1 Why Build Green?

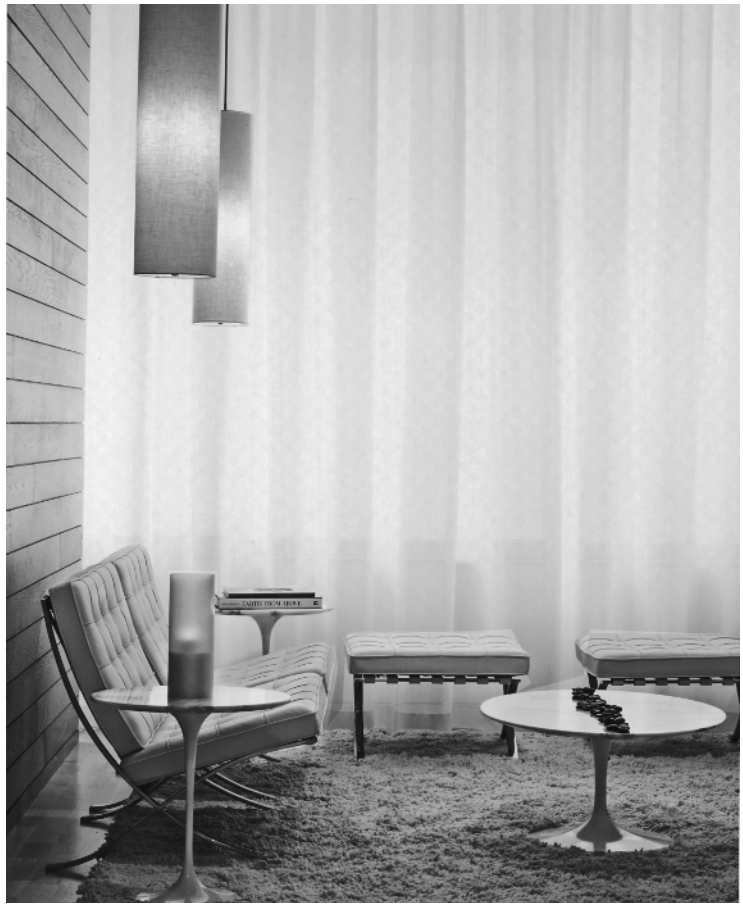
Unless someone like you cares a whole awful lot, nothing is going to get better. It's not.

— Dr. Seuss, *from* The Lorax *(Children's book on the environment)*

Our Place

Green building is a profession that seeks to give back more than it takes from our natural surroundings—the environment at large—and, ultimately, to help preserve the health of both people and our planet. It is a lofty goal, and one that inspires most people in this career field both personally and professionally. Yet there is no one right way to become a green builder, nor is there only one type of green building expert. The field is vast and diverse, full of numerous jobs and specializations, all working together toward the same ideal: to create buildings that are sustainable, and ultimately regenerative.

Consider the people who create a green building. It is not just one, or even two, sets of people or teams that come together to plan, design, erect, and maintain a building. Instead, it is a well-integrated group of individuals, all of whom have varying backgrounds and job titles. For green building, the roles include an environmental consciousness where realtors and land developers focus on the planned structure's return on investment and overall sustainable strategy. Architects draft and design the framework of the building itself; interior designers sculpt the healthy interior space; engineers fill in the efficient systems inside, from plumbing to electrical to mechanical. Contractors make sure all the eco-conscious elements are properly installed during construction; and facility managers keep the place green after the sawdust is cleared and the last window is installed.



Relaxation area at Nusta Spa, Washington, DC (LEED CI Gold). Firm: Envision Design. PHOTO: ERIC LAIGNEL

This book seeks to introduce readers to the green building profession, to explain how to become part of this quickly growing career field—and also, importantly, to inspire. This job path is new and not easily mapped, but it is one that provides great rewards to those who persevere.

As renowned green architect William McDonough, FAIA once said, "Our goal is a delightfully diverse, safe, healthy and just world, with clean air, water, soil and power—economically, equitably, ecologically and elegantly enjoyed—period! Which parts of this don't you like?"[1]

THE NEED

All over the world, cities are becoming ever taller, ever bigger, and ever more architecturally innovative. From concrete and steel structures that hover more than 2,700 feet above the Earth to urban areas packed with more than twenty million people, humans have pushed inventiveness past the limits of what was ever thought possible.

But such innovation comes with a tradeoff, and much of that fallout is environmental. In the United States alone, according to the Energy Information Association, buildings account for more than 30 percent of the waste output of the country, up to half of the energy usage, and almost three quarters of the nation's electricity consumption.[2]

Large impacts abound, many of which are created—or contributed to, in large part—by the built environment. Three of these key issues are air pollution, energy consumption, and water scarcity.

Air Pollution

One can survive a few days without food or water, but only minutes without access to air. An easy problem to ignore by virtue of its typical invisibility, poor air quality in buildings often takes the form of fine particulates, toxic emissions, and mold. A common contributor to poor air quality is increased volatile organic compounds (or VOCs) are emitted as gases by everything from paints to building materials to furniture to cleaning supplies. Energy production, consumption, and leaching of toxic building materials can affect air quality as well. All of these air concerns can cause serious health problems, such as asthma, upper respiratory illnesses, developmental issues for children, and even cancers.

Academic Center at Georgia Gwinnett College, Lawrenceville, GA. Energy recovery systems maximize energy efficiency and make the building very economical to operate and maintain. A glass curtain wall partially faces south but is designed with glass that gives a high transmission of visible light yet a low transmittance of solar energy into the building. In areas that receive sunlight for most of the day, a frit has been applied to the third surface of the inner light of the glass to further reduce the amount of solar energy transmission. Firm: John Portman & Associates. PHOTO: COURTESY OF GEORGIA GWINNETT COLLEGE

Energy Consumption

Energy is central to the mechanics of most buildings. Air cooling and heating, lighting, cooking, and electrical needs all require energy to function. Environmental energy concerns range from the limited resource of fossil fuels to climate change impacts, which many have argued contribute to rising sea levels, changing food supplies, and the eventual specter of displacing millions of people.

Water Scarcity

Water is one of the most essential elements for human survival, used for everything from drinking and hygiene to cooking and tending crops. And indeed, a person can only live for two to ten days without water.[3] But the planet's supply of fresh water is rapidly dwindling, and our needs for it are quickly expanding. A 2009 report by consulting firm McKinsey & Company showed that global water needs will increase by 40 percent by the year 2030, while shrinking watersheds, droughts, and rising sea levels are at the same time resulting in decreasing worldwide supplies.[4]

Renaissance Schaumburg Convention Center Hotel, Schaumburg, IL. The nearly 3.5 acres of ponds have been developed with 100 percent native plantings. Firm: John Portman & Associates. PHOTO: JAMES STEINKAMP

A REASON TO CARE

As a collective group, human beings can—and should—be the solution leaders for a sustainable environment. As Anthony D. Cortese, Sc.D., president of Second Nature, explains:

> To make this a reality we must realize that *the road to sustainability is one of culture and values as much as it is about scientific and technological development.* It must be guided by the arts, humanities, social and behavioral sciences, religion and other spiritual inspiration as well as the physical and natural sciences and engineering, in other words, through the fundamental framework of learning and culture. It must also be guided by commitment to have all humans have their basic needs met and have the opportunity for a life of fulfillment.
>
> These ideas must be the *heart of the design principles* of a healthy, just and sustainable society—principles based on a human consciousness in which we apply the Golden Rule to our dealings with all current and unborn humans as well with the rest of life that evolved on earth. To work, these principles must become the basis for society's economic and governance framework and, therefore, a fundamental part of all education.
>
> Can this be done?
>
> Yes, because we must.[5]

As owners, planners, designers, engineers, constructors, and managers of our physical built environment that sits on the Earth, why wouldn't we be the instigators to a more sustainable future?

LEADERSHIP

A green building professional is not just a nine-to-five workhorse. Instead, as with politicians and pastors, one of the interesting things about green building professionals is that their personal life is often an integral part of their professional life. As leaders working toward a more sustainable world, green building professionals are accountable for their entire lifestyle and actions, rather than just what they do in their office hours. Everything green building professionals do is taken into account and carefully considered, including the following:

Region where they are located: Urban or suburban?

Preferred transportation methods: Walk, bike, train, drive, or fly?

Food sources: Local, seasonal, and organic?

Goods purchased: Fair trade, manufacturer values, and content of product?

Often these values and sustainable objectives are part of a green building professional's overall ethos and mindset—and green building professionals are always looking for areas of improvement

ASHRAE provides special parking areas for carpoolers and those with fuel-efficient vehicles (LEED NC Platinum). Firm: Richard Wittschiebe Hand. OWNER AND PHOTO: ASHRAE.

in making their green footprint even smaller. Perhaps an environmental speaker who flies often for business will decide to only ride his bike, in combination with mass transit, while he is at home; or an environmental consultant may become a vegetarian to reduce her carbon footprint. While no one can be environmentally perfect or lead a no-footprint life, efforts to reduce one's footprint are often noted by others in the field and outside green building, and these sustainable actions authenticate a dedication to eco-ideals.

FURTHER INCENTIVES

Should environmental issues not be enough to persuade one about the importance in going green, there are a myriad of business and financial benefits to take into consideration. Building owners can brag about their green credentials to an increasingly savvy (and demanding) consumer market, resulting in the ability to charge higher lease rates and therefore realize a higher return on investment, as well as a preferred market position and demonstrated leadership in their field. There is less need for expensive building upgrade costs when green regulation takes effect, and additional money is saved through reduced insurance costs, tax rebates, and incentives.

As for saving money through health-related issues? Better building health has been demonstrated, resulting in better inhabitant health, thereby reducing absenteeism for illness, increasing work productivity and test scores, and ensuring long-term retention.

Better for both the environment *and* the bottom line.

WORLD OF GRAY

Paper or plastic? It is a common question at the grocery store. Often, however, there is no easy answer. Questions of raw materials extraction, packaging, transportation, associated water/

energy use, health implications of the materials, reuse, and a variety of other factors come into play. Even if you say no to paper or plastic bags, and you hoist your own bag onto the counter, questions remain: Where did your bag come from? What is it made out of? Who made it? How will it be cleaned? The dilemma over even this seemingly straightforward decision can become overwhelming.

But there is a simple solution. When faced with an issue that seems grayer than a crisp black or white, one way to move forward is to use the precautionary principle. A decision-making tool, in its most basic form, this principle means "better safe than sorry." The precautionary principle helps one decide if an action should or should not be taken, when risks are unclear. This is a fundamental premise in the mindset of the green building professional. In other words, the precautionary principle maintains that if there is any suspicion of possible harm to the public or environment from taking a specific action or implementing a policy, the burden of proof falls on those taking the action to show that it is the least harm.

Taking all environmental issues into account, the built environment and the precautionary principle is where the nexus of green building occurs.

GREEN BUILDING

So who in the United States is responsible for green building? From a federal government perspective, it's the U.S. Environmental Protection Agency (EPA), the government agency begun in 1970 to create and enforce laws regarding human health and the natural environment.[6]

Green Building The definition of "green building" from the U.S. Environmental Protection Agency (EPA) is as follows:

Green building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life-cycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. Green building is also known as a sustainable or high performance building.[7]

HISTORY OF GREEN BUILDING IN THE UNITED STATES

Green building is not a new concept. For thousands of years, passive solar design (daylighting versus electrical lighting) and the use of local and regional materials have been incorporated into the creation of buildings, for practical reasons. More recently, what we know as the modern green building movement was instigated by the U.S. energy crisis in the 1970s, in which the cost of gasoline fuel dramatically spiked, calling attention to the need for energy-efficiency research and alternative fuels.

TIMELINE

Here is a brief historical timeline of the green building progress over the last 40 years:

- 1970 launched the U.S. Environmental Protection Agency.
- The green building field began to come together more formally in the 1990s. A few early milestones in the US include:
  - American Institute of Architects (AIA) formed the Committee on the Environment (1989).
  - The EPA and the U.S. Department of Energy launched the ENERGY STAR program (1992).
  - The first local green building program was introduced in Austin, TX (1992).
  - The U.S. Green Building Council (USGBC) was founded (1993).
  - The "Greening of the White House" initiative was launched by the Clinton administration (1993).
  - The USGBC launched its Leadership in Energy and Environmental Design (LEED) version 1.0 pilot program for new construction (1998).
- The USGBC LEED version 2.0 was adopted (2000).
- Ed Mazria published reports and brought together scientists and the building sector to focus on building impacts on climate change and greenhouse gas emissions, with the 2030 challenge (2002).
- The General Services Administration (GSA) mandated that all new federal construction must be able to be certified to a minimum of LEED Silver level (2003).
- The Energy Policy Act of 2005 included federal building sustainable performance standards (2005).
- The Federal Green Construction Guide for Specifiers was made available on the Whole Building Design Guide website (2006).
- The Office of the Federal Environmental Executive published The Federal Commitment to Green Building: Experiences and Expectations (2007).
- President Bush signed Executive Order 13423—Strengthening Federal Environmental, Energy, and Transportation Management, which includes federal goals for sustainable design and high-performance buildings (2007).
- The Energy Independence and Security Act of 2007 included requirements for high-performance green federal buildings (2007).[8]
- USGBC updated LEED to version 2009 (3.0), including a required energy- and water-monitoring agreement

- ASHRAE Standard 189.1, Standard for the Design of High-Performance, Green Buildings Except Low-Rise Residential Buildings, was published as the first green building code (2010).
- The GSA upgraded to a minimum of LEED Gold level certifiable on all new federal buildings and major renovations (2010).
- The International Green Construction Code (IgCC): Safe and Sustainable by the Book released (2012) incorporates Standard 189.1 (2011) as an optional path for a new code baseline.
- The U.S. Green Building Council releases the next version of LEED (Version 4.0 under development in 2012).

AT ALL LEVELS

Thanks in large part to increased green building activity in recent years—both top-down (government requirements/corporate incentives) and bottom-up (consumer demand)—sustainability has become a pervasive notion in day-to-day life. For the most part, when people say "green" these days, it doesn't indicate Crayola's latest crayon color, but is instead recognized as referring to an environmental attribute.

As referenced in the historical "Timeline" feature, green building was mandated from the "top" by the federal government for their buildings, and many state and city governments followed suit. From the grassroots bottom, greater consumer awareness calls for eco-action in local neighborhood communities, buildings and homes—and corporations, manufacturers, and government officials are taking note.

Additional eco-conscious tools are being added to the market that also help the cause of eco-consciousness, the best-recognized example perhaps being the U.S. Green Building Council's LEED program, an internationally recognized green building certification program. Such tools have provided the industry with a user-friendly vehicle for widespread adoption and rapid market transformation.

With this much activity, the need for a specific team player dedicated to the green building effort emerges: the green building professional.

WHAT IS A GREEN BUILDING PROFESSIONAL?

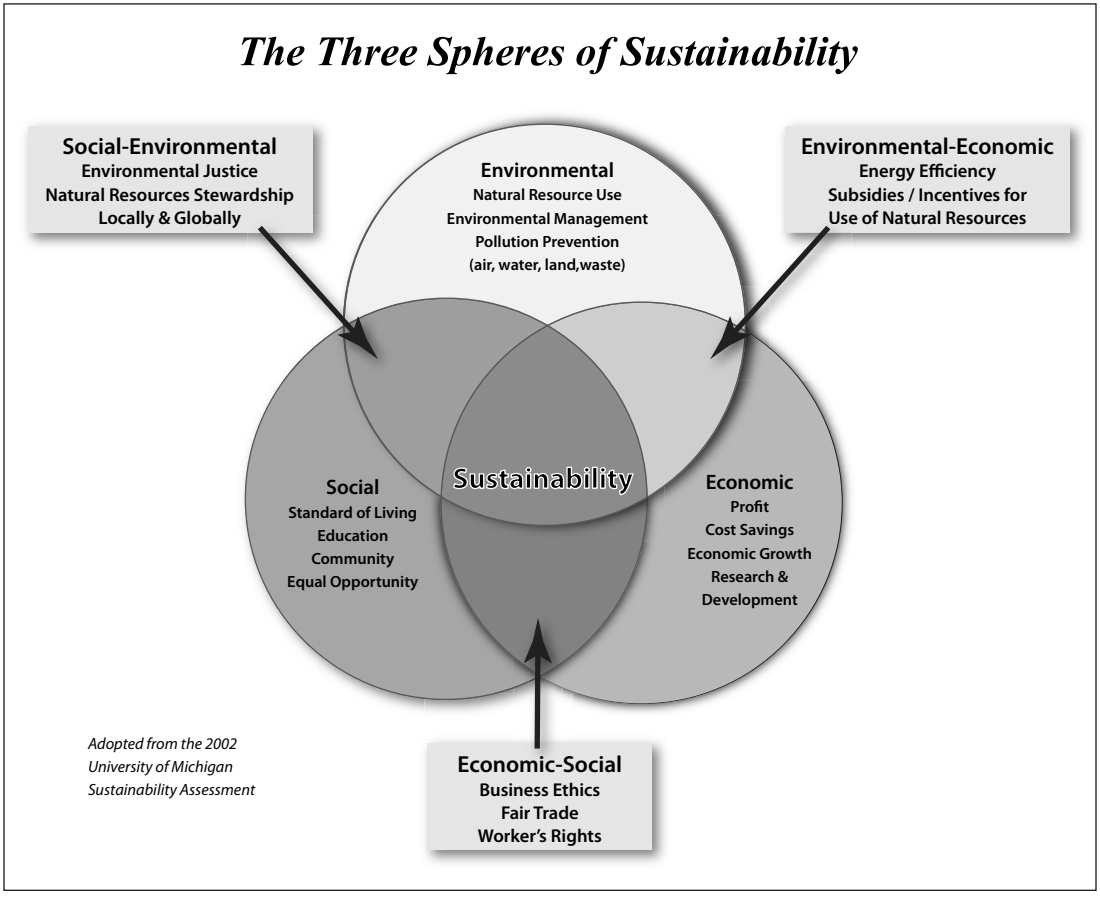
Because it involves so many different aspects, the green building career field includes everything from traditional careers such as architecture, landscape architecture, engineering, interior design, construction, facility management, or real estate—professions that can incorporate sustainability into their approach. It is also possible to specialize as a green building professional consultant, which is a relatively new field.

So what unifies this diverse group of building professionals and brings them together to be "green"? Regardless of each professional's role or specialization, all sustainable building experts use triple-bottom-line thinking in their approach.

A term coined by John Elkington in his 1998 book *Cannibals with Forks: the Triple Bottom Line of 21st Century Business,* "triple bottom line" simply means creating balanced decisions that take the following factors into account equally:

- Economic factors
- Social factors
- Environmental factors

These three elements are also referred to as profit/people/planet, or the three pillars.[9] Another commonly associated term used with the triple bottom line and green building is "sustainability."



The Three Spheres of Sustainability

The term was originally defined in the Brundtland Commission of the United Nations in 1987 and generally means meeting current needs without impacts on the needs of future generations.[10] An example of sustainability would be producing food for the current population and ensuring that the land, water, and other resources necessary for food production remain for the upcoming generations.

Another term similar to sustainability is "regenerative"; however, it extends beyond human needs to all species and offers an opportunity for lost ecosystems to be regenerated. When first introduced to public discussion, some "green" terms may have had specific, separate meanings, but as more people have become involved and invested in environmental goals, many of these words have merged and become interchangeable in their usage. In that regard, the following terms in this book all attempt to describe and relate to a similar approach:

- Environmental
- Eco
- Earth-friendly
- Green
- Regenerative
- Sustainable

A green building professional integrates these principles of triple bottom line into all phases of a building's life, from inception to demolition. Here are just a few ways in which different green building professionals can foster better communities and buildings:

- Urban planners and developers consider urban context, community connectivity, and transportation.
- Civil engineers ensure that the building and site work well with the surrounding infrastructure, thereby minimizing ecological impact.
- Landscape architects design parks and vegetation to connect the natural and built environments.
- Architects and interior designers create healthy buildings and spaces that include efficient and well-considered resources.
- Mechanical engineers specify natural ventilation or high-efficiency filtering equipment, supplying fresh air to the occupants.
- Facility managers maintain the building with the highest-efficiency equipment and the lowest-impact maintenance program.
- Real estate professionals negotiate leases that create a win-win for both landlord and tenant.
- Green building consultants are generalists in all of these fields. Their typical specialty is in maximizing green building performance across all of these areas.

Green building professionals range in their scope and scale, creating a vast array of structures from commercial buildings to residential homes. This book, however, concentrates more specifically on communities and commercial buildings—including civic, office, education, healthcare, and hospitality—and explores how green building professionals can influence these buildings' design, construction, and operation.

LEGACY

When considering becoming a green building professional (or joining any profession), contemplate your ideal legacy.

leg·a·cy [lé-gə-sē] something from past: something that is handed down or remains from a previous generation or time[11]

Some of the most respected workers in America are doctors, nurses, police officers, firefighters, government workers, lawyers, teachers, parents, business owners, nonprofit professionals, politicians, and scientists. In concept, the common thread in all of these fields is the desire to create a positive impact on health, safety, business, and science—on a varying scale from one individual (or animal) up to entire cities, states, or the country as a whole. A green building professional has the same common thread of helping in mind, and sews it into the fabric of our communities, buildings, homes, and ultimately, our lives.

Why are you hopeful about the future of the environment in the United States in particular?

› Three weeks ago, each child in my daughter's Sunday school class had to come up with an 11th commandment. Twelve out of the thirteen children's 11th commandments were about the environment—recycling, picking up trash, conserving water. Yes, I am very hopeful!

Lynn N. Simon, FAIA, LEED AP BD+C, president, Simon & Associates, Inc.

› There is no hope…but I might be wrong…

Peter Bahouth, executive director, U.S. Climate Action Network

› I am hopeful. The reason I am hopeful is because I have the good fortune to know many young people, students currently in our K–12 education system, and these kids that I've been hearing from "get it." They understand that there is a monumental task before all of us to be more aware of how we use our natural resources and how we treat our natural environment. And they are up for the challenge. We have a lot of great minds working on these issues now, but change comes slowly in the beginning. With the rising of the "next generation" of leaders, I am confident great solutions will be seen.

Bryna Dunn, AICP, Associate AIA, LEED AP BD+C, director of sustainability planning and design, Moseley Architects

Green building professionals create a legacy via regenerative, healthy spaces that house people in businesses, schools, health-care facilities, and homes. Buildings can be more than structures that shelter; they can enhance our day-to-day experiences, be a learning tool, and generate income. Next, let's look in detail at where green building professionals have such opportunities.

GREEN JOBS STATS

When thinking about a career path, it is useful to evaluate the future of the job market you are considering. By all accounts, the green building field will only get stronger over the coming years. One well-researched report was released in late 2009, prepared by the prestigious consulting firm Booz Allen, which was hired by the U.S. Green Building Council to better define where the market is headed.[12] The company looked specifically at jobs within the green building industry.

Kiowa County Schools—Main Street. The primary circulation hallway in the school is called "Main Street." The wide, open hallway is a gathering space for students. It is daylit and clad with wood that came from salvaged cypress trees downed during Hurricane Katrina. Firm: BNIM. PHOTO: © ASSASSI

The results are extremely heartening. Booz Allen projected that the number of jobs in green building will increase fourfold by 2013, going from two million to nearly eight million jobs within just four years, which will generate more than $554 billion additional dollars in GDP, and more than $396 billion in earned wages. As for the USGBC, its LEED-related economic outlay has already supported 15,000 jobs—and is projected to support 230,000 jobs by 2013.[13]

As another example, an annual international survey called the Carbon Salary Survey released 2010 results on green jobs in a variety of fields. Of the 1,200 people surveyed, interesting findings included the facts that three-quarters of those in green jobs are satisfied with their work and 35 percent feel more secure in their positions than they did one year ago.[14] Moreover, the study found that green jobs are available across the world in the renewable energy field, perfect for those who want to work and live abroad.

GREEN AS IN "SALARY"

Income estimates for various green building professionals range widely and are updated frequently, so generally it is best to check reliable online sources and reputable annual surveys for the most current information. The Bureau of Labor Statistics has a website and associated tools dedicated specifically to the green building field. As a basic reference: in 2011, an environmental engineer is estimated by that site to make around $80,000 a year.[15] Another resource, PayScale, is a massive database of salary profiles for a variety of jobs, and it gives another good sense of current market salaries. This resource gives job seekers accurate numbers and negotiation leverage for interviews; average salaries for related building professionals in 2011 ranged from $76,000 for a mechanical engineer to $67,000 for an architect to $58,000 for a construction project manager.[16] These figures do vary, however; the Carbon Salary Survey found that the average salary for those they polled in the United States was $104,000.[17]

HOW TO GET INTO THE FIELD

Many different paths lead to the green building field, which means that each path may be custom-tailored or combined to fit specific needs and interests. These paths will be explored in greater depth in Chapter 3, but as a brief overview, here are the three main paths that can be taken: learn, involve, and collaborate.

Learn

The first path into the green building field is via educational knowledge and academic skills. This could be through formal higher education, training, hands-on experience, or competitions.

Involve

Another wide path to take could be volunteering at a local nonprofit organization, or a more formal mentoring or internship program where an experienced professional demonstrates how to incorporate green building principles.

Collaborate

One of the most important avenues to being hired in any profession is networking with existing and new relationships. Another form of collaboration is a formal engagement with a green recruiter that actively seeks an alignment between a candidate's skills and job opportunities. Lastly, a career coach can support those who know they want to enter the green building field but are unsure of their specific area of interest or how to transition into their chosen career.

What are your best tips for entry into the green building profession?

› DIVERSIFY. Learn all you can about economics, biology, business, systems thinking, and sociology. We need people who are able to bring deep knowledge and experience across all aspects of sustainability to address the real challenges and come up with truly innovative, effective solutions.

Mary Ann Lazarus, FAIA, LEED AP BD+C, senior vice president/global director of sustainable design, HOK

› Developing relationships through professional development and networking opportunities is vital for someone who wants to enter the green building profession. Green building is a collaborative process and it is through these relationships where true sustainability lies.

Lynn N. Simon, FAIA, LEED AP BD+C, president, Simon & Associates, Inc.

› There will be plenty of opportunity for folks with environmental degrees. However, I would recommend getting a building- or business-related education and augment it with deep environmental/sustainability knowledge (enthusiasm and idealism are great, but knowledge is critical). Also, just get involved. There are plenty of opportunities to get your feet wet, gain some experience, and meet lots of green building professionals.

Henning M. Bloech, LEED AP, executive director, GREENGUARD Environmental Institute

› Follow your heart and follow your passion. I decided in the third grade that I was going to major in biology and I was going to make the world a greener place. I did major in biology, and I also majored in environmental science. I earned a master's degree in environmental planning. But I still didn't know what I was going to be when I grew up, or how I was going to make the world a greener place. But I still knew that was what I wanted to do, and I wouldn't settle for any job that didn't give me that opportunity. When I heard the pioneering architect William McDonough speak about what he was trying to do with design, I finally knew how I wanted to put my education into practice. I have been working with architects for fifteen years now, helping to bridge that gap between the decisions we make every day about the built environment and how those decisions affect the natural environment. I hope that young professionals will discover their own nontraditional ways to also save the world in whatever part of the field that excites them—because if you're not having fun, you're not going to stay with it in the long term.

Bryna Dunn, AICP, Associate AIA, LEED AP BD+C, director of sustainability planning and design, Moseley Architects

Harness for Good

RICK FEDRIZZI

President, CEO, and Founding Chairman

United States Green Building Council

What does sustainability mean to you personally?

› To me, the definition of "sustainable" is simple: It means living my life today in a way that ensures my children, their children, and their children will be able to live as well as I did. It means laying the groundwork for a future that is more prosperous, more healthful, and more equitable than our present. It means that our habits—at a personal level as well as at a global level—don't lead to an inevitable depletion of resources that would disrupt our quality of life. Living sustainably means exactly what it says: that our lifestyles can be sustained, and that we don't prove to be our own worst enemies.

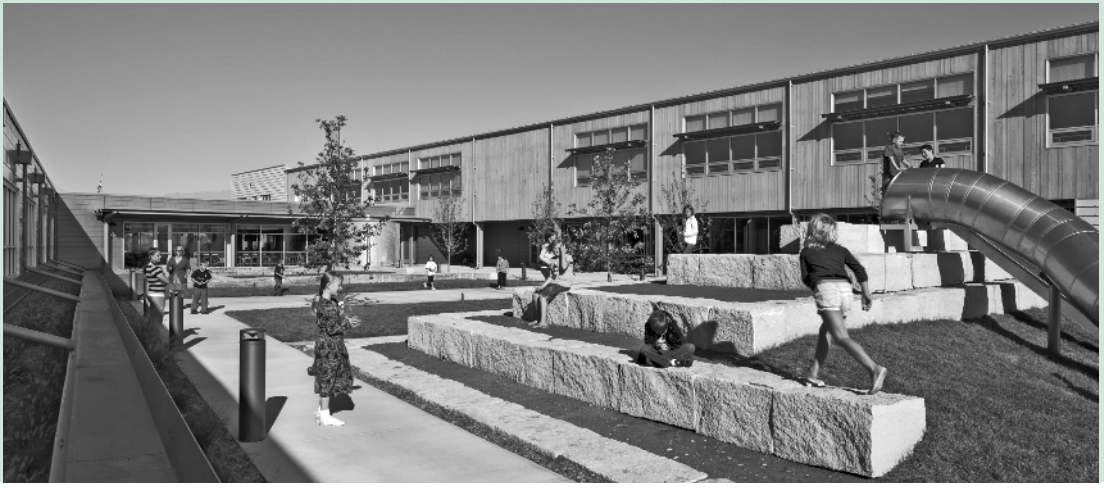
Why did you enter the field of green building, and how did you make the transition?

› I was fortunate enough to have worked for 25 years at United Technologies Corp. (UTC), an early pioneer in what was then a fairly esoteric idea: that the unprecedented technological progress of our era could actually be harnessed for good. In other words, UTC recognized that true progress isn't about a decision between technological expansion or environmental quality; it is about embracing them both, and especially the places where they intersect and complement each other. It was the beginning of our understanding of the triple bottom line, and I knew I wanted to be part of it.

We hear so much about the negative impacts of human activity on the environment; tell us how, in your view, green building acts as an "antidote" to alleviate these negative impacts and/or creates positive impacts on the environment.

› Green building isn't about a laundry list of negative human behaviors that we shouldn't do; it's about all the innovative, exciting, and life-affirming things we can and should do that lead to an econ-

Kiowa County Schools: Courtyard. The building is organized around a courtyard gathering space, a hub of activity for all ages (LEED NC Platinum). Firm: BNIM. PHOTO: ©ASSASSI



omy, an environment, and a social landscape in harmony with each other. It's about solutions, and the businessman in me knew that this was the key to making real change.

Green building's potential for truly transforming the way humans and our environment interact comes from one key concept: connectivity. Green building is focused not on a collection of gadgets and gimmicks but on maximizing the way all of a building's systems interact with each other. Those systems include the human beings who occupy the buildings and the communities that the buildings occupy. In the best buildings, better ventilation and natural daylight save energy while also nurturing the health and comfort of the people inside. Buildings located in walkable neighborhoods reduce greenhouse gases and also connect people to their neighbors and create a strong sense of place. Using less water also means less energy required for municipal water treatment. The use of local materials not only cuts back on transportation needs but also builds into the fabric of our homes, offices, schools, and communities a direct connection to our local economies. And when we spend our time in buildings that are designed, constructed, and operated with holistic sustainability at their core, our day-to-day behavior is affected and we all become part of the solution. In nature, we see how all creatures are intimately and inextricably connected with each other and with their ecosystems; green building ensures that humans interact with their environment in the same mutually beneficial way.

What have you seen as the biggest hurdles to the success of the green building field? How have these hurdles been overcome; or, if they remain, what do you see as potential solutions?

› As with every important change in human history, the biggest hurdle to success is the status quo. When you begin talking about transformation, you are talking about a fundamental change in the way we do things. And when you talk about fundamental change, there will always be people who are nervous about that. They're nervous because they have found success in doing things the way they've "always been done," and they worry that change will upend their success. But green building has a built-in solution. The passion, innovation, and commitment of the people who have been driving this movement for the last two decades have systematically undermined any instinct to cling to the status quo and have disproved the notion that change is bad. Green building has been at the heart of the success of countless companies and professionals, whether they're the ones doing the designing or building, creating the products and materials used in those buildings, or owning and occupying the buildings. To start with, we have more than 16,000 companies whose membership in USGBC is a central component to their business strategies.

Which of the many positive impacts (environmental, social, economic, etc.) of green building do you think is the most exciting, and why?

› Each of the components of the triple bottom line is critical, and none is more important than the others because without one, you can't have the others. They are inextricably connected, and that is why green building works.

I am excited by this industry's economic promise because of its power to make green building devotees of people from all political and cultural walks of life.

Ours is a movement that is seamlessly pro-business, pro-environment, and pro-human, and that has been the key to our success.

Bio-Visionary

BILL BROWNING

Founder

Terrapin Bright Green

You have spoken before about seven ideas that you see as key to the sustainable thought process. Could you explain and describe the meaning and importance of these ideas?

› Biomimicry and biophilia provide the inspiration for thinking about design. Biophilic design reconnects humans with the natural world and leads to healthier, more fulfilling places. By asking nature for examples and proven experience, biomimicry gives us places to look for solutions to design challenges. By looking at the "deep ecological history" of a site, we can set a new level of performance standards tied to what the ecosystem of the site was capable of providing; it is a quantification of ecosystem services. "Node and network" then gives a way to scale and interconnect resilient green infrastructure systems; it is a way of connecting eco-districts. Net zero plus is a philosophy that then says not only should we strive for net-zero energy on a district scale, but we should also give them the capability to stand independently for extended periods. "Transcending the cost barriers" is an integrated approach to push for maximum efficiency that then allows downsizing or elimination of systems with the effect of lowering first cost. Net-zero and carbon-neutral projects are great goals, but sometimes it is not possible to get all the way there on site. "Engaged offsets" is a voluntary carbon-offset system that invests in localized energy-efficiency measures and renewable-energy systems.

All of these ideas are important. I am most focused on biophilic design as I believe that with increasing urbanization, the need to connect with nature becomes stronger. Also, strongly biophilic buildings tend to be loved and maintained. Consider the Johnson Wax Administration Building designed by Frank Lloyd Wright; it is more than seventy years old, and it is still loved and used in its original configuration.

You have an undergraduate degree in environmental design from the University of Colorado, and a graduate degree in real estate development from MIT. Could you explain why you chose this educational path?

› Environmental design allowed me to explore architecture, landscape architecture, and town planning; this broad experience is not available in most design schools. I had intended to eventually go on to get an architectural degree, but ultimately came to the conclusion that developers were the ones shaping the decisions about what gets built. So I went to the MIT Center for Real Estate to learn the business of development.

From what work experience have you learned the most, and why?

› In many of our Terrapin projects we are paid to think, so each new one is exciting. Of the past work, the Greening of the White House project, starting in 1993, stands out as one of the early examples of how to tackle a really complex challenge with a truly integrated design process.

What is the most exciting new green technology or concept you have recently considered?

› We are using site-specific ecosystem metrics as the basis for goal setting—determining how much carbon a native ecosystem could capture on

an annual basis and how much sunlight falls on a site and then is reradiated or captured through photosynthesis. What did the ecosystem do with water, how much was captured, how much was runoff, how much was evapotranspirated? How many species existed on the site? These become the performance metrics for the site, and the challenge is to see if we can meet or exceed the performance of the indigenous ecosystem. This is a much more interesting process than trying to save 30 percent of energy against some hypothetical standard.

What keeps you up at night regarding the environment?

I'm pretty horrified about how caring about the environment has become politicized.

What is one sustainable aspect from which international clients could learn from their American counterparts? Conversely, in what area could Americans follow the leads of their international colleagues?

American projects tend to "get" integrated design better. With some notable exceptions, in many other places green design tends to get trapped just on one issue. Social innovation around green developments is the next frontier for American projects.

Is there a new green trend that you find particularly intriguing?

Urban agriculture is important for reconnecting people to food production; even more important is the biophilic benefit and the experience of seeing a plant grow from seed.

THE POWER OF TWO

The next two interviews are with key green building leaders who happen to be married, and while they share an emerald-green building goal, they provide different yet overlapping roles as green building professionals—one focused on real estate and the other on architecture as well as interiors.

Experienced Passion

SALLY R. WILSON, AIA, LEED AP BD+C

Global Director of Environmental Strategy and Senior Vice President, Brokerage

CB Richard Ellis

Explain your professional background.

› I have a bachelor's degree in interiors and a master's degree in architecture. I practiced architecture for eighteen years—primarily focused on interiors. I joined CB Richard Ellis as a tenant broker. Currently I hold titles of SVP in brokerage and Global Director of Environmental Strategy with CB Richard Ellis.

How and when did you know you wanted to be involved in green building?

› Green buildings have always been a focus of Ken's practice, and when I left the architecture profession (2003) he encouraged me to integrate green building principles in my services.

The first client we pitched green practices to was Toyota in 2004. It was a clear market differentiator for our team and we easily won the business. We are considered experts in green leasing practices. Clients have included USGBC, WWF, Greenpeace, Generation IM, Calvert, and numerous professional services firms and Fortune 500 companies with carbon reduction commitments.

In your work, how is green is involved in your day-to-day process?

› Tough questions because green has become so integral to our team's services offerings that I don't even think about it. Aside from the consulting work for CBRE around greening our enterprise and service offerings, I educate many clients and landlords on the benefits of sustainable buildings, practices, and processes.

Coming from different professional viewpoints, how do you and Ken inform each other's thoughts on green building?

› Ken is much more up on technology and practice. I'm more informed on market perception. My focus is to strategically position our clients so that others (such as Ken) can implement best practices.

As an early adopter, where do you see the trends for green building headed?

› Talk to anyone in their twenties or younger and they are concerned about climate change. The movement will only become stronger because we are building for them.

As past (first) chair of the board for GBCI (Green Building Certification Institute), what do you forecast in credentialing for the future?

› LEED is a market differentiator so I believe it will continue to grow. I also anticipate it will be an international standard. Even in the down economy, we have seen continued growth on both the certification and credentialing sides.

What has been your greatest learning experience along the way in becoming a green building professional?

› Participating in the carbon neutral process for CBRE. We have been working for the past four years to measure and minimize our footprint. This exercise has exposed me to carbon accounting and offset strategies as well as developing and implementing carbon reduction policies for a company with over 400 offices globally.

USGBC Headquarters: Entry, Washington, DC. Completed 2009 (LEED CI Platinum). Firm: Envision Design, PLLC. PHOTO: ERIC LAIGNEL

Green DNA

KEN WILSON, AIA, FIIDA, LEED FELLOW

Principal and Founder

Envision Design

Explain your professional background.

› I can trace my interest in architecture back to when I was in third grade. I went to my older brother's school science fair and saw some architectural models of houses built by some high school kids. I thought it was the coolest thing I had ever seen. My mom told me that was what an architect did, and from then on that's what I wanted to do for a career. Later, when I was about twelve, my mother took me to Taliesin West, which was an incredible experience.

I went to architecture school at Virginia Tech and graduated in 1981. I was able to spend my fourth year of school in England, and while I was there I was able to travel extensively in Europe and Scandinavia as well as throughout Great Britain. My travel in Europe and my work experience prior to finishing my final year were also extremely helpful to my education.

I worked in a variety of firms during the first nineteen years of my career and got to work on a wide variety of project types ranging from single-family houses to large commercial buildings. After about fifteen years of working in the field of buildings, I started working on interiors projects and found that I really enjoyed working with the part of a building that comes in direct contact with people. I started to think more about how building interiors can positively affect people's lives.

I also saw the effect that a recession can have on the architecture business and how work in interiors generally fares better in a down economy.

In the spring of 1999 I started my own firm, Envision Design, with the intention of creating a firm that was focused on client service and design excellence, and that could provide a range of services from architecture, to interiors, to product design and graphics. Our first project as a firm was to design the headquarters for Greenpeace USA, which was an incredible opportunity to become an expert at green design. That project completely changed our thinking from that point forward.

How and when did you know you wanted to be involved in green building?

› I always had a strong interest in the environment. I grew up in a small town in Arizona and loved to go camping and to be out in the wild. I liked architecture that was smart and not excessive. I like the idea of renovating existing buildings and being as energy efficient as possible. When we were hired to design the Greenpeace USA headquarters it all came together. I realized that I had been thinking green in many ways all along and the Greenpeace project allowed me to take that thinking to a much higher level.

Green became a market differentiator for Envision.

In the beginning, it didn't always work, but we kept trying and committed to introducing green design to every client.

Discuss how green is involved in your work, in your day-to-day process.

› After eleven years of owning my firm, green thinking is completely integral to our practice. It is just part of the way we do things. All of our

professional staff are LEED APs and all of the LEED projects we currently have on the boards are seeking Platinum level certification. Our sample library has been completely vetted for non-green materials. Our boilerplate specifications are green regardless if the project is seeking LEED certification or not. Green thinking has become part of our DNA.

Coming from different professional viewpoints, how do you and Sally inform each other's thoughts on green building?

› Sally is typically dealing with sustainability at a much larger scale within her company. Because of her position at CBRE, she gets to network with her sustainability peers at other Fortune 500 companies, and sometimes I get to hear about what other large companies are doing to make their business more green. I have even gotten to tag along as a spouse to some high-level green conferences that wouldn't pay any attention to a twenty-person architecture firm such as Envision.

What do you think are the largest challenges we face today?

› There is still a long way to go in terms of educating the public to the benefits of green design. I am fortunate to work in Washington, DC, which is very progressive in terms of green thinking. There is a higher number of LEED-certified and LEED-registered projects in the Washington, DC, metropolitan area than anywhere else in the country.

You have provided headquarters to some of the most environmental nonprofits—Greenpeace, World Wildlife Fund, U.S. Green Building Council—what is the common thread among these projects, and what did you learn from these experiences?

› At the end of the day, green still doesn't trump everything. Even our environmental nonprofit clients still want space that is functional, efficient, and beautiful. They want their projects to run effectively and to be produced on time and on budget. Of course they want them to be green, but once we are hired and we have done our LEED charrette, our clients assume we are taking care of the green aspects of the project, and they focus their attention on the design and functionality of space. We constantly update our clients on the green aspects of a project, but it is not the most important part of regular meetings because there is a confidence that the sustainability issues are being addressed.

How do you bring green (or sustainability) home?

› We did a green renovation of our mid-century modern house in 2004 and we have continued to make improvements over the years. I drive a 2005 Prius, and Sally and I are pretty much homebodies on weekends. Our house is wind powered through green energy credits. We recycle everything that can be recycled and we compost organic waste. We try to set an example for our kids, and we talk as a family about issues of importance. Although they think their parents are weird, I think a lot of it has rubbed off on our boys.

Truth Seeker

NADAV MALIN

President

BuildingGreen

How and when did you know you wanted to be involved in green building?

› I've always cared about doing things in the best way I know how and about protecting the planet. I was building and remodeling homes in the early 1990s, but the market was tight and I was having trouble finding work, so I convinced Alex Wilson to hire me in his research and writing practice. At the time there was no field called "green building" but Alex had a vision of the need for it, which he shared with me. That's when I first discovered the idea, and it seemed just right at the time. Still does.

You have written chapters for several green books, as well as articles for magazines and journals—what have you learned in this process?

› I've learned that people are incredibly generous with their time and wisdom when you ask good questions and give them a soapbox from which to be heard. I've also learned that green building is as much about the connections between things as it is about the things themselves, and since everything is connected to everything else, it's hard to figure out how to organize the material!

The resources that are provided by BuildingGreen are some of the most respected in the industry—why do you think this is?

› I guess just sticking it out a long time earns us some respect. We have a consistent voice and perspective that leaders in the field have become familiar with over the years, and they then recommend us to others. Of course, it doesn't hurt, in a field so rife with greenwashing, that we don't carry ads in our publications.

What is the best/worst part of your day-to-day job?

› The worst part is easy—figuring out what NOT to do. There are so many great projects we want to take on, and we get asked to work with people on many things. We just can't do all of it, but we're not so good at setting limits.

The best part of my job? I especially love learning new things, sharing ideas, and facilitating meetings of motivated, smart people.

What qualities do you look for when hiring a green building professional?

› Critical thinking skills come first—it's hard to gauge sometimes, but it really helps if people have a strong, effective BS detector. Attitude comes next—we need people to do a lot of different tasks, some of which can be tedious or challenging, so they have to be gung ho about doing whatever needs to be done!

Many can't wait until BuildingGreen's next Top 10 Green Building Products list hits the proverbial newsstand. Beyond there being such a vast array of products from which to select, what are the other challenges with creating this list?

› As with LEED and so many other things in the green building field, the challenge seems to be finding things that are ahead of the pack, but not so far ahead that the market doesn't know what to make of them. Some of our picks go on to be huge successes, but others fizzle out because not enough people recognized the value they bring.

On occasion, it seems you have to write "hard" articles or reviews that will be controversial. What motivates you to take the sometimes unpopular stand?

› People look to us for help interpreting and understanding complicated issues. Designers rarely have time to do the kind of research it takes to really dig in and understand things deeply—so that's a service we try to provide.

When things get controversial, we just try to follow our best sense of the truth, and trust that readers will appreciate that, even if they don't always agree with us. Most of all, though, we take the trouble to lay out the evidence and reasoning behind our ideas, so we are being as transparent as possible. That goes a long way toward easing people's concern about any specific position we take.

As an early adopter, where do you see the trends for green building headed?

› As I see it, the 1990s were about innovation—inventing the field. And the 2000s were, thanks largely to LEED, about getting the early adopters on board. That suggests that this decade of 2011 and beyond will be about the movement really going mainstream. As part of that trend, the push for more proof of actual performance benefits, as opposed to predictions based on modeling, will intensify.

What advice would you give someone embarking on a career in the green building professional field?

› This may sound strange coming from me, but the field is very different from what it was twenty years ago, when anyone could hang out a shingle. Now it's important to have solid professional credentials and a good education in architecture, engineering, or another design or construction profession. With that foundation, it's relatively easy to gain the green expertise needed to work on green buildings. It's all about connecting the dots....

Authentic Sustainability

L. HUNTER LOVINS

President and Founder

Natural Capitalism Solutions

How would you define a sustainability consultant?

› Sustainability consulting is the practice of helping companies, communities, and countries implement procedures, practices to operate in ways that enhance human and natural capital.

Most sustainability consultants came initially from careers of environmentalism or social justice. They were trying to get companies to do less harm to the environment and to people. Authentic sustainability means backing down from harmful practices and enhancing the natural world that sustains us. The work that I have been doing since 1968 has helped companies find ways to do this that are also more profitable because they are more sustainable.

This can be hard. In an economy in which unsustainable ways of doing business are subsidized, and are often the more familiar way of doing business, it takes creativity to make the business case that behaving in ways that are less wasteful can deliver savings that go right to the bottom line. Initially, and to some extent, still, some environmentalists attacked this approach. They believed that companies should do the right thing because it is the right thing. And some leading CEOs like Patagonia's Yvon Chouinard and Interface's Ray Anderson have profited enormously by taking this position. Yvon quotes my old mentor, David Brower, that you can't do business on a dead planet. Ray Anderson asked, "What's the business case for ending life on earth?"

I figured, that while these visionaries are right, waiting for their wisdom to pervade Wall Street would achieve the very outcome they were working against. If I can show CEOs a clear and present business case for using energy more efficiently, installing renewable energy, implementing genuinely more sustainable practices, pure greed might be a better motivator than morality.

For example, we just did a report for Boulder County, Colorado. It was a literature review on the science of

Sun Valley Branch, Los Angeles Public Library, Sun Valley, CA (LEED NC Gold). Firm: Fields Devereaux Architects & Engineers, James Weiner, AIA, LEED Fellow—design architect. An art glass window created by a local artist tells a narrative of the community that provides a focal point for the lobby. A tapered elliptical skylight well brings balanced light to the entry procession.
PHOTO: © RMA PHOTOGRAPHY

genetically modified organisms (GMO), because the county has an ongoing debate as to whether farmers should be allowed to plant GMO sugar beets on publicly owned open space. It's interesting, because the science is all over the map. Our advice, therefore, is that it *isn't* a science issue, it's a policy issue. They need to determine what the people want the county to do, as the county is a steward for the people. That's not the sort of thing most people think of when considering sustainability, but is it important to ask whether GMOs are sustainable? Initially, they allow for the use of fewer herbicides and pesticides. But studies now emerging show real threats to human health. We looked through the span of literature about what others have said and came to the conclusion that it's an issue for the public to decide.

On the other hand, I was just in the Netherlands consulting for Royal Dutch Shell. Shell is trying to understand the nexus between energy, water, and food security, which opens a huge array of topics. A team of us was there helping them, including ecosystems scientist Eric Berlow. He talked about "ordered networks," or ways of organizing complex bodies of information. Folks were there from various universities, cities, and other businesses, such as Siemens and IBM, with their (IBM) Smarter Planet Initiative. The goal was to technically enable Shell to be a better-run and more profitable company, but we were there to use corporate might to achieve a better outcome for the Earth and its people. The details of your work depend entirely on who your client is, but the end game remains the same.

Given your experience with entities such as the World Economic Forum, the UN, and the major corporations, you have a broad, global view of the environment. What is your vision for the future?

› We're in a horse race between catastrophe and the creation of a whole new way of doing business, a new way of living on the planet, and treating each other. If you read Global Biodiversity Outlook 3, a great bit of research from Dr. Tom Lovejoy and a lot of scientists, you'll realize that all of the world's major ecosystems are in peril; three of them are tipping into collapse. Coral reefs, the first of these major ecosystems, will be gone by the end of the century if we continue the way we're going; these are the ocean's nurseries. The Amazon is collapsing. It is the world's lungs. Third, the oceans are acidifying. That could be game over for life as we know it. It's happening very rapidly, and it's scaring scientists badly. Indeed, it is written nowhere that humankind will endure. As comedian George Carlin pointed out, "Save the planet? The planet'll be fine, it's the people who need to be saved."

But those of us who think there's something noble and magnificent in this human experiment are working hard to ensure that future generations can enjoy a planet that's as beautiful as the one that's been given to us; that life as we know it can survive—because that's what's at stake, if you read the science literature. We're destroying it by the way we're doing business. We're facing formidable challenges: We're losing major species, we have economic instability, and we're almost certainly headed into a second major recession if not a global depression. We have volatile energy prices. Food is at record world prices. And Goldman Sachs now calls water the petroleum of the next decade.

At the same time, 24 separate studies from the big consulting houses show that the leading companies in sustainable policy have 25 percent higher stock values than their less-sustainable competitors. The companies with the fastest-growing stock values have market capitalization of $650

million more than their less-sustainable competitors and are well protected from value erosion even in a down economy. Something's going on here. We're helping companies understand that core business value is enhanced by behaving in more sustainable ways; that this enhances every aspect of shareholder value, even though it might not show up on their balance sheets. Given that a recent Accenture study said that 93 percent of Fortune 500 CEOs say sustainability will be extremely important in the coming decade, this is clearly a field with a big future.

What do you imagine will be the biggest shifts in the green building realm in the next five years?

› Focus on existing buildings and infrastructure will result in some breakthrough approaches to city planning revitalization.

Adaptation as a green building priority as we begin to see climate shifts having real impact, especially along the coasts (this is already happening in the UK).

Recognition of importance of water will begin to emerge in parallel with, and in some places, beyond, energy.

Mary Ann Lazarus, FAIA, LEED AP BD+C, senior vice president/global director of sustainable design, HOK

› Existing buildings, existing buildings, existing buildings—oh, did I say existing buildings!

Lynn N. Simon, FAIA, LEED AP BD+C, president, Simon & Associates, Inc.

› Interest in rating systems and systems of thought that go beyond LEED

Recognition that sustainability can be more thoroughly realized at a neighborhood or community scale than at a building scale

Alex Zimmerman, A.Sc.T., LEED AP BD+C, president, Applied Green Consulting Ltd., founding president of the Canada Green Building Council

› A much stronger focus on products and materials and their immediate impacts on occupants (chemical toxicity) and life-cycle impacts. I see us moving away from using single attributes and perceived singular environmental benefits (recycled content, rapidly renewable, PVC-free, etc.) to evaluate products toward EPDs (environmental product declarations) and more comprehensive impact assessments, which will lead to better purchasing decisions.

Henning M. Bloech, LEED AP, executive director, GREENGUARD Environmental Institute

› Climate change will change everything we do. If we decide to act in time it will have profound impact on siting, water, energy, transportation, materials, urban heat islands, mosquito control, and where our wine comes from.

Peter Bahouth, executive director, U.S. Climate Action Network

› I think the rapid changes in building codes, specifically the awareness now given to green building issues in the codes, is going to turn design and construction on its head. There is going to be a huge learning curve for those companies who haven't been paying attention.

Bryna Dunn, AICP, Associate AIA, LEED AP BD+C, director of sustainability planning and design, Moseley Architects

Rebuilding Bright Futures

KIOWA COUNTY SCHOOLS

Greensburg, Kansas

BNIM

Vision + Challenge:

Following the devastating tornado that destroyed their town and schools, Kiowa County USD (Unified School District) 422 chose a bold strategy to combine their schools into a single K–12 facility that would retain a distinct identity for each school function: elementary, middle, and high school. The design utilizes a highly flexible, sustainable approach that constantly maintains a student-centered focus.

In direct alignment with the town's Sustainable Comprehensive Master Plan, the school district decided to rebuild to LEED Platinum. This decision led the way for the city, which later mandated that all public buildings attain a Platinum rating. This K–12 facility combines the resources of three rural community school districts into a single facility, thereby right-sizing at a regional scale.

The district understood the importance of daylighting for increasing student academic performance/potential and focus, so the design optimizes daylighting and natural ventilation in all classrooms. Separate zones for kindergarten, elementary, middle, and high school grades allow students the unique learning and social opportunities that each age group requires. The design also integrates the students in key ways in order to build a sense of community, encourage mentorship, and instill a desire for achievement.

Strategy + Solution:

COMMUNITY

During the school design process, the town was implementing a community-wide Comprehensive Master Plan that heavily informed the school master plan. The new school's site was selected as part of an initiative to strengthen Greensburg's density and the fabric of development along Main Street. Other criteria served as even stronger influences: the ability to safely walk and bicycle between home and school; the availability of basic services within walking distance of the school; and the ability to share theater, meeting spaces, athletic fields, and other facilities with the larger community.

LAND

The team used a site master planning process to determine the best location for proper building orientation to maximize passive solar and wind opportunities for the school building, minimize site impact by maintaining the existing storm drainage flood path through the site, emphasize connection to the community, and provide a prominent location to support the shared use of the school facilities.

The site design for the school combines restoration of habitat with an infusion of native landscaping. A series of bioswales, constructed wetlands, restored wetlands, and walking trails re-create natural environment areas that also process stormwater. This environment reconnects students, staff, and visitors with vital ecosystems while protecting the land from erosion. It also creates a natural habitat for native species.

WATER

With Greensburg's low annual rainfall average amounts, increasing the efficiency of the building's water use safeguards water resources, as water becomes more costly and scarce. The City of Greensburg has no stormwater collection system, and the school site is bisected by a floodplain, so it became crucial to conserve and reuse whatever rainwater falls within school boundaries.

A variety of strategies mean that long-term water-saving goals will be met while helping to reduce the burden on municipal wastewater systems and reducing potable water demand. The building uses many efficiency strategies, such as low-flow plumbing fixtures, dual-flush valves, and waterless urinals.

To reduce potable water use, captured rainwater is stored in six cisterns to meet irrigation needs during dry months for the native, low-maintenance landscape. An on-site constructed wetland treats wastewater and returns it to the water table. The facility also captures condensation from HVAC equipment for reuse as make-up water in cooling towers.

ENERGY

One-hundred percent of Greensburg School's purchased electricity is from renewable energy sources. A 50-kilowatt wind turbine provides a portion of the electricity needs, while the remaining power is generated at the wind farm located outside of town.

HVAC (geothermal closed-loop ground source heat pump) systems isolate unavoidable sources of pollution, provide for adequate supply and filtering of fresh air and return air, and maintain the building and its equipment in clean condition. Controllability of systems, both temperature and supplemental task lighting, improves the comfort levels of the interior environment, promoting productivity and well-being.

The building envelope, orientation, lighting, and sun-control systems for the school buildings minimize the heating and air-conditioning loads for the building. Structural insulated panels were used to reduce thermal loading and create a high-performing building envelope. A rain screen cladding system improves resistance to moisture infiltration and reduces thermal loading. White and metallic silver roof finishes reduce thermal loading. In conjunction with high-efficiency chillers and modular air handlers, these strategies will reap substantial savings over an ASHRAE 90.1, 2004 minimum energy code baseline building.

MATERIALS

To avoid harvesting raw materials, products with recycled content were used throughout. Durable Kansas limestone, zinc, and reclaimed cypress were used on the exterior. Inside, raw materials such as polished concrete floors and concrete block were used in high-traffic areas, while reclaimed wood was used in tactile areas. Preference was given to materials manufactured within 500 miles, which conserved transportation energy while supporting local industry. An innovative limestone "shingle" skin came from a regional quarry 120 miles from the site.

To mitigate construction waste flow, the team incorporated reclaimed materials, from interior wood furring and paneling reclaimed from deconstructed warehouses to exterior furring, siding, and bridges from cypress salvaged from Hurricane Katrina.

The construction waste management plan diverted 95 percent of the construction waste from landfills to recycling. The school has an ongoing waste-recycling plan including a plan to compost kitchen waste for use in gardens.

LIGHT AND AIR

Daylighting and ventilation strategies shaped the building sections through placement of operable windows, sun-shading protection, and orientation to take advantage of passive lighting and air movement. The building's longest facades face the north and south to maximize daylighting and reduce heat gain from western sun. The gymnasiums, with saw-tooth skylit roofs, are placed north of the classroom and administration areas to avoid blocking sun and air access to these areas. The classroom roofs are sloped in part to provide for the future placement of solar panels.

Kiowa County Schools: Lab. The design process first focused on daylight and the optimization of daylight in all occupied spaces. The significance of daylight in impacting academic achievement was a driving factor in the design solution (LEED NC Platinum). Firm: BNIM. PHOTO: ©ASSASSI

Since daylighting optimization, ventilation, and indoor air quality have a great impact on student academic performance and the health and comfort of building occupants, these ideas became a central focus of the design. Daylighting and controls, operable windows, maximized views, classroom controls, outdoor classrooms and lunch areas, a courtyard playground, and shared learning spaces are all employed in the creation of a comfortable learning environment with a strong connection to the outdoors.

Expansive windows in the classrooms mean that they have views of the surroundings and can be entirely daylit during school hours. Exterior sunshading devices reduce glare and heat gain. North-facing clerestories balance the light throughout the room and provide a path for natural ventilation that takes advantage of natural stratification and prevailing southwesterly breezes.

COLLECTIVE WISDOM AND FEEDBACK LOOPS

Engaging the community, students, and faculty in the full design process through large-scale workshops meant that there was buy-in to the design from the very beginning. The design team and school district worked with a child development specialist to help them better understand the learning and play opportunities for the outdoor spaces for the school. The entire collaborative process produced a building that meets the needs of the children, faculty, staff, and community, but furthermore, is a huge source of pride and is the heartbeat of the community.

ON THE HORIZON

The future is vast and exciting for people seeking to enter the ever-changing and expanding field of green building. As global demands increase on natural resources and people are striving to heal and restore the planet for future generations, the need for sustainability experts is great. Key to the solution of many current environmental problems, green building professionals have healthy job prospects, strong economic yields, and a plethora of resources to support the field. There is no better time than now to start the journey toward becoming a green building professional.

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