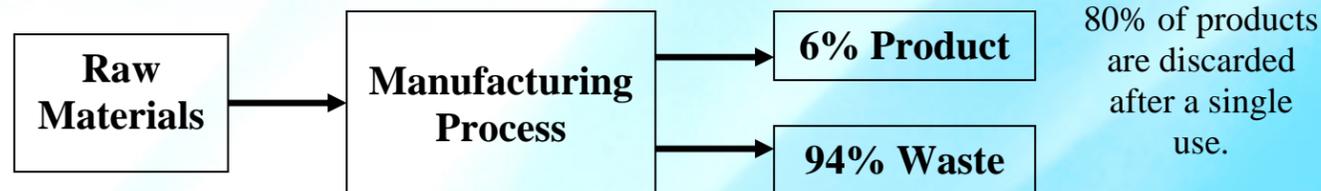


# Materials and Mission

It is estimated that 99% of the original materials used in the production of, or contained in, the goods made in the U.S. become waste within 6 weeks of sale. The extraction and processing of raw materials, the use of energy in manufacturing, the transport of finished products, and the ultimate use and disposal of these products present a great challenge to environmental quality. Our current product and material use follows a linear industrial process: waste is created faster than it can be reconstituted to quality resources. The traditional compliance-based approach to management of our materials is no longer enough. Instead, a new comprehensive approach is needed that maximizes the use of every product and material before it becomes waste, if it becomes waste. By developing more “sustainable” purchasing practices, Fort Carson can limit these environmental impacts while improving mission-readiness and saving money.

## Take-Make-Waste

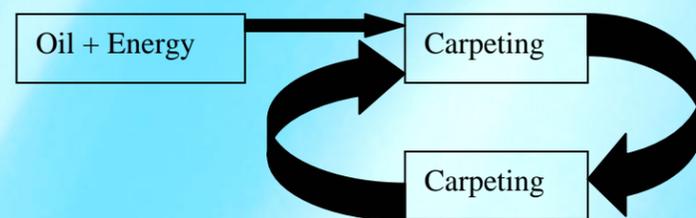


## Waste = Food

*Maybe we can be more like nature? In nature, waste does not exist.*



## Waste = Raw Material



*Similarly, we need technical loops for our material processes. Byproducts should serve as feedstocks for other processes or products.*

From Nattrass, Brian & Mary Altomare. 2002, Dancing with the Tiger, New Society Publishers, Gabriola Island, Canada.  
&  
1999, The Natural Step for Business

# Key Sustainability Considerations

**Clean Products** – The use of materials that are non-toxic, made of renewable resources, produced in an environmentally friendly manner, and easily reused or recycled is critical to sustainability.

**Product Leasing** – Many products such as carpeting, furniture, and appliances can be leased rather than purchased. Little or no consideration is given to what will happen to the product when it no longer meets its intended use. Companies now offer leasing of products where the supplier will take away and reuse/recycle the product when the user is finished with it. With this system, the supplier takes responsibility for used products, encouraging a more sustainable manufacturing process.

**Local Manufacture** – The purchase of locally manufactured products stimulates the regional economy, reduces transportation costs and associated environmental impacts, and helps to sustain the community. In addition, the use of local manufacturers may increase the feasibility of creative product use approaches, such as product leasing or manufacturer buy-back in which the manufacturer buys back all of, or components of, the original product.

**Use Reduction** – Sustainability depends on our ability to use the smallest quantities of products and materials needed to meet minimum requirements—in other words, not wasting resources. This includes reducing amounts used, spilled, and leaked to the environment.

**Reuse and Recycling** – Material reuse and recycling reduce the costs and environmental impacts associated with processing virgin materials, transporting new products, and disposal of waste materials. Recycling processes should be designed to maximize the value of the new product made and minimize energy requirements and waste generation.

**Waste** – Both garbage and hazardous waste are expensive to manage and dispose of. Changes in purchasing and use of materials and products can reduce waste generation.

# Realm of Possibilities

## Clean Products



- **Clean Products Guide:** The GSA maintains an extensive list of environmentally friendly products that are available through the supply system.
- **Clean Coatings:** Researchers are working on alternative paint technologies that reduce the use of energy to heat and cool buildings by creating a barrier between the external environment and the surface to which the coating is applied. The coating acts like a heat conductor in one direction and an insulator in the other.
- **Biomimicry:** This concept involves designing materials based on natural processes and products. For example, spider web silk is three times stronger than Kevlar, the material used for bulletproof vests. Harnessing these natural technologies will greatly reduce environmental impact and improve mission-readiness.

## Product Leasing



- **Take-Back Programs:** The original manufacturers of products retain ownership and disposal responsibility for their products. When we finish with the product, it is taken back for recycling or re-manufacture and reuse.
- **Paperboard and Food Composting:** Waste streams are turned into a usable product—compost.
- **DLA Re-refined Motor Oil Program:** This program provides re-refined oil that meets military specifications in exchange for used motor oil.

## Local Manufacture



- **Locally Manufactured Products:** The use of locally manufactured products minimizes distances required for product delivery, thereby reducing harmful air emissions and saving fuel. In addition, the purchase of these products stimulates local economies, providing better, more vibrant communities around the installation.

## Use Reduction



- **Laser Technology:** This technology eliminates the use of chemicals for paint strippers and reduces the generation of hazardous waste created from abrasive blasting. It also eliminates the use of hazardous cleaning compounds.
- **Two-Sided Copying and Printing:** Incorporation of two-sided copying and printing into the office culture will reduce paper use by one half.
- **Totally Electronic Office:** A totally electronic office reduces the overall flow of material into an office, and there will be fewer pens, staplers, tape, and plastic binders as well.

## Reuse and Recycling



- **Team Tire:** DLA offers a program in which local vendors come into the motor pools and provide re-treaded tires in exchange for used tires.
- **Recycled Asphalt:** The Pentagon parking lot was repaved using a 25 percent recycled asphalt product.
- **Landfill Fluff:** Unsorted household garbage is fed into a grinder, hydrolyzed, and then flash-heated to kill germs, resulting in dry fluff. The process reduces waste volume and weight by 90 percent and costs \$30/ton. The dry fluff may be useful as a soil amendment.
- **Deconstruction:** Taking apart a building to reuse its component parts, rather than the typical “bash and trash” demolition will dramatically reduce costs for waste management and new materials purchase.



# Materials



**Challenge:** Purchase materials and services that are produced in accordance with sustainability principles and generate little or no waste after use. How can Fort Carson...

- Utilize products and materials efficiently?
- Use organic, biodegradable, renewable, and recycled-content products and materials to the maximum extent possible?
- Create and enhance supplier and contractual relationships for developing, producing, and using environmentally friendly products and materials?
- Use materials and products with reduced chemical persistence and toxicity?
- Reduce the costs and liabilities associated with material procurement and disposal?
- Promote the local manufacture of products with reduced environmental impacts from raw material extraction, manufacture, storage, delivery, use, and disposal?
- Enhance resource recovery, reuse, and recycling of solid waste?

## Key Facts

Products Purchased: \$110M/yr

	Generation	Disposal
<b>Hazardous Waste</b>	47,000 pounds/yr	\$80,000/yr
<b>Solid Waste</b>	307,000 tons/yr	\$450,000/yr

Hazardous Materials Management Cost: \$300,000/yr

On-site Landfill Closure Cost: \$6M

Cost Avoidance through Reuse of Products through DRMO: \$1.73 M (FY97-02)