

Sustainable Design

A Critical Guide

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Acknowledgments

It would risk extreme hubris to start without acknowledging the vast body of preceding work by others, which I've attempted to synthesize and organize into this brief. Often, it is by people I have never met but whose writings or designs I have admired, learned from, and perhaps incorporated here. These are the people who laid the groundwork for contemporary environmentalism and sustainable design, people who predate the bandwagon, from Thoreau and his fears of future technology to Bucky Fuller and his ardent visions of technological solutions, from the forebodings of Rachel Carson to the tentative optimism of Bill McKibben and the exuberant designs emerging worldwide.

Of course, there is also a long list of people I need to thank specifically. First must be Kevin Lippert, who approached me to write this book. Also at Princeton Architectural Press: Clare Jacobson, Laurie Manfra, Jennifer Lippert, and especially Jan Haux and Megan Carey.

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Teaching at Parsons The New School for Design and elsewhere has provided me with the continuing impetus to find coherent and succinct ways to explain concepts that are often complex and overlapping. For starting me on that path, I owe major gratitude to Tony Whitfield.

I'd like to think I gleaned from my father, Jules Bergman, the importance of distilling those complex

concepts into comprehensible bits of understanding that can be reassembled to better explain the whole. Among his television science reports, he covered—and made accessible to the nontechnical viewer—early environmental topics such as solar power, asbestos, and clear-cutting.

The influence of my mother, Joanne Bergman, ranged from providing me with every building toy known to 1960s western civilization to engaging me in early environmentalism. I recall being volunteered for activities like trudging through muddy local forests to survey the wetlands remaining between the pre-McMansion subdivisions. (Or did I volunteer her?) Only recently did I figure out that who I am is no accident.

And the proverbial last-but-certainly-not-least is my wife and CEE Lori Greenberg. Years ago, a magazine editor asked us what Lori's position at my product design company was and I flippantly replied Chief of Everything Else. For this book, Lori was art director and primary shoulder. That doesn't begin to sum up what this book and I owe her.

Introduction

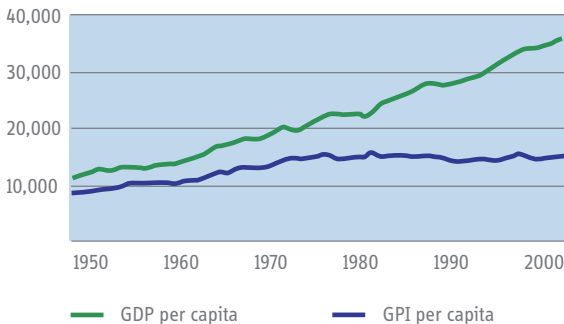
Let's clear the air (so to speak) right away. This is not a book about doom and gloom. We won't spend a lot of time talking about environmental crises. Many others have taken care of that, and whether or not you believe that climate change is the upcoming apocalypse—it's actually not the only environmental concern we face—we don't need to dwell on it. The rationales for ecodesign reach far beyond the singular goal of mitigating climate change to include setting the stage for the future—the sustaining—of our species and aspiring still further to a positive outcome: improving the quality of our lives.

Too often environmentalists take the view that we have been bad and must amend our ways, that sacrifice is the necessary path, that we have been irresponsible and we have to give up modern comforts to become more responsible. That approach is not going to work. Most of us have grown used to our ways, and it would be impossible to turn back the clock to how we lived before the Industrial Revolution. Doom-and-gloomists (who are more likely to call themselves realists) would say we have no choice: the dual problems of consumption and population cannot be overcome any other way. But sacrifice does not represent a desirable path or one that most of us would undertake voluntarily. Furthermore, getting rid of technology and modern comforts will not solve our problems. Take cars, for example. The back-to-our-roots approach, which some people consider environmentalism to be, would have us trade in cars for horses. But I doubt we'd like manure-filled streets any more than we like greenhouse gases and traffic jams. The same is true for other areas of technology: reverting from electric or gas furnaces to wood-burning fireplaces on a widespread level is worse environmentally.

We don't need to go backward. There are plenty of design paths, some shovel-ready and others on the near horizon, that will allow us to live comfortably (maybe even more so) within the means of our incredible planet. This isn't the same as saying that we don't need to change or rethink our lifestyles. We certainly do, and that, many argue, will lead to improvements in our lives.



Technology can provide both realistic and unrealistic solutions. Buckminster Fuller's dome over midtown Manhattan for climate control was one of his more unrealistic solutions.



Real GDP and GPI per capita, 1950–2004, adjusted for inflation (adapted from Redefining Progress).

Many of the choices we appear to face take the form of false dichotomies, either-or dilemmas for which the possibility of other solutions is overlooked. The alternative to a car-dependent society is not horses alone. Choosing between bad and worse heating systems is less of a problem if our buildings are designed to need less heating in the first place.

Another approach posits that since technology got us into this situation, it will get us out of it. As the popular analogy goes, If we can put a man on the moon. . . . In the chapters that follow, you'll see a lot of technological fixes; but you'll also encounter other kinds of solutions, involving social and individual choices that reevaluate how we want to live our lives, what we value, and how we derive satisfaction and happiness.

Note that latter point: how we derive happiness. While the pressing need is to design and build in ways that better sustain the natural environment, our objective is not just to stop biting the hand that feeds us, but also to bandage and heal that hand while improving our lives. That's very far from doom and gloom and the notion that the only viable path is one of self-sacrifice. In fact, we can make the world a better place both ecologically and anthropogenically, that is, from the points of view of the Earth and humanity. Actually, the two are inseparable. Our interests are one and the same. In spite of all our technology, we need the Earth's ecosystems in order to survive. We might be able to think and invent our way out of problems like rising sea levels or a scarcity of fresh water, but it will be much more difficult and expensive and cause greater human suffering than if we work with, instead of against, nature's systems.

Our objective as a profession is to create designs for the built world that not only conserve the environment, but also preserve and enhance the lives of everyone: symbiotic solutions. I don't mean to suggest that these solutions won't require changes to our lives: there's no getting around the fact that we (especially in the Western world) are consuming resources at an insatiable rate. But change does not have to equal sacrifice. We can and should

consume less, and we can do so without diminishing our quality of life.

We'll discuss many win-win (and often win-win-win) solutions in the chapters ahead. The term I propose for this way of thinking, which assumes that we have the potential to come out of this predicament for the better, is *eco-optimism*. It's the opposite of how one might have felt after seeing *An Inconvenient Truth*. (I once attended a screening of another ecodocumentary that was so profoundly depressing that everyone in the theater headed straight for the nearest bar afterward.) To paraphrase an *X-Files* line, the solutions are out there. We just have to implement them.

The concepts and solutions in the following pages fall into two categories. The first involves incremental steps, or what I call tweaks: things like adding insulation, using low-flow toilets, or switching to compact fluorescent lights. Such important solutions are often inexpensive and worthwhile (the low-hanging fruit) and found by applying the basic three Rs of environmentalism: reduce, reuse, and recycle.

The second category is what some call the fourth R: rethink. Related to the discussion of false dichotomies, rethinking usually involves taking a step back (which is not the same as going backward) to ask ourselves what we are trying to accomplish. For example, instead of asking how to make a cleaner, more energy-efficient lawn mower, we could ask if there is a better way to design the landscapes surrounding our buildings and infrastructure than planting water- and nutrient-dependent grasses. Rather than incorporating energy-efficient but expensive or complex heating and cooling systems, we could design buildings that rely less heavily on these systems or not at all. When we change how we ask the questions, the possibility of arriving at other answers emerges. These are the game changers, the concepts that have the potential both to alleviate environmental concerns and to improve our lives, and they come with an architectural bonus. They also offer the most interesting design possibilities, because they represent fertile new territory.



Ecodesign is the opportunity to go far beyond tweaks to develop new concepts and typologies, such as this structure at Nanyang Technological University's School of Art, Design & Media (2006) in Singapore, designed by CPG Consultants.

Tweaks are vital, especially as interim solutions; cumulatively, they can add up to a significant impact. Aesthetically, however, they are just the nuts and bolts of sustainable design, necessary but not fulfilling. For those who have chosen the design profession for its creative nature, the best possible solutions will synthesize a variety of tweaks with an ability to envision the future.

It's a challenge to define and explain sustainable architecture in the limited space of these pages. Rather than squeeze in every type of sustainable design, construction method, and material, I have attempted to discuss the essential components of ecodesign through specific materials and methods. Regard this Architecture Brief as a primer in sustainable architecture and design, defined as inclusively as possible. Some topics—for example, alternative construction systems like straw bale or rammed earth—have not been included, as interesting as they are. But the concepts underlying them—thermal mass, natural materials—are reviewed.

There are also areas of debate as to best solutions. In these instances, I have pointed out the viewpoints, the pros and cons, rather than prescribe a single answer where there may be none. Frequently, these viewpoints are evolving. As our expertise in sustainable design grows, knowledge is upended. Today's high-tech answer may contain issues yet to be realized. (For a historical example, see the discussion of tight buildings in chapter six, "Indoor Environmental Quality.")

In light of an evolving discipline, this book is intended as a guide, a base that organizes and explains the concepts and goals of sustainable design, and creates a jumping-off point from which those concepts can be further developed and physically emerge. In the ongoing maturation of ecodesign and its merger with the larger enterprise of design, this is a beginning, not an end.