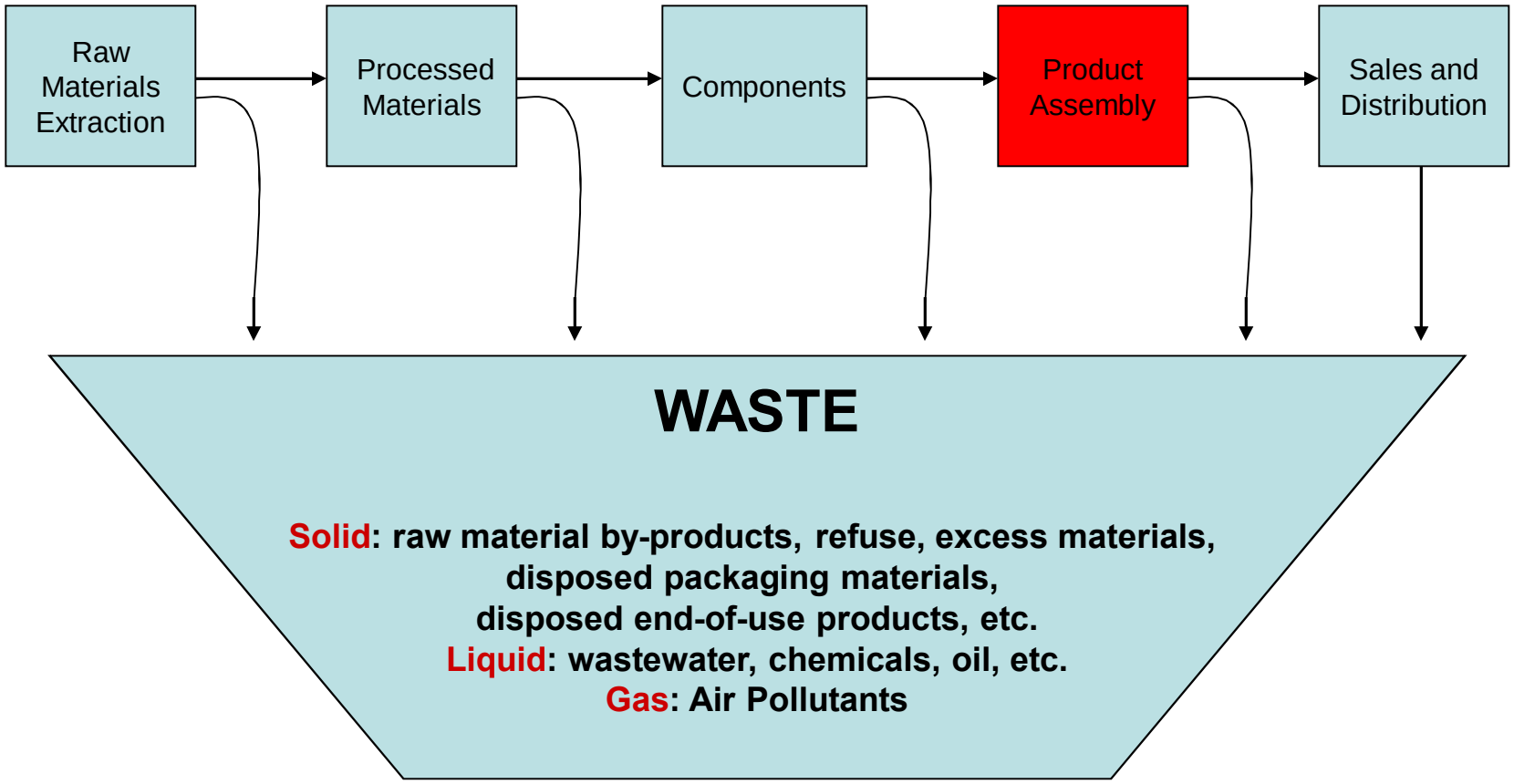
Waste Management in Footwear

AG AFIRM GROUP adidas GROUP GAP H&M LEVI STRAUSS & CO. PUMA TESCO C&A HUGO BOSS new balance Phylmar Group Environmental Health & Safety Social Responsibility s.Oliver Timberland

Waste from Shoe Supply Chain



ENVIRONMENT

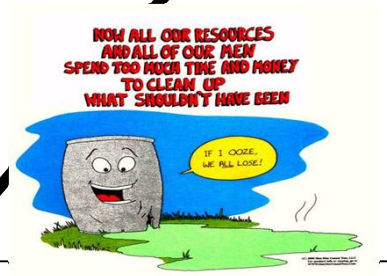
Material Input and Waste Diagram

VOC,
Green House
Gas, Ozone
Depleting
Substances,
Sox, NOx, etc.

Input Materials

Leather (natural and synthetic)
Fabric/Textiles (natural & Manufactured)
EVA, PU, Latex, Rubber, Components
Laces, labels,
Chemicals (adhesive/cement, primers)
Packaging (carton, boxes, wraps, etc)
others

cutting waste;
injection waste from mold leakage;
dust from roughing/buffing;
Chemical containers;
Residual chemicals;
written of materials/components;
Worn out spare parts;
employee living waste;



Wastewater
(toilets, cleaning,

Chemical spills
Oil spills (lube,
Fuel)

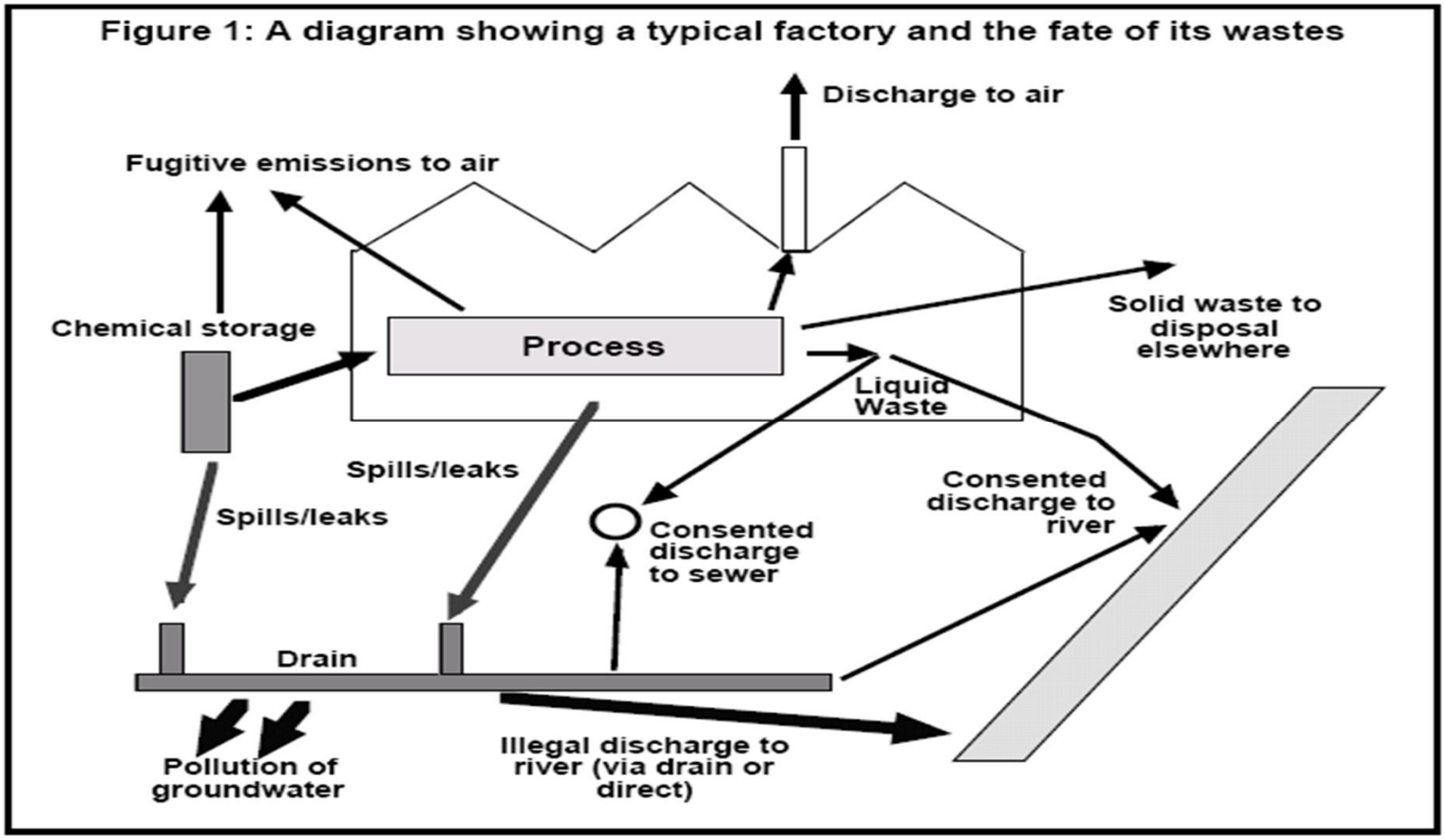


Figure 1: A diagram showing a typical factory and the fate of its wastes
Discharge to air
Fugitive emissions to air
Chemical storage
Process
Solid waste to disposal elsewhere
Liquid Waste
Spills/leaks
Spills/leaks
Consented discharge to river
Consented discharge to sewer
Drain
Pollution of groundwater
Illegal discharge to river (via drain or direct)

The largest quantity of waste is generated at the cutting processé

- e.g. waste rate from cutting of natural leather (e.g. cow hide) = 25 ï 35% *(14th Meeting of UNIDO Leather Panel, 2000)*
  - a leather skin is never homogenous and rectangular
  - the quality of the leather at the side of the skin is generally poor
  - The shape of the pieces to be cut is scarcely the same and the production delay does not allow the optimization of their arrangement
- For textiles or fabric, cutting waste is generally lower because the material is more homogenous = 20 ï 25%
- Waste from upper = 132.6 tons/M pairs
- Waste from sole = 118 tons/ M pairs
- Adhesives, oils, solvents = 4.6 tons/ M pairs
- Household type waste = 10.8 tons / M pairs

> Worldwide Footwear Consumption: From an average 1 pair of shoes/person/year in 1950, to 2.6 pair /person/year in 2005
> In UK, 2003 retails figure was 338 M pairs of shoes sold and waste arising from post consumer used was estimated to reach 169,000 tonnes

Recycling of Footwear Products, *Center for SMART, 2007*

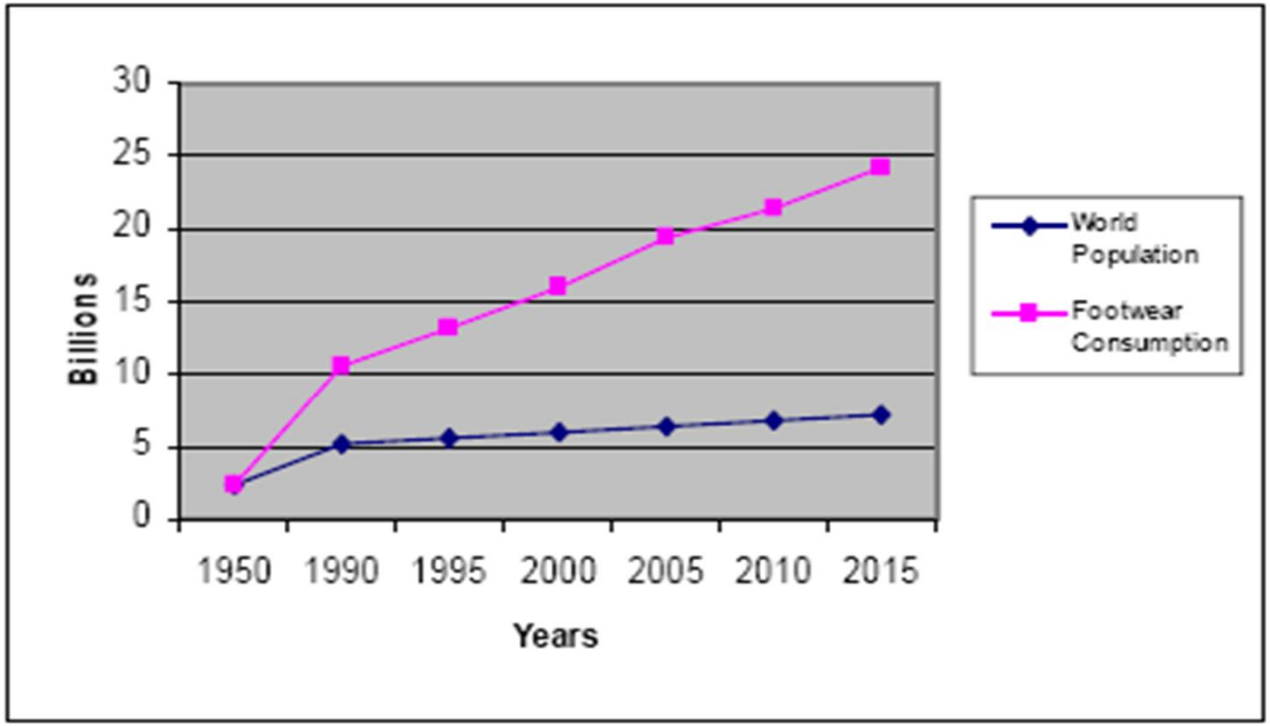


Figure 2: Global Footwear Consumption

Sample Waste Inventory from a Puma Factory

Materials	% waste
Leather, Natural	4.1%
Leather, Synthetic	3.6%
Outsole	17.2%
Midsole	11.8%
Insole	2.7%
Fabric/Textile	6.8%
Inner Box	2.3%
Corrugated Outer Box	0.4%
2008 PUMA SAFE E-KPI survey	

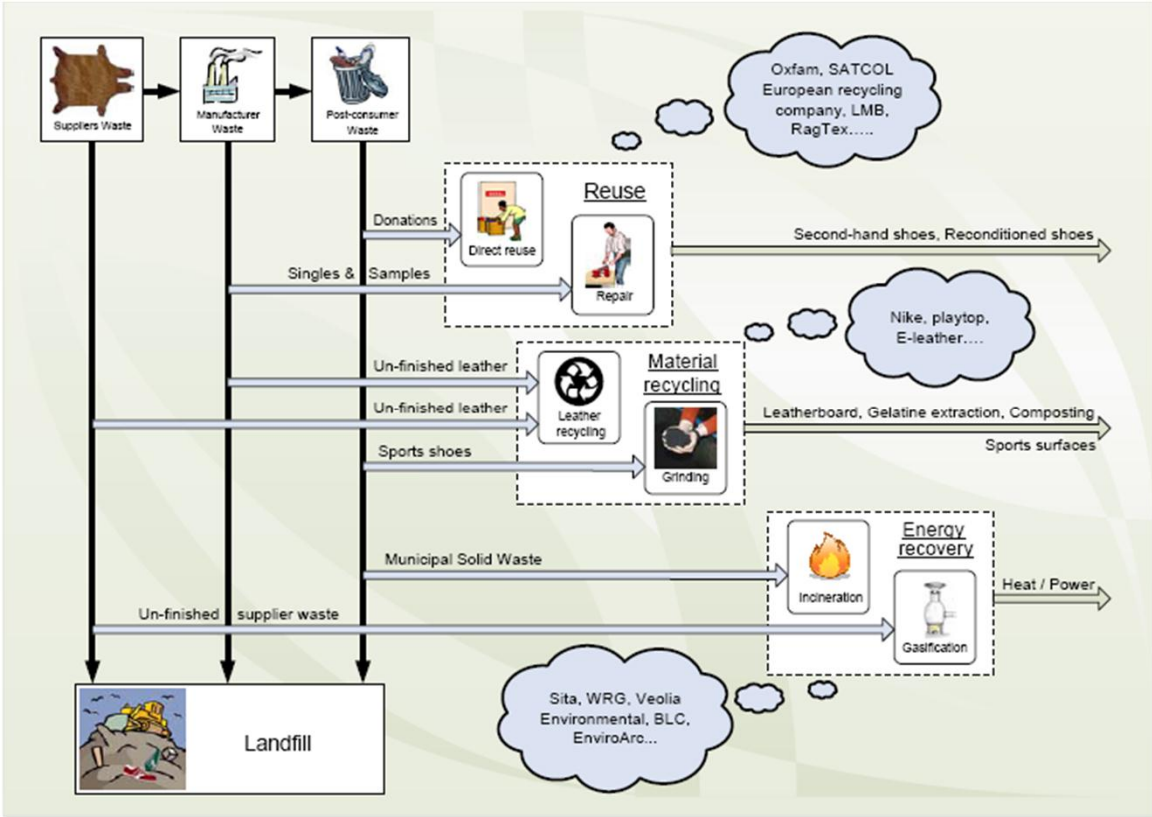
Other source of waste in Footwear

Injected outsole	ÅThermoplastic material can flow out between two parts of mold due to pressure ÅThe mold contains a tube through which the material is injected. The ñcarrotsò are considered waste ÅPurges of materials from machine during turn over of operations / shutdown
Sole preparation	ÅBuffing/roughing dust before cementing
Components and accessories (eyelets, laces, etc)	ÅUnused, old stock written off from inventory and become waste; Å**Reduce:** purchase ñJust in Timeò
Materials and supply packing waste	ÅPaper or plastic wrappings of materials, containers, chemical cans and drums, cartons, wooden pallets, etc. Å**Reduction:** Returnable and reusable containers can be offered by suppliers
Residual chemicals, maintenance and housekeeping	Åworn out spare parts Åspent lube oil (e.g. cutting machines, etc.) Åworkshop rubbish and dust

Integrated Waste Management

- Prevention
- Minimization/Reduction
- Reuse
- Recycling
- Energy Recovery
- Disposal

Reuse



Center for SMART, 2007

Pros

- extending the "use" life of shoes
- establish collection method via recycling banks and charity shops
- creation of jobs in less developed countries

Cons

- Transportation (carbon miles)
- diverting waste from developed world to developing countries
- Economic Impact (restricting the development of local footwear industry)

Material Recycling

Pros:

- Proven technology for the recycling of athletic shoes (more than 20 million pairs of post-consumer athletic shoes have been recycled)
- Established market for shoe recycled materials (surfacing)

Cons:

- Limited application to athletic shoes only (with no metallic parts)
- Recycling of post-consumer finished leather is not currently available

Energy Recovery

Incineration

Pros:

- Established method (municipal incineration plants, co-combustion in rotary/cement kilns etc.)
- High calorific value of leather

Cons:

- Harmful air emissions
- Low public acceptance in the UK

Gasification

Pros:

- Applicable to a variety of waste types
- No harmful air emission released

Cons:

- Expensive technology (approximately £165/tonne)
- Not proven for post-consumer shoe waste

Sample End-of-Life Analysis

	Phases for recycling	GWP (kg CO_2 equiv.)
Gross Emissions	Disassembly	2.21
	Transport Simple to Recycler	0.11
	Recycling	0.44
	Transport Recycler to China	0.07
Avoided Emissions	Avoided Landfill	-0.27
	Avoided Production	-1.62
Net Emissions		0.94

GWP ï Global Warming Potential, 100 years, Kg-CO2 equivalent. Measures the radiative forcing (W/m2) of greenhouse gas emission relative to CO2 over the course of 100 years, EPA.

Reduce

Reducing the amount of waste you produce is the best way to help the environment. There are lots of ways to do this.

Reuse

Instead of throwing things away, try to find ways to use them again!

Recycle

Many of the things we use every day, like paper bags, soda cans, and milk cartons, are made out of materials that can be recycled. Recycled items are put through a process that makes it possible to create new products out of the materials from the old ones.