



# THE SKINNY ON LEAN

## Use It or Lose It – GE Appliances and the Lean Process

What does it take to make a 100-year-old manufacturer globally competitive? That's the question GE Appliances' leaders asked themselves in 2005 when they began applying Lean to eliminate waste during manufacturing. The vision of what Lean means to the transformation of GE Appliances has grown. GE is launching seven completely revitalized product lines using the Lean process over the next two years – a process that will cut cost and improve GE's competitiveness. That competitiveness means more Americans at work with the creation of more than 1,000 new U.S. jobs.

### CRUNCHING NUMBERS USING LEAN

#### GE Bottom-Freezer Refrigerators and Lean

Using Lean, the Bottom-freezer team found ways to save material and labor costs at the same time they improved quality. From operators eliminating screws with snap-together parts to using a cross-functional team to brainstorm ways to simplify assembly, GE has saved millions of dollars.

**1/2:** The length of the assembly line has been reduced by 50 percent.

**20:** Lean eliminated 20 parts from just one assembly area, the vegetable pan. GE estimates they've eliminated more than 100 parts in the average refrigerator compared to previous models.

**20%:** The new bottom-freezer refrigerator line achieved the ENERGY STAR® rating that is 20 percent better than current guidelines for refrigerators, meeting 2014 requirements.



**25%:** Using Lean's cross-functional team approach, the team brought the product to the shelf in 25 percent less time, since steps could be done concurrently rather than consecutively. This bottom-freezer launch will be the fastest and biggest refrigeration program of this magnitude in GE's history.

**1 out of 2:** Even though the new refrigerators will have more features than the previous model, the Lean team removed 50 percent of the wiring.

### FREEZE FRAME

#### Hourly workers make big impact on Lean Savings



**Kenny Farnsley**, an hourly Kaizen Promotion Officer (KPO) or Lean leader, found a way to improve the evaporator assembly process that saved GE \$1 million in investment cost. He started with crude models and developed them into simple, reliable machines that produce a good quality part. This is a 70-percent reduction versus the cost of traditional automated equipment.

**Geoffrey Henderson**, a team leader, found a way to reduce shoulder injuries while boxing up the refrigerators for shipping. Instead of throwing the box over top the refrigerator, the operator stands on a 6-ft. platform to place the box over the refrigerator – virtually eliminating any lifting.

### GE GEOSPRING HYBRID WATER HEATER & LEAN

**2.35 Ef** While the team used the Lean process to reduce product cost by \$200, they were able to retain the original 2.35 energy factor rating determined by the U.S. Department of Energy.

**\$325** Using the Lean process, the GE team maintained the original \$325 annual consumer savings on utility bills while lowering product cost by \$200.\*

**\$8M** GE has saved more than \$8 million during GeoSpring development and production.





## GE DISHWASHERS AND LEAN

In 2009, GE experimented with Lean on a dishwasher assembly line – resulting in great savings:

**30%** Labor efficiency improved by 30 percent after employing Lean principles.

**60%** GE reduced dishwasher inventory by 60 percent.

**68%** The Dishwasher team reduced production time by 68 percent.

## FACILITY FACELIFT: GE APPLIANCE PARK'S TRANSFORMATION WITH LEAN

As Appliance Park transforms itself to a Lean and modern manufacturing facility, the large production buildings are getting a facelift. So far, the amount of steel recycled as a result of the demolition is equal to roughly the amount of structural steel needed to build or equal:

- 4 KFC Yum! Centers
- 24 Fully Loaded Boeing 747s
- 2,600 Asian Elephants

## BARE BONES: LEAN BACKGROUND

Lean determines what customers want and are willing to pay for – then uses the least amount of resources to create that product. Various industries have adopted the Lean philosophy, including healthcare, retail and manufacturing. In a manufacturing environment, Lean:

- Creates efficiencies during the initial design and manufacturing processes
- Reduces ergonomic issues
- Simplifies the entire production process
- Continually refines product and manufacturing processes to add value for the customer
- Eliminates waste, whether it's time, resources or parts, during production
- Produces better quality products

Lean was adopted from processes developed by Henry Ford as well as Kiichiro Toyoda, Taiichi Ohno, and others at Toyota. Visit [www.lean.org/WhatsLean](http://www.lean.org/WhatsLean) for a full history.

## THE LEAN TEAM PACKS A 1-2-3 PUNCH

Every skill needed to build a new product is in the same room from the first day through product launch.

1. Co-location of the core team is key. For each product line launch, a space is dedicated to each new product to include engineers, quality employees, hourly and salaried production workers and sourcing teams.
2. The cross-functional approach cuts product development time and involves all team members in the entire process – from design through production.
3. Lean promotes a “One-Team” approach to problem solving.

## THE BASIC STEPS OF LEAN

1. Specify the value from the customers' perspective.
2. Identify all steps required to deliver the product or service to the customer.
3. Eliminate steps that don't create value.
4. Create a process that flows smoothly.
5. When it isn't possible to flow, create a system that pulls from the upstream process.
6. Repeat until no waste exists.

“A large amount of the work in designing, manufacturing, delivering and selling a product is non-value-added work, or the customer does not want to pay for it. The trick is using Lean to find and eliminate the non-value-added work.”

– Richard Calvaruso, Lean leader for GE Appliances in Louisville, Ky.



\* Based on DOE test procedure and comparison of a 50-gallon standard electric tank water heater using 4879 kWh every year vs. the GeoSpring™ hybrid water heater using 1830 kWh every year.