Informa-TECH

Volume 29, number 2, August 2015

Lean energy – Kaizen – EMS – Better than yesterday, not as good as tomorrow (Japanese maxim)

For many years now, a great number of companies have been implementing efficiency measures and technologies to increase their performance, counteract instabilities in the prices of energy and meet new regulations aimed at reducing greenhouse gas emissions. So now we can ask ourselves: what more can we do to continue to reduce our energy consumption and shrink our environmental footprint?

The answer? Lean Energy. It proposes a strategy and a toolkit to continuously improve operational efficiency while reducing energy costs and cutting greenhouse gas emissions. Today it is clear that achieving a company's full potential calls for taking technological, organizational and behavioural dimensions into account. In recent years, however, companies have mostly concentrated on the technological dimension to the detriment of the two others, thus leaving room to do even more by optimizing the other two dimensions.

Here is what Lean Energy involves and how this process enables us to meet our objectives to reduce energy consumption.

Some definitions

Lean Energy

Originating in Japan, Lean Energy is a management philosophy that literally means "lean management." Work is organized in such a way that employees are mobilized to identify and eliminate energy waste by questioning the use of energy in their daily activities. It is not about replacing appliances; rather, it is making them more efficient by making sure that they are functioning optimally. This approach takes into account different aspects of a project – technology, management structure, and human behaviour. While technology and profitability are the focus of energy efficiency decisions, the human resources contribution is very important when it comes to the longevity of the continuous improvement measures.

Kaizen – Treasure Hunt

Integrating a Lean Energy approach into a company is not automatic. There are various tools on the market. A continuous improvement process adapted to energy, like the Kaizen or the ENERGY STAR "Treasure Hunt" approach, works well, calling for an intense, several-day activity involving company stakeholders from all decision-making levels. This approach facilitates collecting facts and data to obtain as accurate a picture as possible of energy consumption:

- How is energy consumed: where, how much, when, what type of energy?
- How does the process consume energy?
- Where are the energy losses?
- How can energy needs best be met?
- What improvements are possible?

All have to contribute, according to their responsibilities, to finding factual answers to those questions. At the end of the days of thoughtful analysis, a list is drawn up of potential projects to optimize energy consumption. Sometimes, very cost-effective projects are implemented during the approach. In the spirit of Lean Energy, high efficiency projects that

affect ways of doing things, rather than replacing appliances, are prioritized. A continuous improvement approach is not an energy audit since, among other things, employees are directly involved, and since operations are analyzed and optimized with the goal of improving energy consumption.

EMS – Energy management systems

Since a Lean Energy approach integrates not only the technological dimension of projects but also the management structure and human behaviour, it is worthwhile including an energy management system (EMS). This does not mean installing control software or electronic accessories. EMS helps give an overall view of a company's energy issues. From the production line to the boardroom, everyone is concerned, involved and made aware. In terms of energy management, EMS helps a company develop its own way of doing things so as to answer questions like:

- What are the objectives to be achieved?
- What is the role of each person?
- When and how can monitoring be assured and who is responsible?
- …

Figure 1 illustrates the Lean Energy tridimensional approach. Kaizen and Treasure Hunt are examples of effective tools for technology, while EMS focuses more on the management structure and corporate culture. The elements that make up EMS are illustrated in Figure 2. It clearly is a continuous improvement approach since a plan of action is defined in order to monitor the achievement of the objectives. Measurements are then implemented, validated and corrected, based on pre-determined performance indicators. The ISO 50001 standard or the ENERGY STAR guidelines are methods that help organizations establish the systems and processes needed to improve their energy performance, measured in terms of usage, consumption and efficiency.

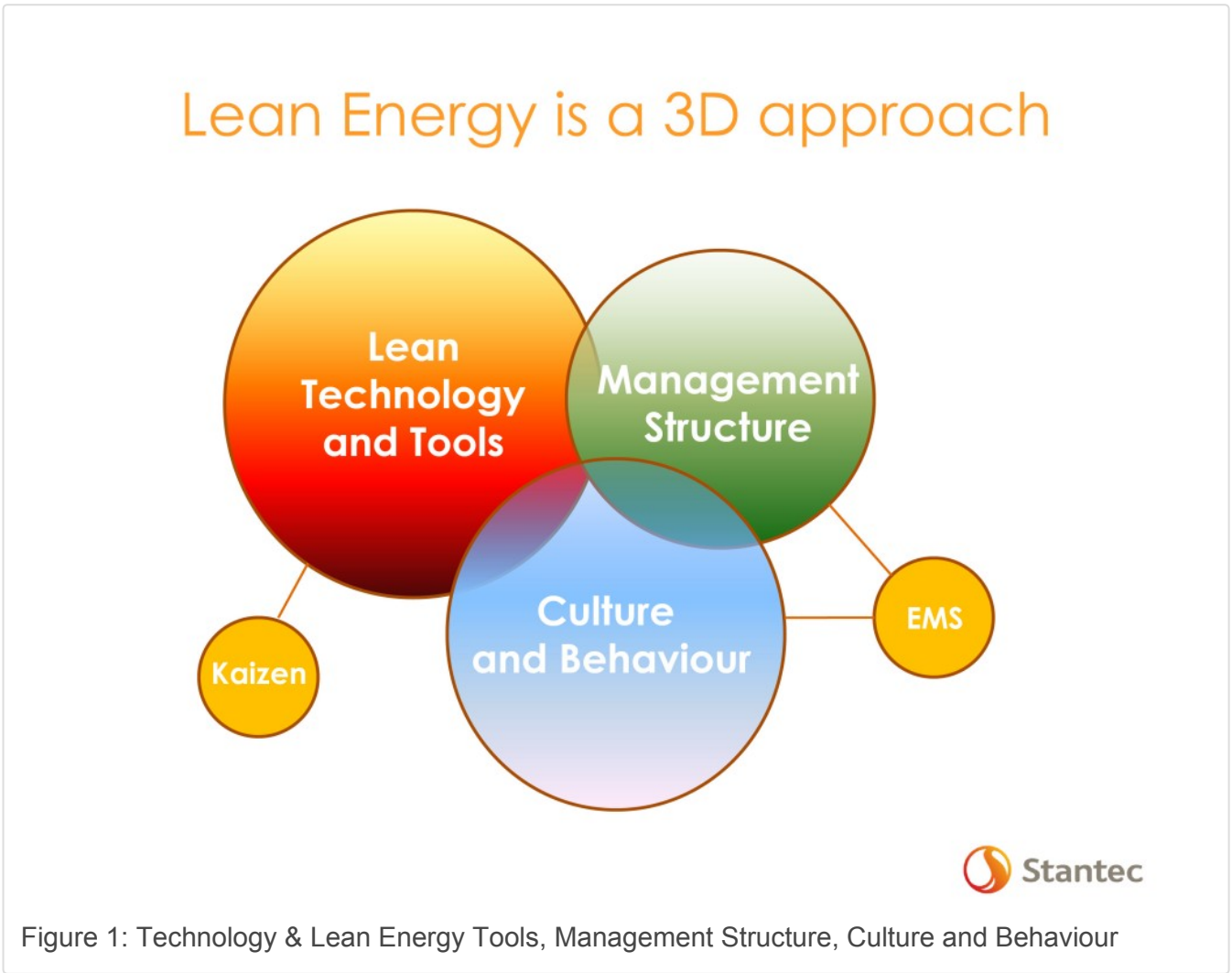

Figure 1: Technology & Lean Energy Tools, Management Structure, Culture and Behaviour

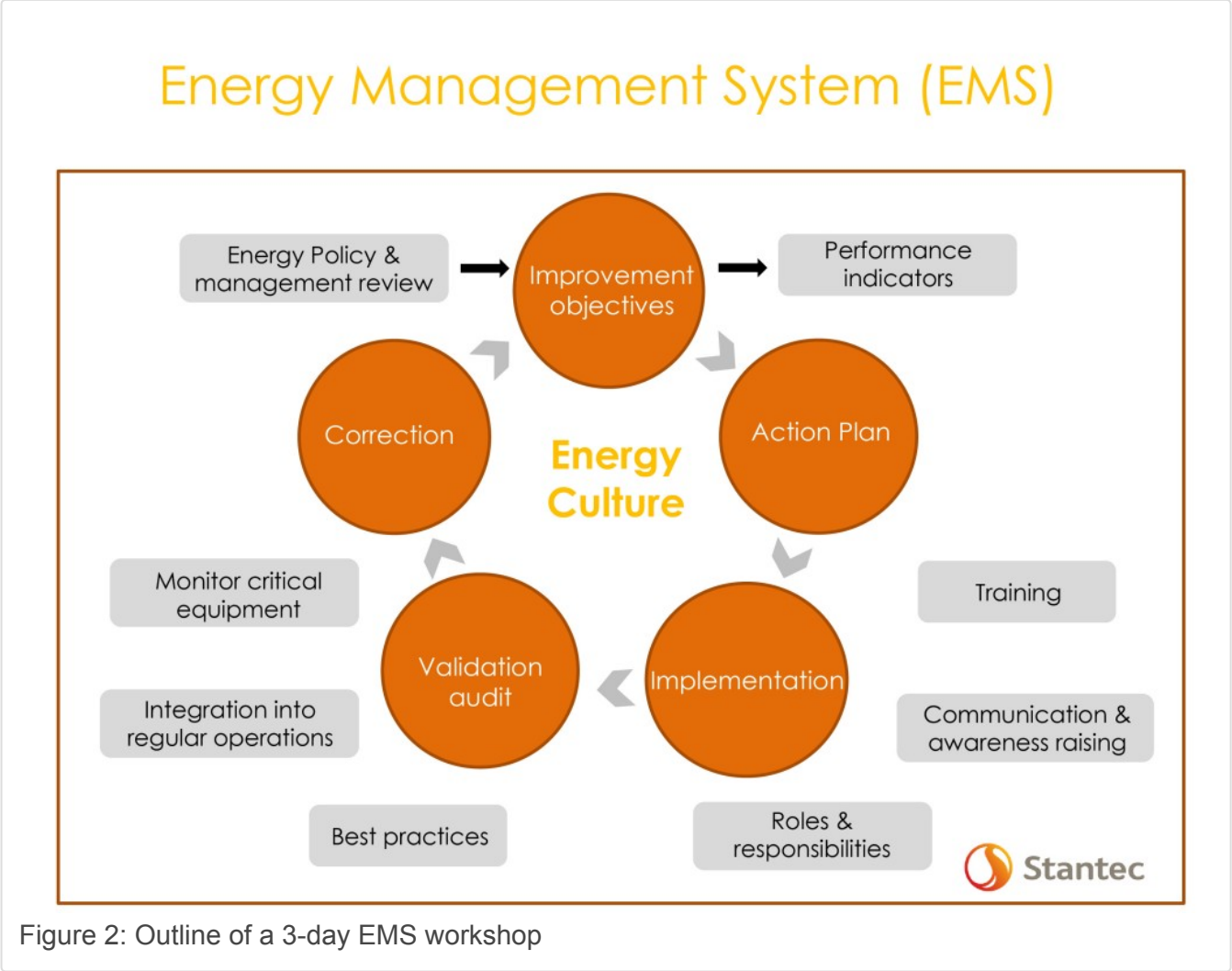

Figure 2: Outline of a 3-day EMS workshop

Concrete improvement results

Some companies have bravely integrated this philosophy into their processes and some energy savings projects were initiated a short time later. Their projects in Québec have saved, on average, more than 20% of thermal energy consumption. The following table shows one example:

Company	Total number of projects	ROI ≤ 3 months	3 months ≤ ROI ≤ 1 year
Kruger Bromptonville	22	10	9

The Rio Tinto Alcan plant in Beauharnois has adopted this approach. Since 2011, its specific natural gas consumption has been reduced by 8.65%, while production has increased by 15%.

In the United States, under the Superior Energy Performance (SEP) certification program, more than 20 North American plants have implemented ISO 50001. The savings measured and certified by these companies have sometimes been around 25% and more over three years. The Lean Energy approach, Kaizen and ENERGY STAR tools and, of course, EMS, are effective tools for those concerned about their company's energy consumption. It is therefore possible not only to implement energy savings measures but also to monitor their performance and to involve everyone in the success and achievement of such worthy objectives. A company becomes more productive and society is in better shape thanks, among other things, to the reduction in greenhouse gases.

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Thanks to Jean Claude Paradis, Senior Project Manager, Stantec

To learn more about the subject, here are a few references:

- http://www.iso.org/iso/home/standards/management-standards/iso50001.htm
- http://www.epa.gov/lean/lean-energy-and-climate-toolkit
- http://www.energystar.gov/buildings/facility-owners-and-managers/industrial-plants/earn-recognition/energy-star-challenge-industry

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