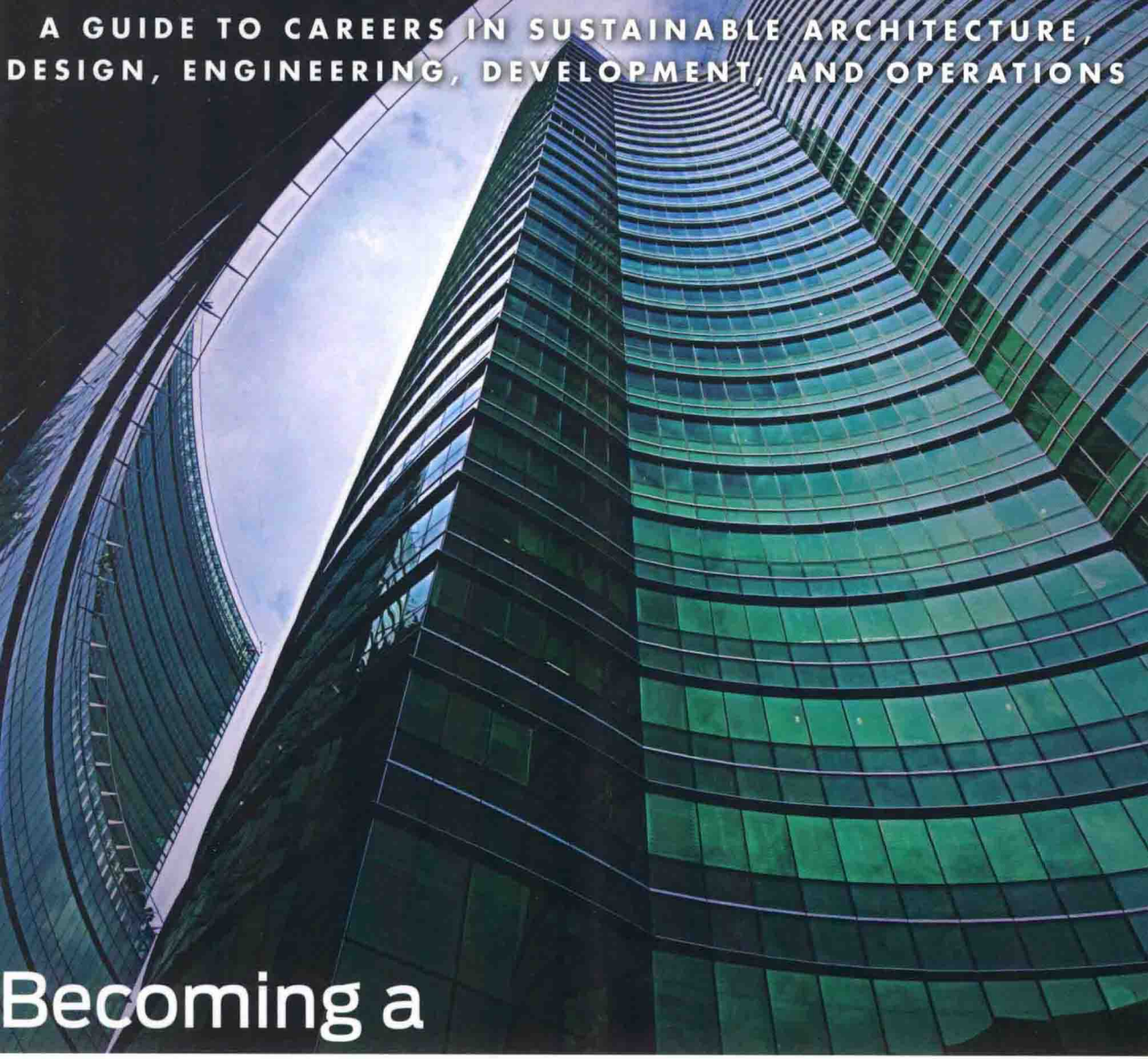
A GUIDE TO CAREERS IN SUSTAINABLE ARCHITECTURE, DESIGN, ENGINEERING, DEVELOPMENT, AND OPERATIONS



Becoming a Green Building Professional

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Becoming a GREEN BUILDING PROFESSIONAL

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For my mother, Nora Ellen

FOREWORD

A Human Design Revolution

by

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Humanity and Higher Education at an Unprecedented Crossroads

Because of the extraordinary and exponential growth of population and of the technological/economic system, human beings have become pervasive and dominant forces in the health and well-being of the Earth and its inhabitants. The sum of humanity and the expansive dynamic of industrial capitalism constitute a planetary force comparable in disruptive power to the Ice Ages and the asteroid collisions that have previously redirected Earth's history. While the Earth's population has grown from 1 billion to 6.7 billion in the last two centuries, energy consumption has risen 80 times, and economic output has risen 68 times. Most of that has occurred in the last half-century. Despite the impressive array of environmental protection laws and programs established in the industrialized countries since 1970, all living systems (oceans, fisheries, forests, grasslands, soils, coral reefs, wetlands) are in long-term decline and are declining at an accelerating rate, according to all major national and international scientific assessments. Some (e.g., major ocean fisheries, coral reefs, forests) have collapsed, and more are moving rapidly to total collapse. Human beings and the rest of nature are burdened by a staggering array of persistent, toxic natural and manmade chemicals, as well as air and water pollution, that are affecting our health and the viability of large ecosystems.

At the same time, we are not succeeding in many health and social goals: 3.2 billion people are without sanitation and earn less than $2.50/day; over a billion have no access to clean drinking water. The gap between the richest 20 percent of the world and the poorest 20 percent has jumped from 28:1 to 85:1 since 1960. Even in the U.S., the gap is the greatest since the Gilded Age of the late nineteenth and early twentieth centuries. We have a worldwide economic recession

and international conflicts and wars over resources such as oil and water that are destabilizing world society. This is happening with 25 percent of the world's population consuming 70–80 percent of the world's resources.

And the challenge that will accelerate all the negative trends is human-induced global warming, primarily from the burning of fossil fuels that is now destabilizing the Earth's climate and most of its other life-supporting systems. Despite what we may read or hear in the news media (especially in the U.S.), human-induced climate disruption is real and is already affecting us: It is worse and happening faster than predicted by the most conservative scientists just five years ago in 2007. What most people do not understand is that destabilizing the Earth's climate can undermine modern civilization. As Dianne Dumanoski asserts in her recent book, *The End of the Long Summer:*

> Our way of life depends on a stable climate. The cores of ice drilled from the ice sheets on Greenland and Antarctica tell us we live at a truly extraordinary time within the Earth's volatile climate history. Through most of our species' 200,000-year existence, our ancestors had to cope with a chaotic climate marked by extreme variability, a climate that could not support agriculture. The world as we know it, with agriculture, civilization, and dense human numbers, has only been possible because of a rare interlude of climatic grace—a "long summer" of unusual climatic stability over the past 11,700 years. The human enterprise has become a risky agent of global change. The gargantuan size of our modern industrial civilization is now disrupting our planet's very metabolism—the vast overarching process that maintains all of earthly life. Because of humanity's planetary impact, this exceptional moment on Earth is drawing to a close. What lies ahead is a time of radical uncertainty.[1]

While this may (and should) make us uncomfortable, it is current reality and leads to the central question for the future of humanity.

> How will we ensure that all current and future human beings will have their basic needs met, will live in thriving, secure communities, and will have economic opportunity in a world that will have nine billion people and that plans to increase economic output 3–4 times by 2050, on a planet whose capacity to support life is more precarious every day?

The consensus among Earth systems scientists is that if everyone lived like the average American, we would need four to five planets (three planets for a European lifestyle) to continu-

1 Dumanoski, Dianne. *The End of the Long Summer: Why We Must Remake Our Civilization to Survive on a Volatile Earth* (New York: Crown Publishers, 2009), p. 2.

ally supply all our resources and provide critical ecosystem services, including conversion of waste products into useful substances. At the same time, Asia, Africa, and Latin America are expanding economically at unprecedented rates to lift 3 billion people out of poverty and create a higher quality of life for all of their people. The challenge is not just an environmental one, it is arguably the greatest civilizational, moral, and intellectual challenge that humanity has ever faced. It is not about saving the planet. The planet has survived five major biological extinctions, the last being 65 million years ago in the age of the dinosaurs, and it will survive the sixth being caused by human beings. The goal is to create a thriving civilization for all of humanity. The goal is built on the understanding that all human activities and human survival are completely dependent on the Earth for all of their resources and key ecosystem services, including converting waste products into useful substances.

A Change in Mindset

How did we get here? The cultural operating instructions of modern industrial society are that, if we just work a little harder and smarter and let the market forces run society, all these challenges will work themselves out.

But the routine business of our civilization is threatening its own survival, and by putting Earth's living system in jeopardy, it also risks foreclosing on the conditions for any civilized life. In the industrialized world, we are guided by a myth of human separateness from and domination of nature for our purposes, and of continuing "progress" fueled by economic growth, because this model has worked in the last three centuries to create a modern society offering spectacular increases in the quality of life for a significant portion (though still a minority) of the world's population. This guiding myth contains an implicit assumption that the Earth will be the gift that keeps on giving—providing the resources and converting our wastes into useful substances—ad infinitum, irrespective of the size of the population or the level of its material desires. The guiding myth assumes that human technological innovation will allow us to ignore planetary limits.

> We need a *transformative shift* in the way we think and act. As Einstein said, "We can't solve today's problems at the same level of thinking at which they were created." We currently view the array of health, economic, energy, political, security, social justice, environmental, and other societal issues we have as separate, competing, and hierarchical, when they are really *systemic* and *interdependent. We have a de facto systems design failure.*

For example, we don't have environmental problems *per se*. We have negative health and environmental consequences of the way in which we have organized society economically, socially, and technologically. The twenty-first century challenges must be addressed in a systemic, integrated,

and holistic fashion, with an emphasis on creating new and more desirable ways of helping society succeed. We need, for example, buildings that foster the health and productivity of their occupants, use as little energy as possible and get their energy from renewable sources, are constructed of renewable and ecologically friendly materials, live within and sustain local ecosystems, support strong local and regional social networks, allow for easy access through sustainable transportation, and constantly educate us about how to live sustainably.

Remaking the Built Environment

When we look at the scale of human impact and needs, it is clear that remaking the nature and the location of the built environment must be a top priority. Buildings have a significant impact on the environment and human health, accounting for *one-sixth* of the world's freshwater withdrawals, *one-quarter* of its wood harvest, and *two-fifths* of its material and energy flows (*70 percent* of electricity), with very large negative impacts on the environment and health. Structures also impact areas beyond their immediate location, affecting watersheds, air quality, and transportation patterns of communities—*over four-fifths* of all transportation is from one building to another. Moreover, people in developed countries spend nearly *90 percent* of their lives indoors, making the quality of the indoor environment key to good health. The resources required to create, operate, and replenish this level of infrastructure are enormous and are diminishing. By all accounts, we will have to replace *three-quarters* of the existing building stock and *double* the built environment in the next 40 years, to accommodate the demand. This is not possible without a radical change in the design, construction, operation, and location of buildings.

Design Principles

Here is what we know about living sustainably over the long run:

- Use as little resources and energy as possible; power the economy with renewable energy.
- Move from the linear "take, make, waste" model to a circular industrial production in which the concept of "waste" is eliminated because every waste product is a raw material or nutrient for another industrial activity.
- Live off nature's interest, not its capital—use natural resources only at the rate that they can self-regenerate—by following the ideas embodied in sustainable forestry, fishing, and agriculture.

This is the concept of *biomimicry*—learning from and imitating nature, which has figured out what works and survives after 3.4 billion years of experimentation.

These principles afford the best chance that all current and future generations will be able to pursue meaningful work and have the opportunity to realize their full human potential, both

personally and socially. A growing consensus of business, government, labor, and other leaders believe that a clean, green economy based on these principles is the only way to restore American economic leadership, create millions of jobs, and help solve global health and environmental problems. Ray Anderson, the late chairman and founder of Interface, Inc.—the world's largest modular carpet manufacturer, with annual sales of $1.2 billion, and one of the world's leading companies dedicated to economic, social, and ecological sustainability—says:

> At Interface, the business case for sustainability (as a core purpose of our business) is crystal clear: A capitalist to the core, I can't think of a better business case than lower costs, better products, higher morale, loyal employees and goodwill in the marketplace. Our costs are down, not up, dispelling the myth that sustainability is expensive. Our first initiative—zero-tolerance waste—has netted us $433 million in saved or avoided costs, more than paying for all capital investments and other costs associated with sustainability. Our products are the best they've ever been. Sustainability is a wellspring of innovation; our product designers have been particularly successful using "biomimicry" as a guide, nature as inspiration. Our people are galvanized around our mission and a shared higher purpose—Maslow at his best: self-actualization that comes when people commit to something bigger than themselves, a type of top-to-bottom and bottom-to-top alignment that sustainability has fostered. The goodwill of the marketplace is tremendous, winning business for Interface because customers want to be aligned with a company that is trying to do the right thing. No amount of marketing, no clever advertising campaign, could have created the kind of customer loyalty that we have experienced.[2]

Transforming Our Thinking, Values, and Actions

These principles must be a foundation of learning and practice. Higher education must lead this effort because it prepares most of the professionals who develop, lead, manage, teach, work in, and influence society's institutions, including the most basic: elementary, middle, and secondary schools. Higher education has been a crucial leverage point in making a modern, advanced civilization possible for an unprecedented number of people in almost every important way, and it will be even more important in a world that is rapidly expanding and becoming more interdependent. In addition, college and university campuses are microcosms of the rest of society—they are like mini cities and communities that mirror society.

2 Ray C. Anderson. "Editorial: Earth Day, Then and Now." *Sustainability: The Journal of Record.* April 2010, 3(2): 73–74. doi:10.1089/SUS.2010.9795.

Unfortunately, the current education system is, by and large, reinforcing the current unsustainable paradigm. Indeed, it is the graduates of the world's best colleges, universities, and professional schools who are leading us down this path. For example, despite the growing number of architecture schools focusing on teaching sustainable design, most have yet to make sustainable design the default for education and practice. The same is true in the education for virtually every intellectual discipline and profession.

Why is this the case? Several structural aspects of the current system contribute to the problem. Interactions between population, human activities, and the environment are amongst the most complex and interdependent issues with which society must deal, as are the strategies, technologies, and policies for a secure, just, and environmentally sustainable future. These issues cross over the disciplinary boundaries that dominate the higher education learning framework. Moreover, much of higher education stresses individual learning and competition, resulting in professionals ill prepared for cooperative efforts.

What if higher education were to take a leadership role in helping to make sustainability a reality? *The context of learning* would make the human/environment interdependence, values, and ethics a seamless and central part of teaching of all the disciplines. *The content of learning* would reflect interdisciplinary systems thinking, dynamics, and analysis for all majors and disciplines, with the same *lateral rigor* across and *vertical rigor* within the disciplines. *The process of education* would emphasize active, experiential, inquiry-based learning and real-world problem solving *on the campus* and *in the larger community.* Higher education would *practice sustainability* in *operations, planning, facility design, purchasing, and investments* connected with the formal curriculum. It would form *partnerships with local and regional communities* to help make them sustainable, as an integral part of higher education's mission and the student experience. The latter is critical since higher education comprises anchor institutions of economic development, with annual operating expenditures of $320 billion. This is greater than the GDP of all but 28 countries in the world.

Beacons of Hope

There has been unprecedented, exponential growth in distinct academic programs related to the *environmental dimension* of sustainability in higher education, especially in the last decade. Exciting environmental (and now sustainability) studies and graduate programs in every major scientific, engineering, and social science discipline, and in design, planning, business, law, public health, behavioral sciences, ethics, and religion, are abundant and growing. Progress on campuses modeling sustainability has grown at an even faster rate. Higher education has embraced programs for energy and water conservation, renewable energy, waste minimization and recycling, green buildings and purchasing, alternative transportation, local and organic food growing, and "sustainable" purchasing—saving both the environment and money. *The rate of increase is unmatched by*

any other sector of society. In the U.S., according to the U.S. Green Building Council,[3] the higher education sector has nearly 4,000 new buildings that are being designed or have been designed to meet advanced levels of sustainable design under the LEED system (Leadership in Energy and Environmental Design) in the last decade. The student environmental movement in the U.S. is the most well organized, largest, and most sophisticated student movement since the civil rights and anti-war movements of the 1960s. These developments represent one of most encouraging trends in higher education innovation since World War II.

Unfortunately, higher education is doing a poor job on the health, social, and economic dimensions of sustainability. And the educational efforts have not reached the majority of students, who know little about the importance of sustainability or how to align their personal and professional lives with sustainability principles. With a few exceptions, sustainability, as an aspiration for society, is not a central institutional goal, or *lens* for determining the success of higher education institutions.

One of the brightest beacons of light for systemic change in the U.S. is the American College & University Presidents' Climate Commitment (ACUPCC),[4] launched in January of 2007 by 12 college and university presidents, working with Second Nature, the Association for the Advancement of Sustainability in Higher Education (AASHE), and ecoAmerica. It is a high-visibility, joint and individual commitment to measure, reduce, and eventually neutralize campus greenhouse gas emissions, to develop the capability of students to help all of society do the same, and, importantly, *to publicly report on their progress.* Second Nature provides the ongoing support and organization of the ACUPCC Network.

As of January 2011, just under five years later, 675 colleges and universities in all 50 states and the District of Columbia have made this unprecedented commitment. They represent 5.9 million students—about 35 percent of the student population—and include every type of institution, from two-year community colleges to the biggest research universities. *This is unprecedented leadership. Higher education is the first and only major U.S. sector to have a significant number of its members commit to climate neutrality.* This is especially important given the inability of the international community and, in my experience, the U.S. Congress, to act. These schools are doing what is scientifically necessary, not what is easily doable within their current mode of operation.

Another beacon of hope is the efforts of the design, construction, and planning professions, through the professional schools, societies, and nongovernmental organizations (such as USGBC, Architecture 2030, and American Institute of Architects). Holley Henderson's book *Becoming a Green Building Professional* is an important contribution to this effort—combining a wide variety of perspectives and knowledge critical to the *teams* of design professionals that are necessary to create the building and community design revolution. It is written in a way that is useful to practicing professionals, faculty, and students in colleges, universities, and professional schools.

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3 USGBC: U.S. Green Building Council, www.usgbc.org/, accessed July 15, 2010.

4 American College & University Presidents' Climate Commitment, www.presidentsclimatecommitment.org/, accessed January 2011.

While all these efforts are incredibly important, the scale of the challenge requires a quantum leap forward in our thinking, actions, and values. Most of the world's major international governmental, scientific, and nongovernmental institutions, as well as many business organizations, agree that the deep changes needed in individual and collective values and actions must occur within the next decade, if we are to avoid changes that will undermine the long-term viability of a complex human civilization.

Many argue that creating a healthy, just, and sustainable society is too hard or impossible. If we continue business as usual, today's students and their children will experience the worst effects of climate disruption, and of other large, unsustainable means of meeting human needs. They will find themselves in a world with greatly diminished prospects for a good quality of life, peace, and security. We are faced with the greatest intergenerational equity challenge in modern history. The Earth does not recognize how hard it is for us human beings to change. It will respond to the physical changes we cause on its own schedule and in its own ways. It doesn't have the cognitive ability to decide to wait for us to figure out how we can change to preserve our way of life and ourselves.

If we follow the principles in *Becoming a Green Building Professional*, future generations will have the kind of chance they deserve for a decent life.

PREFACE

PATH

When I was considering which career path to take, my inclination was an art-based field, so I found myself in the art of making space, as an interior designer. Have you ever found yourself doing something, and you know you can perform the tasks, but it's not your calling? This is where I found myself. So, on my mother's recommendation, I read a book called *Zen and the Art of Making a Living,* by Laurence G. Boldt. Two critical decisions came from this book:

- Investigate options.
- Ask myself: What is my purpose?

During my research of career options, I saw a presentation by Ray C. Anderson. I distinctly recall that he used overhead transparencies (old-school vintage presentation format that predates PowerPoint), and I was incredibly moved by his authentic story of a reformed businessman in search of zero impact solutions. My research, plus his inspiration, culminated in a very nervous, hand-trembling meeting with the president of the company I worked for at the time (tvsdesign), Roger Neuenschwander, FAIA. My pitch was simple: "Green building is the future, and I'm going in this direction." Without hesitation, he said, "Write a business plan, we'll back you." I thought, "What is a business plan?" This conversation was in LEED's infancy and the recent green building buzz. I had zero environmental training or education other than one enlightening environmental biology class in college. He and the firm were taking a chance. I ended up writing the business plan and helping them to begin a sustainable design practice; years later, I worked for Ray's company, InterfaceFLOR, and finally began a sustainable consulting company called H2 Ecodesign. After seven blessed years, I was invited to write this book.

I offer my circuitous path as a living example of what my meditation class facilitator, Teresa, often says: "You are exactly where you need to be, doing exactly what you need to be doing." While I questioned at points along the way if I was in the right place, each step (whether I knew it at the time or not) was filled with purpose. This book was written with purpose in mind—your purpose. No matter what career path you take in the building field, or in a completely different direction—such as accounting, practicing law, or teaching—environmental consciousness can be woven into the fabric of your career. Shelters or buildings house all of us, so their contribution to our society is important.

Here's what I learned in the early nodes and milestones along the path of my career search, and what I continue to acknowledge: Listen to wise advice, act on inspiration, go forward with courage, and ground yourself in the knowledge that each step on the path is purposeful. Seek your internal compass.

You may be beginning your first career search, transitioning to an eco-job position, or simply considering the green building profession. Regardless of where you start, green building careers may be a new adventure for you. With this in mind, we have gathered a unique perspective from a dynamic US Green Building Council (USGBC) group called Emerging Professionals. Emerging Professionals are typically out of school but, under thirty years old. You'll find their voices thread throughout the book and indicated with this icon: EP

For more information on the USGBC Emerging Professionals please visit: www.usgbc.org/DisplayPage.aspx?CMSPageID=116

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I drank a lot of tea over these months provided by the amazing folks at Octane Coffee: www.octanecoffee.com.

Last, but not least, a thank-you to each of the challenges in my life—you know who you are. Adversity creates an important perspective, and I now know that those moments are rich growth points.

Becoming a GREEN BUILDING PROFESSIONAL