

Introduction to Panel 5

The role of energy management systems, education, outreach and training

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Introduction

Energy management practices can involve many activities such as energy auditing and technical analysis, project implementation, target monitoring and reporting, internal and external communication as well as training of staff etc. To organize the work with energy related issues some companies choose to implement a full scale energy management system (EnMS), which conform to standard. In addition, as a stamp of approval, some companies achieve certification issued by a third party auditor.

In common for energy management practices is the intention to spur attention-raising effects and generate know-how which in turn can facilitate an optimal and cost-effective energy use in industrial firms. Literature has demonstrated significant and multiple benefits coming from energy management practices, e.g.: energy efficiency improvement and energy cost savings; reduced greenhouse gas emissions; reduced emissions to water and air; reduced impacts from sudden interruption in energy supply (McKane et al. 2009; Worrell et al. 2009; Capeheart et al. 2007). However, there are still many companies, and especially those being less energy-intensive, which appear hesitant to adopt energy management practices. This could be attributed to a curtailed technical or managerial capacity to focus on the energy performance of business, which is probably the case for many SMEs.

The stimulation of EnMS implementation, or associated but less comprehensive energy management practices and activities, has become a means for the public governance of industrial energy and environmental issues. National EnMS standards and specifications have been developed over the last decade and more recently the international ISO 50001 standard was launched. In some countries and across some corporations energy management practices have now become established and

so there are experiences to be spread. Organizations like the International Energy Agency (IEA) stimulates further uptake; in one of its 25 Energy Efficiency Policy Recommendations IEA advises governments to require energy-intensive industries and stimulate other industrial energy end-users to implement EnMS which conform to ISO 50001 or equivalent (IEA 2011).

Out of the 15 papers in this panel twelve are papers that are orally presented in the panel sessions and three are papers that are presented in the poster session. The orally presented papers have been grouped into five thematic panel sessions:

- Introducing EnMS – guidelines to facilitate implementation
- EnMS in practice – industrial experiences in three countries
- Monitoring and verification – feedback and benchmark
- Encouraging energy efficiency to improve business
- SMEs – small but large potential

In the following we briefly introduce the papers of the five oral sessions as well as the poster papers and conclude with some of the key findings derived from this work.

Introducing EnMS – guidelines to facilitate implementation

To implement and certify an EnMS which conform to standard can be a challenge for many companies and especially for firms which have little or no experience from working with other management systems based on the “plan-do-check-act” approach. To facilitate an effective implementation the two papers presented in this session provide useful guidelines.

The paper of Seidel (5-021-12) is written out of concern for those manufacturing companies which lack capabilities to implement full scale EnMS according to standard. The author provides a review of a couple of approaches that aim to simplify and clarify the vital steps involved in an EnMS implementation. The author also contributes with an own proposal for a stepwise introduction of an EnMS suited for SMEs.

Carl et al. (5-092-12) describe the development and the key components of an incentive program which intends to provide industrial customers with consultancy support to achieve EnMS implementation according to ISO 50001. The program, which has been created for a large utility in the USA, is currently in a pilot stage but provides an interesting case of how an energy supplier with an energy saving obligation can contribute to EnMS implementation among its customers.

EnMS in practice – industrial experiences in three countries

As was presented in the previous session the uptake of EnMS standards or less comprehensive practices has started to take off in some countries. In this session three papers share experiences from three different countries.

Mahmood and Meyhoefer (5-042-12) present a case study of the textile industry in Pakistan. Due to the benefits of an EnMS approach compared to only conducting energy auditing, a pilot program has assisted 25 mills to implement EnMS. The results show that the concerned companies achieved significant energy savings but that financial barriers still hinders the realization of the actual energy saving potentials.

Backlund et al. (5-055-12) investigate energy management practices and energy saving potentials among Swedish manufacturing industries. While some companies participate in a voluntary agreement scheme which requires full EnMS implementation and certification, others are incentivized by a simpler energy audit program. A third category of companies has not received any targeted support to introduce energy management practices. Although energy management practices are sometimes deficient among program participants the results verify the positive effects induced by policy programs. Improved energy management across the industry sector is needed to realize untapped energy saving potentials.

Vermeeren et al. (5-062-12) share some experiences from the Netherlands. As a background the author describes how industrial energy management has been applied since year 2000 as part of a national voluntary agreement scheme. Next, the paper features recent experiences from the ongoing transition to ISO 50001 with the empirical evidences gathered from the Dutch paper industry. Among the conclusions are some important aspects to be addressed for a successful and persistent EnMS implementation.

Monitoring and verification – feedback and benchmark

Monitoring involves procedures to continuously collect and analyze data on industrial energy use and is vital to verify that energy management practices lead to improved energy performance in accordance with the firm's objectives and targets. Two papers are concerned with this subject.

Mourik et al. (5-152-12) discuss critical issues when designing and implementing feedback and energy management systems to support a change towards more energy efficient behaviour in different customer segments and among them industrial clients. In particular, the paper explores the role of DSOs in facilitating the provision of such systems in a liberalised electricity market. Over a hundred energy feedback and management pilots in and outside of Europe were analysed. This resulted in recommendations about how to design, implement and in particular how to 'embed' the most effective systems for different types of customers. It is concluded that successful feedback and energy management requires knowledge about the diverse practices of customers and that their needs and characteristics are taken into account.

Whiteley et al. (5-136-12) share empirical evidences from two industrial sites located in the United Kingdom. Both sites demonstrate large but untapped energy savings potentials which have been identified through the use of energy analytical techniques like half-hourly energy analysis and thermal imaging. By applying these techniques industries can reveal the details in their energy use and reap cost-effective measures. Conclusions are made about the lack of skills in energy analysis among practitioners, which is best addressed by launching training and awareness programs.

Encouraging energy efficiency to improve business

The role of a manufacturing firm is to generate profit through the production of goods and services. Energy efficiency is not a primary goal of business. However, if viewed as a strategic issue it can be regarded a means to increase productivity and achieve profitability. This session contains three papers concerned with barriers against energy efficiency and how these can be overcome to make it a strategic and perhaps even a joyful issue.

Based on an extensive literature review, a novel approach for barriers to the adoption of industrial energy-efficient technologies is provided by Cagno et al. (5-172-12), highlighting the actors addressed by the barriers and showing how external barriers reflect on a single enterprise when undertaking a decision whether to invest in an energy-efficient technology. The approach represents a unique instrument both for enterprises and policy makers to identify critical factors to improve industrial energy efficiency and to open the research to further investigation in this topic.

Crittenden (5-081-12) poses the question: What do effective practitioners do to successfully integrate energy efficiency within the core business practices of industrial firms? In an analysis of 20 energy-intensive companies with operations in Australia the author has examined three institutional mechanisms (i.e. cognitive, normative and regulative) which have influenced the firm behaviors and helped them to integrate energy efficiency into their core business.

Sattler and Krautgartner (5-074-12) present a new way to engage people in energy efficiency called: "TuDu" (German for "Just do it!"). Energy experts together with a group of cabaret artists are building a bridge between economy and art. "TuDu" combines well known songs and important facts from energy-relevant topics such as efficiency, compressed air, lighting, and standby into a show. The aim is to raise and re-enforce awareness for efficient energy use among employees and to

motivate them to responsibly handle and preserve valuable energy. Concrete practical success stories show that substantial savings can be achieved.

SMEs – small but large potential

While large and energy-intensive firms may have both strong motives and the necessary resources to implement and maintain an EnMS it is more difficult for the broad category of SMEs. In this last session of the panel two papers are presented to cover some challenges and opportunities faced by SMEs.

Thollander et al. (5-050-12) examine barriers to the implementation of cost-effective measures. The paper presents an energy audit tool for industrial SMEs which has been developed on the basis of three decades of research and teaching in the area of energy auditing in industry, covering more than 300 energy audits, primarily conducted in Sweden. The tool uses unit process categorization, which enables energy auditors and energy program administrators to conduct energy audits in a standardized way. The data collection is facilitated by a set of forms and data is automatically summed at different levels of detail and summarised in sheets.

Fleiter et al. (5-100-12) explore factors that drive the adoption of energy efficiency measures by SMEs. The analyses rely on a data set of SMEs which participated in a German energy audit program in 2008–2010. High investment costs and lack of capital are main barriers to energy efficiency improvement measures, even when measures are deemed profitable. The findings provide evidence that the quality of the energy audits affects the adoption of energy efficiency measures. Potential regulations could involve quality standards for energy audits, templates for audit reports or mandatory monitoring of energy audits.

The poster session

Gürtler and Neelis (5-091-12) highlight the importance of proper industrial insulation to achieve a high energy performance in industrial facilities and for certain processes. The paper presents the main components and results of a recently launched program where certified insulation engineers assist industrial customers to raise their awareness about optimal insulation solutions so to ensure that state-of-the-art insulation practices are adopted with regards to material selection and installation.

Falkner et al. (5-030-12) highlight that standards need to be controlled and monitored to ensure that they deliver. The author shares experiences from Australia and the case of electric motor systems. Since 2001, the country has been regulating minimum energy performance standards of electric motors. The efforts have focused on compliance testing, to inform standards development, and harmonisation at the domestic and international levels. Australia has also been leading a number of initiatives at international level.

Lucas and Putier (5-121-12) describe results of a voluntary benchmarking program which covers 48 production sites of the French feed production industry. Among four indicators the

results highlight an average fall in specific energy consumption of between 15 and 20 % between 1985 and 2007. The specific energy cost per production unit fell significantly until the end of the 1990s, but has thereafter increased under the influence of higher fuel and electricity prices. Energy savings are still achievable in this industrial sector, but better monitoring tools are needed to prove the value of energy management.

Key findings

- The high-level policy recommendations from organisations like IEA are supported by findings in the presented papers. Industrial EnMS implementation should be stimulated by public governments through an appropriate combination of requirements and incentives.
- Less comprehensive energy management practices can provide stepping stones for full EnMS implementation. A policy portfolio should preferably contain program components that are suited both for advanced companies and beginners in energy management. Valuable knowledge transfer can be generated between different groups of companies. Overlapping policies should be avoided to ensure a cost-effective implementation and to exclude free-riders.
- The commitment and clear mandate from top management, which is reflected by the allocation of resources, is of utmost importance for a successful EnMS. The commitment matters not only in the EnMS build-up or implementation phase but throughout to establish a persistent EnMS, which is prepared to address new and upcoming challenges and to continuously improve energy performance at the site.
- With the right approach there can be cost-effective savings from SMEs.
- Valuable results can be obtained from monitoring the accuracy and effectiveness of standards and norms.
- Benchmarking between industries can create opportunities for energy efficiency improvement.
- A better understanding for energy efficiency issues can be created while having fun.

References

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