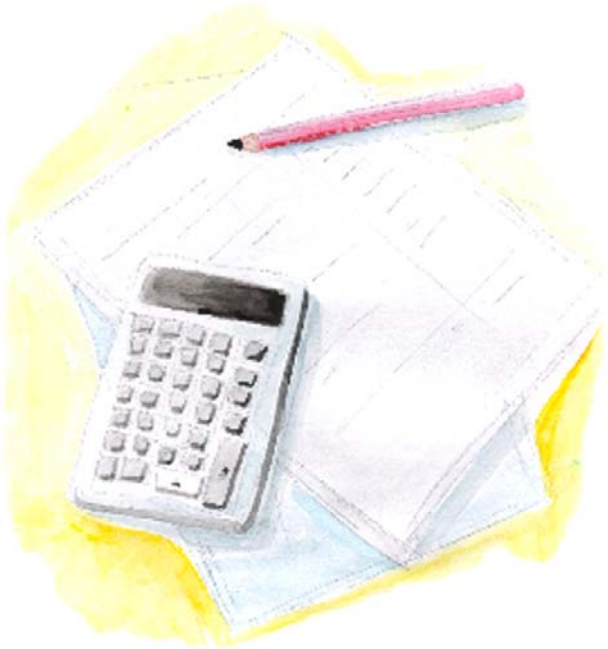
Washington Lean and Environment Project
Final Report

Executive Summary



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Publication Date: August 2007, Revised August 2008 with 12-Month Review Information

Project Conducted by:

Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Program (www.ecy.wa.gov/programs/hwtr)

Washington Manufacturing Services (www.wamfg.org)

Pilot Project Facilities:

Canyon Creek Cabinet Company, Monroe, Washington (www.canyoncreek.com)

Lasco Bathware, Yelm, Washington (www.lascobathware.com)

Columbia Paint & Coatings, Spokane, Washington (www.columbiapaint.com)

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Washington Lean and Environment Project Final Report

The Washington State Department of Ecology's (Ecology) Hazardous Waste and Toxics Reduction (HWTR) Program and Washington Manufacturing Services (WMS) partnered in a project to provide lean and environmental technical assistance to manufacturing facilities in Washington through three pilot projects. Participating facilities included:

- **Canyon Creek Cabinet Company** (Canyon Creek), a large manufacturer of custom frameless and framed style cabinetry in Monroe.
- **Lasco Bathware** (Lasco), a manufacturer of fiberglass and acrylic bath and shower fixtures in Yelm.
- **Columbia Paint & Coatings** (Columbia Paint), a manufacturer of residential, architectural, and industrial paint and coatings in Spokane.

Ecology provided environmental expertise for the pilot projects, while WMS provided lean manufacturing expertise and management of on-site activities at the facilities. The overall project objectives were to: (1) develop a partnership between Ecology and WMS, (2) evaluate the benefits of deliberately integrating environmental tools into lean practices, and (3) gain the expertise to offer and promote future lean and environment projects to manufacturers statewide. Funding for the project was provided by Ecology, the National Institute of Standards and Technology, and the U.S. Environmental Protection Agency.

Project Activities and Results

Ecology and WMS jointly marketed the pilot projects to manufacturers across Washington and selected facilities based on their ability to meet certain criteria (e.g., demonstrating potential for environmental improvement and securing management buy-in). The pilot projects yielded impressive operational and environmental results at each facility. Cost, time, and environmental savings from the pilot projects are summarized in Table ES-1

Table ES-1. Annual Cost, Time, and Environmental Savings from the Lean and Environment Pilot Projects

Reductions	Canyon Creek		Lasco		Columbia Paint	
	Time and Environmental Savings	Cost Savings	Time and Environmental Savings	Cost Savings	Time and Environmental Savings	Cost Savings
Raw Material and Solid Waste	1,800 wood sheets 10,400 parts 508,000 lbs waste	$376,000	43,200 lbs resin 29,000 lbs overspray[1]	$24,400	49,200 lbs paint solids 18,000 lbs shrink wrap	$109,200
Hazardous Substances and Waste	68,700 lbs purchase 84,400 lbs disposal	$165,600	- - -	- - -	17,600 lbs disposal	$10,000
Air Emissions	55,100 lbs volatile organic compounds	N/A	- - -	- - -	- - -	- - -
Wastewater	- - -	- - -	- - -	- - -	36,900 gallons	(included above)[2]
Energy	20,700 therms	$24,000	126,000 therms	$99,300	- - -	- - -
Labor[3]	39,000 hours	$624,000	2,200 hours	$35,500	2,500 hours	$90,600
Cost Savings Subtotal		*$1,189,600*		*$158,200*		*$209,800*
Total Cost Savings:			$1,557,600 per year			

[1] Estimated potential savings for production of one of Lasco's common models, based on measurements conducted during the kaizen event in 2007.
[2] Cost and material savings associated with the paint solids in wash water are included with raw material savings for the Columbia Paint pilot project.
[3] The labor savings estimates are conservative. Labor hours were reassigned to other value-added activities.

In addition to these savings, other improvements from the pilot projects included:

- Increased production without the need of a Clean Air Act Title V air permit at one facility.
- Reduced total lead time for producing products.
- Increased flexibility and efficiency of production, enabling facilities to be more responsive to customer demands and more competitive in the marketplace.
- Reduced product defects, improved overall workplace organization and ergonomics, and reduced worker exposure levels.
- Enhanced staff morale, improved communication between staff and management, and empowered staff to initiate process improvement activities.

Concurrently with the three pilot projects, WMS and Ecology worked on several separate lean and environment efforts with other manufacturers in Washington and have also further developed the Ecology-WMS partnership.

Key Findings

1. The project confirmed that environmental considerations can be effectively integrated into lean methods to reduce more waste, yield greater cost savings, and increase environmental benefits.
2. The project generated strong, ongoing environmental and operational results.
3. Ecology and WMS have different organizational cultures, but the partners realized the value of overcoming and managing these differences.
4. The partnership added value to individual services offered by Ecology and WMS.
5. Establishing a long-term lean and environment service delivery model is important to the success of the partnership.

Recommendations

The project has potential implications for future lean and environment efforts of Ecology, WMS, and other organizations seeking to combine lean and environmental improvement approaches. Recommendations include:

1. Expand and improve lean and environment service delivery through additional demonstration projects.
2. Continue lean and environment innovation efforts (see textbox).
3. Sustain support for the Ecology-WMS partnership and future lean and environment activities.
4. Develop and implement a coordinated strategy for lean and environment activities in Washington.
5. Extend lean and environment efforts beyond Washington.

Lean and Environment Innovation Areas
(Recommendation #2)

- Environmental "pain" and regulatory issues (i.e., focus on environmentally sensitive processes with substantial costs and/or risks to businesses)
- Product and process design
- Guidance and tools for technical assistance providers
- Links to other environmental and business improvement efforts
- New audiences (local governments, larger manufacturers, etc.)
- Improving agency processes with lean

In conclusion, the Washington Lean and Environment Project was a successful partnership of two technical assistance agencies working together to improve the operational and environmental performance of businesses. Future partnership efforts will likely add to the effectiveness of lean and environmental assistance providers and allow businesses to be more competitive and environmentally sustainable.