



## Product Cards

**Cotton Shirt**  
**\$5.00**



**Organic Cotton Shirt**  
**\$16.00**



**Bottled Water**  
**\$2.00**



**Reusable Water Bottle**  
**\$10.00**



**Farmers' Market Apples**  
**\$2.00/lb**



**Grocery Store Apples**  
**\$1.00/lb**





## Externality Cards (1 of 2)

### Cotton Shirt

Cotton production can involve the use of pesticides. From planting to harvest, cotton is often treated with herbicides, fungicides, and insecticides. Pesticides can be damaging to organisms that live in the soil and can be washed into streams when it rains, polluting waterways.

Cotton fields are also often irrigated. On average, it takes approximately 659 gallons of water to produce the cotton used to make a shirt (Water Footprint Network).

Researchers have calculated that an average cotton shirt has a carbon footprint of 6.34 kg of carbon dioxide (Continental Clothing Co. Ltd, 2009).

### Organic Cotton Shirt

Organic cotton is grown without using synthetic chemicals. This means that only natural fertilizers, pesticides, and weeding techniques are used to produce the cotton. As a result, fewer pollutants may enter waterways. Organic cotton is often grown as a rotation crop, which prevents the soil from becoming depleted of nutrients and allows the soil to hold more water. This may allow farmers to use less water for irrigation (Jorgensen et al., 2006).

Only natural oils are used during the cleaning and spinning process. These oils easily biodegrade, thereby reducing the number of times the shirt needs to be washed during production. In addition, only natural dyes are used (Jorgensen et al., 2006).

Researchers have calculated that the total carbon footprint of an organic cotton shirt is 2.34 kg of carbon dioxide (Continental Clothing Co. Ltd, 2009).

### Bottled Water

Petroleum, which is a nonrenewable resource, is used to make most plastic bottles, and fossil fuels are required to ship those bottles of water around the world. This is an energy-intensive process that produced over 2.5 million tons of carbon dioxide emissions in 2006 (Pacific Institute, 2012). Not only do these greenhouse gas emissions contribute to climate change, but the whole process uses a great deal of water too. Approximately three liters of water are used to manufacture one liter of bottled water (The Water Project).

Most likely this bottle will be used only once and then thrown away. If it is made of PET plastic it can be recycled, otherwise it will take more than 1,000 years to biodegrade in a landfill (The Water Project).



## Externality Cards (2 of 2)

### Reusable Water Bottle

This reusable bottle is made from aluminum. Aluminum production is one of the most energy-intensive industries contributing to greenhouse gas emissions (Tufvesson, 2011).

Since the bottle can be refilled from any tap, the transportation cost for the water is significantly lower than for bottled water. The bottle can be reused, which reduces waste. When the bottle is disposed of it can be recycled; in fact, 75 percent of the primary aluminum ever produced is still in use today due to active recycling programs (Tufvesson, 2011).

### Grocery Store Apples

In the Southeast, many of the apples we buy come from Washington, as this state is responsible for producing more than half of the apples eaten in the United States. Washington apples travel more than 2,000 miles to the southeastern United States and the trains or trucks that transport them typically use fossil fuels, such as diesel. This results in air pollution and carbon dioxide emissions that contribute to climate change (WSU Extension, 2014).

Apples that travel a great distance are packed in heavy boxes to protect the fruit, which creates more waste. In addition, preservatives are often used to maintain freshness for fruit that travels long distances before reaching the consumer (Lanford, 2011). Washington apples are available year-round in southern grocery stores.

### Farmers' Market Apples

Apples sold at a farmers' market in the Southeast may come directly from a local farmer or from a collection of farmers in that state or region. Many farmers' markets sell organic produce and these apples may have spots from insect damage.

Farmers' markets are usually not open every day, or even all day. Apples are only available in late summer and fall, depending on the variety and whether the farmer has cold storage. Because the farmers are local, the money they earn from selling food supports the local economy. Since the apples travel a considerably shorter distance than those sold at the grocery store, transportation fuel consumption, air pollution, and greenhouse gas emissions are reduced. Research shows that the carbon dioxide emissions from transporting locally produced apples can be 40 times less than the emissions for transporting conventional ones, depending on how both are transported (Bentley & Barker, 2005). Also fruit that is freshly picked and sold immediately will be closer to peak ripeness, which could mean increased flavor and nutrition (Nutrition.gov, 2014).