Fox River APICS

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Lean & Green

A Winning Combination!

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Agenda

- Lean ~ Green ~ Lean & Green
- Energy
- Water
- Carbon
- Lean & Green Tools

Lean & Green

Lean is the number one improvement program for organizations

Going Green is becoming the number one objective for our planet.

What does it mean to be lean?





Lean

Philosophy

The systematic elimination of waste, defined as non-value added activities.

Execution

Methodology, policies, procedures, and tools

What does it mean to be green?





Corporate Social Responsibility (CSR)

- Reduce consumption of natural resources, raw material & energy
- Reduce/eliminate polluting environment with hazardous materials

What does it mean to be Lean & Green?







Lean + Green = Sustainability

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

The Bruntland Commission of the United Nations

March 20, 1987

Sustainability

- Goals for environmentally friendly designs
  - Develop more environmentally sound products
  - Minimize waste of raw materials and energy
  - Reduce environmental liabilities
  - Increase cost-effectiveness of complying with environmental regulations
  - Be recognized as a good corporate citizen

Sustainability

- Guidelines for Environmentally Friendly Designs
  - Make products recyclable
  - Use recycled materials
  - Use less harmful ingredients
  - Use lighter components
  - Use less energy
  - Use less material

Sustainability

- Benefits
  - Lower energy costs
  - Lower material costs
  - Higher ROI & ROA
  - Higher employee morale
  - Better brand image
  - Loyal customers

What's Included

Energy, water and raw materials consumed in excess of what is needed to meet customer needs.

Pollutants and material wastes released into the environment.

Hazardous substances that adversely affect human health or the environment.

ENERGY

Nonrenewable



Renewable



Nonrenewable *

- Petroleum
- Natural Gas & Propane
- Coal
- Nuclear

* *In 2014, nonrenewable sources of energy accounted for about 90% of total U.S. energy consumption and 87% of electricity generation*

Renewable *

- Biomass
- Wind
- Geothermal
- Hydropower
- Solar

*

In 2014, renewable sources of energy accounted for about 10% of total U.S. energy consumption and 13% of electricity generation

Renewable Energy Considerations

- Scalability
  - Yield
    - Cost - *per Kw*
      - Politics & NIMBY
        - Unintended Consequences

Water







Water – *A threatened resource*

- Less than 1% of the world's fresh water is readily available for human use

  87% of that is used for agricultural purposes and 60% of that is wasted.

- Most Asian countries are expected to have severe shortages by 2025.

- More than 1.2 billion people lack access to clean drinking water

Virtual Water Usage

Product	Gallons	Product	Gallons
cup of tea	9	cup of coffee	37
glass of beer	20	glass of wine	32
lb of potato	31	lb of figs	379
lb of beef	1,857	lb of goat	127
cotton T-shirt	766	lb eggs	400
gal of ethanol	371	blue jeans	2,900 gal

Pepsi Water Projects

- China – introduced conservation techniques to farmers, cutting water for growing potatoes (for Lay's chips) by 50%
- UK – Cut water usage 42% by using captured water from potatoes being processed
- India – Captured monsoon rain runoff from factory roofs, saving it for future use or to replenish aquifers
- Worldwide – cleaning bottles with purified air, instead of rinsing with water
- Naked Juice fills bottles with juice at 200 degrees, thereby sterilizing them

Carbon







Carbon Footprint

- Business
  - Cities
    - Events
      - Personal



Carbon Disclosure Project

The Carbon Disclosure Project is an independent not-for-profit organization holding the largest database of primary corporate climate change information in the world.

www.cdp.net

Carbon Disclosure Project

5,000 organizations in some 80 countries around the world – including **81% of Global 500 companies**, now measure and disclose their greenhouse gas emissions and climate change strategies through CDP, in order that they can set reduction targets and make performance improvements.

Carbon Disclosure Project

Global system for peer to peer performance comparison and sharing best practice.

Companies using CDP have identified savings of over **$50,000,000,000**

The Carbon Disclosure Project reports that 6% of leading companies already deselect suppliers who fail to manage carbon, while 56% are committed to do so in the future (2010)

ISO50001

Energy Management Systems –
Requirements with guidance for use.

- A voluntary International Standard with requirements for energy management systems (EnMS)
- It will provide benefits for organizations large and small, in both public and private sectors, in manufacturing and services, in all regions of the world.
- It will establish a framework for industrial plants; commercial, institutional, and governmental facilities; and entire organizations to manage energy.
- Targeting broad applicability across national economic sectors, it is estimated that the standard could influence up to 60% of the world's energy use.

As reported…

"The greatest thing about carbon reduction…

is that it always results in

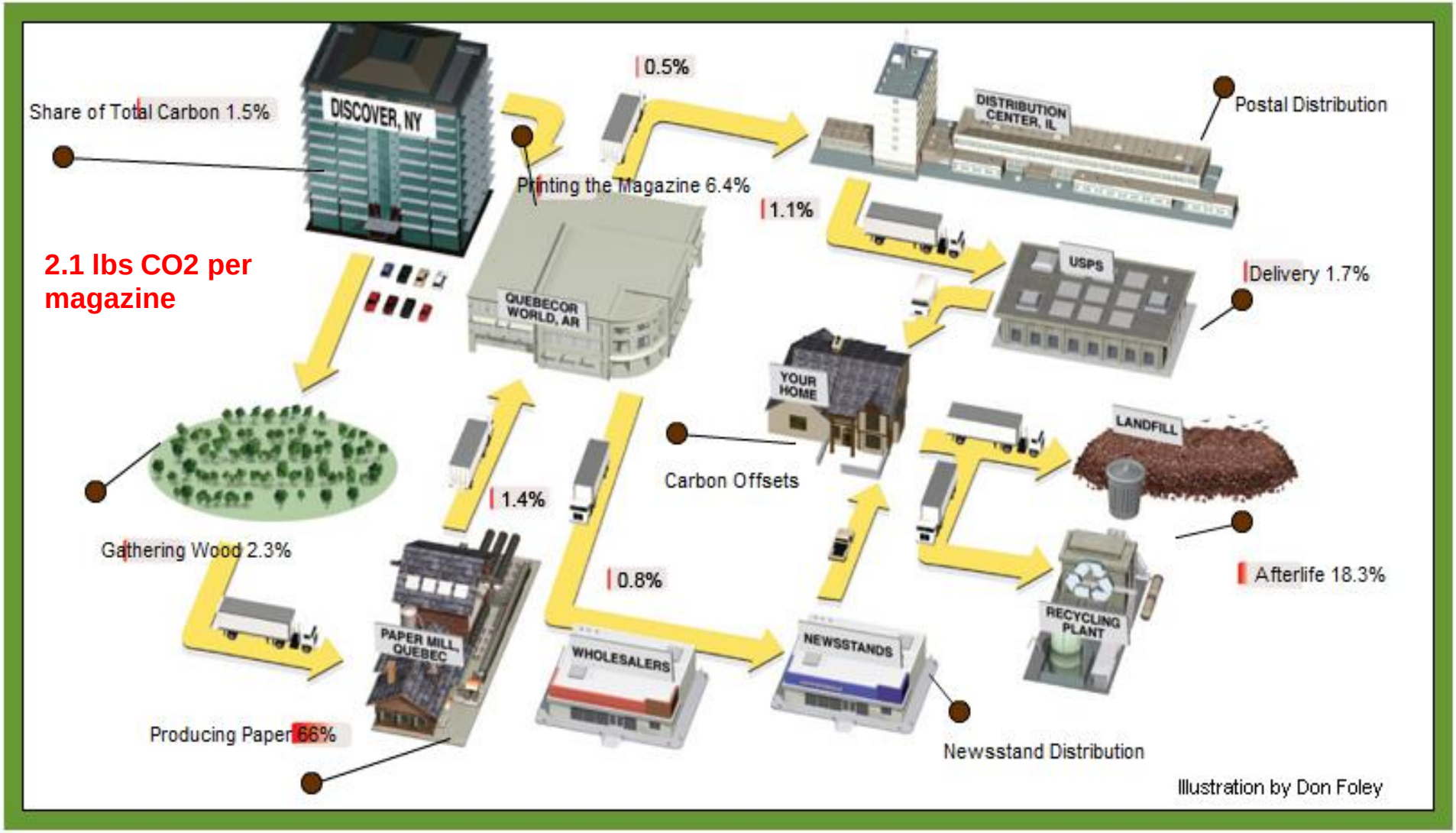
a lower-cost operation

Peter Rusy, COO

DHL Neutral Services Ltd

October 2008

Discover's Carbon Footprint



Your Carbon Footprint



Google: 17,400,000

The Nature Conservancy

Protecting nature. Preserving life.™

The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

Carbon Footprint Calculator

Climate Change and Global Warming

Carbon Offset Program

Carbon Footprint Calculator

Climate-Saving Tips

Contact Us

Make a Donation

Adopt an Acre of Rainforest

how you can help

donate online

Your Results (calculated carbon footprint for me only)

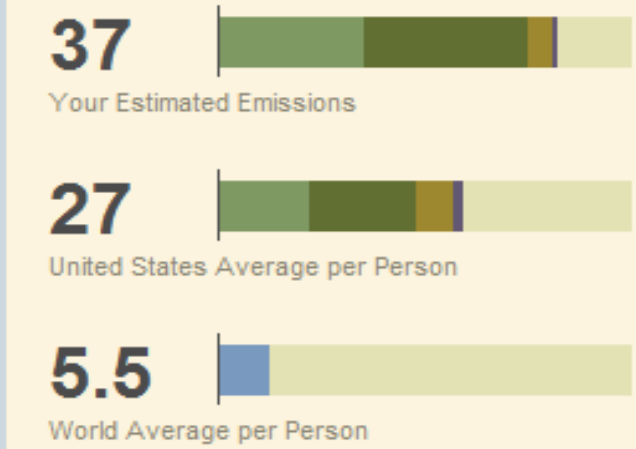
How was my carbon footprint calculated?

Your estimated greenhouse gas emissions are **37 tons** of carbon dioxide (CO2) equivalent per year, which is **above the U.S. national average.**

To reduce your climate impact, there are many simple things you can change in your everyday behavior that will make a big difference in the fight to slow climate change:

- Offset Your Carbon Footprint
- Learn More about Nature Conservancy Offsets
- Read our Climate-Saving Tips
- More Actions

Emissions Comparison Tons of CO_2 eq/year



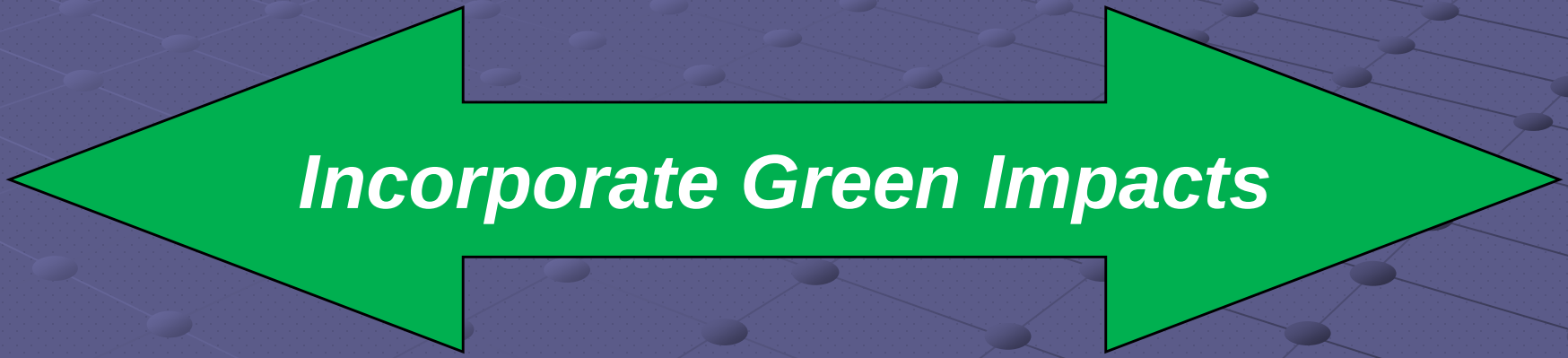
Offsetting your carbon footprint with The Nature Conservancy will sequester carbon over the next 70 years. Learn more about the Conservancy's science-based carbon offsets program.

Bovine Global Warming

- The livestock sector (mostly cows) generates more greenhouse gas than does transportation.
- Cows produce more methane gas than all other ruminants combined.
- The methane production of an average cow (30-50 gallons/day) does the same greenhouse damage annually as 4 tons of carbon dioxide.
- Livestock is the largest source of methane gas emissions worldwide, contributing over 28 percent of total emissions

2006 United Nations' Food and Agricultural Organization report

Turning Lean Green



Green 5S

- **Sort – separate needed from unused; ID HAZMAT, dispose of properly; turn off equipment not in use.**
- **Set in order – use environmental waste containers, sealed and labeled.**
- **Shine – scrub; check for leaks (air hoses, coolant,), check air quality – dust, odors, fumes; insulation**
- **Standardize – work instructions and procedures.**
- **Sustain – Discipline; audit checklists**

Seven Types of Waste
- A Green Approach -





Environmental Waste

An unnecessary or excess use of resources or a substance released to the air, water, or land that could harm human health or the environment.

US Environmental Protection Agency

Examples

- Hazardous
  - batteries, lead, lamps, mercury,…
  - chemicals, pesticides, acids,…
  - radioactive & hazardous components,…
- Non-Hazardous
  - municipal solid waste
  - (some) industrial waste



Does this look familiar?

Maintenance Wants	Planner Requisitions	Purchasing Orders
1 gallon can	5 gallon bucket	55 gallon drum
@ $10 per gallon	@ $7 per gallon	@ $4 per gallon
$10	$35	$220

Big Opportunities

Some companies have found that as much as 40% of their chemical supplies go unused and become hazardous waste when they expire or become obsolete

Target & Walmart

- Target expanded its Product Sustainability Index, a list of hundreds of chemicals the retailer is encouraging suppliers to take out of their products. Target will help promote products for suppliers that comply.
- Wal-Mart has a similar list, and it expects suppliers to list their ingredients online by January.

(Sep 2015)

Waste Reduction



Recycling

- 1 ton of paper saves 17 trees, 2 barrels of oil, 4,100 kilowatts of energy, 3.2 cubic yards of landfill space, and 60 pounds of air pollution
- 1 aluminum can saves enough electricity to power a TV for 3 hours
- 1 ton of glass saves the equivalent of 9 gallons of oil
- A 50% increase in steel recycling would save the energy equivalent of 7 nuclear power plants

Design for Logistics *(DFL)*

- Reduce the use of resources
- Fit standard containers to reduce shipping air
- Reuse packaging material
- Facilitate returns
- Reduce costs

We Can Change & Save Money…

The Green Supply Chain reports that Kraft has reduced 150 million pounds of packaging materials from its supply chains since 2005. ***Feb 2010***

www.thegreensupplychain.com

Levi Straus & Company

At least 20% of the material in its new Waste-Less jeans comes from eight 12 to 20 ounce recycled plastic bottles and food trays.

Spring, 2013

Kaizen Blitz





Lockheed Martin

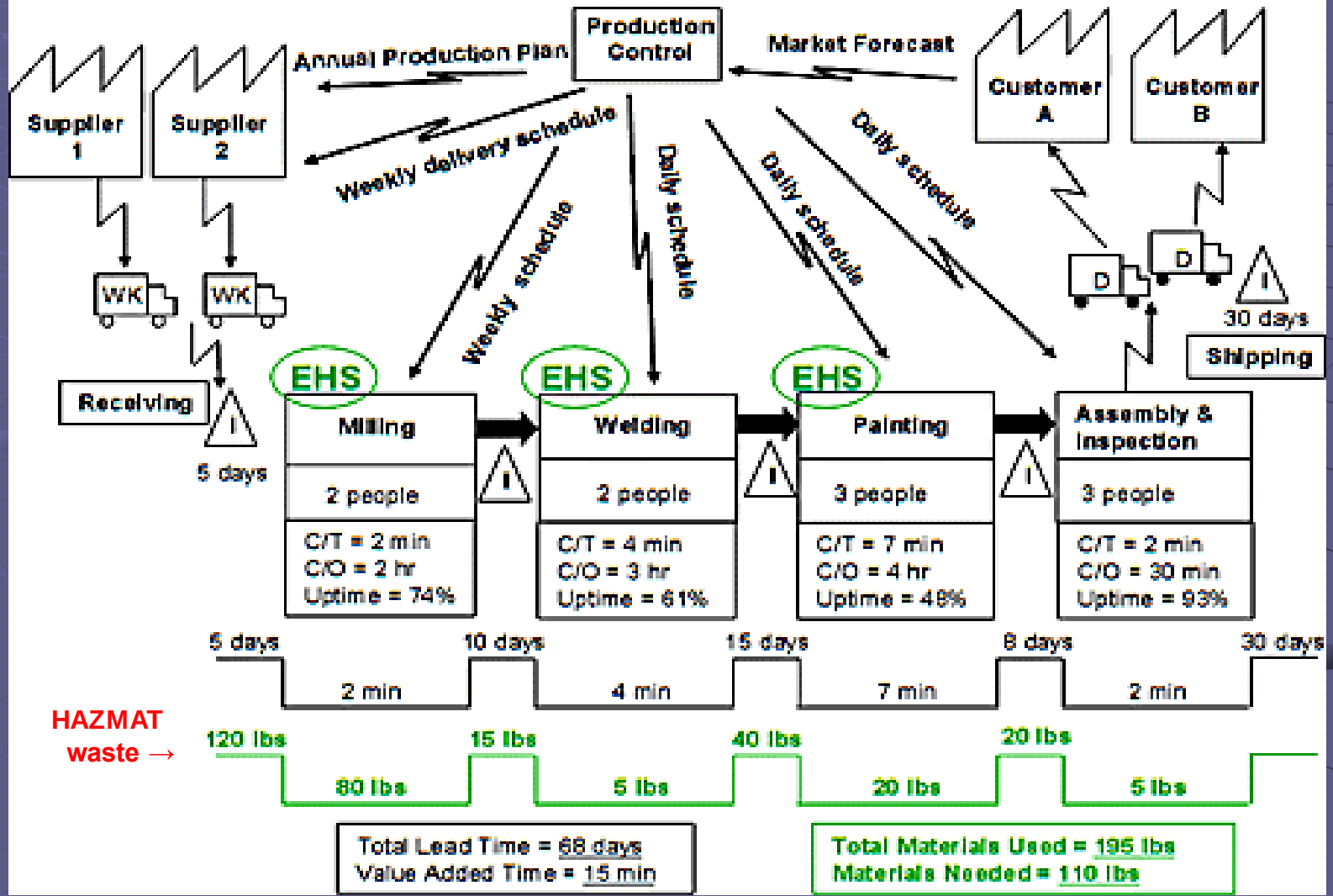
Conducted kaizen blitz events to chemical and waste management activities because a significant amount of chemicals were never used when they expired on the shelf or became obsolete and unneeded.

Moved to just-in-time system with chemicals delivered three times a week in right sized containers – eliminated the chemical warehouse and chemicals expiring on the shelf.

Value Stream Mapping 1

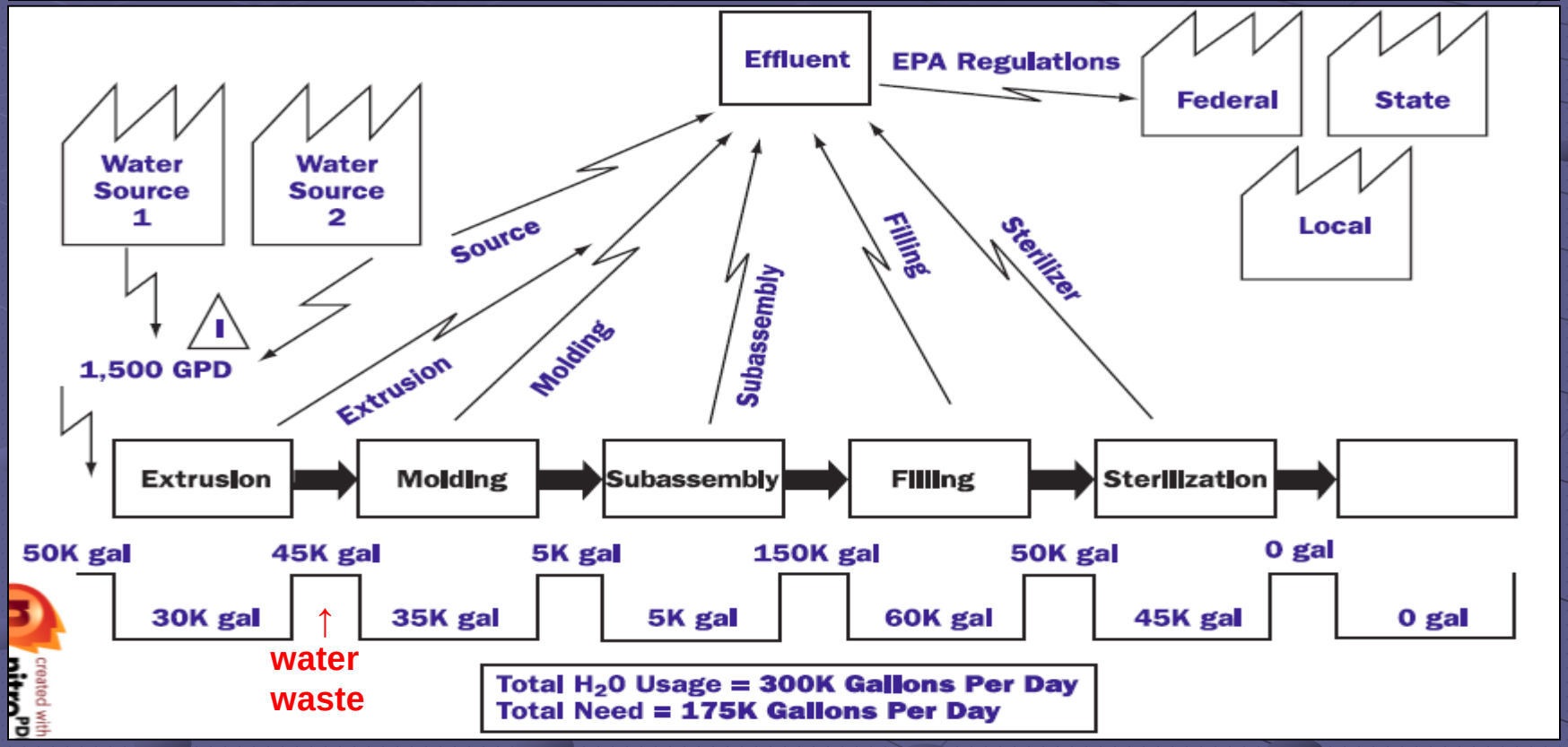
Identify and record hazardous materials and environmental waste

Environmental / Health / Safety



Value Stream Mapping 2

Record the use of natural resources
including water



Audits & SOPs

- Add green items to SOPs and audit checklists

  energy / water / hazardous materials / product / packaging / transportation / storage / environmental impact

- Highlight progress with green adaptations

- Reward the greenest area in the facility

Green Certifications



Green Certifications

- **Green Globe**
- **Green Business League**
- **Green Business Certifications**
- **Green Business Bureau**
- **Green Seal of Approval**

Google: 69,100,000 results!

Lean Certifications

- **Lean Manufacturing (ASQ)**
- **Certified Lean Master (ISCEA)**
- **Lean Certification (SME)**
- **Lean Enterprise Workshop Series (APICS)**
  (Note: no certification)

Google: 3,850,000 results

Why Go Lean & Green?

- **Reduced costs; provide a positive ROI**
- **Reduce consumption of scarce resources**
- **Increase corporate responsibility and image**
- **Customers are demanding it**
- **Regulatory compliance; more and more, governments are requiring it**

The Good

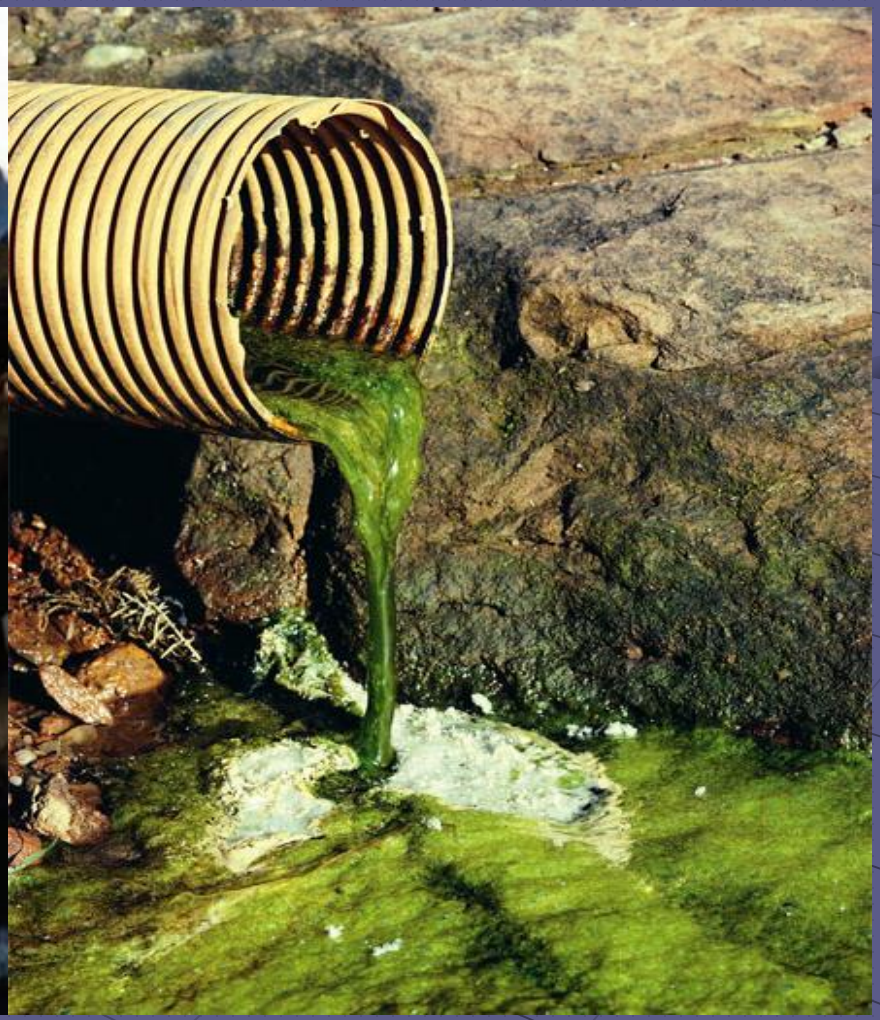
- McDonalds – goal to end deforestation in its supply chain by 2030. Effects all 3,100 direct suppliers and extends throughout their entire supply chain. *(Apr 2013)*
- Japan – developing cellulose nanofiber technology to transform plant fiber to lightweight material 5x stronger than steel. *(Oct 2015)*
- General Mills – announced plan to cut carbon emissions across entire supply chain by 30% over next 10 years *(Aug 2015)*

The Bad

- Volkswagen - emission cheating resulting in 11M vehicles spewing 35x acceptable level of pollution. VW stock dropped 35% following disclosure *(2015)*
- China – from 2005-2011 added 2 coal-fired electric plants a week. Current coal usage is 4B tons per year and growing
- 2012 Olympics & supply chain interruption

The Ugly





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