NKBA Professional Resource Library

KITCHEN & BATH SUSTAINABLE DESIGN

Conservation · Materials · Practices

Amanda Davis, NCIDQ, Robin Rigby Fisher, CMKBD, CAPS

NKBA National Kitchen & Bath Association

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WILEY

NKBA
National Kitchen & Bath Association

"It's kind of fun to do the impossible." —Walt Disney

Brandon Cole 1984–2014

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Right photo [bathroom]: Design by Elina Katsioula-Beall, CKD. Photo by Suki Mendencevic
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About the National Kitchen & Bath Association

The National Kitchen & Bath Association (NKBA) is the only nonprofit trade association dedicated exclusively to the kitchen and bath industry and is the leading source of information and education for professionals in the field. Fifty years after its inception, the NKBA has a membership of more than 55,000 and is the proud owner of the Kitchen & Bath Industry Show (KBIS).

The NKBA's mission is to enhance member success and excellence, promote professionalism and ethical business practices, and provide leadership and direction for the kitchen and bath industry worldwide.

The NKBA has pioneered innovative industry research, developed effective business management tools, and set groundbreaking design standards for safe, functional, and comfortable kitchens and baths.

Recognized as the kitchen and bath industry's leader in learning and professional development, the NKBA offers professionals of all levels of experience essential reference materials, conferences, virtual learning opportunities, marketing assistance, design competitions, consumer referrals, internships, and opportunities to serve in leadership positions.

The NKBA's internationally recognized certification program provides professionals the opportunity to demonstrate knowledge and excellence as Associate Kitchen & Bath Designer (AKBD), Certified Kitchen Designer (CKD), Certified Bath Designer (CBD), and Certified Master Kitchen & Bath Designer (CMKBD).

For students entering the industry, the NKBA offers Accredited and Supported Programs, which provide NKBA-approved curriculum at more than 60 learning institutions throughout the United States and Canada.

For consumers, the NKBA showcases award-winning designs and provides information on remodeling, green design, safety, and more at NKBA.org. The NKBA Pro Search tool helps consumers locate kitchen and bath professionals in their area.

The NKBA offers membership in 11 different industry segments: dealers, designers, manufacturers and suppliers, multibranch retailers and home centers, decorative plumbing and hardware, manufacturer's representatives, builders and remodelers, installers, fabricators, cabinet shops, and distributors. For more information, visit NKBA.org.

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Preface

PROFESSIONALS AS STUDENTS

When the National Kitchen and Bath Association (NKBA) approached us about coauthoring a new volume for the NKBA Professional Resource Library, we were honored and ecstatic. We had been recommended based on our educational work at Portland Community College and specifically for work that had been done thanks to a grant from the National Science Foundation. Our colleague Denise Roy, who teaches in the Architectural Design and Drafting Department, wrote and secured grant monies for the education of educators who teach in the building arts.

The goal of the grant is to provide opportunities for educators to add or increase concepts of sustainability in their curriculum through activities. Rather than conducting research, educators in architectural design and drafting, interior design, and building construction technology went to work for individuals and organizations as interns. The result has been nothing short of phenomenal. All three departments now have a strong focus on sustainable design, and the students can't get enough of it. This mission to educate professionals continues with LOCATE: Technical Education for High Performance summer sustainability conferences. For one week in June, educators in landscape, construction, architectural design, and interior design converge to learn through activities, tours, and from each other.

The goal for this book is similar: educate for applicability. Write about concepts but also discuss implementation and benefits. A sustainable approach to kitchen and bath design includes touching all parts of a project from construction materials to systems to material choices. A chapter on creating a green office and business approach is included in the book. Sustainable design is about cutting waste and reducing carbon emissions, but it is also about creating more comfortable homes that have reduced operating costs.

Writing this book has been journey. It has been rewarding to stretch ourselves professionally and to put the knowledge that we share each day with our students into a textbook format. We were given the opportunity to write a textbook that we would want our students to use. It is many an educators' dream.

We have enjoyed both attending and presenting at the LOCATE Summer Sustainability Institutes. We have both presented our teaching of green design at the KBIS Educators' Forums over the years. We both feel that we are always, simultaneously learning, practicing, and teaching.

We hope you enjoy this book.

> *When the last river has been polluted, the last tree cut down, the last fish has been caught, will we realize we cannot eat the money?*
>
> *—Native Cree saying*

Amanda writes:

I'd like to acknowledge the support and guidance of Johanna Baars, Publications Specialist at the NKBA. I also want to thank Green Hammer Design Build and C. R. Herro at Meritage Homes. Both companies serve as inspiration for green building. I'd like to thank my family for supporting me through this process.

Robin writes:

Writing a book on sustainable design was a longtime goal of mine and has been challenging and exciting. It could not have been done without the help of many people. I'd like to thank Johanna Baars at the NKBA for her patience and prodding; my teaching partner, Dorothy Payton, for her knowledge and insights; my assistant, Brandon Cole, for his project management and Photoshop skills; Bernhard Masterson for his energy, knowledge, and love of mud; Richard and Anna DeWolf for their insights; Nancy Foster for her vast knowledge of toilets; Rhonda Knoche for her support; Tracey Stephens; Green Depot (Portland, OR); Joel Fraley CKD; Janel Campbell, CKD,CBD; Corey Klassen, CKD, CBD; and Hannah Mizar, illustrator extraordinaire! Last, I want to thank my family for their patience and support during this journey.

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Sigrid McCandless, CMKBD
Karen Richmond, CMKBD
Teresa Slye, NCIDQ, LEED

Understanding the Need for Sustainable Design

1

On my first Boy Scout trip, in the mid-1950s, I learned the basic environmental principle that we should leave the campsite as we found it. We were told that the next group of hikers deserved no less and that in fact we should clean the site up if those before us had been careless. I did not as a child understand that the campsite would be global or that the next hikers would include unborn generations.

—John Sitter

Learning Objective 1: Discuss the concept of designing for benefit rather than austerity.

Learning Objective 2: Apply sustainable design concepts to kitchen and bath projects.

Learning Objective 3: Identify the basic needs for applying sustainable practices.

Our world is in dire straits; human impact on the earth is affecting the future of the planet (see Figure 1.1). Consider these facts:

1. The average temperature of the earth has risen by more than 1.4° F over the last century.[1]
2. Oceans are warming and becoming more acidic, ice caps are melting, and sea levels are rising.[2] From 1880 to 2011, the average sea level rise was 0.07 inches per year, but from 1993 to 2011, the sea level rise was between 0.11 and 0.13 inches per year.[3]
3. Emissions of greenhouse gases (carbon dioxide [CO_2], methane, nitrous oxide, and fluorinated gases) have increased due to human activities such as:
   - The burning of fossil fuels.
   - Anaerobic decay of organic waste in landfills due to industry processes and commercial and household chemicals (see Figure 1.2)

Global warming or climate change occurs when the greenhouse gases redirect too much radiation toward the earth. Radiant energy, in the form of heat, comes from the sun. In a most amazing natural cycle, unnecessary (and potentially harmful) radiant energy is sent out of the earth's atmosphere into space. With the exponential increase in the amount of greenhouse gases in the earth's atmosphere over the last 150 years, this process is being interrupted. The gases are trapping the energy as heat (see Figure 1.3).

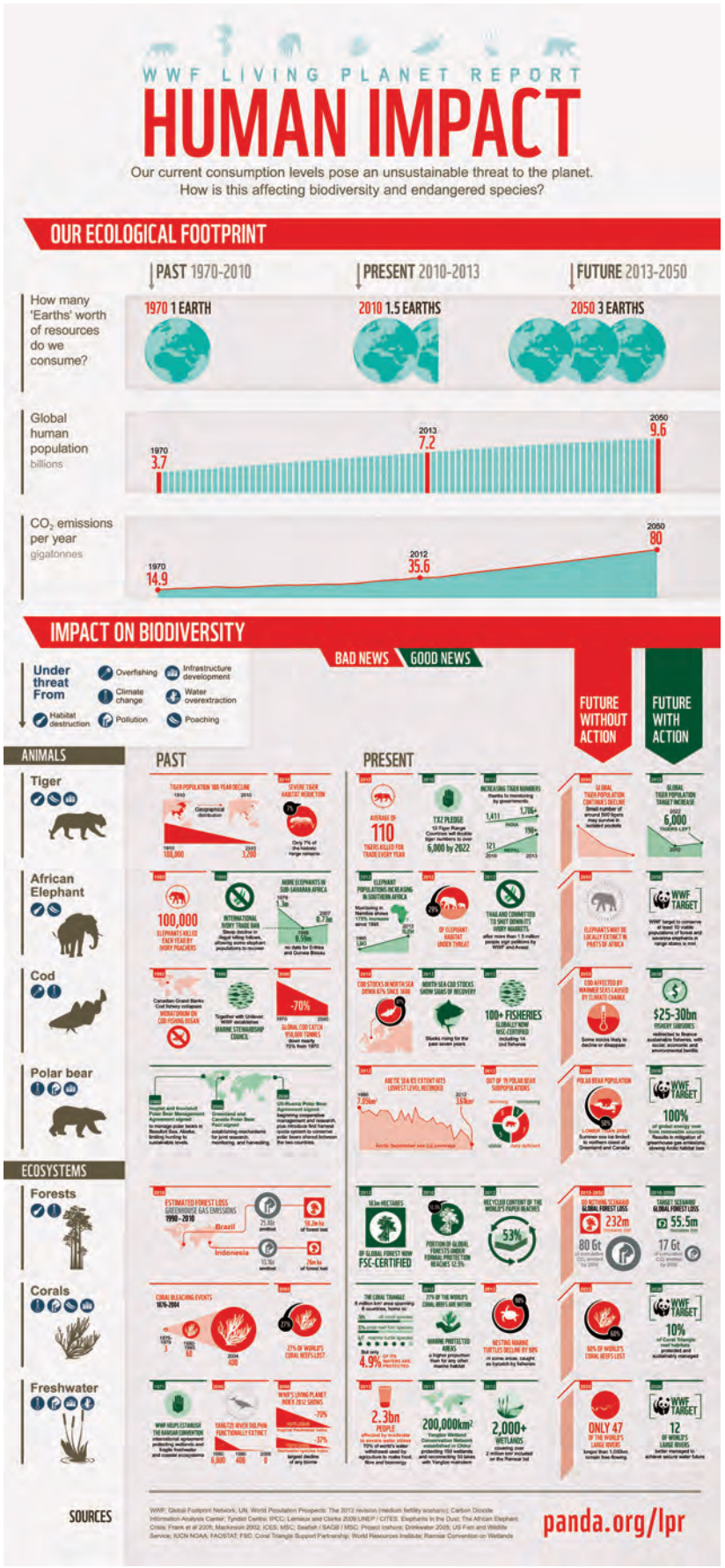

FIGURE 1.1 World Wildlife Fund Living Planet Report © 2014
World Wildlife Fund, www.panda.org

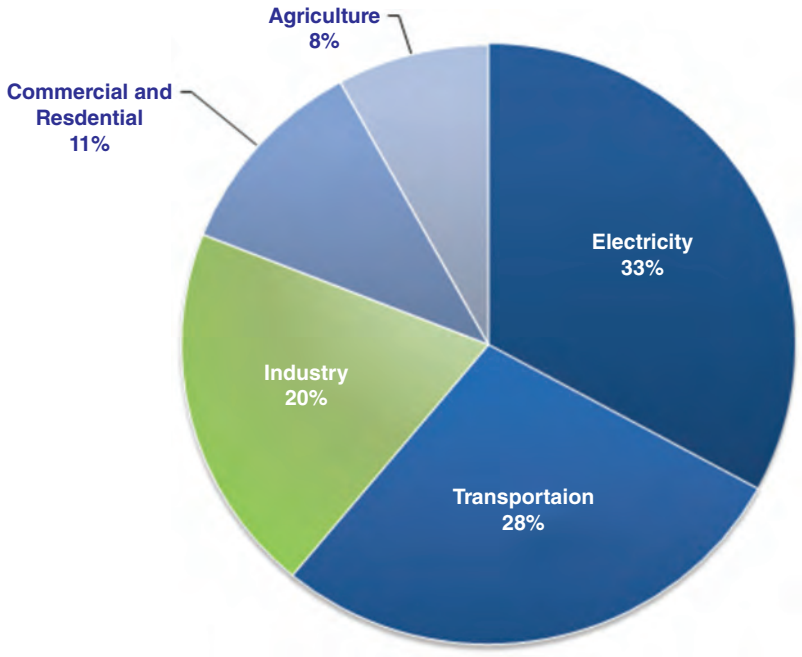

FIGURE 1.2 Total US Greenhouse Gas Emissions by Economic Sector in 2011
www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

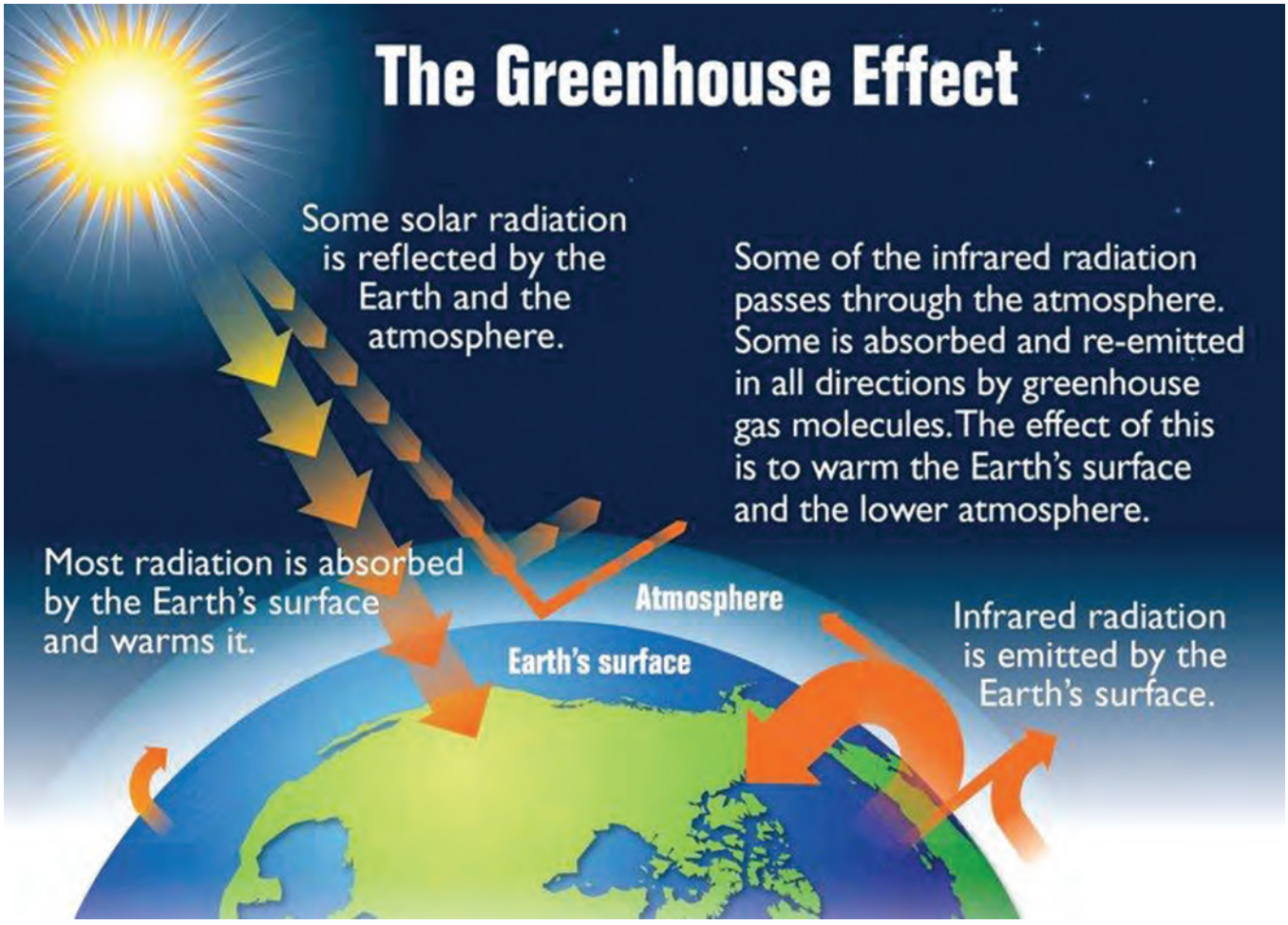

FIGURE 1.3 The Greenhouse Effect
www.epa.gov/climatestudents/basics/today/greenhouse-effect.html

The term "greenhouse gas" is a blanket term for compounds that exacerbate this situation. These gases are by-products of industry. Waste emissions from the burning of fossil fuels are the leading source of these gases, but they are not completely responsible. Other sources of greenhouse gas include the manufacture of hydrofluorocarbons (refrigerants), emissions from landfills, emissions from livestock, and off-gassing of chemicals.

The construction industry has only added to our current problem. Research shows that the construction industry impacts our global problem with residential buildings accounting for:

- 38.9 percent of total US energy consumption
- 38.9 percent of total US CO_2 emissions
- 13 percent of total US water consumption[4]

TRIPLE-BOTTOM-LINE APPROACH

We can answer the question "Why sustainable design?" with inspiration from the triple-bottom-line (TBL) concept (see Figure 1.4). This book is written in what appears to be the end stages of the worst economic crisis (recession) since the twentieth century's Great Depression. It is an exciting time. With the kitchen and bath remodeling sector experiencing a return to business growth, there is an opportunity to make this return to prosperity a green one. How do things look different now from four years ago? How will they look four years from today? The conversation about sustainable building, design, and remodeling practices is an evolving one.

At the end of the twentieth century, many companies were profiting at the expense of many workers and the natural environment. *People, planet, profit* is a business concept also known as the triple bottom line (TBL).

The term "TBL" first was used in 1994 by economist John Elkington. At the time, it was a revolutionary approach to *business as usual*. The TBL asks that businesses create three sectors with measureable outcomes to determine the success of the company. It states that it is not enough simply to look at the final success (profit) of the company as the one bottom line; one must also look at how the business affects the environment (planet) and how the business supports its community (people).

In this book, we examine ways to create sustainable kitchens and baths by understanding the need to become a steward of the environment. Creating a sustainable design practice means planning for benefit: saving your client money, paying homage to the environment, and designing healthy interiors that will enhance your clients' lives.

Event-Oriented Thinking, Systems Thinking, and the Butterfly Effect

There are a thousand hacking at the branches of evil to one who is striking at the root.

—Henry David Thoreau, *Walden*

The environment is a big issue—one country, one government, one community, one business, or one person cannot resolve all the issues, but if each one of us does our part, then change will occur. It will take a new way of thinking—a paradigm shift.

To make a paradigm shift, we must look at our attitudes, behaviors, and beliefs. This is not a linear process; it is a loop. Let's look at this in a different way:

Midterms are fast approaching, and you are getting a cold. Your homework is piling up, but there is a party this weekend, so you take cold medicine and head out. You spend the next three nights pulling all-nighters, take your midterms, and spend the next few days in bed very sick (see Figure 1.5).

This is event-oriented thinking. This process looks at the world in a linear fashion: A happens, then B, then C. Event-oriented thinking assumes that each event has a cause and that

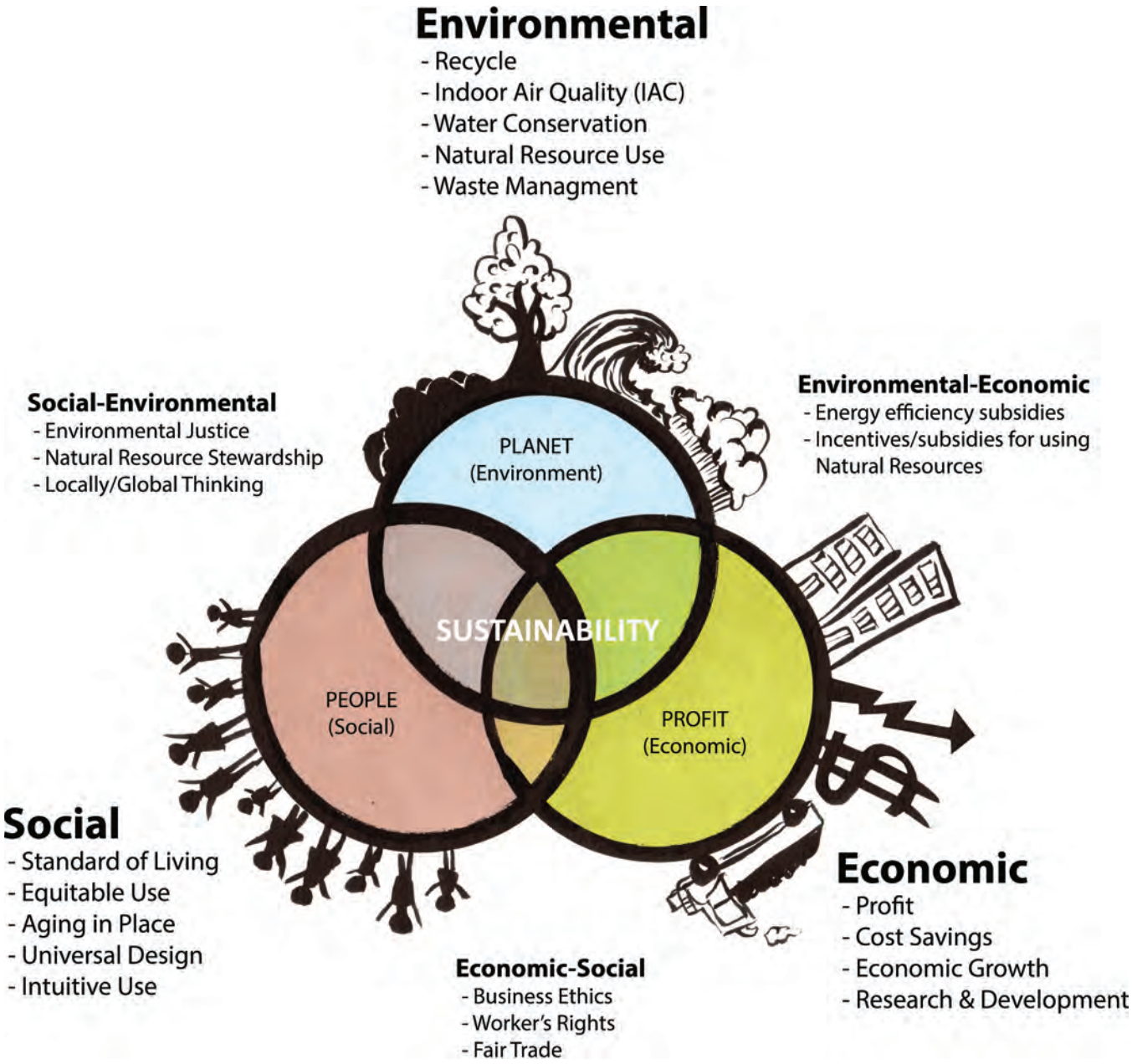

FIGURE 1.4 The main parts of the triple bottom line are people, planet, and profit, but as this figure shows, there are subsets that further define the TBL. *NKBA*

changing the cause will correspondingly change the event. The rest of the system that produced the event need not be considered.

We can't solve problems by using the same kind of thinking we used when we created them.

—Albert Einstein

Now let's look at your cold in a new way.

Midterms are fast approaching, and you are getting a cold. After a few days of being miserable, you start thinking, "I seem to get a cold close to midterms often. Why is that?" You are

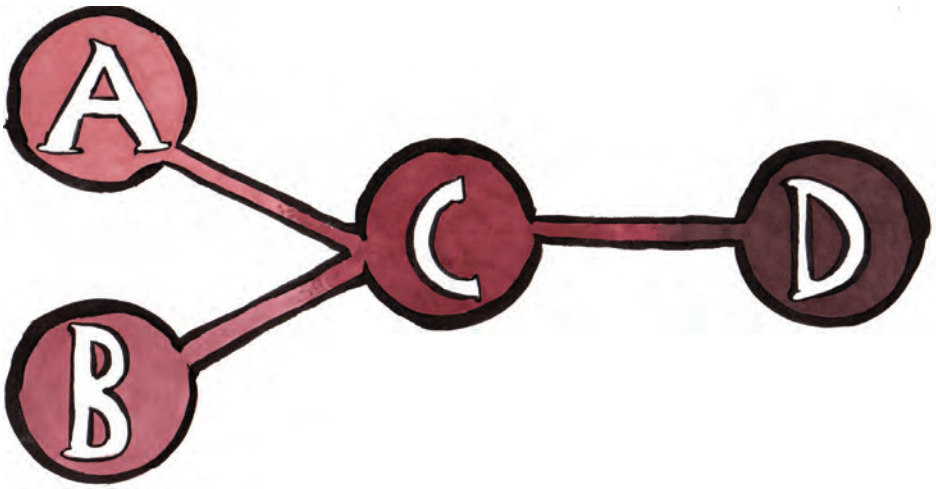

FIGURE 1.5 Event-oriented thinking says that everything can be explained by a chain of events: If A or B happens, then C will most likely occur—cause and effect.
NKBA

recognizing a pattern. So, what happens at midterms each time? Well, the amount of work is beginning to pile up, but you are still going out with your friends on Friday and Saturday, not eating well, and your exercise regime has gone by the wayside. Now you are seeing what is influencing the pattern. To make a change, you need to make a shift. What can you do to break the pattern? Perhaps you can only go out on Saturday if all your studying is done, plan your meals in advance, get a workout partner, and focus on your health.

You are on your way to break the cycle. This is systems thinking (see Figure 1.6).

System thinking is the process of looking at things as interdependent systems where one part influences another. Event-oriented thinking is linear cause and effect, but systems thinking is *circular* (a causal loop). Systems thinking is not reacting to a problem; rather, it encourages a more holistic approach to solutions.

The metaphor of the *butterfly effect* illustrates system thinking. A butterfly flaps its wings, and the small current has the ability to effect change as large as the path of a storm. The concept involves considering that small, almost imperceptible events can alter larger ones. It involves understanding that there is an interdependency of all events on the planet and that all circumstances are sensitive to one another. Much like the butterfly effect, systems thinking reasons that small events can be separated by time and distance and still affect one another.

This is the appropriate way to look at sustainability. Just changing your lamps to compact fluorescent bulbs (CFLs) or light-emitting diodes (LEDs) can be part of the solution; but as a designer, you have the opportunity to effect larger change. You can be part of the solution.

That's what this book is about—arming you with the knowledge and tools to effect change.

Imperceptible Change?

In a Pew Research poll conducted to determine Americans' views on global warming, it was found that while 67 percent of the respondents believe there is "solid evidence" for climate change, only 30 percent consider it an issue that the president and congress should address.

Why?

It has been suggested that our inability to deal with this issue is due to the way our brain functions. Daniel Gilbert, a professor of psychology at Harvard, suggests that because "global warming doesn't take human form," it is difficult for us to see it as an enemy. He further suggests that because global warming has occurred slowly, our minds have had time to normalize it.

In the ninteenth century, experiments were made using a frog and some water on the stove. If the frog was placed in uncomfortably warm water, it jumped out of the pan. However, if