



BEAUTIFUL CHINA: ECO-CITY INDICATORS GUIDEBOOK

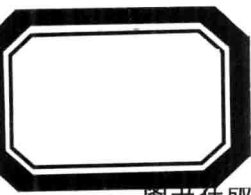
美丽中国：生态城市标准体系与实施评价

Bluepath City Consulting
御道工程咨询公司 著



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Bluepath City Consulting could not have assembled a book as ambitious as *Beautiful China: Eco-City Indicators Guidebook* without invaluable assistance and contributions from the following people.

In fall 2010, we jointly published with SSTECH *Navigating Eco-City: Sino-Singapore Eco-City Indicators Deconstruction and Implementation* in Chinese. After three years, this book has grown through testing in real pilot eco-city projects in China.

This *Beautiful China: Eco-City Indicators Guidebook* would not exist were it not for our supportive clients, who aided us financially and challenged us intellectually with their ambitious eco-project blueprints, including Lin Xuefeng, Ma Chengliang, Yu Zhenxiang, Jin Meizhu, Wang Weiqun, Wang Qiang, Lv Zhanzhi, Yan Xu, and Zhang Lingbo.

This work has fundamentally relied on cohesive team efforts, especially from Meng Fanqi, assisted greatly by Wei Fangling and Wu Yijiang, who provided consistent stable support throughout all the years leading up to the birth of this book.

We owe special thanks for guiding ad-

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great thanks to Liu Tao, a brilliant graphic designer, who provided visualization support to deliver our sophisticated thinking in a simple template.

New staff members lifted morale just as this book was going to press. We welcome Ou

Qi and thank him for the publishing assistance.

And finally, family support has been so important throughout our eco-journey and we owe our heartfelt gratitude to all the family members of our team.


Shanfeng Dong

Shanfeng Dong

August 2013

Beijing, P. R. China

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Foreword I

by Wei Jianguo

After the accession to the World Trade Organization, China has successfully created employment opportunities for 120 million migrant workers through the opportunity of world industrial transfer, and has become an important base for global manufacturing. However, at the meantime, the sustainability of China's future is in severe question due to resource exploitation, environmental pollution, and the cost of the demographic dividend.

The year 2012 is worth commemorating because the 18th Congress of the Communist Party of China was held in that year. Though the world economy became even more uncertain, this Congress clarified that our priority is the creation of an ecological civilization, providing a new chance for China to further transform its development mode.

Our thoughts on the construction of eco-cities have, in recent years, rapidly developed from theoretical explorations, to feeling an urgent need to take action, then to realizing the complexity of the issue, and now researching relevant system models and mechanisms. Eco-city theory is playing a bigger and bigger role in promoting green development and the realization of an ecological civilization.

In the past decade, the world has experienced a rapid increase in eco-city projects—there are more than 180 eco-city plans across the world. Eco-city plans are widespread in China as well—over 100 cities have applied to the National Development and Reform Commission and the Ministry of Housing and Urban-Rural Development for certification of their eco-city plans.

As different countries and cities differ greatly in resources, environment, economics, politics, culture, and history; they also differ in eco-city evaluation standards, development modes, as well as management systems and mechanisms. A global vision and in-depth international communications are necessary to reach agreements on standards and mechanisms so as to effectively guide the construction and development of eco-cities.

The Sino-Singapore Tianjin Eco-City is the first inter-governmental collaboration eco-city project between China and a foreign country, and the Qingdao Sino-German Eco-Park is the first inter-governmental collaboration eco-industrial zone project between China and Europe. An eco-city must be founded on ecological economical principles, offer residents a liveable environment with beautiful surroundings, and operate harmoniously as

an environment-friendly and socially cohesive settlement full of innovation and vitality. These two eco-cities are testaments to the great achievements of China's reforms and opening up policies, and demonstrate that Chinese people and other peoples of the world are determined to courageously seek a happy life together.

Based on the practice and experience of working with these two eco-city projects, Bluepath City Consulting publishes *Beautiful China: Eco-City Indicators Guidebook* to explain through establishing clear strategic positioning, clarifying the city's development goals and functions, and laying out industries properly, support the growth of real economy as the engine of future economic development, which incubates region-wide industrial synergy clusters. Bluepath has also established a holistic indicator system covering social, economic, environmental, and resources management, improved eco-city standards and methods for data monitoring and evalua-

tion, and helped evaluation of industry access with considering environmental protection, safety, social security, and other issues. These efforts are significant for China's exploration of further development under the new circumstances of industrial globalization.

This improved model of scientific development will encourage healthy multi-lateral collaborations, exchange complementary advantages and share common progress between China and foreign countries. China is at the global forefront of pioneering in developing ecological civilization, economic transition, and eco-city construction. Such new mode will also induce other developing countries to follow the same path and help them with their economic and social development, which will further promote the establishment of new strategic partnerships.

I hope that all readers enjoy reading *Beautiful China: Eco-City Indicators Guidebook*.



Wei Jianguo

General Secretary of the International Exchange Center of China
Member of the Commission for Discipline Inspection of the Central Committee,
Communist Party of China
Former Deputy Minister of Commerce

Foreword II

by Pan Jiahua

Urbanization is an inevitable process in the development of human society. Living spaces have always been at the center of all human action—cities have long been our preferred means of first passively adapting to natural forces, then active transforming them with mechanisms of domination, and finally using structures to embrace and enshrine nature. A city is a combination of fortress (城, *cheng*) and market (市, *shi*) in Chinese. 城 (*cheng*), meaning “fortress,” is a space for human to defend themselves from natural disasters, wild animals, and enemies. 市 (*shi*), meaning “market,” is a space for people to gather and exchange information, materials, and products. Further, *cheng-shi* combined together is built environment where there is a large capital stock, accommodating high population density, intense economic activities, and frequent information exchanges. Because of cities, people gradually break away from nature. However, the human race is a biological phenomenon and is a part of nature. Without nature, habitats are obviously unliveable; and without a liveable habitat, people cannot obtain a sufficiently

good quality of life. In this sense, building ecological cities becomes an essential human pursuit.

With the acceleration of industrialization and urbanization after the mid twentieth century, natural ecological systems have been damaged, living environments have been polluted, and the function of CHENG has been relatively weakened and that of SHI has been continuously strengthened, resulting in economic development, increasing incomes, and consequently a growing demand for a liveable environment. One efficient way to meet this demand is by building ecological cities or eco-cities.

An eco-city does not mean that we should return to the raw ecology, nor to restore pure wild nature that was originally there, because a natural ecological balance is contingent upon larger regional forces and cannot be accomplished within a small geographic space. However, abundant capital, information, and advanced technologies can be applied to design an artificially-controlled ecological-friendly system that optimizes the cycles of production, consumption, and de-

composition to maintain natural functions, to improve the environment, and ensure that waste and pollution from production and living are within ecological limits.

The construction and maintenance of a city's ecosystem is an artificial effort that requires the input of external energy and capital. Capital and technology are man-made and can be accumulated; yet energy, especially fossil fuels, is limited by external availability constraints. At present, a large amount of fossil energy is consumed for industrial production, transportation, and residents' living, resulting in massive carbon dioxide emissions.

According to the provisions of the United Nations Framework Convention on Climate Change and the Copenhagen Accord, greenhouse gas emissions must be controlled and reduced to mitigate climate change. Under such condition, the operation of a city's ecological system is subject to restrictions on carbon emissions. The constraint on the total amount of carbon dioxide emissions allowed is actually a constraint on the total consumption of fossil energy. Since limiting carbon emissions is both a global as well as Chinese trend, eco-city must also contain carbon emission reductions plans.

China has short- and long-term goals for reducing carbon emissions. The short-term goal is, by 2020, China's carbon emissions per unit GDP will decrease by 40% to 45% compared to 2005. This goal is included as an obligatory target in mid- and long-term national economic and social development plans, which

also set corresponding monitoring and evaluation methods. Long-term emission controls will aim at 2050 and China will face the challenge with persistent efforts to reduce carbon emissions.

If low-carbon development goals cannot be adequately managed, China's development will be constrained as the climate change impacts of development increases. On the contrary, if appropriated treated, it also enables Chinese to accelerate the introduction of advanced technologies, promote independent innovation, and accelerate the transition to a low carbon energy structure. In actual work, indicators are most effective when performance is linked with the appraisal of governmental officials, however this may also induce in-efficiency and negative impact on well-being. Therefore the administration and design of indicators needs to be adjusted and improved through practice.


China already ranks first in the world for greenhouse gas emissions, emitting nearly 30% more than the second worst polluter, the United States. China's average per capita greenhouse gas emissions also exceed the world average. Although developed countries have high average per capita emissions, China cities' average emissions per capita are already higher than that of many cities in developed countries, even comparing to New York, London, and Tokyo. This means that China faces a great challenge in transforming its urban development mode to be greener.

So how to make sure eco-city is low carbon? The answer is through scientific city

planning; rational eco-city standards and implementation protocols; the combined use of technical, political and financial measures; the combination of building energy conservation and technical improvements; focus on quality products and buildings; as well as effective city management. In this aspect, the practice-based methods introduced in *Beautiful China: Eco-City Indicators Guidebook* are worthy of discussion and should be learned from.

The Sino-Singapore Tianjin Eco-City and the Qingdao Sino-German Eco-Park can

be model cities due to their advanced designs that incorporate energy efficiency and low carbon development principles into complete city systems. In the past few years, much experience, especially in regards to low carbon transformation, has been accumulated and these experiences can and should be referenced by other countries. Some of these experiences are of Chinese characteristics and will promote the development of eco-cities around the world.


Jiahua Pan

Pan Jiahua

Director-general, Institute for Urban and Environmental Studies,
Chinese Academy of Social Sciences
Member of the National Expert Panel on Climate Change
Member of the National Advisory Group in Foreign Policy
Vice President of the China Society for Ecological Economics

Foreword III

by Mao Qizhi

Bluepath City Consulting has actively participated in some leading eco-city projects in recent years such as the Sino-Singapore Tianjin Eco-City and the Sino-Germany Qingdao Eco-Park. These practices have given Bluepath a chance to explore a set of comprehensive indicators covering the construction, operation, and evaluation of eco-cities, and to have further creatively developed this system of deconstructing indicators as well as this guidance on indicator-led eco-city planning and operations implementation. All these endeavors are well illustrated in *Beautiful China: Eco-City Indicators Guidebook*, a book that summarizes new progress in China's scientific research on eco-cities.

In the late 1960s, UNESCO launched the Man and Biosphere Program (MAB), and in 1971 an international scientific research project was set up by MAB to conduct urban studies research from ecological perspective. In 1974, the first International Ecology Congress was held in the Hague, a Committee of Urban Ecology was established, and followed by the periodical *Urban Ecology* that was first published in 1975. As the world socio-economy and scientific technology advance as they accompany the urbaniza-

tion process, eco-city theory and practice has been continuously enriched and improved.

China's scholars and institutions have engaged in the study and discussion of eco-cities since 1980s. In 1994, the Chinese government for the first time incorporated a Sustainable Development Strategy into the country's long-term economic and social development plan. In 2002, the *Shenzhen Declaration on Eco-city Construction* was promulgated at the International Eco-city Congress held in Shenzhen. In 2004, the Ministry of Construction [now the Ministry of Housing and Urban-Rural Development (MoHURD)] announced proposals on implementing ecogarden cities. In 2007, "building an ecological civilization" was established by the 17th National Congress of the Communist Party of China (NCCPC) as one of the five goals of building a moderately prosperous society, and terms such as "harmony between human and nature" and "building a resource-saving and environment-friendly society" were added to the CPC Constitution. In 2011, MoHURD established a leading office on low-carbon and eco-city development responsible for organizing the study and revision of plans and policies regarding China's effort to construct low-carbon eco-cities and to make important de-

cisions on major works and projects. In 2012, the 18th NCCPC included “developing an ecological civilization” within the “five-in-one” scheme created there to give an overall description of socialism with Chinese characteristics, and further systematically elaborated the general requirements, major tasks, and correct paths of eco-civilization realization.

So far the rules for guiding the development of an ecologically-sound relationship between nature and humans have yet to be accurately described. From a philosophical perspective, “eco-city” can also be interpreted as synonymous with the terms “sustainable city,” “green city,” “low-carbon city,” and “garden city.” Whatever we call this vision, however, it is a grand cause aimed at building ideal human settlements in harmony with nature and existing cultural characteristics, applying ecological and environmental theories to scientifically plan, construct, and operate cities. Such a program indeed represents China’s contribution to sustainability and will benefit future generations.

Today, environmental quality has become a critical indicator of people’s well-being in both urban and rural areas. In order to build a moderately prosperous society in the near future, we must ensure that every citizen can drink clean water, breathe clean air, eat safe food, enjoy good environmental quality and live in livable communities. Ecological civilization is a dynamic process with never ending. Many places have adopted an evaluation indicator system to guide cities development towards an ecologically harmonious and environmentally friendly state. I hope that Bluepath can, based on the eco-city indicator systems it has already piloted, constantly sum up and improve this work further, and continue to experiment with new practices and innovations.

There is only ONE earth and eco-city development is a communal solution that will benefit the entire human race. I sincerely hope that readers can gain some positive insights from this book, *Beautiful China: Eco-City Indicators Guidebook*.



Mao Qizhi

Professor of Tsinghua University

Deputy Director, Center for Science of Human Settlements, Tsinghua University

Deputy Director, Institute of Architectural and Urban Studies, Tsinghua University

Vice President, World Society for Ekistics

Academician, International Eurasian Academy of Sciences

Foreword IV

by Peter Head

This book comes at a very important time. All over the world there is a realization that the way we live in cities and city regions is critical to dealing with the pressing problems of climate change mitigation and adaptation coupled with tackling the rapidly increasing problems of energy, water, and food security. Sustainable Development Goals (SDG's) are being fashioned to replace the Millennium Development Goals (MDG's) and one of the proposed targets for the SDG's is Inclusive, productive, and resilient cities which aim to produce a beautiful quality of life for citizens. China has helped the world to meet the MDG's by taking millions of people out of poverty through urbanization and industrial development over the last 15 years but has experienced first-hand the challenges of associated environmental damage and planetary limits to resource consumption.

China is now seeking a new, more resilient model of economic development which focuses on services derived from products, services provided by ecological systems and a circular economy which is much more resource efficient — the “Ecological Civilization.” This book describes first-hand the journey China has been going through to test and evolve the ideas for transitioning from an

Industrial Development model to the Ecological Development model in demonstration eco-city developments. The rest of the world is realizing the need to make this change, too, either through retrofitting existing cities or by developing new cities in a more resilient way, and so for everyone this book is an excellent source of learning and inspiration from the cutting edge of the evolution of China's practice and also from leading work globally.

A key element in China's philosophy and practice is the Scientific Approach to Development in which the metrics of economic, social, and environmental character of city development are quantified against the goals being sought. The book traces the evolution of these metrics from a small basket of indicators, which were tested at the city level, to a new and sophisticated array of indicators, which are derived from an underlying understanding of the potential for a systems approach to integrated city planning. The book goes on to discuss the importance of data availability for the approach to succeed and how the protocols for this data must be tied into city administration governance regimes.

The final really interesting and innovative section of the book concerns the trans-

formation of a framework for sustainable development into a systems tool to guide development investment and infrastructure design, which can deliver a path towards the Ecological Civilization. This is the area of work I am currently focused on through The Ecological Sequestration Trust and I am sure from our work that open-source tools can be made a-

vailable globally to support the approach outlined clearly in this excellent book.

I therefore recommend this book to everyone in all countries of the world who are looking for guidance on the very practical steps that can be taken to fashion a future for our children that will enable them to live a good life in harmony with the natural world.



Peter Head

CBE FREng FRSA

Executive Chairman, The Ecological Sequestration Trust

Chairman of the Institute for Sustainability

Former leader of planning and integrated urbanism team in ARUP

Independent Commissioner on the London Sustainable Development Commission

“one of 30 global eco-heroes” by Time Magazine in 2008

“one of 50 people who could save the Planet” by Guardian

Foreword V

by Hiroaki Suzuki

Urbanization in developing countries is a defining feature of the 21st century. Some 90 percent of global urban growth now takes place in developing countries—and between the years 2000 and 2030, developing countries are projected to triple their entire built-up urban areas. This unprecedented urban expansion poses cities, nations and the international development community with a historic challenge and opportunity. We have a once in a lifetime opportunity to plan, develop, build and manage cities that are simultaneously more ecologically and economically sustainable (Eco2 Cities www.worldbank.org/eco2).

Sino-Singapore Tianjin Eco-City (SSTEC), to which the World Bank has been supporting through Global Environmental Facility, is a milestone in eco-city development in China. Its twenty six key performance indicators developed by the SSTEC Administration and Bluepath have made SSTEC distinguishable from many other similar eco-city undertakings in China. They provide SSTEC's policy makers and practitioners with clear objectives of the eco-city, in terms of both quantity and quality, and milestones to measure their progress towards their goals.

During the construction of SSTEC, Blue-

path has helped the SSTEC's administrators further develop their indicators by articulating their implementation mechanism. Any project, whether it is a simple road construction project or complex eco-city project, constantly face the needs of adjustment, due to unexpected physical problem or evolving socio-economic conditions. As this book "*Beautiful China: Eco-City Indicators Guidebook*" emphasizes, the real value of eco-city indicators is not to show quantitative output but to help the policy makers and practitioners, take necessary actions when they realize that they face some obstacles or challenges in achieving their planned objectives.

In this sense, eco-city indicators and their implementation framework are core building blocks of cities' governance system. In building eco-city indicators and their implementation system, the policy makers and practitioners have to go through all their institutional and regulatory mechanism such as their decision making systems, budget allocation mechanism and administrative structure.

This book, introduces the theory and practice of eco-city indicators building on Bluepath's rich experiences in the field of eco-city development as well as their extensive literature reviews. As it also introduces

the history and regulatory framework of eco-city development in China, this book is a must to read for policy makers, planners and practitioners of eco-cities in China as well as their partners including financial institutions, contractors and consultants. This book is also useful for many professionals working on sustainable urban development, across the world.

For this reason, I would like to extend heartfelt appreciation to the authors of Blue-path for their valuable intellectual contribution summarized in this book, hoping that this book will help us develop sustainable cities and to affect the trajectory of urbanization in a lasting and powerful way which can lock-in systemic benefits for current and future generations.

A handwritten signature in black ink, appearing to read 'Hiroaki Suzuki', with a stylized, flowing script.

Hiroaki Suzuki
Lead Urban Specialist
The World Bank

Preface

The twenty-first century world is turning its eyes towards cities as the location of innovation and creation, as well as the source of environmental degradation and social discord. Over half of the world population is now urban and urbanization now affects the quality of life of all of Earth's citizens whether rural, suburban, or urban. Urbanization has also become the focus of Chinese governmental action at all levels, as most significantly signaled by the national government's introduction of policies and rhetoric regarding the construction of an "ecological civilization" since 2007 and the use of this term as a main policy goal during the Eighteenth Party Congress in 2012.

When studying the improvement of complex and dynamic cities, it is important to also focus on the drivers of social development, e. g. political, economic, and cultural features, instead of exclusively focusing on planning strategies and technologies that promise to improve the city's physical impacts on the environment.

Although technological innovation has greatly improved living standards in China during the past few decades, historically technology alone has proven incapable of resolving all conflicts and contradictions that arise in human society and indeed technology may create more, and increasingly more complicated, problems.

In fact, disciplines in the humanities have co-evolved with technological advancements. Mankind's progression from the agricultural age through the industrial age, and then to the present day (what some are calling the start of the ecological age), cannot be separated from the "soft" non-physical supporting cognitive frameworks and analytical methods that have enhanced individual cognition and social organization, such as economics, philosophy, and social sciences.

Over the past decade in China, Bluepath's understanding of developing eco-cities has constantly evolved as our experiences accumulate. In the beginning, sustainable development was mainly defined by technical means, with "integrated planning" strategies adopted to provide multi-disciplinary state-of-the-art *technological* solutions.

However, it was not long before we recognized that the development of a culturally-embedded sustainable lifestyle is far more important in driving the efficient consumption and utilization of resources. Moreover, it became apparent that sustainable lifestyles and cultures must differ by geography to accommodate local resource constraints, fit diversified local cultural histories, and avoid the risks of mono-cultural cities.

Consequently, we introduced "cultural planning" to our work through in-depth research on disciplines including philosophy,