



LEAN-TO-GREEN:
WHEN LEAN AND GREEN INTERSECT FOR
GLOBAL ENVIRONMENTAL SUSTAINABILITY

THE BENEFITS OF LEAN MANAGEMENT HAVE BEEN WELL ESTABLISHED WHEN IT COMES TO ELIMINATING WASTE, STREAMLINING OPERATIONS, AND LOWERING COSTS TO RESULT IN GREATER EFFICIENCY. HOWEVER, IT'S A MORE RECENT DEVELOPMENT TO LOOK AT THE WAYS IN WHICH LEAN PRINCIPLES AND PRACTICES HELP ENTERPRISES BECOME MORE ENVIRONMENTALLY SOUND.

Leaders are under increasing pressure to “go green” from regulatory bodies and from consumers motivated to choose products perceived as less environmentally harmful. The necessity to comply with continuous rule changes is an added stress, along with the need to keep up with competitors who may be ahead in incorporating eco-friendly practices. One recent report reviewed 59 journal articles and concluded that industries must deploy both Lean and green strategies for operational excellence and maximum sustainability to remain competitive in global markets.

Beyond practical and financial concerns, there is the much bigger issue of sustainability, both of resources and of the very planet itself. The dwindling of key resources such as energy and water and the growing threats posed by drought, wildfire, flood, and catastrophic weather events increasingly affect daily life in every corner of the planet. “Climate change poses the biggest threat to sustainable development everywhere,” notes a recent United Nations report, concluding that “urgent action to halt climate change and deal with its impacts is integral to successfully achieving all sustainable development goals.”

As glaciers melt, sea levels rise, aquifers run dry, and forests burn, communities must rethink everything from infrastructure needs to disaster prevention strategies. These disasters – and the environmental hazards involved – are costing governments billions of dollars a year in disaster relief, environmental cleanup, and mitigation. With the effects of climate change accelerating from year to year, it is no longer possible for enterprises to continue doing business according to the rules and practices of the past. Manufacturers must assess and confront the contributions of environmentally unsound manufacturing practices to the current situation and become proactive in making changes to become sustainable. Companies that do not implement major shifts in resource use and clean manufacturing processes will find themselves shut out of the global economy.

In this environment, Lean management principles and practices are ever more relevant. A cornerstone of Lean management is the use of systematic methods to cut out non value-added activities, streamline operations, and by their very nature, taking these steps can yield substantial environmental benefits. While optimizing an enterprise to be faster and more reliable, produce higher quality products and services and operate at lower cost, Lean thinking can optimize the utilization of resources and reduce environmental impact, making it the ideal partner to “green enterprise”.

While Lean targets waste in the form of materials, costs, and worker time, "green enterprise" focuses on waste that directly affect the environment. More specifically, "green enterprise" seeks to modernize production and operations processes to prevent or reduce the release of greenhouse gasses, eliminate or reduce the use of non-renewable or toxic materials, and generate less solid and liquid waste.

What the "Lean-to-Green" movement suggests is that the two strategies can be integrated for maximum environmental impact by targeting environmental waste and pollution more specifically. "The Lean transformation of a production or service facility may very well achieve green transformational results as well because they share the goal of eliminating waste across all levels of the cycle," says Patrick Wiebusch, Co-Founder and Managing Partner at Four Principles.

Companies have used Lean methods to lower energy consumption, cut water use, and reduce the amount of waste going to landfills. Lean management methods have helped companies meet overall sustainability goals such as reducing their carbon footprint.

In a landmark study, researchers surveyed manufacturing firms whose success in implementing Lean management had earned them the Shingo Prize for Operational Excellence. What they found was that the Shingo prize-winners were significantly greener compared to other manufacturers according to 25 of 26 measures of "green enterprise". This, they concluded, indicated a strong correlation between success in developing Lean systems and environmental credibility.

Four Principles helps companies analyze production yields and material consumption, and develop strategies for defect reduction. *"Lean philosophy can play a key role in helping companies integrate complementary elements of green management,"* says Seif Shieshakly, Co-Founder and Managing Partner at Four Principles. As a specific example of Lean-to-green, Four Principles can perform an analysis to map energy uses, then identify opportunities to optimize energy consumption.

When upgrading existing equipment and manufacturing components or considering the purchase of new equipment, Lean systems can help companies quantify environmental performance impact and consider it in the decision-making process. *"The goal is to design with 'green reliability' in mind, and Lean can help with that,"* says James Ryan, Principal at Four Principles. *"Organizations can bridge the environmental gap by evaluating the energy consumption of engineering alternatives as a cost category."*

Life cycle asset management can assess the environmental impact associated with materials, components, manufacturing and operations processes, including energy consumption, water usage, and the generation of harmful byproducts and waste.

Where Lean and "green enterprise" intersect, there can be remarkable synergy between the twin goals of efficiency and sustainability, and continuous improvement programs can be expanded to embrace both. For example, the Lean concept of Operator Care can be used to set standards of practice designed to reduce variations in the manufacturing process, leading to less waste of product and raw materials.

Manufacturers such as General Electric, Eastman Kodak, Toyota, Baxter and more have used Lean to become greener:

- Baxter International Healthcare Corporation mapped the manufacturing processes to identify major steps in water usage and opportunities for improvement, resulting in water use reductions of 170,000 gallons a day
- General Electric reduced greenhouse gas emissions by 700,000 metric tons, saving \$111 million in operating costs at facilities worldwide
- Steelcase, Inc. improved operations, reducing fixed utility costs by close to 90 percent
- Toyota reduced the annual facility energy consumption per vehicle by 19 percent and collectively reduced greenhouse gas emissions by almost 150,000 tons
- Another Baxter International facility implemented energy efficiency strategies to save \$300,000 in energy costs in one year.
- Eastman Kodak saved \$15 million over a seven-year period due to energy efficiency improvements
- "Sustainable production strategies such as waste reduction, re-use, and improved energy efficiency can add value, lower costs and shorten production times," says Patrick Wiebusch, Co-Founder and Managing Partner at Four Principles. "Lean and green management offers a way to continuously improve the management processes that add value to the organization, costumers, and most importantly, help to preserve nature."

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info@fourprinciples.com

Dubai, UAE Office Address

Dubai Media City
Building 8
Office 212
P.O. Box 502621
Dubai, UAE
Tel: +971 4 368 2124

Riyadh, KSA Office Address

Al Urubah Road – AL Wurud
Abdul Latif Jameel building
Ground floor
P.O. Box 286161
Riyadh 12252, KSA
Tel: +966 55 501 5895