

US EPA ARCHIVE DOCUMENT

Lean and Sustainable Offices

Explanations, Tips, and Calculators

When Lean efforts work together with other process management strategies, such as Environmental Management Systems (EMS), everyone in the organization can benefit. The Lean drive to eliminate waste can produce environmental benefits if simultaneous actions are implemented to conserve resources and reduce pollution at the source. In combination, becoming more lean and more sustainable can uncover substantial economic benefits, such as cutting costs related to utilities, waste management, and potentially reduce the regulatory risk and compliance activities associated with environmental regulations.

This whitepaper focuses the intersection of Lean and EMS to reduce resource waste in offices. It explains Lean, EMS, and the relationship between them, outlines basic resource wastes and tips for reducing them, and provides links to further resources, including calculators for quantifying savings.

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1. Understanding the Relationship between Lean and Environmental Management Systems (EMSs)

Lean and EMS are two business process management systems that attempt to reduce waste and focus on organizational continuous improvement. Recent research suggests that despite their differences, Lean and EMS can be compatible and synergistic. By cooperating, Lean and EMS teams at an organization can both achieve their goals and improve their organization more effectively than by working separately. (“Lean Production and EMSs: Aligning Environmental Management with Business Priorities” Jennifer Tice, Lori Ahouse, and Tim Larson)

What is Lean?

An organization should develop a management framework for deciding how and when to implement Lean methods, but Lean is comprised of the methods themselves all focused on improving operational efficiency and continuous improvement. Lean tools are used as

a collection of tactical methods for improving efficiency and reducing waste in a process. Some of these methods include: Kaizen events, 5S, Value Stream Mapping, Standard Operating Procedures, and Visual Controls.

- **Kaizen events:** Three-to-5-day periods during which an authorized team analyzes and improves a process.
- **5S:** A system for creating and sustaining an efficient, productive workspace.
- **Value Stream Mapping (VSM):** A tool to create a visual representation of every step in the process. The non-value-added steps are recognized and eliminated, and a VSM of the new, streamlined process is drawn.
- **Standard Operating Procedure (SOP):** A set method of performing a task that has been determined to be the most efficient. A Lean team creates it, puts it into writing, ensures that the staff is trained on it, and sets up visual controls as reminders.
- **Visual Controls:** Signs, symbols, color-codes, and other visible cues about how a task is to be performed that are placed in the relevant work area.

The Lean process empowers employees to solve problems and implement solutions rapidly with access to and approval from management. As it catches on within an organization, Lean builds a culture of empowered, problem-solving employees and can facilitate rapid, stunning change.

What is an EMS?

EMS is often deployed as a higher level of systems management than Lean. EMS is a management framework; a team of people and a systematic method used to identify environmental opportunities and set goals for improvement. ISO 14001, created by International Organization for Standardization (ISO), is generally used as the standard for EMS. This standard defines EMS as, “The overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing, and maintaining the environmental policy.” ISO is driven by the market sector, and although governments may participate, it is not regulatory. Because of this, ISO 14001 is a process, rather than performance, standard.

While some of people on the EMS team for an organization may be from the environmental department, many team members are from other branches of the organization. From there, they can intercede between the EMS and their own department. An EMS should also include managers and be well-connected in order to obtain the authority to make real changes.

Like Lean, EMS is a system for continual improvement, which follows the Plan-Do-Check-Act framework. Also similar to Lean, EMS focuses on waste elimination and requires and promotes a culture of empowered, problem-solving employees. An EMS systematically lists the operations, or aspects, of an organization, and continually examines them to find which have the greatest environmental impacts. Some of these operations may include air emissions, water discharges, soil contamination, use of raw materials, energy use, and use of natural resources.

If the EMS team determines that it can successfully influence an aspect, it sets objectives (or qualitative goals for improvement) and targets (the qualitative, dated plans for improvement). The EMS team selects a specific area where an Environmental Management Practice (EMP) can be implemented to help accomplish the target. The team then determines a means for how this improvement can take place and breaks down the steps into a timeframe. For example:

Objective: Reduce air emissions

Target: Reduce air emissions by 20% by 2015

EMP: Reduce VOC Emissions at Atlanta Plant

Means: Update filtration technology

Timeframe: Begin purchasing technology by 2011 to reduce emissions by 5% annually

The EMS team then connects with those who are responsible for the aspect and (with the help of management support) puts the EMP into practice. As time goes on, the EMS team makes sure that EMPs are sustained, and repeats the process of listing aspects, setting objectives and targets, and introducing EMPs.

Lean and EMS Together

Lean and EMS can differ in focus because of their perceived respective drivers. Lean is often viewed as being driven by business competitiveness, capital productivity, customer satisfaction and quality. Lean is focused on those activities that provide for added value to the operation and the customer. An EMS, on the other hand, is often viewed as being driven by the need to comply with environmental regulations, as well as the desire to reduce the economic, human health, and environmental costs associated with environmental wastes. The presence of an EMS, especially a certified EMS, can be a signal to the marketplace that an organization is committed to high functioning management and transparency of its practices and procedures. It is a sign of “good housekeeping.” Although these perceived different focuses create the potential for Lean and EMS to compete, in reality they can complement one another, leading to the achievement of greater environmental and economic results.

By arming the EMS with Lean methods, the Lean process can add value to EMS and vice-versa. As previously stated, an EMS alone should focus on the reduction and management of environmental impacts. Similarly, Lean’s goal of reducing waste can incorporate the pollution prevention and minimization of environmental wastes as “non-value added” activities in a process. By incorporating Lean tools into the EMS, Lean events can connect EMS to stronger financial drivers. Or, it may be easier to add EMS objectives to a Lean event than to try to accomplish them independently. Any access to process information, process employees and managers’ commitment that the Lean event has already acquired can also be channeled into EMS objectives. Finally, by utilizing Lean methods, the EMS team can improve its own procedures. EMS teams can use the Lean idea of standard work (Standard work is the method to keep processes constant so

that the outcome is what was predicted and it was achieved in the most efficient and professional way. Source: <http://www.valuestreamguru.com/?p=107>) to integrate EMPs with the staff's daily routines. EMS teams can also use Lean methods to improve its own processes and procedures.

EMS adds value to Lean by giving perspective to this process' environmental blind spots and anticipating environmental issues. Because the Lean process traditionally seeks only to improve the process based on reducing eight types of waste represented by the word **DOWNTIME**:

Defects
Overproduction
Waiting
Non Value Added Processing
Transportation
Inventory (Excess)
Motion (Excess)
Employee Knowledge, Skills & Abilities (Not used)

Using this traditional Lean definition of waste, it has some environmental blind spots:

- 1) In the haste to cut out unnecessary steps, Lean may unknowingly cut out a step which is necessary for limiting environmental risk.
- 2) The Lean process may miss an opportunity to reduce a significant environmental waste whose economic benefits are only slight or are significant but hidden
- 3) Lean does not incorporate a lifecycle analysis of the product, which can reveal many avoidable environmental costs. Because it focuses only on the production process and consumer response, Lean misses out on environmental savings that come from designing products to last and then be reused, recycled, or disposed of in an environmentally safe way.

These blind spots inherent in Lean are the very issues on which an EMS team focuses. If Lean event teams include EMS team members, their expertise on these issues may lead to identification of otherwise overlooked savings and avoid unnecessary environmental costs. For example, in one Lean event the process improvement teams may suggest the need to clean a product faster by using stronger solvent and adding an extra dip tank so there is less motion and transportation of the product around the facility. Without any input from the EMS team, the process improvement team has created a hazardous waste and safety liability for the facility, and increased the environmental footprint of the overall product (which could have a huge impact on labeling and product competitiveness in the marketplace) simply because it fit the traditional Lean goal of reducing time, motion and transportation.

Because of Lean's fast pace, departments within the organization that keep track of compliance and sustainability efforts and goals may not catch such oversights soon enough to avoid subsequent costs in time and money. An EMS advisor serving on the Lean team can minimize these costs by proactively addressing an organization's sustainability goals, environmental regulations, ensuring that everyone at the organization

knows their responsibilities for incorporating environmental management into the Lean functions.

Overall Resources:

Sustainable Office Toolkit

<http://www.p2ad.org/toolkit/>

Green Building

<http://www.epa.gov/greenbuilding/>