

the  
principles  
of  
green urbanism

Transforming the City for Sustainability



Steffen Lehmann

# the principles of green urbanism



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**Steffen Lehmann**

This publication is endorsed by



United Nations  
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THE UNIVERSITY OF  
NEWCASTLE  
AUSTRALIA

UNESCO Chair in  
Sustainable Urban Development  
for Asia and the Pacific

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## **Pre-publication praise for *The Principles of Green Urbanism***

"Addressing the present day problems of the great industrial cities with ideas which are firmly embedded in the future, this book is a *must read* for all those who want to see a responsible approach to the greening of their urban environment. It addresses one of the great challenges for the urban environment of many of the world's major cities: How do you take an existing urban structure and make it respond to environmental concerns? The content is stimulating and the case studies provide real life examples of a possible way forward. Read it!"

– **Peter Brandon**, Professor, Salford Think Lab (Manchester)

"Inspiring! *The Principles of Green Urbanism* is a relevant publication for today's planning problems. Excellent reading for all interested in urban design, and much food for thought."

– **Peter Droege**, Professor, Chair Renewable Cities Council (Sydney)

"Highly relevant case studies, based on practical principles for achieving green urbanism. This is an important, highly relevant and very topical book which should be read by decision makers all over the world."

– **Herbert Girardet**, Professor, World Future Council (London)

"Steffen Lehmann has a long interest in sustainable cities design and his book provides a critical overview of ecological urbanism concepts, offering a methodology for sustainable design."

– **Ken Yeang**, PhD, Architect (London/ Kuala Lumpur)

"This book will become increasingly important as the world recognizes the escalating energy crisis and global warming challenge. It will be a useful resource for many urban design courses."

– **Norbert M. Lechner**, Emeritus Professor, Auburn University (USA)



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Dedicated to the people in developing countries suffering the impact of climate change, this book hopes to inspire all urban designers, planners and architects to rethink conventional design practice and to take action to stop climate change.

### Globalization and mega-city growth: big feet, small planet

Over the past decade I have tried to make connections between cities and their increasingly global hinterland whilst exploring environmental and social conditions within cities themselves. One conclusion I have reached is that working towards the environmental sustainability of cities can deliver tremendous social and economic benefits. In an urbanizing world we need a fresh approach to looking at cities and novel ways of understanding the impacts of urban living. Unless we change the way we use resources, particularly fossil fuels, we will cause this planet to become uninhabitable. In particular, the seemingly unstoppable growth of large globally connected cities, with their huge appetites for the world's resources, is a development of enormous consequence for the future of humanity, and for all life on Earth.

The job of urban planners, civil engineers and managers is to create spatial structures that satisfy the needs of city people. We want them to provide secure habitats that allow us to move about our cities efficiently, and we want them to provide pleasant spaces for work, for recreation and for meeting people. We want urban environments that are free from pollution and waste accumulation. But we also need to get to grips with the impact of cities beyond their boundaries. Our urban society, with its fossil-fuel powered industrial, farming and transport systems, has unprecedented impacts on the world's ecosystems. The WWF states in its recent *Living Planet Report* that in the last 30 years a third of the natural world has been obliterated. Reversing this collision course between humans and nature is increasingly becoming an, as yet, unaccustomed challenge for city dwellers, architects, civil engineers and urban planners.

## Foreword I

Herbert Girardet

This book presents a series of inspiring ideas for urban development, using urban renewal strategies and the conceptual model of Green Urbanism. It is illustrated with remarkable work from design studios which the author of this book has conducted over a period of four years, constantly refining his ideas by using the Australian city of Newcastle as a field of exploration and as a generic case study for all regional cities in the developed world facing a decline in manufacturing industries. Some of the main themes which this book seeks to explore are: Can urbanism ever be green? How can we create cities of physical beauty and social and cultural diversity that are also environmentally and economically sustainable?

In my recent studies, I have drawn on the work by the 19th-century German geographer Johann Heinrich von Thünen. The integration of towns and cities into their hinterland is well described in von Thünen's book 'The Isolated State'. He was the founder of location economics and the first to develop an analytical model of the relationship between markets, farming systems and their location. The medieval town represented his model perfectly. Von Thünen described the inherent logic by which towns were encircled by clearly defined systems of farming and forestry, with four different zones surrounded by an outer zone, each with a different purpose. However, when a major transport route such as a



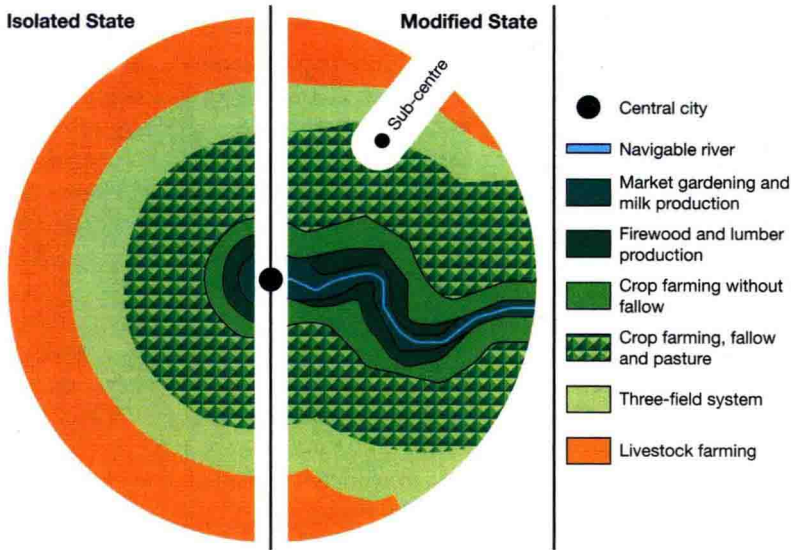


Fig. 1: City diagram, by the geographer Johann Heinrich von Thünen. He made a major contribution to the understanding of the relationship of urban settlements to their local hinterland. Once significant transport connections are established, their linkages to local farmland and forests tend to be weakened. [Courtesy: H. Girardet; from *Cities, People, Planet*, 2008]

navigable river, or, today, a motorway, was available, the circles were opened up and replaced by an increasingly linear arrangement. Today global transport systems supply our cities.

Von Thünen's analytical model is still of great relevance today, as the availability of cheap transport systems bringing food and goods from long distances is beginning to be questioned because of their wasteful use of energy, particularly when airplanes fly in food from halfway around the world. In this regard, I find the Eco-City ideas of this publication, which are based on urban farming, productive urban landscapes and the decentralized generation of energy, of great relevance. These ideas are supported with highly relevant case studies, based on practical principles for achieving a new green urbanism. Steffen Lehmann's design studios illustrate well how this new green urbanism will look like. This is an important, highly relevant and very topical book which should be read by decision makers all over the world.

**Herbert Girardet**  
**London, October 2009**

**Professor Herbert Girardet** is a recipient of the UN Global-500 Award for outstanding environmental achievements. He is Director of Programmes of the World Future Council, based in London. He is an honorary fellow of The Royal Institute of British Architects and was chairman of the Schumacher Society, UK. He has written 12 books and produced 50 documentaries on many aspects of sustainable development. He has been a consultant to numerous clients, including UN-Habitat, the Greater London Authority, the London Development Agency, the Dongtan Eco-City project, and the cities of Adelaide and Vienna. His most recent book, *A Renewable World – Energy, Ecology, Equality*, was published in September 2009.

## Foreword II

Peter Droege

### Thinking in the dimension of the city

This book documents ideas for urban renewal and environmental sustainability, using the Australian city of Newcastle as a most suitable case study. It presents the author's conceptual model of *Green Urbanism*; it also presents a series of strategies for the urban regeneration of derelict, post-industrial city centres, and includes documentation of students' speculative work from advanced design studios conducted at the University of Newcastle. By doing so, the book introduces ideas about the future of our cities, with some stunning plans, images and model photographs, accompanied by texts that offer a deeper understanding of the discussed topic.

The text explores ideas and proposals for the revitalization of the typical post-industrial urban landscape, based on strong public space networks, pedestrian-friendly connectivity and a reintegration of urban greenery. The author's discussion offers general insights and strategies that are applicable to other cities seeking ways to reclaim their derelict urban landscapes or are wishing to revitalize abandoned sites to transform them into a contemporary, integrated part of a vibrant and revitalized city centre.

Cities are always in a constant state of transition, and the harbour city of Newcastle is – as many others are – at an important juncture in its evolution. Current thought requires mixed-use urban development to deliver environmental and social outcomes based on holistic ideas of relationships between appropriate densities, typology, transport and public space. The author has worked with his students to devise masterplan proposals that provide a provocative vision of what might be our zero-carbon, fossil-fuel free future: overlapping mixed-use activities, living and working building typologies explored on the urban scale, infrastructure systems for renewable energies, public transport and individual energy-efficient building designs.

The presented visions offer mixed-use solutions that will help to stabilize the global climate and which can regenerate neglected areas of a city, at its core and along its waterfront, by applying different kinds of strategies for both. This has relevance for many similar cities, as much of the introduced strategies are generic and are transferable to any post-industrial condition in the developed world.

Such complex large-scale developments require input from the community into design parameters, and they are a great learning experience for all participants. The crucial task is now: How do you formulate zero-carbon urban design and fossil-fuel free architecture for the 21st century?

The need to build new types of 'renewable cities' poses a huge challenge to classical city planning. This book provides practical answers through the definition of *The Principles of Green Urbanism*, which unfold to the reader as a clear conceptual framework for all involved in urban design, and ensures the proposed strategies are future-proof. What par-

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ticularly distinguishes this book is its focus on the different contemporary urban contexts one might come across as a professional or a student, and the articulation of a pragmatic set of principles to apply them in the real world. To make this type of urban design and architecture much more common, policy-makers need to use all the tools and legislation at their disposal, including reforming building codes, offering tax incentives, supporting research and mounting public information campaigns.

Steffen has a long history of initiating community outreach projects involving students in design questions relevant to the city. I offer my great appreciation to the author and the team of educators who were involved in the study under Steffen's leadership, and I also applaud the students who took on the challenge so creatively. Education for sustainable development has been adapted by universities all around the world to different degrees, and the new thinking is finally gaining momentum and is being introduced into the various curricula. These studios are a great example for the dynamic relationship that can exist between research, practice and teaching, and how research-based design can drive a teaching initiative.

Steffen Lehmann has given considerable time and continuous energy to tutoring and mentoring architecture students, and to the development of each project with great care and vision. Over the period of four years, the students were given a valuable opportunity for exposure to the realities of challenging briefs and realistic constraints (be it the reduction of energy consumption or the respect for built heritage). The studio process involved an interactive exchange of ideas between the University, the city council, local planning experts, the Port Corporation and consultants from private practice.

The *Principles of Green Urbanism* is a relevant publication for today's urban planning problems. It is inspiring and excellent reading for all interested in urban design and the future of cities. It offers a timely reflection on the relationship between old, energy-hungry, fossil-fuel based city models and the new possibilities of renewable energy technologies. Based on the conviction that design professionals can genuinely make a difference to the lives of ordinary people and the future of our societies, this text book is a helpful tool for all those working in the fields of urban design, urban planning and architecture.

**Peter Droege**  
**Sydney/Vaduz, October 2009**

**Dr. Peter Droege** is an urban planner and author who lives and works in Sydney and in Vaduz. He is the Chair of the World Council for Renewable Energy and the initiating director of a Solar-City research development initiative. He has held professorial and advanced positions at MIT, the University of Tokyo and the University of Sydney. He is currently a professor at the Hochschule of Lichtenstein. He is the editor of the book '100% Renewable' (2009).

### **Sustainability... on the urban scale**

The ambitious themes of this book, the state and future of our cities and the opportunities to transform entire districts into energy-efficient, close to zero-carbon neighbourhoods, started as a series of lectures which I delivered in the late 1990s at various European schools of architecture and urban design, and papers given at conferences in many parts of the world on the subject of *green urbanism* and *the city as powerstation*. Some of the ideas explored and presented in these forums were still radically new (such as the notion of a *city block as powerstation*), and were intended to stir up debate and controversy beyond the student body. This is exactly what happened. My claim that purely functionality and aesthetic-based solutions were no longer sufficient for the design of our urban environment, and that we generally need to rethink 'the city itself', including the criterion for energy use, waste, food and water consumption, was highly provocative to some. In challenging classical city planning, I asked: What if we designed cities for walking and cycling, with human-centred public space networks, on-site energy generation, and compact self-sufficient communities? I claimed that the sprawling suburb had neither an economic, social, nor an environmental future, as it made everything inefficient – from water use to public transport, from energy use to land use. I suggested new organizing principles, energy-efficient urban systems, based on decentralized energy supply and waste recycling patterns, and the radical re-compacting of urban form to allow us to use the district, the town, or the city itself as a powerstation by using the roofs and facades to turn entire districts into productive urban landscapes supported by urban farming.

## **Preface**

Steffen Lehmann

As usual, things are not as simple as they appear, and at this time I could not be confident that global climate change and urbanization were so closely linked, or even that global warming was a direct result of man-made, anthropogenic interventions in the environment. Today, of course, the scientific evidence is overwhelmingly in favour of this model, and we have reached a much more holistic and robust understanding of the issues surrounding urban ecology, and with widespread concern about the environmental crisis growing, we are now plotting nothing less than a peaceful revolution against old unsustainable methods and practises of urban design.

### **Climate clock is ticking**

Scientists have clearly shown that human activities alter the climate. For instance, the *Urban Heat Island* effect has proved towns and cities are warmer than the surrounding countryside, and there is evidence that weekends tend to be cooler and wetter because of the drop in human activity. Climate change is now understood as a life-shaping force with far reaching impact. The increasing need for a profound restructuring and transformation of the way in which we live, and the way in which we develop, build and operate towns and cities, is widely acknowledged. For instance, a major urban transformation in the way we generate, distribute and supply energy to households is now under consideration on many levels, but its consequences on new urban settlement patterns, future-proof infrastructures, and adaptable building typologies will need to be reassessed.