Action Plan is also sometimes called a "program". The implementation of the Actions defined in the Energy Action Plan will be measured during the implementation phase to judge the readiness for certification (see "Monitoring and verification").

The assistance of the consultant on this task is primarily to review the draft plan developed by the customer to help to assess the validity of the action plan and to improve it.

Implement measures and operate EnMS

The implementation of the EnMS consists of following the Action Plan. It means implementing technical and organizational measures, as well as monitoring and verifying the success of these measures. Most improvements will target technical Energy Efficiency measures for components or systems; others may affect the organization or processes as documented in the Energy Action Plan.

Technical measures

In the course of the program, energy saving measure opportunities are to be identified on an ongoing basis by the consultant's staff and by the organization's staff. All measures are to be documented in the Energy Action Plan at least. The majority of measures usually consists of technical measures where:

- Components are exchanged to more energy efficient components (e.g. from incandescent light bulbs to compact fluorescent bulbs)
- Components and systems are maintained to achieve better energy efficiency (e.g. cleaning)
- Components are installed to achieve better energy efficiency (e.g. software, insulation)
- Systems are changed to more energy efficient systems (e.g. burner system)
- Processes are changed to more energy efficient processes (e.g. setpoints)

The assistance of the consultant consists of providing information on measures implementation (or guide the customer to that information) and to verify progress and results of the Action Plans.

Organizational measures

Also the organizational measures are to be documented in the Energy Action Plan at least. The majority of organizational measures usually consist of measures where:

- Communication (internal and external), documentation (where, by whom, how), reporting (audit results, who to whom) and review (management review, internal and external audits, consultant reviews) contents and processes are defined
- Roles, contributions, or efforts of energy related staff are defined
- Cooperation with other organizations or units is decided
- Certification commitments are documented
- Participation in energy related events or contests is decided

The assistance of the consultant consists of providing information on measures implementation (or guide the customer to that information) and to verify progress and results of the Action Plans.

Monitoring and verification

Monitoring and verification of the EnMS is the responsibility of the customer, and covers the activities related to the actual improvement of the energy performance and maintaining the level of improvement[10].

To operate an EnMS after initial implementation, a number of processes have to be followed by the organization. They include periodic auditing, reporting, communication and improvements by the measures.

Consultancy assistance during the implementation phase is to review relevant documentation and work with the customer as necessary to ensure that the minimum requirements for the operation of an EnMS are followed[11] (review measures, contents, staff involved …) to make sure that a later certification can be successful.

The verification of progress with respect to implementation of the EnMS will be done according to ISO 50001[12].

Certification Readiness Check, milestone 2

At this stage, the consultant reviews the relevant documentation and prepares a Certification Readiness Check report. In this Certification Readiness Check the customer is checked on its readiness for ISO 50001 certification and on progress of Energy Performance against the objectives and the policy. The consultant will use – amongst other resources – an EnMS milestone 2 checklist.

Ideally, the customer will pass the Check upon first review; however, some minor iterations may be necessary before the Certification Readiness Check report is finalized. The consultant must assess whether the customer can realistically address

10. The program requires successful implementation of at least 70 % of the agreed number of measures, with at least 90 % of the total savings value identified.

11. See chapter 4.5.5 Operational control, ISO 50001 standard.

12. See chapter 4.6.3 Internal audit of the EnMS, ISO 50001 standard.

any major deficiencies within a reasonable time frame. If not, the report should be issued indicating the customer is not ready and detailing the steps needed and submitted to the customer and the utility with a recommendation to the utility regarding whether further participation in the pilot is appropriate.

Milestone 2 is considered to be met successfully if any remaining deficiencies are expected to be completely addressed by the foreseen certification date. Furthermore, the total work by the customer to mitigate the aforementioned deficiencies must be estimated to be less than one work week (40 hours).

Once the Certification Readiness Check is complete and approved by the utility, the customer has fulfilled milestone 2, this also fulfils the function of an internal audit evaluation and indicates that the customer is ready for or very close to ISO 50001 certification.

The Certification Readiness Check includes, as consistent with the ISO 50001 standard, at a minimum:

1. Energy Action Plan as described in Milestone #1 above.
2. Summary table of how items in the Energy Review were addressed.
3. Action Plans implementation updates since Energy Action Plan was submitted.
4. All other EnMS activities executed since Energy Action Plan was submitted.
5. Savings balance, i.e. an overview of the overall and incremental energy savings attained to date through EnMS development, differentiating the savings that would have occurred anyway (e.g. projects previously planned).
6. Other documentation not specifically mentioned here that demonstrates the current status of the EnMS (will vary by customer).
7. Readiness statement: Confirms commitment to certification for customers on Certification Path.

Management review and ISO 50001 certification, milestone 3

After the certification readiness check and report is complete, the final preparations are executed by the customer to get the ISO 50001 system fully in place. The management review activities have to be organized and documented, see 4.7 in ISO 50001.

Once the management review activities are organized and decisions on actions have been taken, which is the sixth and final step in implementing ISO 50001, the customer applies for certification. Certification takes place by an accredited body, not the consultant. The customer provides documentation that they have successfully become ISO 50001 certified to show that milestone 3 has been achieved.

INCENTIVES

Incentives are given to the participating customers at two milestone completions and for successful certifications. A comparison of the consultancy budgets and incentives shows that per customer, consultancy expenditures (which are cost neutral for the customers) amount to about 2–3 times the amount of the incentives.

PROGRAM TOOLS, SERVICES AND REFERENCES

Tools for customers include templates and documents that will be made available to the customer and adapted to the specific situation of the organization with contributions by the customer. The following list shows EnMS tools and services provided to the utility's customers:

- Short speech on program/Frequently Asked Questions
- Factsheet content with examples, testimonials on implementing EnMS
- Factsheet content on EnMS standards and interrelations
- Factsheet on performance indicators
- Factsheet on related legal requirements
- Existing tools publicly available
- Customer project time schedule
- Migration checklist from 14001
- EnMS intake checklist
- Program flyer
- EnMS handbook (includes background information in Appendices)
- Application form, including Memorandum of Understanding (MoU)
- Energy audit
- Energy Review
- EnMS milestone 1 checklist

Table 1. Incentives and consultancy support.

Milestones Achieved	Certification Path Incentives	Streamlined Path Incentives	Certification Path Consultancy	Streamlined Path Consultancy
#1 Energy Action Plan approved	$7,500	$0.	35 d	15 d
#2 Certification Readiness Report issued	$7,500	$0	10 d	3 d
#3 ISO 50001 certification received	$7,500	n.a.	10 d	0 d
#4 Superior Energy Performance certification received	$7,500	n.a.	7 d	0 d
Additional incentives for measures implemented through the core programs	n.a.	Up to 5,000	n.a.	n.a.
Total Possible	$30,000	$5,000	52 d	18 d

- EnMS milestone 2 checklist
- EnMS training
- EnMS workshop

Reference documents developed for the pilot program include:

- ICIPP Program Approach
- Amendments to General Policies and Procedures of the utilities program framework
- Assistance Protocol (internal use, this document)
- Background of initially targeted companies (one only so far as example)
- Background information on marketing research

Further relevant reference documents developed by third parties for Energy Management Standards ISO 50001 and SEP:

- ISO 50001 standard
- SEP standard, see www.superiorenergyperformance.net/pdfs/SEP_Overview.pdf
- SEP score card spreadsheet (update expected 2012)
- SEP Measuring & Verification Protocol for industry, November 9, 2011
- MSE 50021 standard draft – SEP, Additional requirements
- MSE 50028 standard draft – SEP, Requirements for verification bodies

Conclusions

Without the program ever being applied at the utility's customers, no conclusions on the applicability and the results of the pilot program can be given. However, the expectation on the program was as follows.

For the planned number of 10–12 small and 2–3 large customers enrolling each year, a program budget was calculated, including incentives, consultancy costs and program development. The consultancy expenditures increase in the course of the years because some consultancy services are not necessary in the first year(s).

This results in the total program costs as shown below.

The total pilot program costs from 2011 to 2014 are estimated to move in the range of 1.5 million dollars. It is considered to limit the number of participants to 10 small and 3 large organizations in order to cap the total expenses of the program.

The expected savings of the pilot program are estimated to be in the range of 115 MWh for small/medium customers per year and 600 MWh for large customers per year, resulting in total savings from 2012 to 2014 of approximately 10 GWh and an emission reduction of around 10,000 t.

Assuming an average utility cost of 8 Cent/kWh, this results in simple payback periods of up to 2.3 years for large customers and up to 2.8 years for small/medium customers. Compared to other programs, this is slightly better than average.

With the background of the recently agreed European energy efficiency directive, it seems to be advisable to create and apply such a program or similar ones at European utilities, ministries or other program issuing entities.

References

- ISO 50001
- EN 16001
- Superior Energy Performance certification program and scorecard
- Consumers Energy, 2012 Business Solutions Program Application and 2012 Program Incentive Catalog