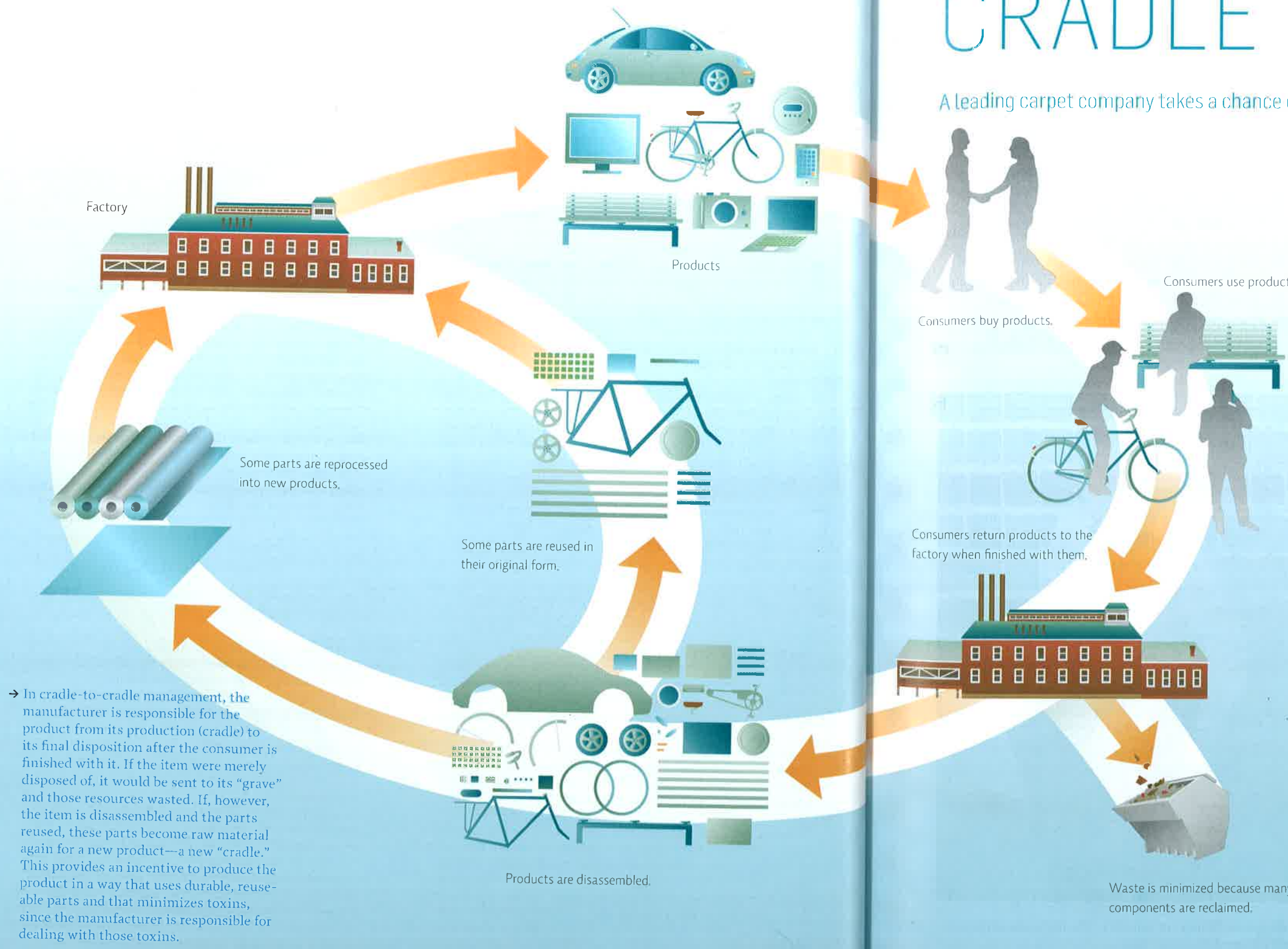


# WALL TO WALL, CRADLE TO CRADLE

A leading carpet company takes a chance on going green



→ In cradle-to-cradle management, the manufacturer is responsible for the product from its production (cradle) to its final disposition after the consumer is finished with it. If the item were merely disposed of, it would be sent to its "grave" and those resources wasted. If, however, the item is disassembled and the parts reused, these parts become raw material again for a new product—a new "cradle." This provides an incentive to produce the product in a way that uses durable, reusable parts and that minimizes toxins, since the manufacturer is responsible for dealing with those toxins.



**CORE MESSAGE**

Human impact on Earth can be measured in terms of our ecological footprint which increases as our population increases, but is also closely tied to the way we use resources. Our economic choices, both corporate and individual, tend to focus on short term gain rather than long term sustainability, but we can make better and more informed decisions by taking all the costs—economic, social, and environmental—of a given action into account. Using nature as a model can help us make more sustainable choices while still supporting a viable economy.

**GUIDING QUESTIONS**

- After reading this chapter, you should be able to answer the following questions:
- What are ecosystem services? How can it be useful to place a monetary value on these services even if we know it will not be accurate?
  - What is the concept of an ecological footprint, and how does it relate to our use of natural interest and natural capital?
  - What factors influence how much human actions impact the environment, and how can we reduce that impact?
  - What are externalities and internalities in the business world and how do these concepts relate to the concept of true costs?
  - How does environmentally based economics differ from mainstream economics, and how might ideas from environmental economics help industry and consumers make better choices?

It was the summer of 1994, and Ray Anderson was feeling pretty good about things. His Atlanta-based company, Interface Carpet, was the world's leading seller of carpet tiles—small square pieces of carpet that are easier to install and replace than rolled carpet—raking in more than a billion dollars per year. One day, though, an associate from his research division approached him with a question. Some customers apparently wanted to know what Interface was doing for the environment. One potential customer had told Interface's West Coast sales manager that environmentally speaking, Interface “just didn't get it.”

Anderson was dumbfounded. The carpet industry was not generally an eco-conscious industry; after all, synthetic carpet is made from petroleum in a toxic process that releases significant amounts of air and water pollution, along with solid waste. Indeed, Interface used more than a billion pounds of oil-derived raw materials each year, and its plant in LaGrange, Georgia, released 6 tons of carpet trimming waste to landfills each day. “I could not think of what to say, other than ‘we obey the law, we comply,’” he recalls—in other words, his company did things by the book, in terms of the environment. That wasn't enough? His research associate suggested that the company launch a task force to create a companywide environmental vision. Anderson agreed, albeit reluctantly.

Desperate for inspiration, Anderson began leafing through *The Ecology of Commerce*, a book by environmental activist, entrepreneur, and writer Paul Hawken, which one of his sales managers had lent him. The book told the story of a small island in Alaska to which the U.S. Fish and

Wildlife Service had introduced a population of reindeer in World War II. Although the reindeer thrived for a time on the available plants, eventually the population exploded beyond what their environment could support. They ultimately died out because, as Anderson explains, “you can't go on consuming more than your environment is able to renew.” Yet that, he suddenly realized, was precisely what Interface was doing—using more resources than it could possibly renew. “As I read the book, it

● WHERE IS LAGRANGE, GEORGIA?



↑ Ray Anderson, founder of Interface. The background displays sample pieces of his carpet tiles.

became clear that, God almighty, we're on the wrong side of history, and we've got to do something.”

Anderson realized that he had to make changes to Interface—he needed to build it into a **sustainable**, environmentally sound business. “I didn't know what it would cost, and I didn't know what our customers would pay, so it was a leap of faith,” Anderson recalls. “I knew we had to do this, but it was like stepping off of a cliff and not knowing where your foot was going to come down.”

By virtue of our sheer numbers, humans have a substantial impact on the environment. But the choices businesses (and by extension, consumers) make can increase or decrease that impact. The amount and type of energy and water they use, the way they handle the waste they produce, the raw materials they use—these decisions affect not only business operations themselves, but also Earth as a whole, especially considering the magnitude of the resources and waste that some large businesses use and produce.

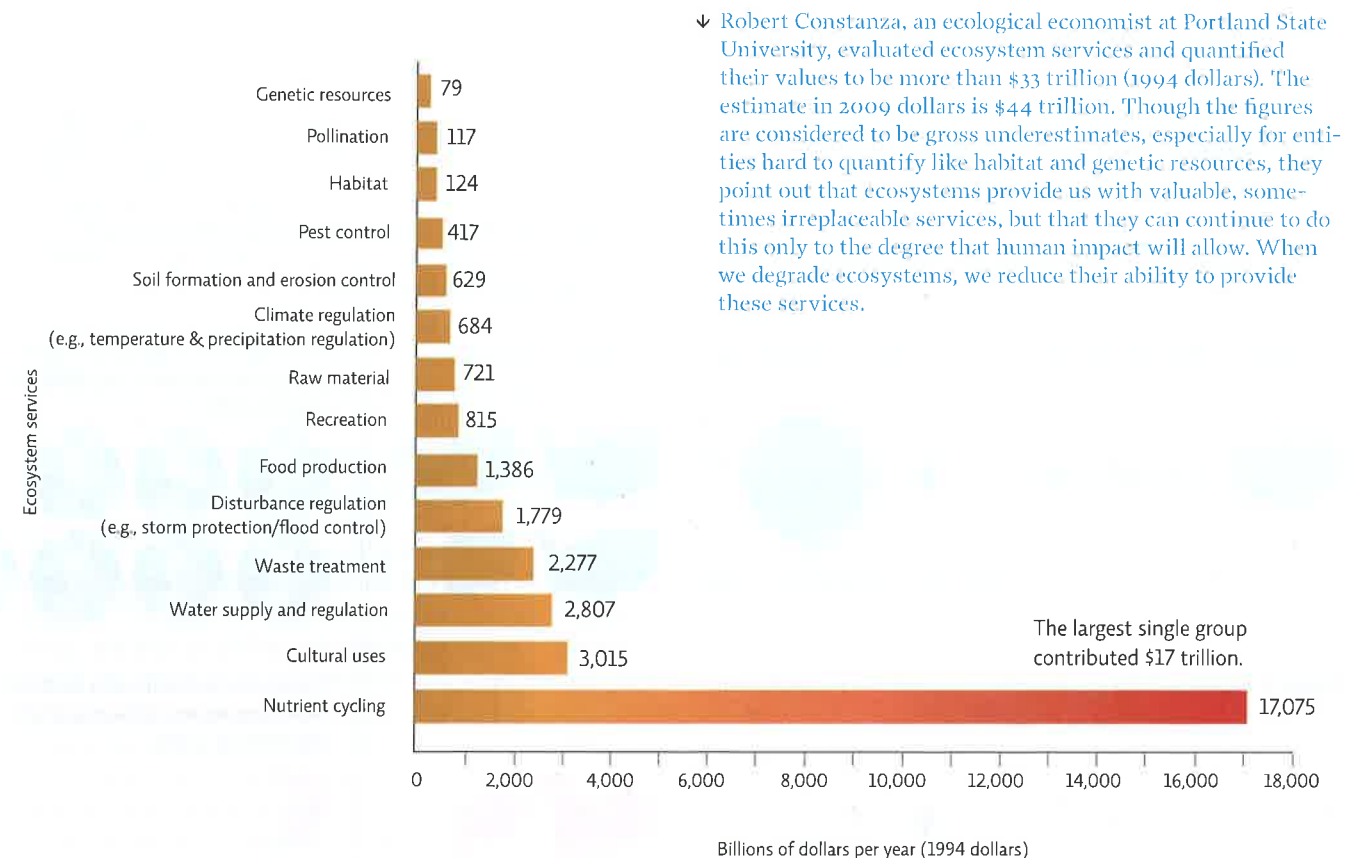
Businesses that are environmentally mindful don't just try to minimize their impact on nature—they actually

look to nature as an economic model from which to learn and model their choices. After all, **economics**—the social science that deals with how we allocate scarce resources—is not just about money. Most of the resources on which we depend actually come from the environment. Environmental resources like timber and water can be considered ecosystem goods. And ecological processes like water purification, pollination, climate regulation, and nutrient cycling are essential **ecosystem services** that also deserve to be considered in an economic accounting of value. Some of these resources are priceless because there are no substitutes—consider the oxygen produced by green plants, which we need in order to survive. [INFOGRAPHIC 4.1]

As explained in Chapter 1, when ecosystems are intact, they are naturally sustainable: They rely on renewable

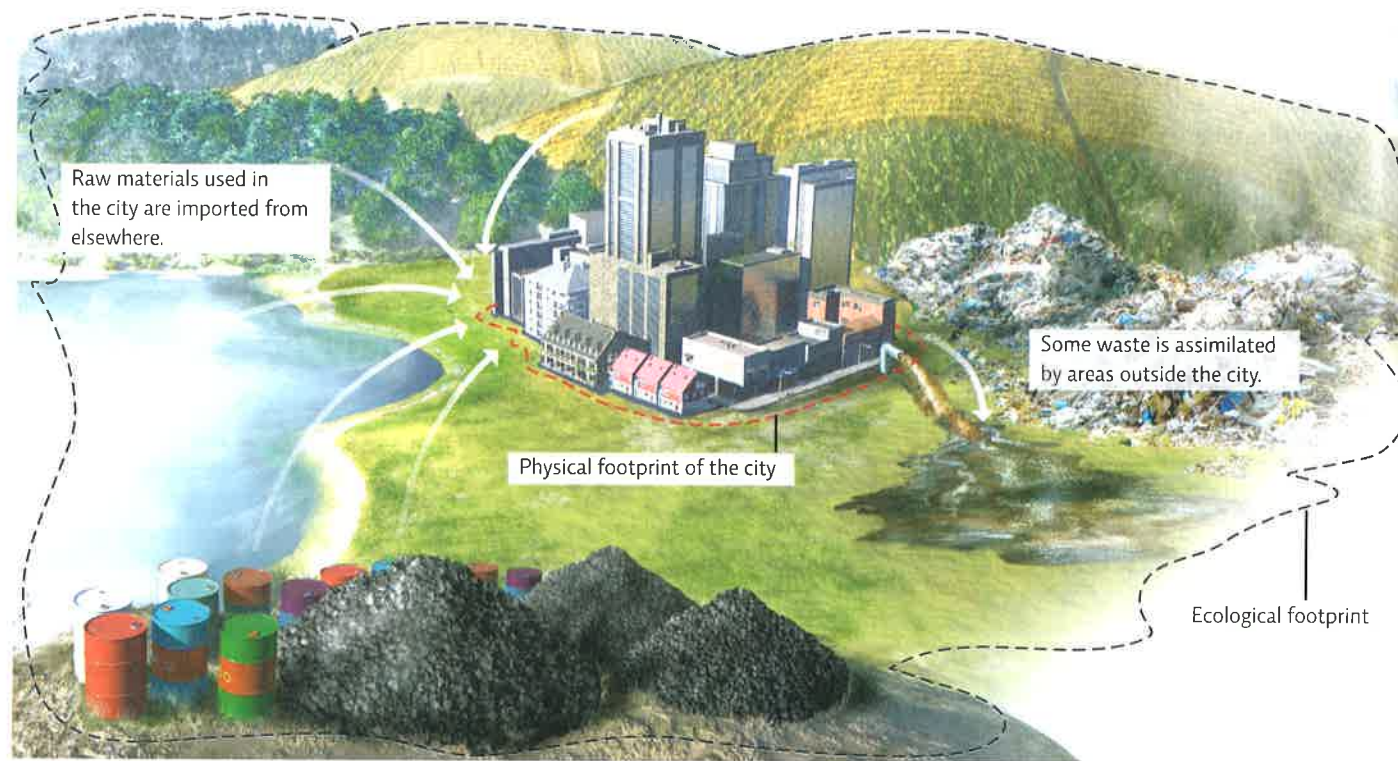
**sustainable** Capable of being continued without degrading the environment.  
**economics** The social science that deals with how we allocate scarce resources.  
**ecosystem services** Essential ecological processes that make life on Earth possible.

Infographic 4.1 | VALUE OF ECOSYSTEM SERVICES



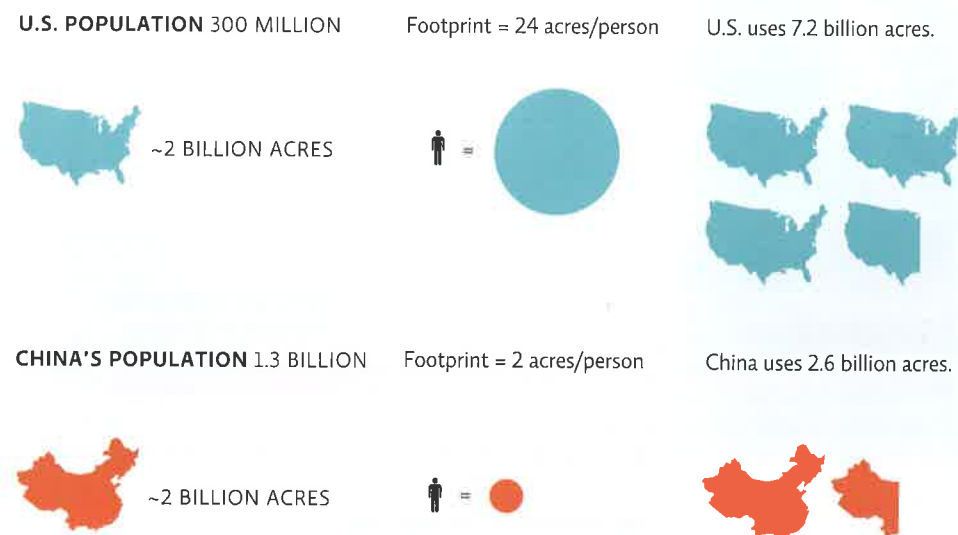
**Infographic 4.2 | ECOLOGICAL FOOTPRINT**

↓ The ecological footprint is the land area needed to provide the resources for and assimilate the waste of a person or population and may extend far beyond the actual land occupied by the person or population; it is usually expressed as a per capita value (hectares or acres/person). The current world footprint would require about 1.5 Earths to maintain, but obviously we just have one to work with.



**BOTH PER CAPITA IMPACT AND POPULATION SIZE AFFECT HOW MUCH ENVIRONMENTAL IMPACT A NATION HAS**

↓ The United States doesn't come close to having enough land area to meet its current ecological footprint; China, a more populous nation, just barely misses the mark, due to its lower per capita footprint. But as China develops economically and more of its people enter the middle class, per capita consumption will likely increase, along with China's overall impact.



If everyone on Earth had a footprint like the United States, we would need over 6 Earths.



If everyone on Earth had a footprint like China, we would have land and resources to spare.



resources and also provide services that help to renew and recycle these resources. But ecosystems will only be able to provide us with their valuable goods and services as long as we let them. As Anderson came to realize, when we degrade ecosystems by using more from them than we replenish, we threaten our planet's ability to provide the services we need, and this ultimately threatens our own future. By using nature as a model, businesses can lessen their impact on the environment and still make choices that support a viable industrial economy.

**Businesses and individuals impact the environment with their economic decisions.**

Like many businesses, Interface Carpet has a large **ecological footprint**, that is, the land needed to provide its resources and assimilate its waste (typically expressed as hectares (ha) or acres (ac) per person or population). The ecological footprint is a value that businesses, individuals, and populations use to quantify their impact on the environment.

The ecological footprint of a population is influenced by both its sheer size (see Chapter 5 for more on human population growth) and its per capita (per person) use of resources. This means a small population of people, each using many resources and generating a lot of waste, can have an impact as big, or bigger, than a much larger population of people with a lower per capita impact.

The United States, for instance, has a particularly high per capita footprint, in that it requires much more land area to support each person than it actually possesses—the country is forced to import resources from other countries, and even export some waste. In fact, if the 7 billion people who currently populate the planet all lived like the average person in the United States, we would need the landmass of six or more Earths to sustain everyone. According to the World Wildlife Federation's 2010 *Living Planet* report, humans currently use 30% more resources than is ultimately sustainable. This means that unless we stop using them so quickly, we are going to run out. [INFOGRAPHIC 4.2]

What kinds of essential resources does Earth provide us? Considered in financial terms, our **natural capital** includes the natural resources we consume, like oxygen, trees, and fish, as well as the natural systems—forests, wetlands, and oceans—that produce some of these resources. Our **natural interest** is what is produced from this capital, over time—more trees and oxygen, for example—just like the interest you earn with a bank account. Natural interest represents the amount of readily produced resources that we *could* use and still

leave enough behind to, in time, replace what we took. Natural interest might be represented by an increase in a fish population, for instance, or new growth in a forest—basically, the extra that is added in a given time frame.

[INFOGRAPHIC 4.3]

If we only withdraw resources equivalent to (or less than) the natural interest, we will leave behind enough natural capital to replace what we took. When Anderson spoke to his employees in the summer of 1994 about his new plan for sustainability, he stressed that his goal was to begin putting back more than the company took from the planet—in other words, he wanted Interface to be what he calls a “restorative enterprise.” Up to that point, the company was using up far more natural capital in the form of resources like petroleum and water than was ultimately sustainable. Anderson realized that if we take more than is replaced, capital will shrink and therefore produce less the next year. By continually taking more than the equivalent of natural interest, we diminish resources and can potentially eliminate them. This can be an especially big problem with commonly held resources like water: Once we remove it from wells or rivers, we have to wait for the next rainfall to replenish it. When many users are accessing the resource, it can quickly become degraded if they do not work together to manage it—a tragedy of the commons (see Chapter 1).

When we dip into our natural capital as humans are doing today, using 30% more resources than is sustainable, we are decreasing future interest potential. Essentially, we are taking resources away from the future, in what eco-architect Bill McDonough calls *intergenerational tyranny*. By liquidating our natural capital more quickly than it can be replaced and calling that “income,” the question becomes this: Where will future income come from?

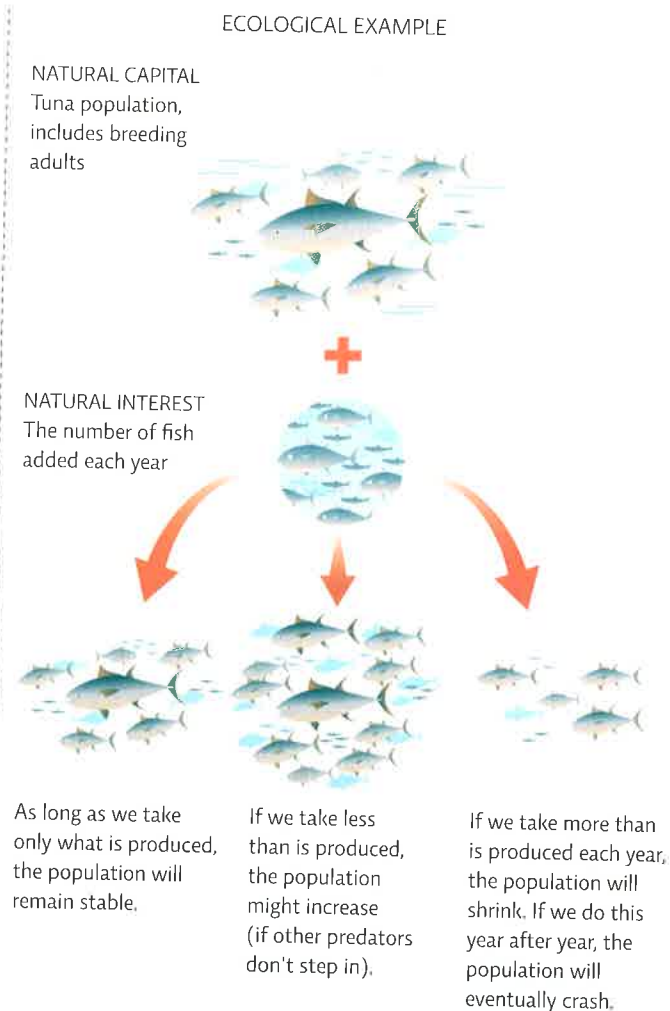
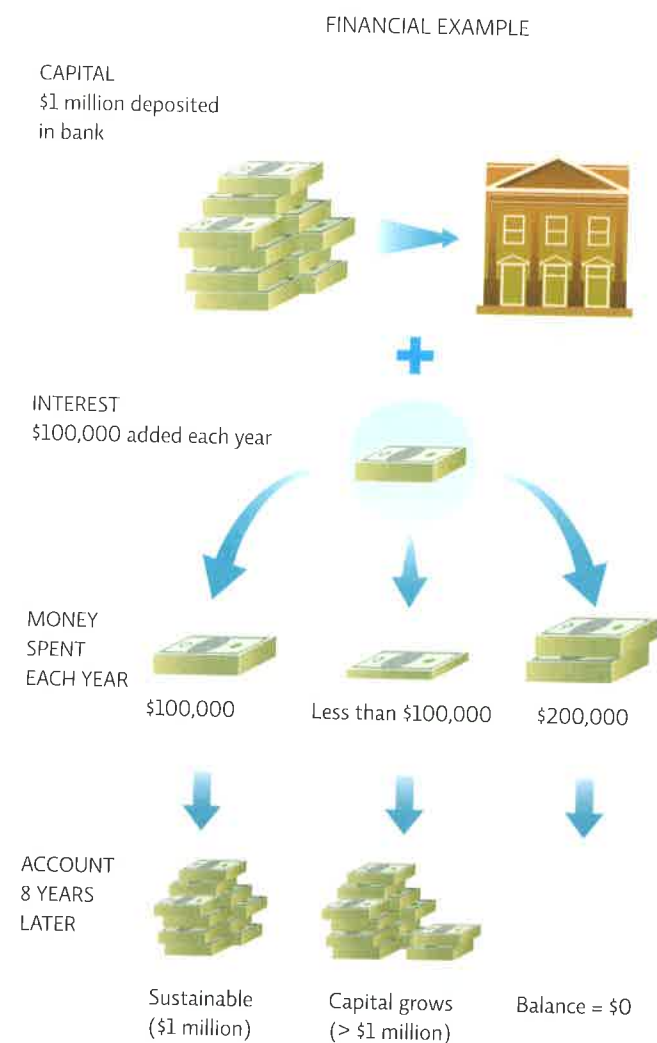
From 1994 to 2006, Interface made major changes in order to achieve its new goals. The company cut the amount of energy it derived from fossil fuels by 55% and reduced its total energy use by 43%. It did this in part by maximizing energy efficiency in its facilities, installing skylights and solar tubes to replace artificial, electricity-dependent lighting, and installing more energy-efficient heating, ventilation, and air conditioning systems. In one of its factories, Interface also installed a real-time

**ecological footprint** The land needed to provide the resources for and assimilate the waste of a person or population.

**natural capital** The wealth of resources on Earth.

**natural interest** Readily produced resources that we could use and still leave enough natural capital behind to replace what we took.

Infographic 4.3 CAPITAL AND INTEREST



↑ Natural resources can be compared to the financial concepts of capital and interest. Natural capital is the wealth of resources on Earth and includes all the natural resources we use as well as the natural systems that produce some of those resources (forests, wetlands, oceans, etc.). Natural interest is the amount produced regularly that we could use and still leave enough natural capital behind to replace what we took.

energy tracker that displays energy use prominently for its employees to see, inspiring them to think of new ways to conserve energy. Although they declined to reveal how much money they invested in such improvements and technology, the company has ultimately recouped its costs in energy savings, according to a company spokesperson.

Researchers often use the **IPAT model** to estimate the size of a population's ecological footprint, or impact (I), based on three factors: population (P), affluence (A), and technology (T). The premise is that as population size increases, so does impact. More affluent and technology-dependent populations use more resources and generate more waste than do less affluent and technology-dependent populations (technology allows us to build more

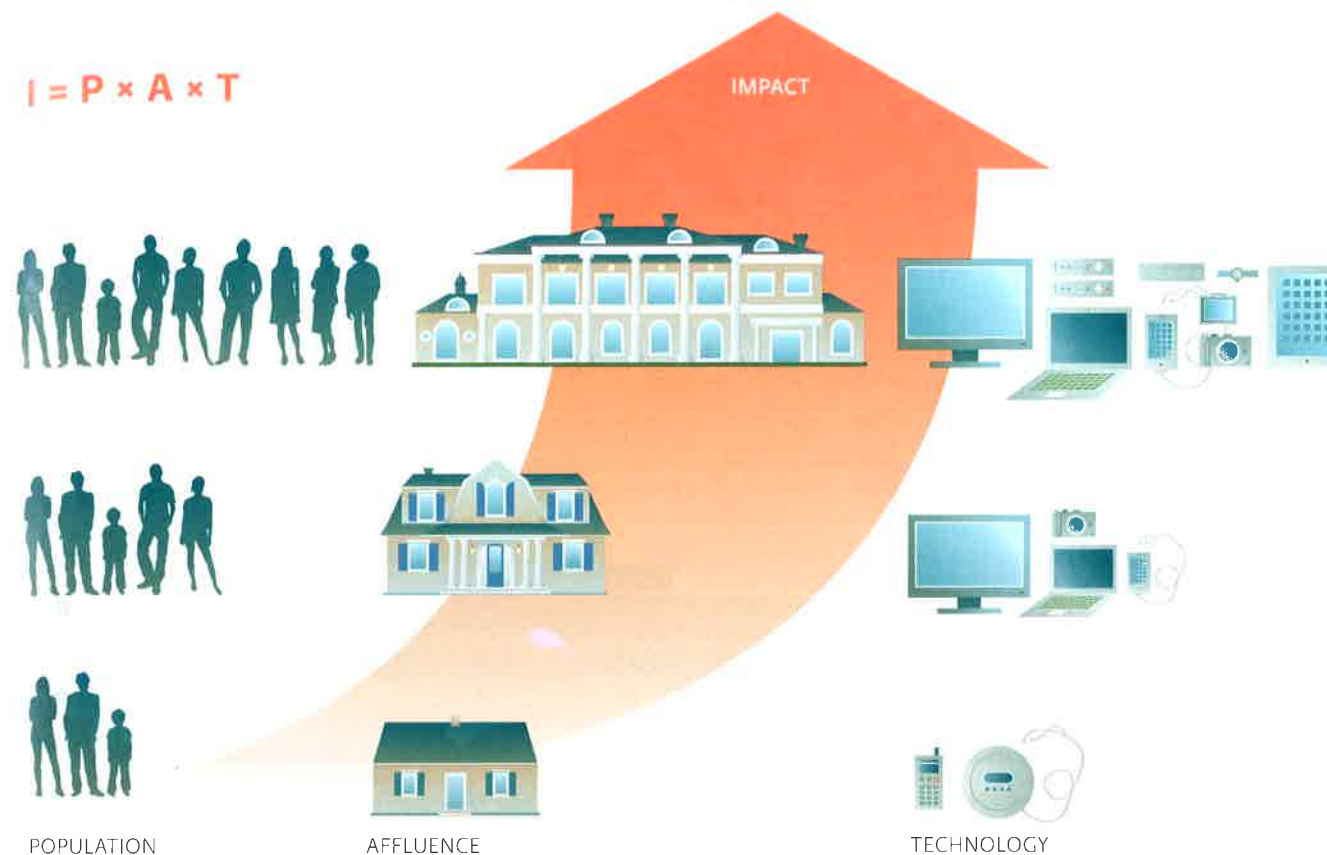
things, dig deeper, and fly higher, all of which drain the environment). [INFOGRAPHIC 4.4]

One caveat with regard to this model is that technology can have the opposite effect: It can decrease, rather than increase, environmental impact. In 2006, for instance, after deciding to become sustainable, Interface invented a new technology called TacTiles— 2.5 × 2.5-inch squares of adhesive tape that join carpet tiles together. The adhesive is made from the same plastic used to make soda bottles.

**IPAT model** An equation ( $I = P \times A \times T$ ) that identifies 3 factors that increase human impact (I) directly: population size (P), affluence (A), and technology (T).

Infographic 4.4 THE IPAT EQUATION

↓ Population (P), affluence (A), and technology (T) all affect how much of an impact an individual or population has on the environment. As any or each of these factors increase, so does the population's overall impact, as indicated by the model's equation:  $I = P \times A \times T$ . The right kind of technology can actually lower overall impact, in which case the equation becomes  $I = (P \times A)/T$ .

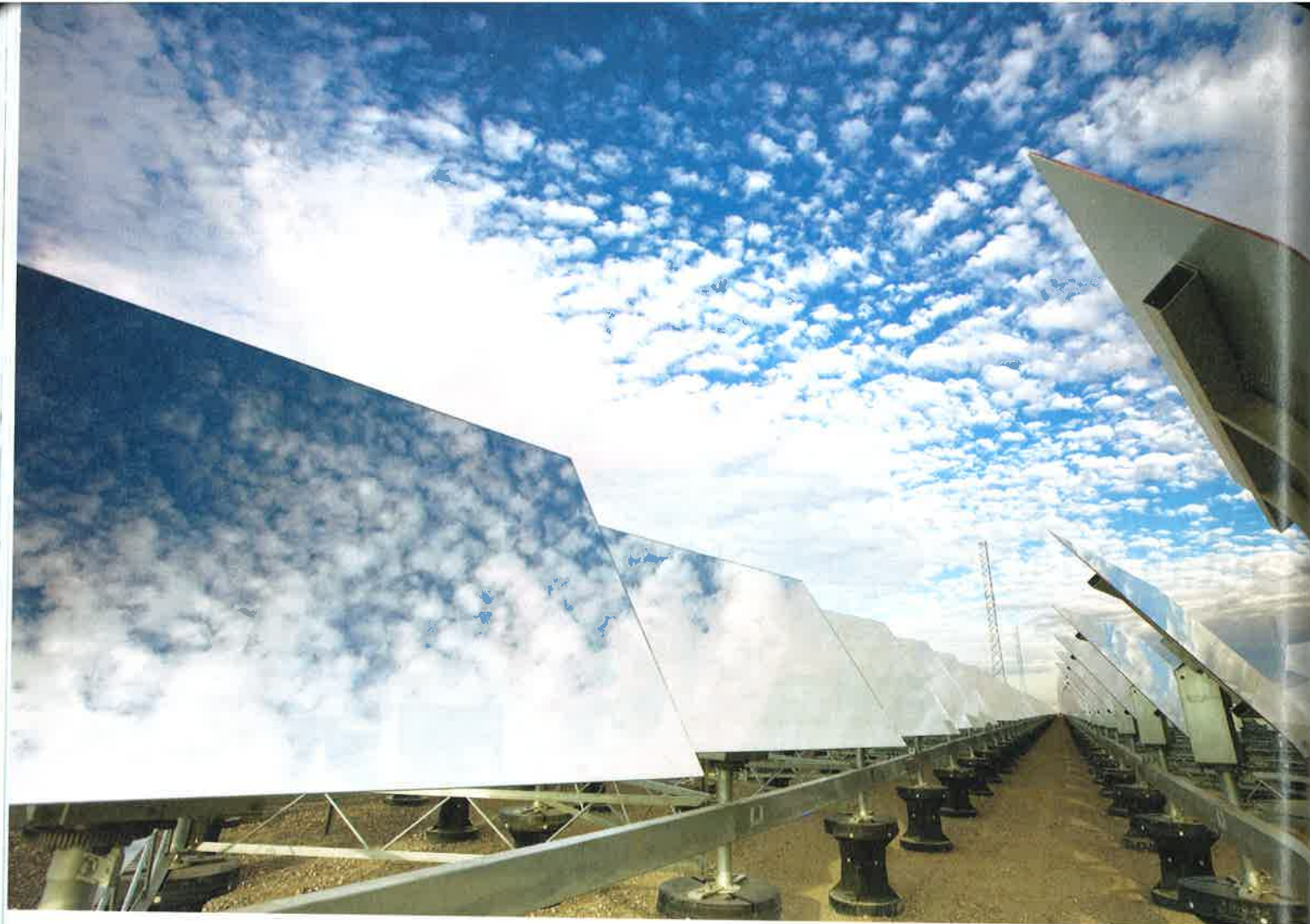


In contrast with traditional “spread on the floor” adhesives, Interface’s new tape does not contain any volatile organic compounds, which the U.S. Environmental Protection Agency recognizes as a health risk. TacTiles also make it possible for customers to replace single carpet tiles easily, when, for instance, there has been a spill. Although resources are still required to make TacTiles, they reduce health risks and waste compared to other approaches. When technologies such as TacTiles reduce the environmental footprint rather than increase it, the equation used to describe their impact changes to:  $I = (P \times A)/T$ .

In 2007, to further reduce its impact, Interface launched a major carpet-recycling initiative called ReEntry 2.0. More than 5 billion pounds of carpet are pulled up and discarded globally each year, and less than 5% of that has historically been reused or recycled. With ReEntry 2.0, Interface developed a way to recycle carpets—both its own and those made by its competitors—to make new carpet, using only a small amount of virgin materials to



↑ Interface’s process that reclaims old carpet and converts it into recycled raw materials diverted 28 million pounds of carpet from landfills in 2010. Since 1995, Interface has diverted a cumulative total of 228 million pounds of carpet and carpet scraps.



↑ The Sierra SunTower solar power plant in Lancaster, California, is a 20-acre array of 24,000 mirrors that focuses sunlight and creates a high-temperature steam that runs a traditional turbine generator. The facility provides energy for 4,000 homes in Southern California.

do so. With ReEntry 2.0, Interface has diverted 100,000 tons of material from landfills. Interface has promised to eliminate *any* negative impact it has on the environment by 2020, in a plan it calls “Mission Zero.”

### Mainstream economics supports some actions that are not sustainable.

One of the limitations of mainstream economics is that it doesn't take into account *all* potential costs. For instance, a carpet tile might require a certain amount of material that has a particular monetary cost—but what about the environmental costs associated with drilling enough oil to make that material in the first place, or the costs associated with cleaning up the pollution it creates? The direct cost of the material is an **internal cost**—a cost that is accounted for when a product or service is priced—but it is often incomplete. There can also be **external costs**, such as the health costs associated with the waste produced by making the carpet tiles or the environmental

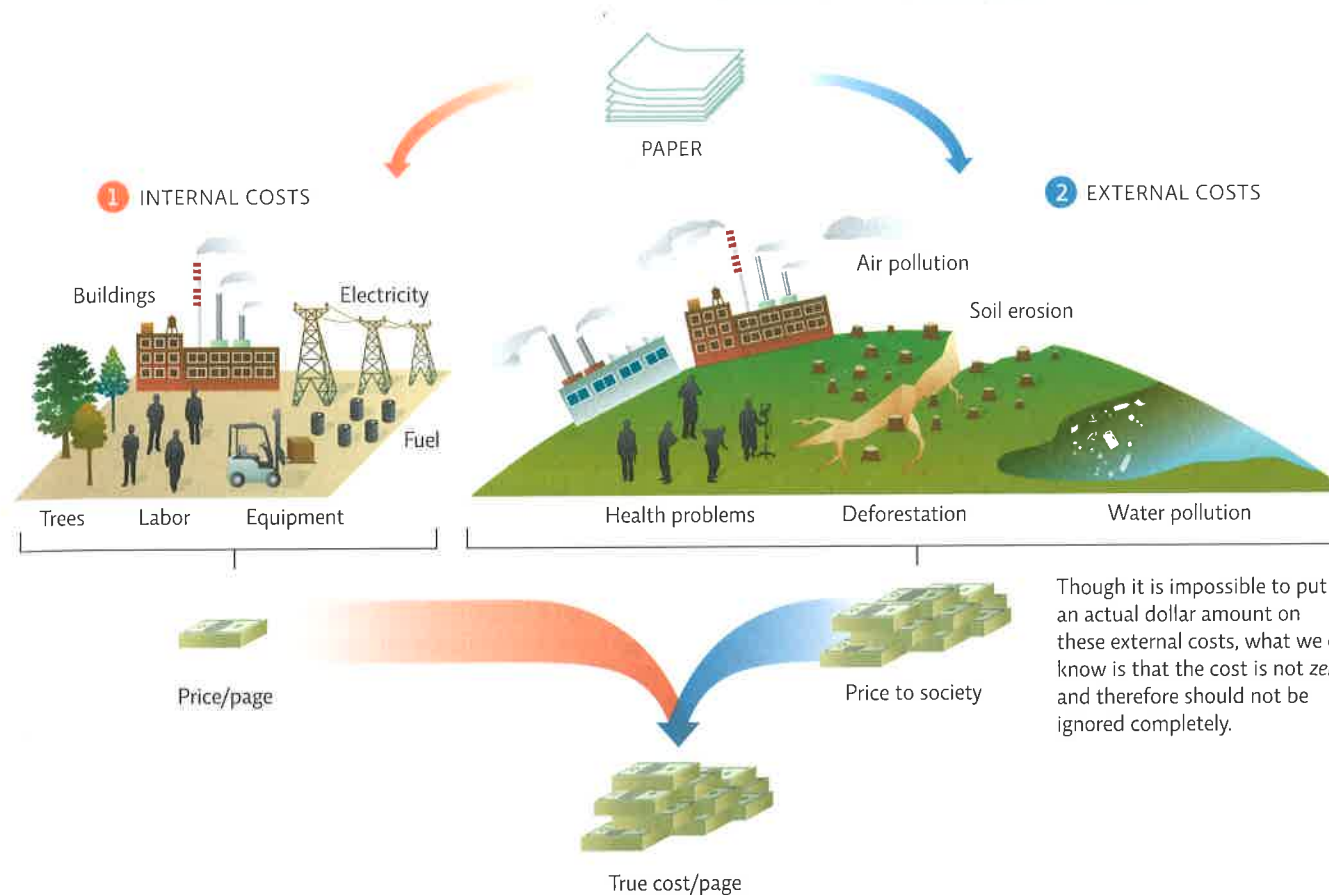
damage caused by pollution. Historically, economists have regarded these as external to the business cost (the business doesn't pay for them) and they aren't reflected in the price the consumer pays for the good or service. But if the business doesn't pay for the costs and pass those costs on to the consumer, who does pay? Other people, present and future, and other species do. They pay in the form of degraded health, ecosystems, or opportunities.

An assessment of the cost of a good or service should include more than just the economic costs but also the social and environmental costs—the **triple-bottom line**. By ignoring the external costs, economies create a false idea of the true and complete costs of particular choices. A customer may pay \$8 for every 50 square centimeter carpet tile, but the **true cost** for that piece of carpet would be much higher if it included the cost of greenhouse gas emissions and, for instance, the cost of treating people for asthma who might fall ill as a result of the particulate matter released during the carpet's production. The inadequate valuation of a product could

### Infographic 4.5 | TRUE COST ACCOUNTING

What does it take to produce the paper you use every day?

↓ Many environmental and health costs of our goods and services are externalized (not included in the price the consumer pays). But if consumers don't pay all the costs to produce a product, such as paper, who does?



Though it is impossible to put an actual dollar amount on these external costs, what we do know is that the cost is not zero and therefore should not be ignored completely.

eventually lead to the exploitation or overuse of resources needed to produce it, an example of market failure. When external costs are internalized, on the other hand, people (or species) who don't benefit from the transaction do not pay for it. In this case, the product or service can be more appropriately priced or valued; this new price more accurately reflects its true cost.

Because we are so accustomed to not paying true costs, we would most likely be appalled at how much goods and services would really cost if all externalities were internalized. Although it sounds discouraging, any time

**internal cost** Those costs—such as manufacturing costs, labor, taxes, utilities, insurance, and rent—that are accounted for when a product or service is evaluated for pricing.

**external cost** Costs that are not taken into account when a price is assigned to a product or service.

**triple-bottom line** Considering the environmental, social, and economic impacts of our choices.

**true cost** Including both internal and external costs when setting a price for a good or service.

we purchase products that were made in a more environmentally or socially sound manner, we come a little closer to bearing the consequences of our choices. We also create a demand for these products in the marketplace. [INFOGRAPHIC 4.5]

Another inaccurate assumption of mainstream economics is that natural and human resources are either infinite or that substitutes can be found if needed. This is true for some but not all resources. For instance, fossil fuels are finite and will run out, even with technological advances that allow us to access more of the fuel that is left. It remains to be seen if we can replace fossil fuels with sustainable alternatives at current levels of use. Additionally, our actions can degrade air and water resources faster than nature can restore them; and crop productivity has its limits.

Mainstream economics also assumes that economic growth will go on forever. Since there are inherent limits to what Earth can provide, resource-dependent unlimited

growth is not, in fact, possible. We have to work within the limits of available resources in ways that allow essential ecosystem services to continue.

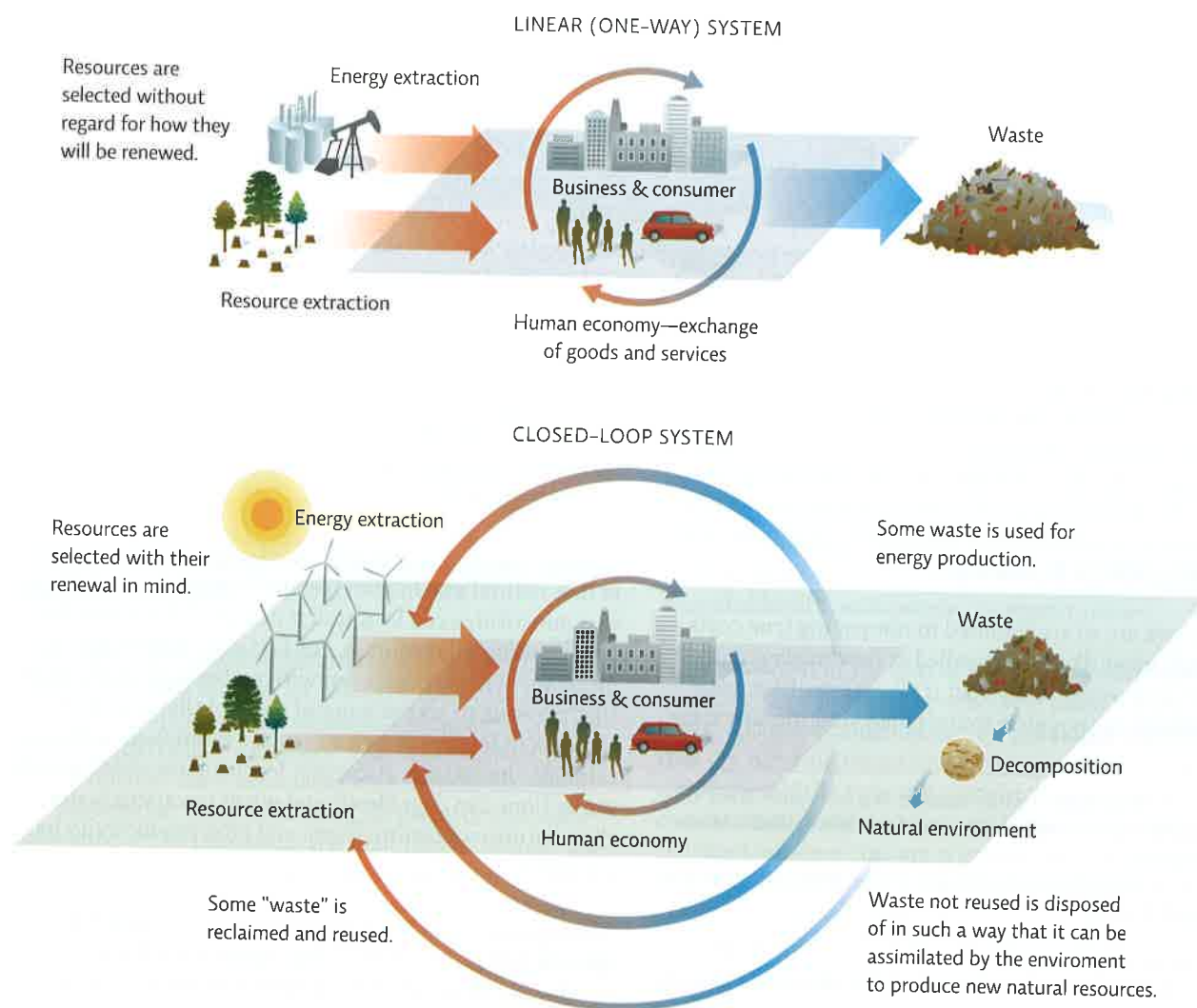
These assumptions lead to yet another **misconception**—that models of production follow a linear **sequence**: Raw materials come in, humans transform those materials into some kind of product, and then they discard the waste generated in the process. But, because some resources are **finite**—and waste in the form of **pollution** can damage **natural capital** like air, water, and soil—linear models of production will eventually fail. For instance, most traditionally produced carpet tiles are made from

fossil fuels, which are not sustainable. Old unwanted tiles are then discarded, and some are eventually burned to release greenhouse gases. A sustainable approach would be more cyclical, where “waste” becomes the raw material once again and can be used to make products. Interface’s ReEntry 2.0 program uses old carpet tiles to make new ones, and old carpet backings to make new carpet backings, in an effort to make the production process more cyclical.

This is an example of a **closed-loop system**, where the product is folded back into the resource stream when consumers are finished with it, or is disposed of in such a

#### Infographic 4.6 | ECONOMIC MODELS

↓ Mainstream economics assumes that resources will always be available and that waste can be disposed of in a linear (one-way) system. Environmental economics recognizes that natural ecosystems provide our resources and assimilate our wastes. If companies could fold “waste” back into production or make sure it can be decomposed by nature, we could reduce our extraction costs, and be operating in a sustainable closed-loop system.



way that nature can **decompose** it. By leasing carpet rather than selling it, Interface manages its product in a **cradle-to-cradle** fashion—the carpet needs to be durable and recyclable, because Interface is responsible for the impact of its use at every stage of the process (See the diagram that opens this chapter on pages 56–57). [INFOGRAPHIC 4.6]

Another problem with traditional economics is that it **discounts future value**: It tends to give more weight to short-term benefits and costs than it does long-term ones. In other words, something that benefits or harms us today is considered more important than something that might do so tomorrow. For instance, we value the tuna we can harvest today more highly than tuna we might harvest 10 years from now, so the value of taking a large harvest of tuna today outweighs the benefits of taking less now to ensure there is still some later. If the money we could earn by using the resource now is higher than sustainable harvesting yields, modern economics tells us it is more profitable to use it now and invest the resulting money in another venture. But this investment approach doesn’t take into account where those other ventures might come from or whether they are in any way diminished by the elimination of the first resource. How might the loss of tuna affect the ecosystem and other populations? Will there always be another fish population to harvest?

A sustainable approach would be more cyclical, where “waste” becomes the raw material once again and can be used to make products.

Two schools of thought are emerging regarding how to incorporate environmental considerations into economic decisions. Both **environmental** and **ecological economics** are disciplines that consider the long-term impact of our choices on human society and the environment. Environmental economists feel we can apply the tools of modern economics to solve environmental problems and still enjoy unlimited economic growth. They support actions such as improving technology to increase production efficiency and reduce waste; valuing resources as realistically as possible; moving away from dependence on nonrenewable resources; and shifting away from a product-oriented economy. In other words, the problems are real but they are solvable within current economic systems.

Ecological economists look to natural ecosystems as models for resource use and, like environmental economists,

stress recycling matter, only using renewable resources, and living within the limits of nature. However, they believe that our ingenuity will only take us so far and that economic growth does have limits; therefore, we must significantly change the way we do things in order to become sustainable as a society. While there are differences between these two approaches, both agree that some of the underlying assumptions of mainstream economics fall short with regard to how we view natural resources and our impact on the planet and people.

What about consumers? We can all decrease our impact by making more sustainable choices and by consuming less. This doesn’t necessarily mean “doing without,” but it does mean being mindful of our choices and opting for sustainable or low-impact choices whenever possible. However, this requires transparency from the industries that produce and sell us goods and services. That is hard to come by with current business models, often because the businesses themselves don’t know all the external costs associated with their products. In order for their new plan to be a success, Interface was counting on their customers to make more sustainable choices as well. And make them they did. ReEntry 2.0 drew many new customers to Interface, including the Georgia state legislature, which purchased 13,000 yards of new carpets.

**Businesses can learn a great deal about how to be sustainable from nature.**

Anderson vowed in 1994 that Interface Carpet would become the world’s first sustainable business. But what does that mean, exactly? By definition, **sustainable development** must meet present needs without preventing future generations from meeting their needs. It should enhance the quality of life without damaging the environment that helps meet those needs. In short, Anderson says, sustainability means “Take nothing. Do no harm.” Some people have said that the term “sustainable development” is an oxymoron because development

**closed-loop system** A production system in which the product is folded back into the resource stream when consumers are finished with it, or is disposed of in such a way that nature can decompose it.

**cradle to cradle** Management of a resource that considers the impact of its use at every stage of the process.

**discount future value** To give more weight to short-term benefits and costs than to long-term ones.

**environmental/ecological economics** New theories of economics that consider the long-term impact of our choices on people and the environment.

**sustainable development** Economic and social development that meets present needs without preventing future generations from meeting their needs.



↑ Yumi Someya is head of U Corporation, a Japanese company which collects around 100 tons of used cooking oil from 5,400 Tokyo restaurants and 100 collecting stations each month. The company converts the oil into biodiesel to fuel city buses, service vehicles, and the company's own trucks. Someya hopes that by 2017, her company will be recycling all the used cooking oil in Tokyo—some 200,000 tons each year.

implies constant upward progress and, at some point, resource restriction will prevent further development. However, this would be true if development could only be considered a physical process, dependent on resource extraction. In reality, development can also be abstract: Some, for instance, consider improved quality of life and happiness to be development, even if it is not tied to physical resource use.

When he first vowed to make Interface sustainable, Anderson did not know whether his business would thrive or suffer as a result. "I was very apprehensive about it," he recalls. But he, along with other entrepreneurs who have followed suit, are finding that **green business**—doing business in a way that is good for people and the environment—is also profitable. It can provide a competitive advantage either because the consumer is willing to support the company's efforts or because green actions end up saving money.

Since 1994, Interface Carpet has reduced greenhouse gas emissions from its manufacturing facilities by 35%, slashed total energy use by 43% per unit of production,

and now relies on recycled or bio-based ingredients for 40% of its raw materials. During this same time, the company has increased sales by two-thirds and doubled its earnings. Some of this extra money was the direct result of its efforts—by reducing the amount of waste it produces, for instance, the company has saved \$438 million dollars in waste elimination costs since 1994. But Interface has also won many new customer contracts as a result of the changes it has made. At one point, for instance, Interface was in competition with two other carpet companies over a \$20 million contract at the University of California. After Interface filled out a 200-page questionnaire about how the company was addressing various environmental issues, one of the university's representatives turned to a colleague of Anderson's and exclaimed, "This is real."

How does a company find inspiration to become sustainable? One way is to look to natural ecosystems—a perfect example of sustainable resource use and waste minimization (biomimicry—see Chapter 1).

At Interface, Anderson was strongly inspired by biomimicry. For instance, the TacTiles technology that the company developed to replace glue was based on the physics that explains how a gecko lizard clings to walls and ceilings. The microscopic hairs on a gecko's foot bond to the molecular layer of water that's present on nearly every surface, allowing its feet to cling. Interface used this information to develop tiles that bond to one another rather than to the floor, making a kind of "floating" carpet that stays in place due to gravity rather than being actually glued to the floor. This makes carpet installation and removal much faster and easier. Interface also revolutionized its operations by considering itself part of a **service economy**; it focuses on selling a *service* rather than a *product*. The idea is simple: A customer pays for the service, and the vendor makes sure that the service is always available. The service might be the ability to photocopy pages, walk on comfortable carpet, or keep refrigerated food cold. Interface, for instance, sells the service of carpet—its color, texture, durability, and comfort—rather than the product itself. The customer pays a monthly fee to "lease" the carpet, and Interface maintains it and replaces it as needed. This encourages Interface to produce carpet that is durable and recyclable and also easily replaceable. [INFOGRAPHIC 4.7]

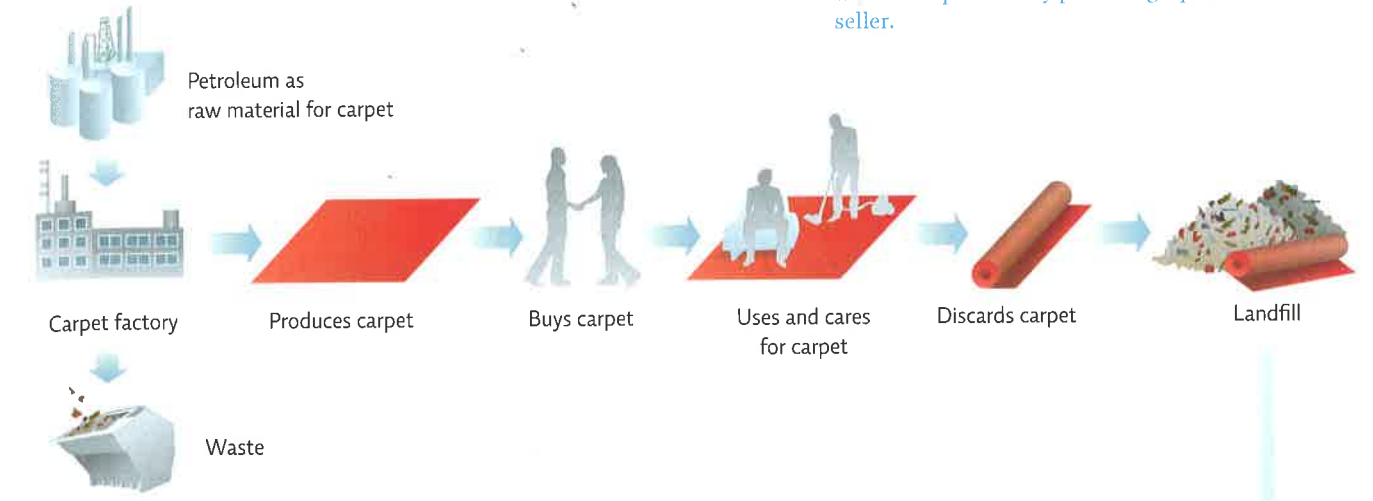
**green business** Doing business in a way that is good for people and the environment.

**service economy** A business model whose focus is on leasing and caring for a product in the customer's possession rather than on selling the product itself (selling the *service* that the product provides).

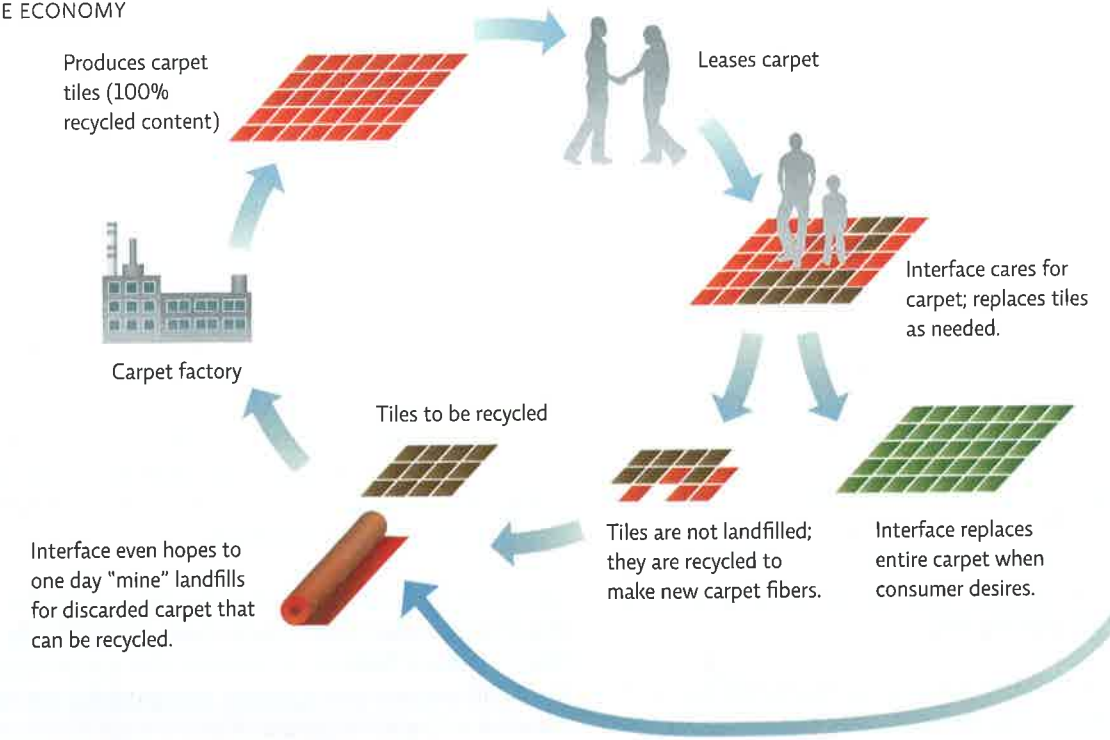
Infographic 4.7 | **PRODUCT VERSUS SERVICE ECONOMY**

↓ A service economy that focuses on providing the consumer the service desired, rather than a product, decreases resource drain and lessens waste while still potentially providing a profit for the seller.

**PRODUCT ECONOMY**



**SERVICE ECONOMY**



Another sustainable business practice involves *take-back programs*, particularly for products with a defined life span, such as electronics: Customers return the product to the producer when they are finished or when they need an upgrade. This provides an incentive to the producer to make a durable, high-quality product that can be reused or recycled.

**There are tactics for achieving sustainability.**

Changing the way we do business is not going to be easy. Even Interface has progressed slowly, despite its strong desire to become sustainable. Start-up or upgrade costs can be substantial, and even though they may pay for themselves in the long run, many businesses simply do not have the capital to fund the improvements. Plus,



↑ Craig Martineau, Brandon Sargent, and Dan Blake (from left) dropped out of Brigham Young University to pursue their green business, EcoScraps. Founded in 2010, the company collects roughly 20 tons of food waste a day from more than 70 grocers, produce wholesalers, and Costco stores across Utah and Arizona. Then it composts the waste into potting soil, which retails for up to \$8.50 a bag in nurseries.

they may find themselves at a competitive disadvantage with businesses who are not trying to internalize costs. Consumers also have a role to play. Recycled paper's higher cost may more closely reflect the true cost of paper, but if consumers are not willing to put their buying dollars behind their environmental ideals, businesses that make and sell paper from trees will still be more successful. In other words, it will take changes by both consumers and producers to put business and industry on the path to sustainability. But there are things that can be done to level the playing field.

One way governments can encourage sustainability is by providing incentives for businesses to account for true costs rather than just internal costs. This could be accomplished by taxing companies based on how much pollution they generate, subsidizing environmentally friendly processes, or *cap and trade* programs that give out pollution "permits" that companies could sell if they release less pollution than they are allowed (see Chapters 25 and 31). For instance, if there is a pollution tax, it will be passed on to the consumer, who then decides whether or not to buy the product. The manufacturer that minimizes waste production and relies on fewer fossil fuels than its competitors would be able to meet the regulations

at the lowest cost, have lower prices, and as a result, have a major market advantage. While promising, these policies can be complex to implement, because external costs are hard to quantify (How is a pollution tax fairly assessed?), and because they may put a burden on smaller manufacturers who have less ability to absorb the cost of upgrades; passing these costs on to the consumer also stresses low-income households.

Another important aspect of becoming sustainable requires that a business handle resources cyclically rather than in a linear fashion. A company that adopts cradle-to-cradle resource management is responsible for the resource or impact of its use at every stage of the process. It can do this by considering not just the immediate impact of using a product but also the upstream and downstream impacts—a *life-cycle analysis*. This can lead to better material choices (less toxic, more sustainable) and better process choices (reusable materials, less waste and pollution).

**ecolabeling** Providing information about how a product is made and where it comes from. Allows consumers to make more sustainable choices and support sustainable products and the businesses that produce them.

Anderson stresses that the consumer needs to know how a good or service is made—what the cradle-to-grave environmental impact of that product is. "You lay out for the consumer everything that goes into that product, and you lay it out for your competitors too—it's a totally transparent revelation of how you made that product, and what that footprint is at every step," he explains. This is hard to achieve when we buy so many products made in faraway places and shipped over long distances.

One way to communicate this information is through **ecolabeling**. But consumers have to be wary of labels because as "green" products become more attractive to consumers, more companies engage in *greenwashing*—claiming environmental benefits for a product when they are minor or nonexistent.

*Fair trade* items are, however, more likely to be produced with less environmental impact. In addition, for a product to be considered fair trade, workers must be paid a fair wage and work in reasonable conditions to produce the goods or services. *Share programs* are another useful option for items that people need infrequently, such as a car for those who live in a large city. Rather than buying, owning, and then storing the product for a large part of the time, consumers share ownership and only use the product when they need it.

Although Interface has come a long way since 1994, it is still working hard to achieve its sustainability goals. In June 2011, the company began producing its first 100% nonvirgin fiber carpet tiles, made from reclaimed carpet, fiber derived from salvaged commercial fishnets, and postindustrial waste. In addition to substantial energy savings, Interface has reduced waste some 76% since 1996 and has several LEED certified facilities. (LEED is an internationally recognized green building certification system; the acronym stands for Leadership in Energy and Environmental Design.) Practices like intercepting industrial waste destined for landfills have a positive effect, while other efforts lessen the company's overall negative impact: less toxic glues, less carpet waste. All the while, Interface is still the world's leading manufacturer of commercial carpet tiles, and its 2010 operating income increased 47% from 2009. "I think we're on the right track and we'll keep on going," says Anderson, who stepped down as the company's CEO in 2001 but still played the role of the company's conscience until his death in 2011 at the age of 77. "We'll get to the top of that mountain."◎

Research article referenced in this chapter:  
Constanza, R. et al. 1997. *Nature*, 387: 253–260.

## BRING IT HOME

### PERSONAL CHOICES THAT HELP

You have an impact on creating a sustainable society. Every time you buy a product or service, you are telling the manufacturer that you agree with the principles behind the product. You can use your purchasing power to show companies that people are interested in good-quality products that support environmental and social values.

#### Individual Steps

- Reduce the amount of stuff you accumulate by buying fewer items and by choosing products that are well made and last longer.
- Use the Good Guide app on your smartphone to scan product barcodes and see how the products rank on different scales of environmental impact, social responsibility, and health.
- Ask your local food store or pharmacy to stock fair trade certified products if they don't already.
- Instead of buying a new or used car, join a car-share program like Zipcar.

#### Group Action

→ Get together with family and friends and write a letter to your favorite companies, asking them to reduce their ecological footprint. You can ask them to become more transparent by publishing how their business practices impact the environment.

#### Policy Change

→ Start a blog or Facebook page to chronicle the changes you make in your buying habits and encourage others to do the same. Discuss the companies whose environmental policies you agree with.

