A Product Lifecycle Approach to Sustainability

Levi Strauss & Co.
San Francisco, CA
March 2009

Why a Product-Lifecycle Approach?

- In 2006, we had several programs in place to address environmental impacts associated with the production of our products and the operation of our facilities
  - Environmental compliance programs
  - Supplier Code of Conduct program
  - Global Effluent Guideline program
  - Levi's® eco products (e.g., using organic cotton)
- We needed a credible, science-based method for measuring the full environmental impact of our products so that we would be able to identify a vision and set of priorities for our environmental work going forward
- We commissioned a lifecycle assessment (LCA) of two of our core products, which yielded some surprising results
- By taking a product-lifecycle approach to our work, we were able to develop a set of strategies to address the greatest impacts of our business on the environment
- Our product-lifecycle approach addresses both environmental sustainability and the sustainability of our business

What Is a Product-Lifecycle Assessment?

- Quantitative method to evaluate the environmental impact of products using:
  - Lifecycle perspective (system analysis) – e.g., from the cultivation of cotton to the end of the product's useful life ("cradle to grave")
  - Mass and energy balance (input/output inventory)
    - Direct Data – inputs and outputs associated directly with product
    - Indirect Data – inputs and outputs used to make the direct inputs (often using extensive industry-average data sets)
  - Impact assessment categories
    - To translate the input and output data to the environmental impacts of the system
- Typically, does not include:
  - Social impacts
  - Economic impacts

Definition of LCA from ISO 14040* Series:

"…the compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its lifecycle"

**Details the requirements for conducting and administering a Life Cycle Assessment (LCA)*

A Credible Methodology

- Forty-year history
  - 1969: Glass bottle recycling vs. one-use PET bottles
  - 1970s: Energy crisis prompted energy-efficiency studies
  - 1997–2001, 2006: International Standards Organization (ISO) 14040 series
- Consensus on LCA practice
  - University graduate programs
  - LCA professional certification (LCACP)
  - LCA to be integrated into LEED program for certification of green buildings
  - United Nations Environmental Program (UNEP) Lifecycle Initiative
  - European Union Integrated Product Policy (IPP)
  - National Institute of Standards and Technology (NIST) – using LCA for preferable purchasing by U.S. federal government

Our Project Scope

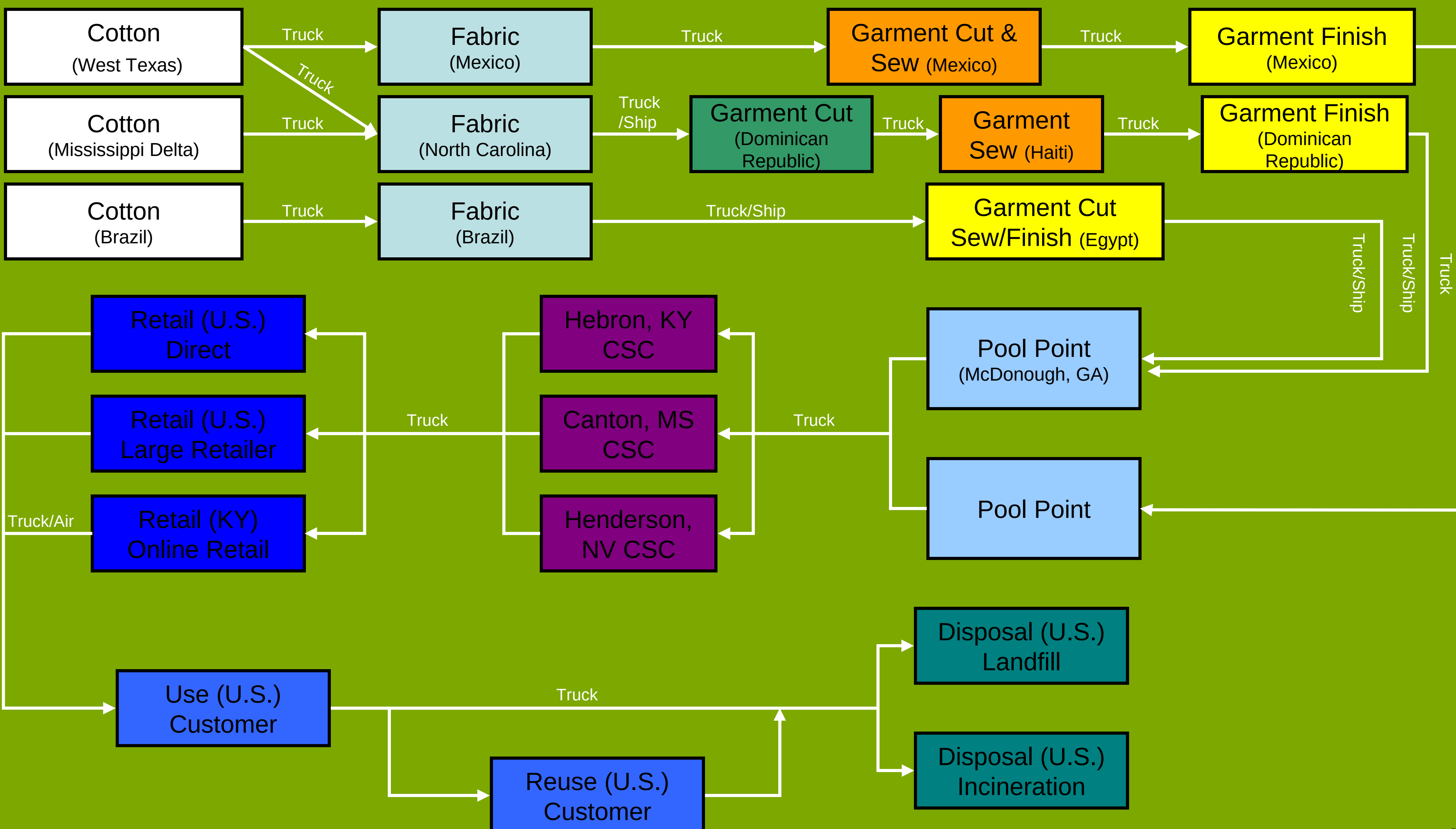
- Selected high-volume product:
  - Levi's® 501® jean, medium stonewash
  - Produced for the U.S. market during the 2006 production year
- Studied the full lifecycle - cradle to grave
- Data compiled from
  - LS&CO. suppliers
  - GaBi 4 software datasets (used by LCA professionals, academics, government and other objective parties)
- Followed ISO 14040 series standards for results intended for internal use only
- Additional review (Phase 2) enables LS&CO. to share select data publicly and refer to LCA findings in conversations around our sustainability story and programs
- Conducted by PE Americas, Boston, MA

The LCA Results of the Studied Levi's® 501® Jean

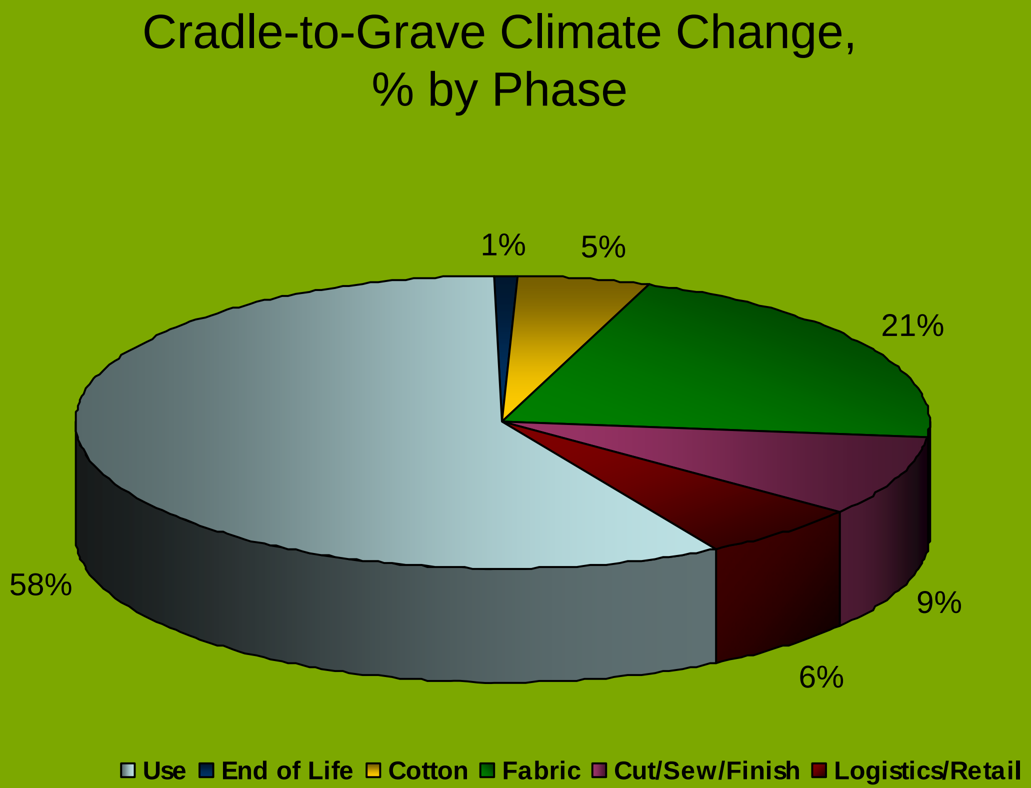
- Shrink to fit fabric
- 0193 Finish
- Medium stone wash
- U.S. Market,
  2006 production year

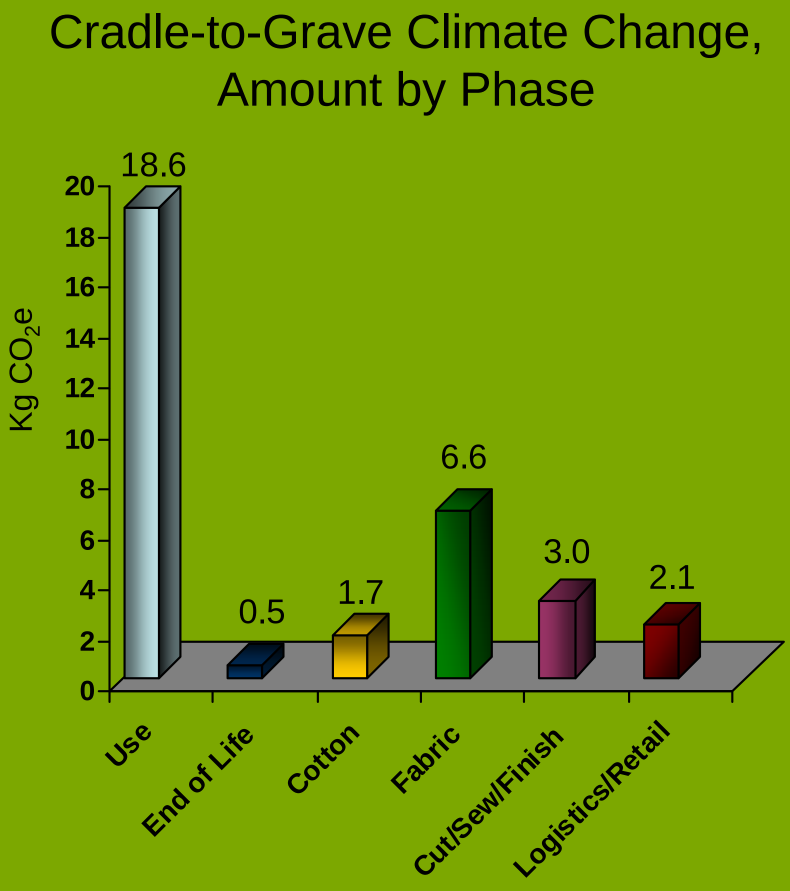
Levi's® 501® Jean System Boundary

Studied product produced for U.S. market during the 2006 production year using 0193 medium stone wash finish



Levi's® 501® Jeans – Climate Change

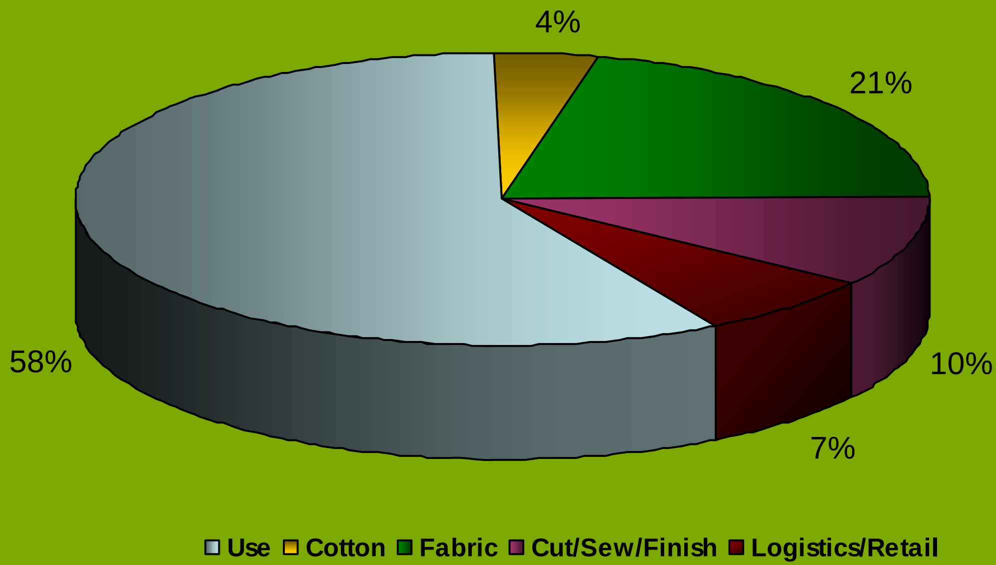




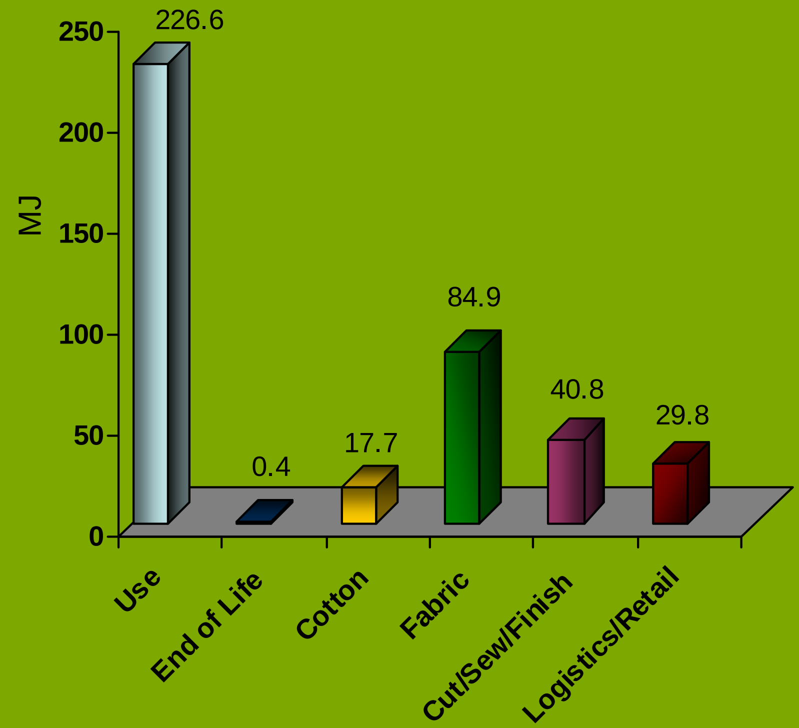
For the studied Levi's® 501® jeans (cradle to grave), the climate-change impact was highest at the consumer-use phase (58%)

Levi's® 501® Jeans – Energy Use

Cradle-to-Grave Energy Use,
% by Phase



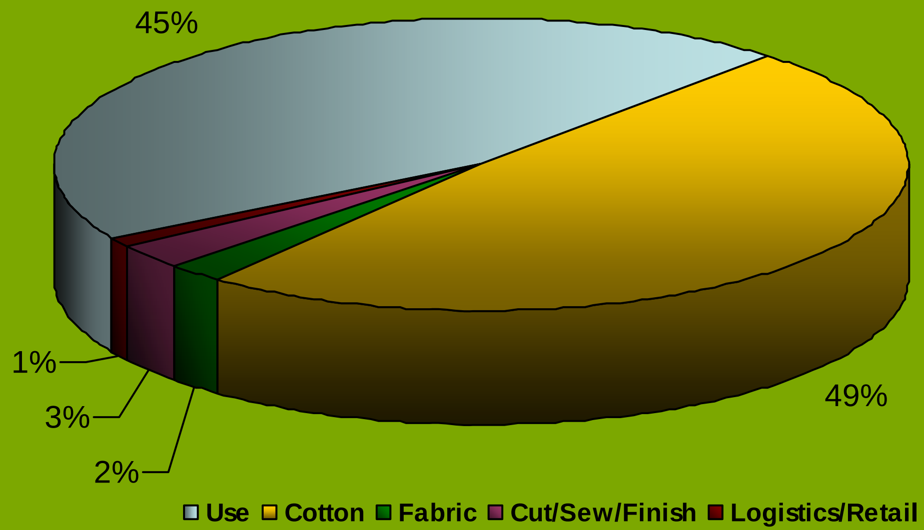
Cradle-to-Grave Energy Use (MJ),
Amount by Phase



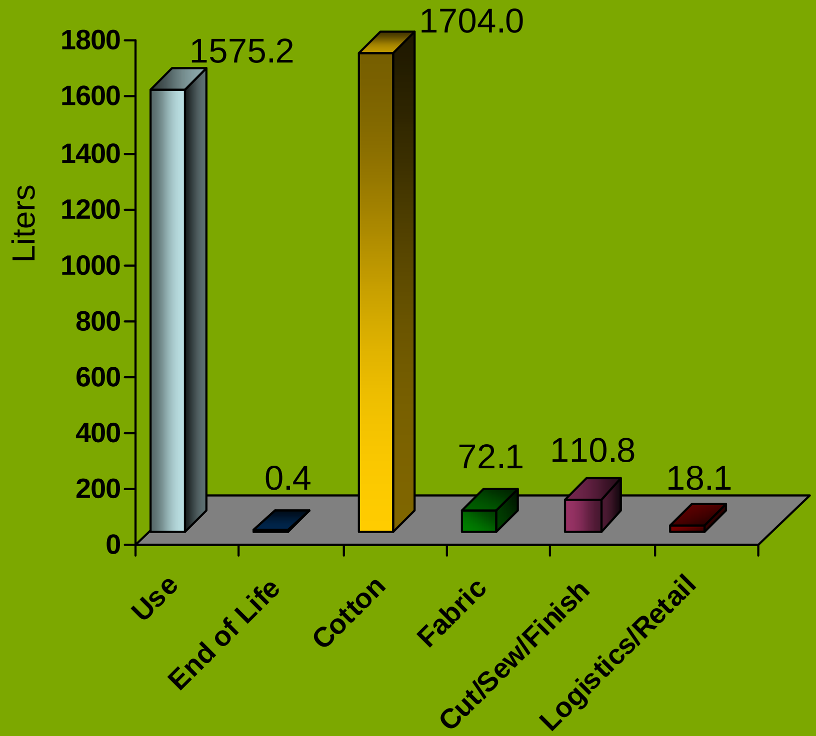
**For the studied Levi's® 501® jeans (cradle to grave),
the energy-use impact was highest at the consumer-use phase (58%)**

Levi’s® 501® Jeans – Water Consumption

Cradle-to-Grave Water Consumption,
% by Phase



Cradle-to-Grave Water Consumption,
Amount by Phase



**For the studied Levi’s® 501® jeans (cradle to grave),
water consumption was highest at the cotton-production and
consumer-use phases (49% and 45% respectively)**

Product-Lifecycle Impact of Studied Levi's® 501® Jean

is equivalent to:

32.3 kg of CO_2

- 78 miles driven by the average auto in the United States
- The carbon sequestered by six trees per year (based on EPA representative sequestration rates of tons of carbon per acre per year)

3480.5 liters of water

- Running a garden hose for 106 minutes
- 53 showers (based on 7 minute showers)
- 575 flushes of a 3.78 liter/flush low flow toilet

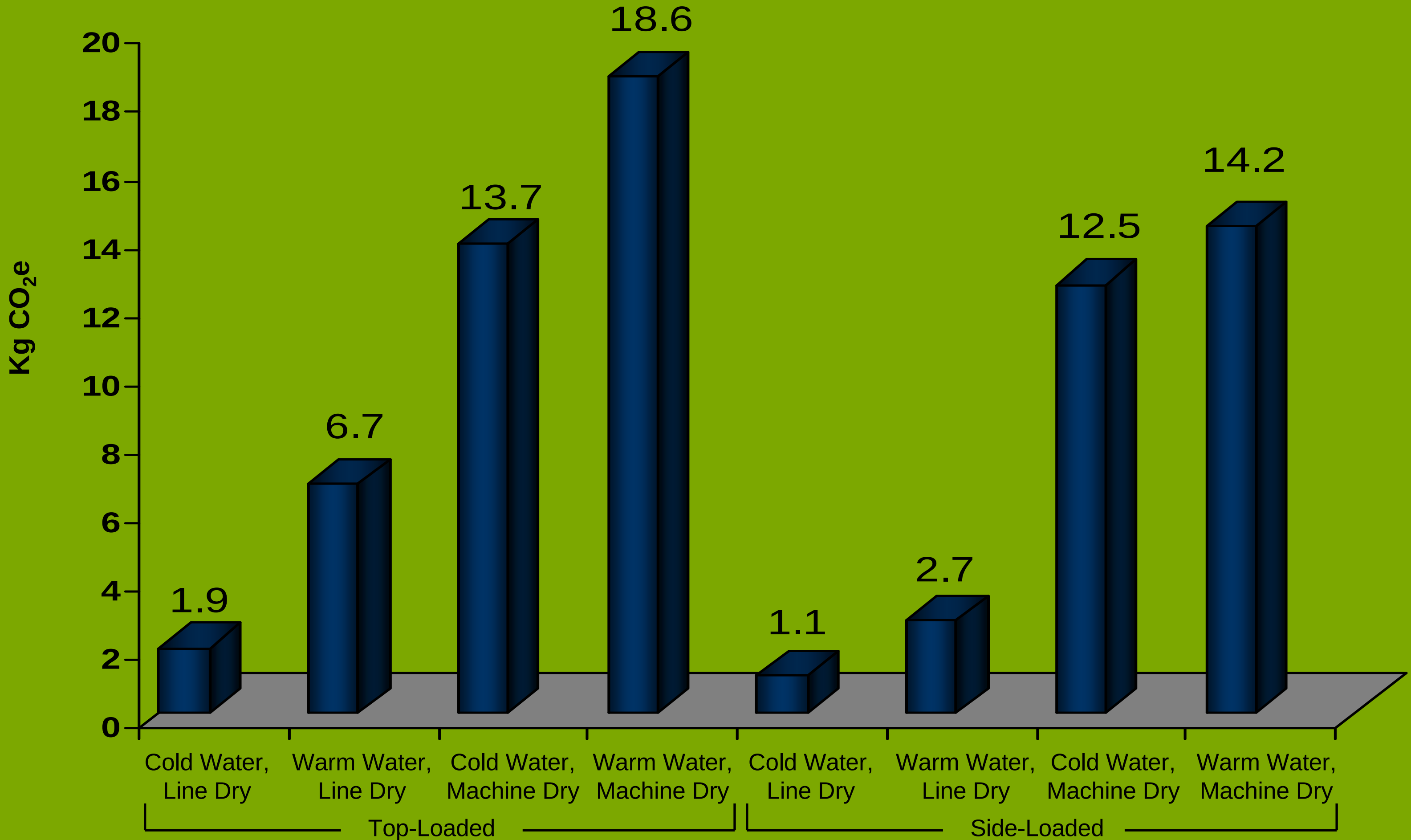
400.1 MJ of Energy

- Watching TV on a plasma screen for 318 hours
- Powering a computer for 556 hours, which is equivalent to 70 work days (based on 8 hours of computer use per day)

Data from LS&CO.'s Life Cycle Assessment on Levi's® 501® jean for U.S. Market, 2006 production year

Consumer Care – Reducing Climate Change Impact

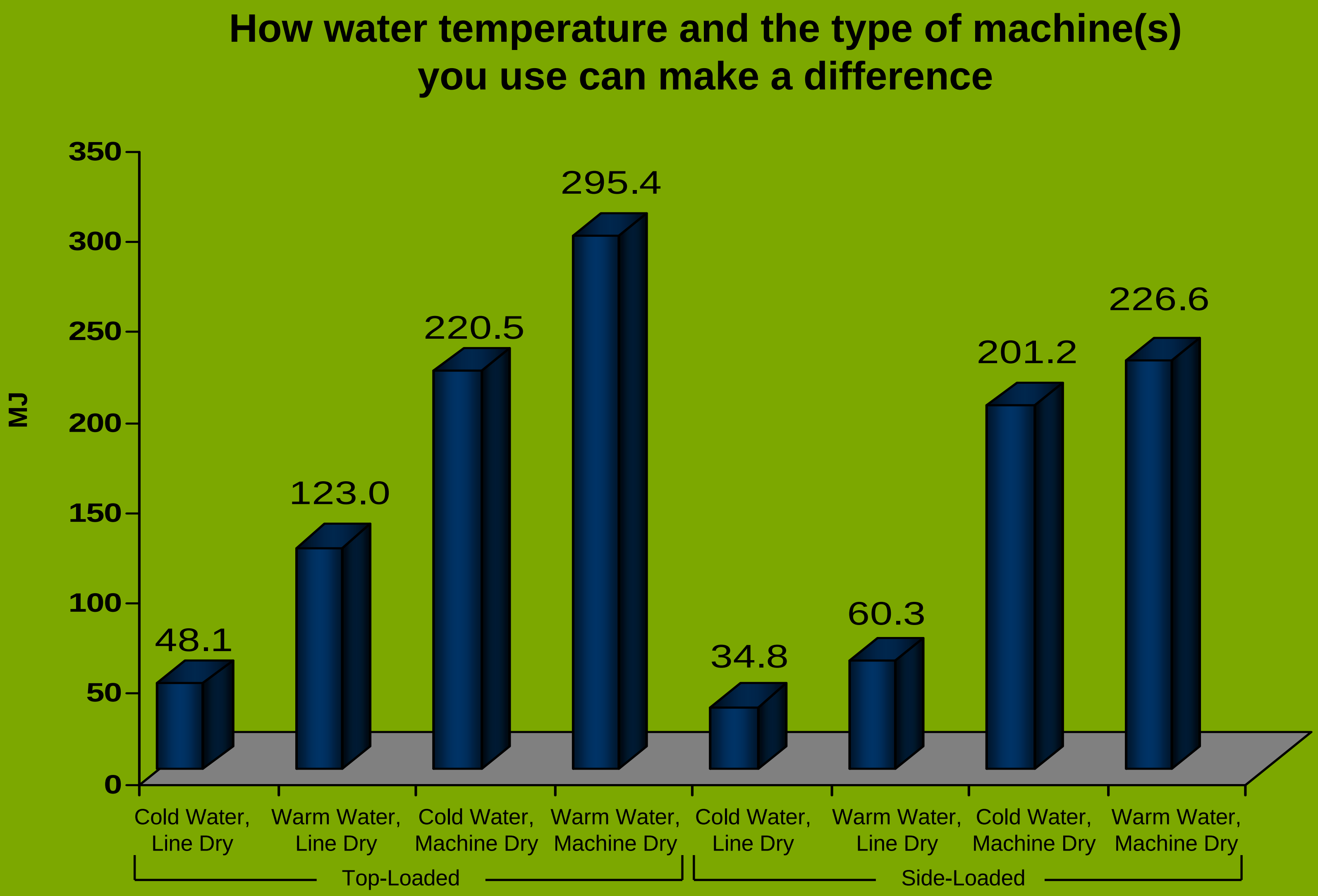
How water temperature and the type of machine(s) you use can make a difference



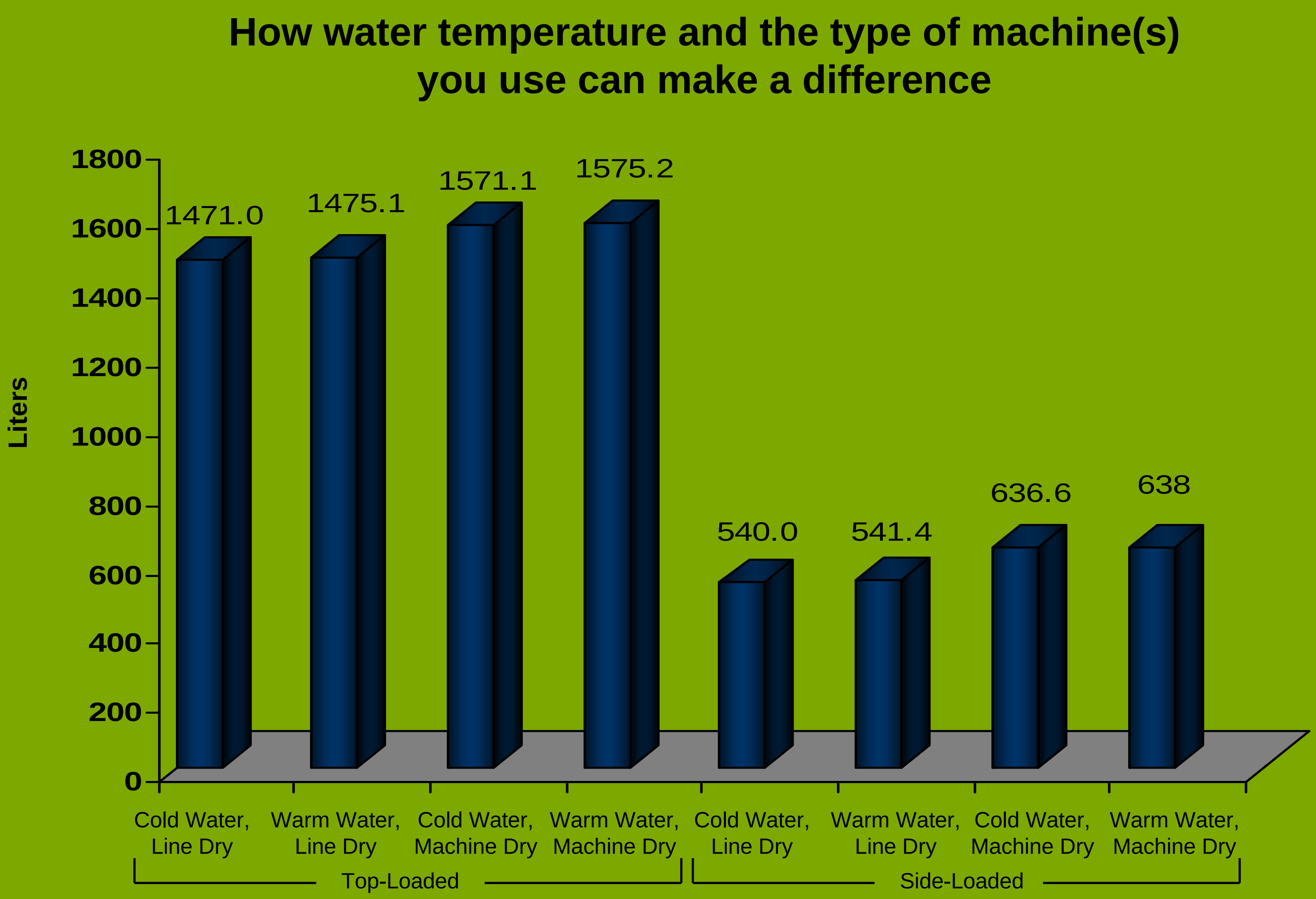
Washer information derived from the following sources:

- *The Federal Trade Commission – Appliance Energy Data: http://www.ftc.gov/bcp/conline/edcams/eande/appliances/clwasher.htm*
- *Bole, Richard. "Life-Cycle Optimization of Residential Clothes Washer Replacement", Center for Sustainable Systems, University of Michigan, April 21, 2006. Available at: http://css.snre.umich.edu/css_doc/CSS06-03.pdf (Appendix C of the University of Michigan report contains detailed washer energy efficiency data, from the Association of Home Appliance Manufacturers)*

Consumer Care – Reducing Energy Use Impact



Consumer Care – Reducing Water Consumption



Number of Washes – Climate Change Impact

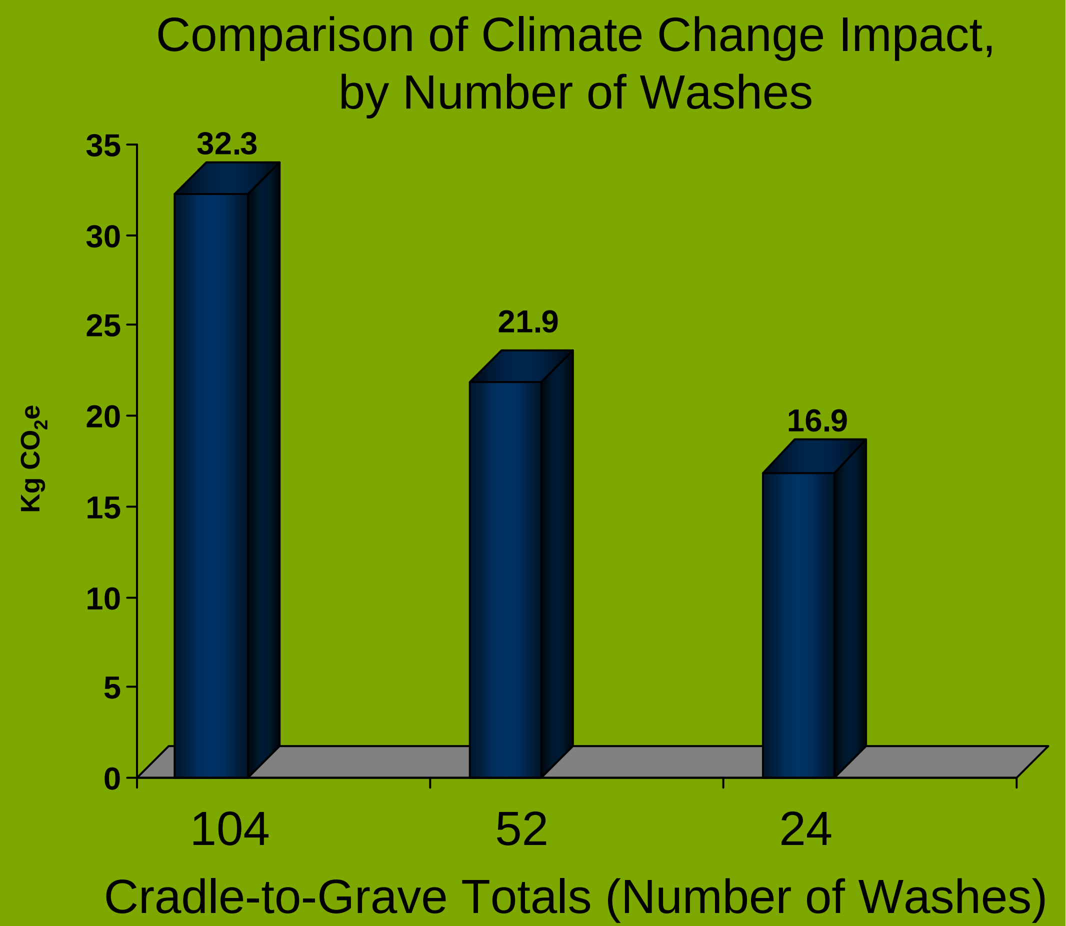
Denim is a hearty fabric.
We don't need to wash our jeans after every wear.

52 Washes

Consumers can decrease the climate change impact by about 32 percent by decreasing the number of times they wash their jeans to once every two weeks from once per week

24 Washes

Consumers can decrease the climate change impact by about 48 percent by decreasing the number of times they wash their jeans to once per month from once per week



**Based on top loaded/warm water/machine dry*

**LCA assumed 104 washings (once per week for two years)*

Number of Washes – Energy Use Impact

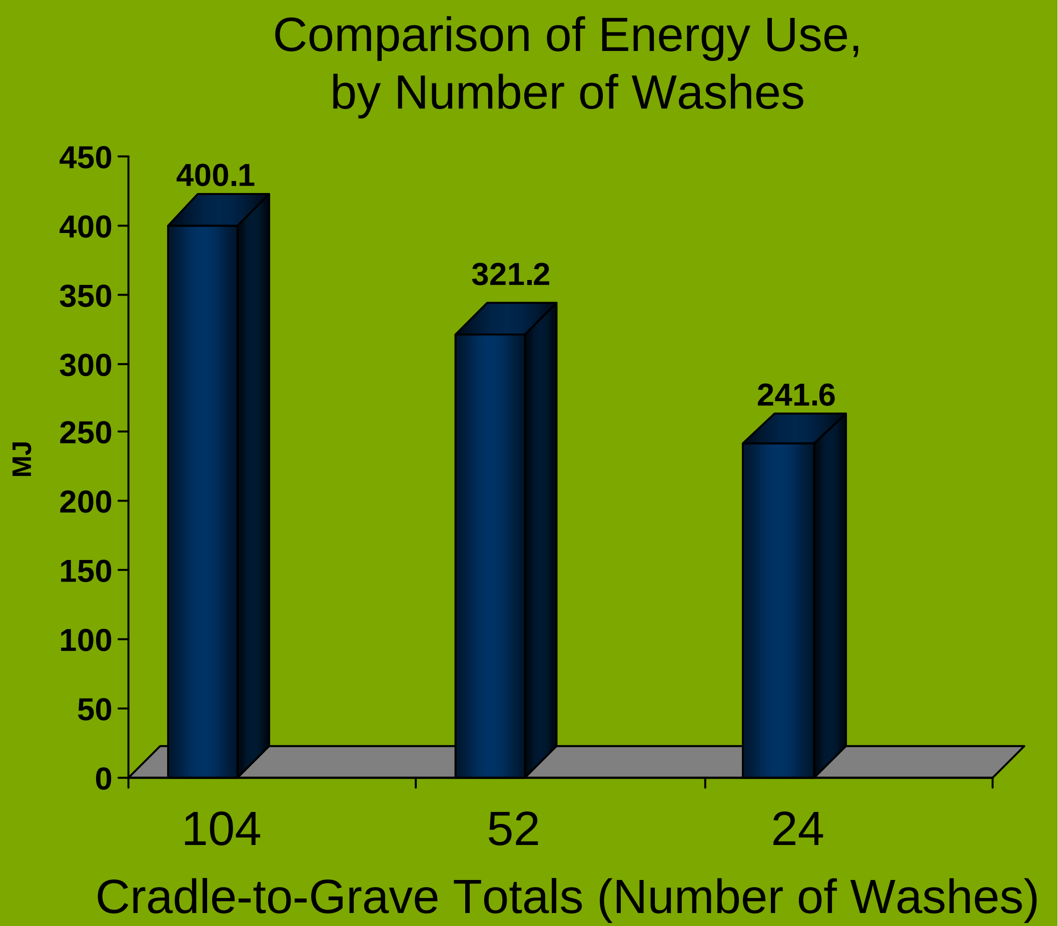
Denim is a hearty fabric.
We don't need to wash our jeans after every wear.

52 Washes

Consumers can decrease the amount of energy used when caring for their jeans by about 20 percent by decreasing the number of times they wash their jeans to once every two weeks from once per week

24 Washes

Consumers can decrease the amount of energy used when caring for their jeans by about 40 percent by decreasing the number of times they wash their jeans to once per month from once per week



**Based on top loaded/warm water/machine dry*

**LCA assumed 104 washings (once per week for two years)*

Number of Washes – Water Consumption

Denim is a hearty fabric.
We don't need to wash our jeans after every wear.

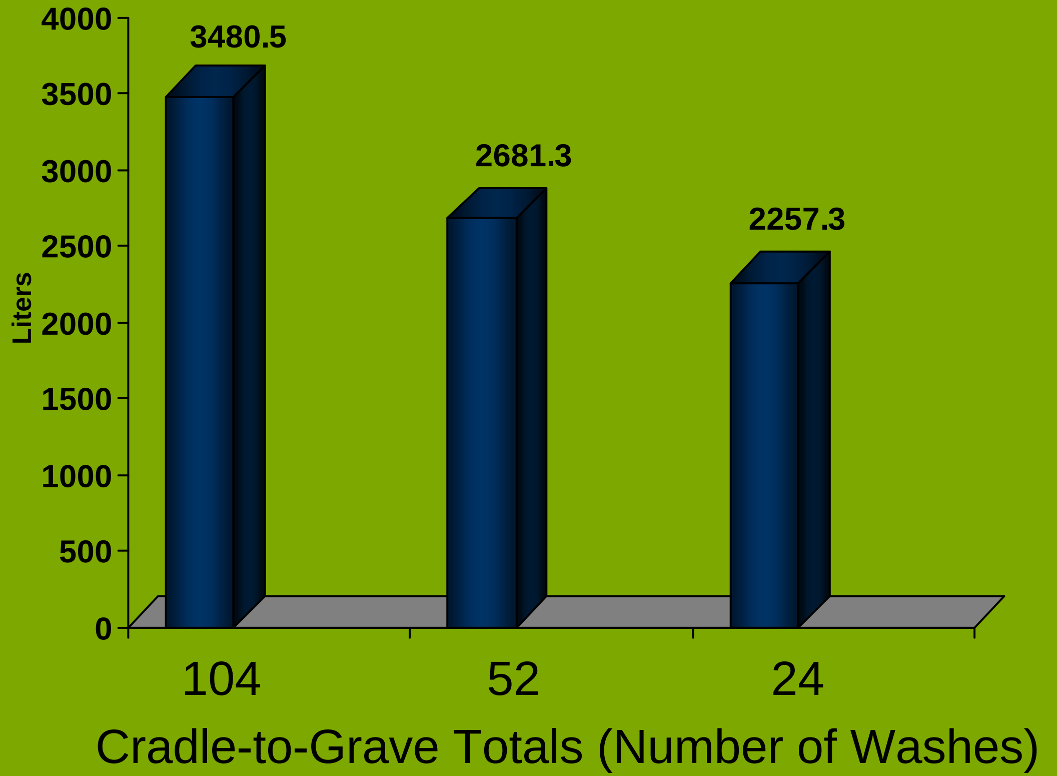
52 Washes

Consumers can decrease water consumption by about 23 percent (799.2 liters) by decreasing the number of times they wash their jeans to once every two weeks from once per week

24 Washes

Consumers can decrease water consumption by about 35 percent (1,223.3 liters) by decreasing the number of times they wash their jeans to once per month from once per week

Comparison of Water Consumption, by Number of Washes



**Based on top loaded/warm water/machine dry*

**LCA assumed 104 washings (once per week for two years)*

What We Learned from Our Product Lifecycle Assessment

- When we look at the full product lifecycle, the majority of environmental impacts occur in lifecycle phases outside of our direct control
- In order for us to decrease our overall environmental impact, we need to continue our efforts within our own sphere of influence in addition to focusing on:
  - Cotton production: the cultivation of our most important raw material
  - Consumer engagement: we are a consumer-facing company, in constant conversation with the consumer about style and quality. We will engage and educate our consumers on the environmental impact of their fashion choices and the responsible care of their washable garments

Examples of Our Product Lifecycle Approach in Action

- Engaging consumers:
  - Levi Strauss & Co. partnered with the Alliance to Save Energy and Proctor & Gamble, makers of Tide® Coldwater, to co-promote our Signature by Levi Strauss & Co.™ jeans in Wal-mart stores, encouraging consumers to save energy and money by washing their jeans in cold water
  - Product care labels: The Levi's® brand is in the process of changing all care labels on the brand's products, instructing consumers to wash in cold water and tumble dry medium. The new instructions will allow consumers to reduce their own environmental/climate change impact and save money on their utility bills

- Reducing product packaging
- Incorporating resource-efficiency factors in product design and manufacturing, including finishing technologies that allow us to reduce our water and energy consumption
- Addressing cotton sustainability through participation in projects such as the Better Cotton Initiative

Benefits of Our Product Lifecycle Assessment

- Helps us focus on the most significant environmental impacts as we develop and evaluate sustainability programs and policies
- Aids discussions with product designers, product managers, merchandisers and other employees on the concept of designing for sustainability
- Supports engagement with external stakeholders as we describe our environmental priorities and goals

A Product Lifecycle Approach to Sustainability

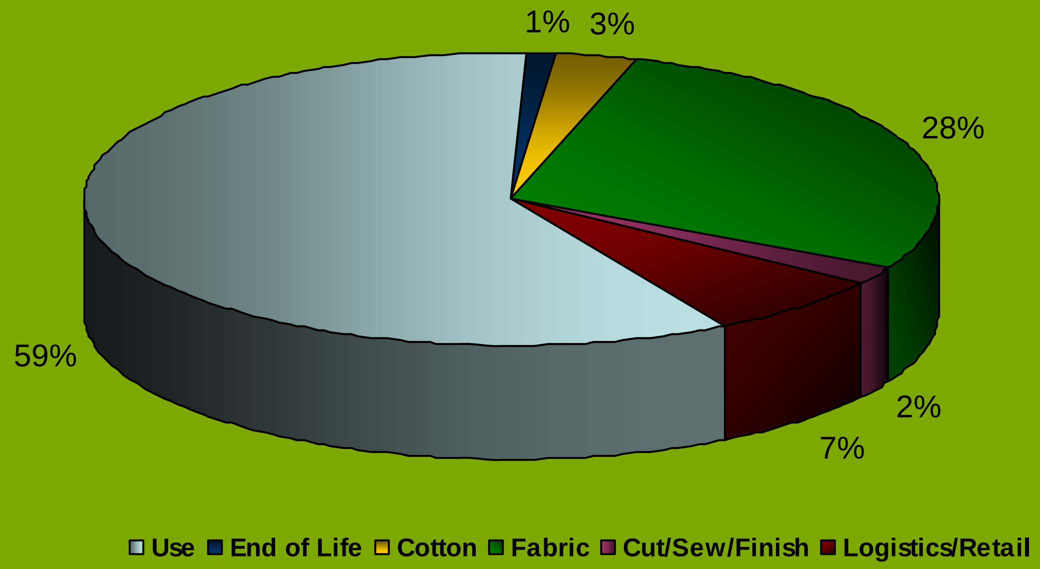
Levi Strauss & Co.

San Francisco, CA
March 2009

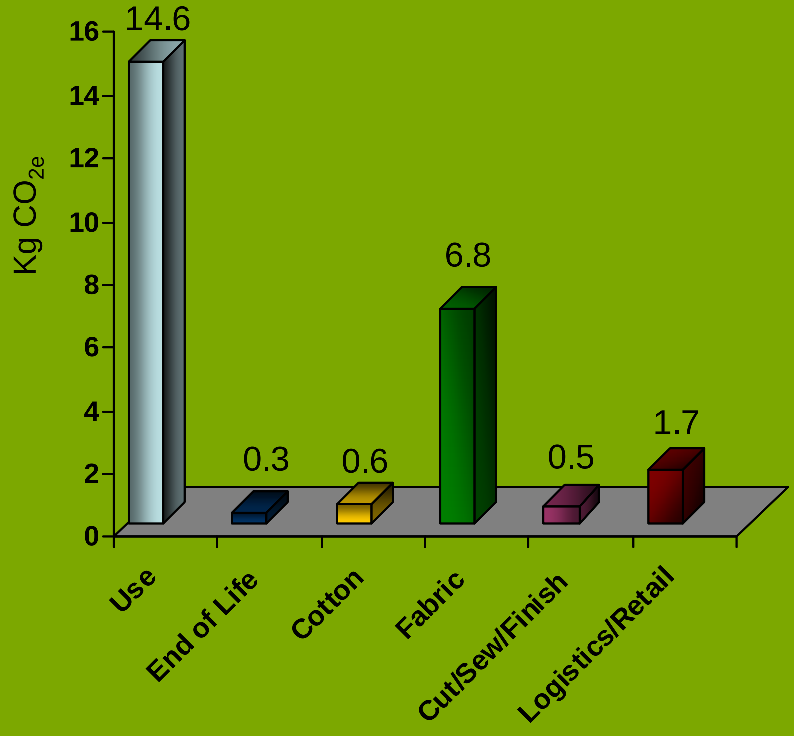
Appendix

Dockers® Original Khaki – Climate Change

Cradle-to-Grave Climate Change, % by Phase



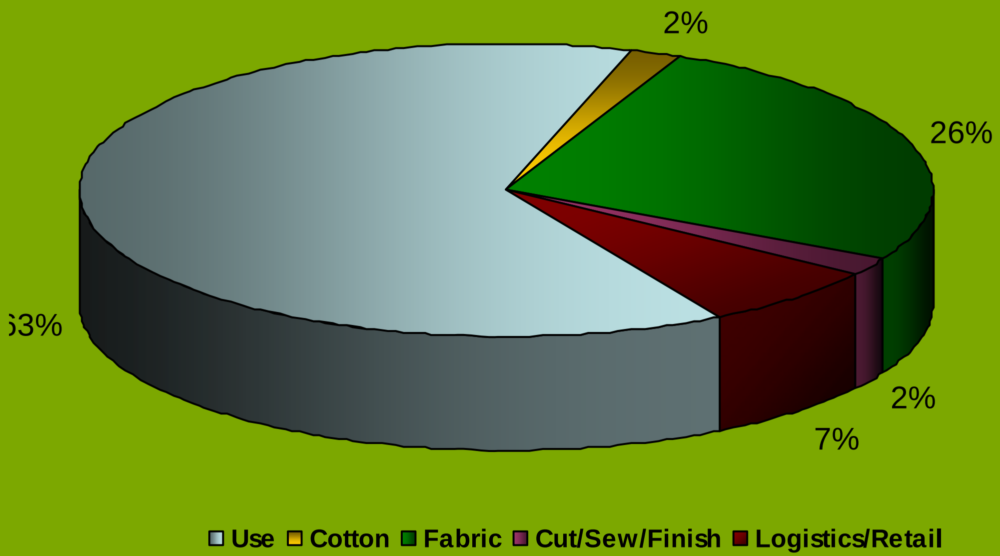
Cradle-to-Grave Climate Change, Amount by Phase



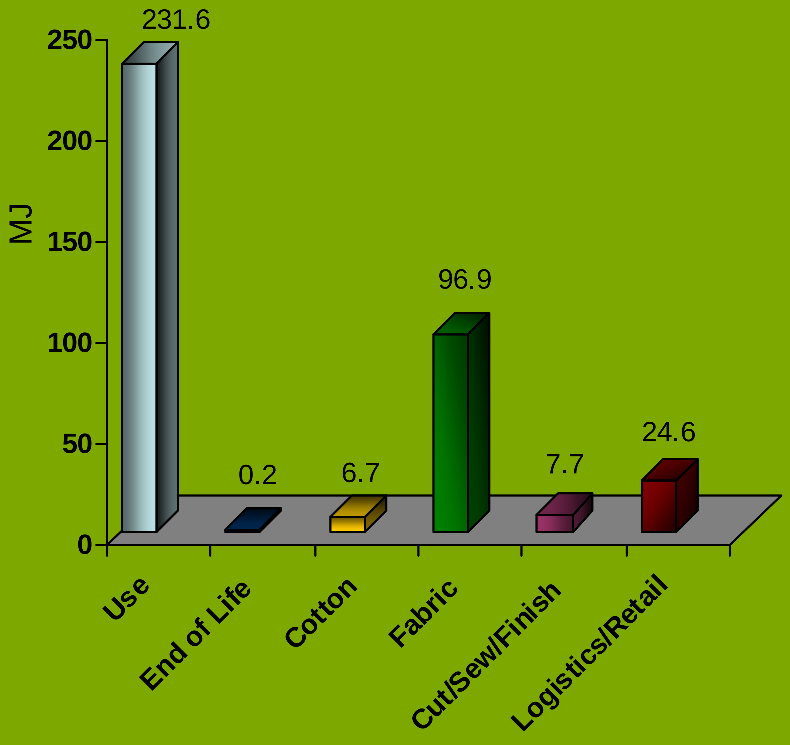
For the studied Dockers® Original Khaki pant (cradle to grave), we found the climate-change impact was highest at the consumer-use phase (59%)

Dockers® Original Khaki – Energy Use

Cradle-to-Grave Energy Use,
% by Phase



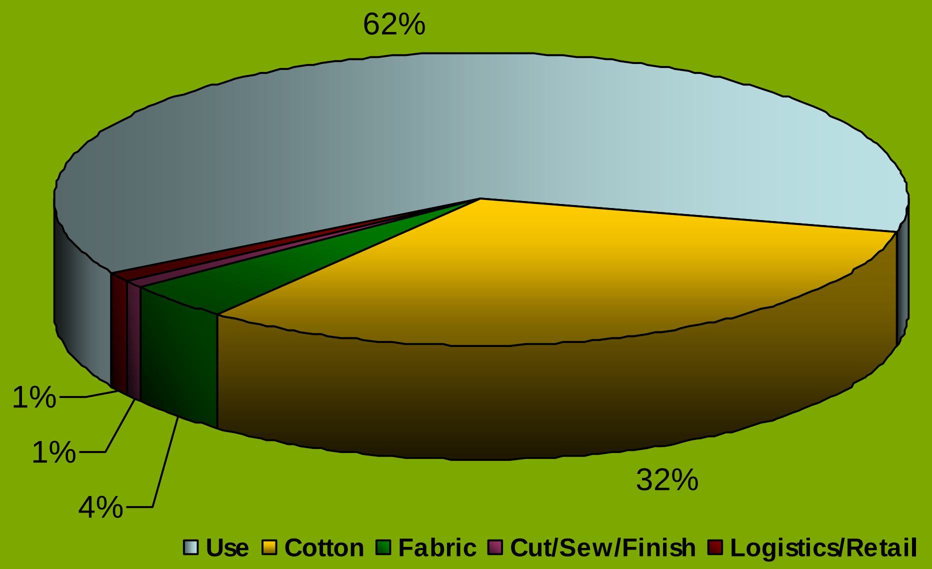
Cradle-to-Grave Energy Use (MJ),
Amount by Phase



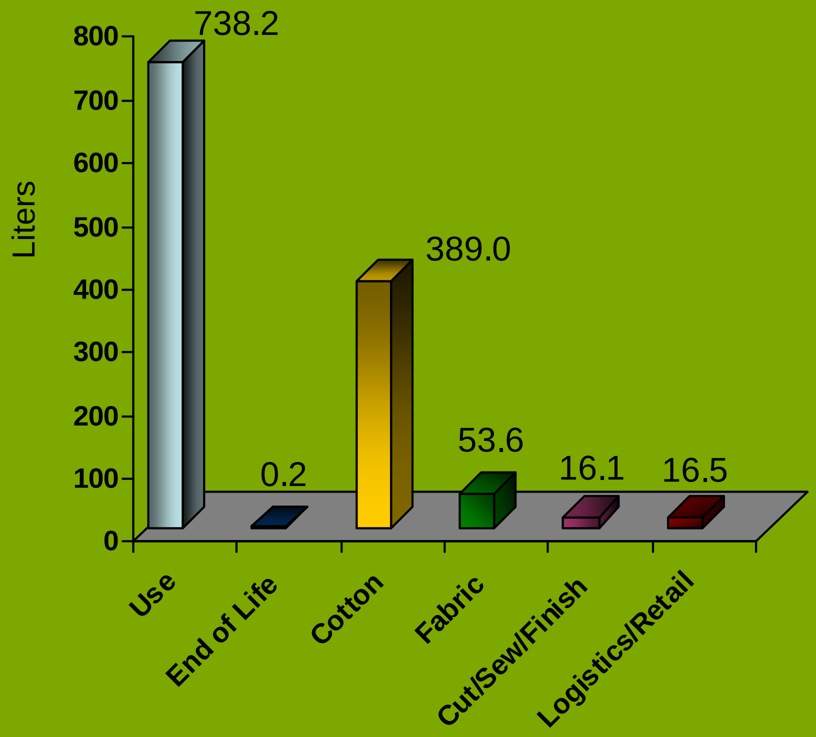
**For the studied Dockers® Original Khaki pant (cradle to grave),
the energy-use impact was highest at the consumer-use phase (63%)**

Dockers® Original Khaki – Water Consumption

Cradle-to-Grave Water Consumption, % by Phase



Cradle-to-Grave Water Consumption, Amount by Phase



For the studied Dockers® Original Khaki pant (cradle to grave), water consumption was highest at the consumer-use and cotton-production phases (62% and 32% respectively)

Selected Assessment Methodologies

Impact Category	Indicator	Description	Unit	Reference
Energy Use	Primary energy demand	Measure of the total amount of primary energy extracted from the earth	MJ	An operational guide to the ISO-standards (Guinee et al.) Centre fro Milieukunde (CML), Leiden 2001
Climate Change	Global Warming Potential GWP)	Measure of greenhouse gas emissions, such as CO2 and methane	Kg CO_2 equivalent	IPCC. Climate Change 2001: *The Scientific Basis*. Cambridge, UK: Cambridge University Press, 2001.
Eutroph-ication	Eutrophication Potential	Measure of emissions that cause eutrophying effects to the environment	Kg Nitrogen equivalent	Bare et al., TRACI: the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts JIE, MIT Press, 2002.
Acidification	Acidificaiton Potential	Measure of emissions that cause acidifying effects to the environment.	Kg H+ equivalent	Bare et al., TRACI: the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts JIE, MIT Press, 2002.
Smog	Photo chemical Oxidant Potential	Measure of emissions of precursors that contribute to low level smog	NOx equivalent	Bare et al., TRACI: the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts JIE, MIT Press, 2002.
Toxicity	Human Toxicity Potential; Eco-toxicity Potential	Measure of the potential toxicity of materials based on the chemical condition, original emission place and its fate.	Kg Benzene equivalent, PM2.5 equivalent; Toluene equivalent; 2,4-D equivalent	Bare et al., TRACI: the Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts JIE, MIT Press, 2002.
Water	Water take	Measure of the water consumed. Sources include surface and ground water	Kg water	

Selected Impact Categories for Communication

- Energy Use
- Climate Change
- Water Uptake