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# Beyond Green Building: Transformation in Design and Human Behavior

Shu Geng

Micheal Deng Eugene Tssui



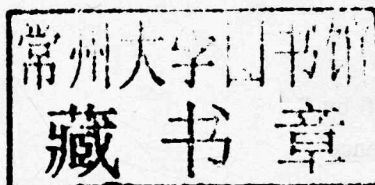
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# **Beyond Green Building: Transformation in Design and Human Behavior**

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**Responsible Editors: Li Min and Liu Chao**

## **Brief Introduction**

Architects Michael Deng and Eugene Tssui present the current and anticipatory evolution of ecological thinking as applied to the built environment and human behavior change. We are given the current societal outlook of a LEED ( Leadership in Energy and Environmental Design ) -based paradigm (Part I) and the proceed to investigate the coming sociological issues that are profoundly effecting our society and culture resulting in an emotional/behavioral motivations and needs (Part II) .

Rarely does a book cover the deeper motivations of the human psyche and how that directly influences our designed, built, environments.

This pioneering book covers the gamut of human behavior, i. e. , the growing epidemic of global obesity, the pervasive presence of bullying in all walks of life, and the irresponsible treatment of the earth and its resources. This is a pioneering work that dares to tread where others fear to go.

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## Editor

**Dr. Shu Geng** received his Ph. D. degree from Kansas State University, and served as a Professor in the College of Agricultural and Environmental Sciences and was an Associate Dean of college of the University of California at Davis. He founded the School of Environment and Energy of Peking University at Shenzhen, China and served as its founding dean from 2009 to 2014. Currently, he serves as an endowed Chair Professor at Northwest Agriculture and Forestry University in Yangling, China. He is a consultant and adviser of more than 20 international companies, governmental agencies and research institutes. He organized and chaired many international conferences on environmental and agricultural sustainability. His research areas include environmental ecology, bioenergy, simulation models, and risk assessment of global environmental changes and water resource management. He has published 142 referred scientific papers and 5 books. Dr. Geng is the founder of AUCE. org (Association of US-China Exchange) and isDwa. org (International Safe Drinking Water Alliance). Dr. Geng is an elected Fellow of American Association for Advancement of Science (1995) and American Society of Agronomy (1997).

## Authors

**Michael Minqu Deng** is an Architect and Urban Designer at CBT Inc. in Boston, MA, USA, and as design Manager at ADD Inc. in Cambridge, MA, USA. The projects he worked on won many awards including AIA and BSA Annual Design Awards. Faculty member at the Boston Architecture College since 2004, where he teaches Advance Design Studios in B. Arch and M. Arch degree program. Guest critic at the Massachusetts Institute of Technology, Suffolk University and lectured at Renmin University in Beijing. Awarded DAAD (Deutscher Akademischer Austausch Dienst) Visiting Professorship 2007 – 2008. Participated Design Exhibitions “99K House” Design Exhibition (Austin Architecture Center, Texas, 2008). City Rack Design Exhibition (National Design Museum, New York, 2008) Beijing Gui River Architectural and Planning Conceptual Design Competition (Beijing Planning Exhibition Hall, 2009) Energy, Save Water, Save the Planet” Conference and Exhibition (National Palace of Culture, Sofia, Bulgaria, 2010). Art exhibition, “Concept as Enzyme” in Chengdu, China.

**Eugene Tssui** is an architect, author of six previous international books, and has been an international professor and scholar at the University of California, Berkeley,

Shenzhen University, South China University of Science and Technology, Harbin University Institute of Technology—Shenzhen Graduate Campus; and Peking University, Shenzhen Graduate Campus. He has been a competitive athlete and winner of Eight US Presidential Sports Awards, is a Four-Time Senior Olympics Gymnastics All-Around Champion and an Eight-Time World Amateur Boxing Champion. He has design offices in Shenzhen, China and Emeryville, California. He is the subject of the recent documentary film, *Telos: The Fantastic World of Eugene Tssui*, and is featured in many international television programs on National Geographic, Discovery Channel, PBS, MTV, CNN, CCTV and others. Eugene Tssui lives in China and USA. He holds an Interdisciplinary Ph. D. , in Architecture and Education, from the University of California, Berkeley. Founding member, The International Save the Water Alliance.

## **General preface to the textbook series**

So far, there have been three major technological revolutions in the world. The first is the IT revolution, which started from the 1950s and experienced “IC- PC – Internet - Web” stages. It is still unfolding now. The second is the biotechnology revolution, which started from the discovery of DNA in the 1970s, and later promoted the great development of genetics, and currently arrived to the stage of personalized medicine. The third is the energy revolution, which started from the energy efficiency movement in the 1980s, and now entered the “energy efficiency and clean energy” stage. It is going to have extremely great potential in the future.

Under this background of energy revolution, the nation's first School of Environment and Energy was founded at Peking University in 2009. The educational goals of this school are to train the talent student into leaders for environmental protection, energy development and utilization, urbanization, and socio-economic development. Program of “Energy efficiency and clean energy engineering” is an important discipline in this school. It is also an important support for the country's future energy issue. This program includes four parts: renewable energy engineering, energy conservation engineering, energy policies, and energy information engineering. Textbooks are the foundation for discipline construction. For this reason, we organized the most famous experts and scholars in the related fields and wrote this textbook series. The series includes 13 textbooks, covering the field of policy, legal, and technology. The names of these books are as follows:

### **Foundation Textbooks**

“Water and energy: evapotranspiration, thermal environment and energy balance”

“Water pollution and energy using chemistry”

“Urban water system and carbon emission”

“Environment and energy microbiology”

“Environmental research methodology and modeling”

### **Technology Textbooks**

“Biomass energy conversion technology”

“Beyond green building: transformation in design and human behavior”

“Municipal solid waste management and recycle technologies”

“Energy technology development and environmental impact assessment”

“Energy-saving technology and sustainable design.”

### **Policy and Management Textbooks**

“Environmental and Energy Law”

“Carbon trading”

“Energy audits and energy efficiency policies”

As we all know, discipline construction is not a short-term behavior and it requires long-term efforts. Excellent textbooks are an essential foundation for the construction of a new discipline. We sincerely hope that the publication of this textbook series can promote the development of energy efficiency and renewable energy in China and in the world.

Editor-in-Chief: Guo Yu Qiu (Professor, Peking University)

## Preface

The force and flow beyond green

In *Beyond Green Building: Transformation in Design and Human Behavior*, architects Eugene Tssui and Michael Deng represent the leading edge of two coasts - the west and east-in the United States. Tssui, an American born Chinese, received his PhD at the University of California-Berkeley. His goal, to save the planet from total ecological destruction, has occupied him since the beginning of his pioneering work in the 80s. In his first book, *Evolutionary Architecture: Nature as a Basis for Design* published by John Wiley & Sons in 1994, Tssui stunned architects and laymen alike with designs derived directly from nature. From the extraordinary strength and resilience of spider webs to the helical reinforcement of sharkskin, Tssui showed how nature has already solved architecture's most compelling problems. In *Beyond Green Building: Transformation in Design and Human Behavior* Tssui focuses on human habits rather than habitats, and shows the impact of these habits upon our environment. With a shocking amount of hard data Tssui illustrates crimes against all forms of nature and the destructive destiny of the United States and her allies in exported commercialism. It no longer matters "why?". We must focus on the solutions, each and every one of us. Tssui, passionate and sometimes relentless, represents the force of the combined chapters. However, the end of the continent North America is the beginning of the eastern Pacific Rim.

If Tssui is the force, then Michael Deng is the flow of the chapters. Deng, a Chinese national educated at Harvard, develops an eastern sensibility to similar problems. He expresses his intricate ideas about spaces that we regard as common or open spaces, establishing "anchors" and "connectors" in a complexity of walkways, built and calibrated with 3-D computer modeling for solar gains in winter and shading in summer. He represents the architectural world not only as a native of China, but also as a professional incorporating the values he learned at Harvard Architectural Department on the eastern seaboard of the United States. The east coast tends toward European and British environmental discussions of "The Commons" which Deng has assimilated into his design concepts. In *Beyond Green Building: Transformation in Design and Human Behavior* Deng provides a descriptive analysis of his architectural projects and of the patterns that blend eastern floral metaphors with dynamic sculptured spaces-

woven as such into purposeful patterns for people to walk, reenergize and teach.

Deng's Chapters 1~4 focus on the essence of China's most precious and fastest diminishing resource: Water. He leads us first to the River Gui, in Yanqing County, a beautiful wetland reservation area to the north of Beijing the capital city. Here he develops the biotope concepts for a restoration of highly polluted waters into the process of his design, cleaning and healing the flow, through this community. Planning a development in such a way is novel in modern China. Acts of radicalism will not change a thing here. Deliberation will.

At first reading Tssui and Deng seem very different. What makes them similar? If architects were medical doctors, Tssui would be in the emergency room and Deng in preventive-health. Tssui wants to amputate values that lead to dehumanization and ecologically destructive behaviors; Deng advocates a life-long "biotope of creativity", a state of mind and place that maintains equilibrium. In ecological ideology and architecture, Tssui makes Deng more meaningful and vice versa. Conversely, they are both rooted in the greatest of organic architectural traditions: adherence to creativity, use of self as model, and the consequent belief systems formed. For both Tssui and Deng designing creative spaces is not enough; they want to design spaces in which they can be and feel creative as architects and artists. Tssui believes that living is the ultimate expression of one's creative beliefs. Deng believes that "Function and beauty inform design."

Finally, this book is about the co-construction of growing narratives on ecological architecture. In the field of ecological architecture, a term coined by Germans in the 19<sup>th</sup> century, all species are webbed and harmonious; buildings are too. Controversy arises when we allow LEED regulators to determine what is green enough. Green as opposed to real green is the debate in these circles. Architecture is important to ecologists and environmentalists far beyond the scope of habitats, shelter, and social spaces. And for architects there is a new path that allows for mismatching and trends, flexibility of forms and spaces. Using alternative thinking, architects can reshape the things that are already there m-dash they notice and welcome anomalies; make the marginal central and develop whole new sets of skills. Theirs is the path to true sustainability and we are certain to arrive if we listen to them.

Dr. Elisabeth P. Montgomery, Shenzhen, China

# Contents

## Part I Sustainable planning and green building design

Chapter 1	<b>Introduction</b>	(3)
1.1	Definition of “green building” (what is it?)	(3)
1.2	Why green building?	(7)
1.3	How to achieve a high performance building?	(9)
Chapter 2	<b>Case study one—Gui River project</b>	(11)
2.1	Preface	(11)
2.2	Site	(13)
2.3	Humanistic approach	(19)
2.4	Urban systems	(21)
2.5	Architecture	(27)
2.6	Sustainability	(30)
Chapter 3	<b>Case study two—FCG planning</b>	(39)
3.1	Introduction	(39)
3.2	Site analysis	(40)
3.3	Planning strategy	(43)
3.4	Urban living	(50)
3.5	Architecture	(53)
3.6	Eco system + sustainability	(58)
Chapter 4	<b>Case study three—GZ Asian game building</b>	(66)
4.1	The brief	(66)
4.2	The building	(67)
4.3	Environmental strategy	(69)
4.4	Executive summary	(71)

## Part II Being the change to design and reshape our world

Chapter 5	<b>The interdisciplinary relationship and structure of human sustainability</b>	(85)
5.1	Introduction	(85)
5.2	The tetrahedron model	(85)
5.3	Conceptual framework	(86)

5.4	Our social world .....	(87)
5.5	Our economic world .....	(87)
5.6	Our environmental world .....	(88)
5.7	Our physical world .....	(88)
5.8	Interdisciplinary relationship: Life's restorative design .....	(89)
5.9	Strengthening the social .....	(90)
5.10	Research questions .....	(91)
5.11	The economic equation .....	(92)
5.12	Economic obsession .....	(93)
5.13	Ecological know-how: real or perceived? .....	(95)
5.14	The social challenge .....	(97)
5.15	The environmental plight .....	(99)
5.16	Our health .....	(100)
5.17	Restorative directive .....	(105)
5.18	Summary .....	(107)
	References .....	(111)
Chapter 6	<b>Issues and problems</b> .....	(113)
6.1	Ships .....	(114)
6.2	Airplanes .....	(116)
6.3	Automobiles .....	(117)
6.4	Electricity, or the manufacturing and burning of coal .....	(119)
6.5	Travel .....	(121)
6.6	Epilogue .....	(123)
	References .....	(126)
Chapter 7	<b>An ecological life means questioning and changing habits</b> .....	(127)
7.1	the necessity of change to preserve our lives and our future: we must be the change, we seek, to find the true meaning of health .....	(127)
7.2	Summary .....	(157)
	References .....	(160)
Chapter 8	<b>Designing for future: architecture, humanity and nature, in communion</b> .....	(163)
8.1	Architecture as an embodiment of social, economic, environmental and physical/moral health .....	(163)
8.2	Architecture as ecological process and change: the way of nature	

.....	( 166 )
8.3 A new language of design: to save our lives, and our home, the earth .....	( 169 )
8.4 Architecture as an adaptive organism .....	( 170 )
8.5 Small is beautiful .....	( 171 )
8.6 Translucent walls .....	( 171 )
8.7 Insulation .....	( 172 )
8.8 Waterless toilet .....	( 172 )
8.9 Multiple functioning spaces .....	( 176 )
8.10 To the future, now .....	( 184 )
8.11 Epilogue .....	( 190 )
References .....	( 195 )

## Chapter 1: Introduction

### 1.1 Definition of Green Building (Chapter 1)

## Part I Sustainable planning and green building design



# Chapter 1 | Introduction

## 1.1 Definition of “green building” (what is it?)

The term “Green Building” has been widely used across real estate and building industry. According to the US Environmental Protection Agency, a green building, or sustainable building, is the practice of creating and using healthier and more resource-efficient models of construction, renovation, operation, maintenance, demolition and disposal.

A green building has characteristics that maximize the positive impacts from its existence while minimizing the negative ones—from construction all the way through the end of the building’s useful life. These green building characteristics are measured against three criteria:

- 1) The environmental impact the building will have now and in the future when considering such factors as energy use, efficient use of space, recyclability and the materials used for construction, all in an effort to conserve natural resources.
- 2) The economic impact, such as lowering operating costs, enhancing asset value, improving productivity, as well as optimizing lifecycle performance.
- 3) Health and community, through the improvement of air quality, occupant comfort and overall health conditions.

The US Green Building Council (USGBC) cites the following advantages for green building:

- 1) A decrease in a building’s operational costs and increase energy savings;
- 2) Reduce solid waste;
- 3) Enhanced asset value and profits;
- 4) Improved employee productivity and satisfaction;
- 5) Optimize lifecycle economic performance;
- 6) Improve air, thermal and acoustic environments;
- 7) Contribute to overall quality of life.

However, in practical world, we see too often misinterpretations of the term. To clarify what we consider a true “Green Building” is, let’s look into this issue closer.

### 1.1.1 Common misinterpretations of “green building”

“Sustainable” and “Green” have become popular words nowadays, maybe too popular sometimes. There are many misunderstandings and misuses of these words for various concepts and purposes. “Green Building” has been widely used as symbol or label. Because often times “Green” sales, it has been put on so many buildings that are not really “Green”. Before we looking into more detail of the topic of this chapter: Sustainable planning and building design, it is necessary that we clarify the definitions from the beginning.

A common misunderstanding is to stereotype green building is a “type” of building. In fact, it is not. Green building design should be part of every good building design practice, regardless of the building type, size, program, location, budget and any other parameters.

Another common misunderstanding is to stereotype green building as “high tech building”. No, green building doesn’t necessary to be high-tech, on the contrary, often times green building should depend on “low tech” design to achieve better performance. A green building has to be a high-performance building, which should be the goal.

Let’s look at some definitions here.

#### (1) Low-tech

(adjective ; lō- tek)

not involving specialized, complex technology” (*American English Dictionary*);  
technologically simple or unsophisticated” (*Merriam-Webster Dictionary*);  
using or requiring only low technology” (*Oxford Dictionary*) .

#### (2) High-tech

(adjective)

“using, requiring, or involved in high technology;

(chiefly in architecture and interior design) using styles and materials, such as steel, glass, and plastic, that are associated with industrial use.” (*Oxford Dictionary*)

Speaking of “Architecture”, which has almost as long a history as mankind, the most “Green”, or sustainable buildings are mostly built before there is even any high technology. It is safe to state that low-tech buildings can be very energy efficient,