

# **The Hidden Potential of Sustainable Neighborhoods: Lessons from Low-Carbon Communities**

**By Harrison Fraker**

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Reviewed by Nicola Szibbo

The terms “low-carbon” and “zero-carbon” are now frequently bandied about in planning dialogues regarding sustainable neighborhood development. These terms—used in the context of neighborhood design and planning—possess increasing currency given the problem of climate change. In the past, zero-energy goals have been perceived as desirable but lofty and difficult or even impossible for planners and designers to achieve. However, in an era of adaptation to climate change, resilient infrastructure and built form is both warranted and necessary. Harrison Fraker—a pioneer researcher and professor in passive solar, daylighting, and other sustainable design techniques—presents this imperative with striking resolve in his new book. Fraker attempts to raise awareness about the “hidden potential” of sustainable infrastructure through an analysis of several best practice case studies in Europe. Exploring progressive neighborhoods at the forefront of environmental design in Sweden and Germany, the book outlines how planners, architects, and urban designers can design and build zero-carbon neighborhoods. Fraker chooses the four German and Swedish case studies specifically because the energy and performance data were available for the purposes of comparative evaluation. The case studies ultimately indicate that low-carbon communities are no longer a futuristic fantasy, but are now a reality.

It is clear that in order for sustainable neighborhoods to be realized, the relevant metrics and measurements need to represent the “three axes of sustainability”: environmental, economic, and social. Fraker’s book covers the environmental aspects in great detail. Chapters two through four are dedicated to the individual neighborhoods; each chapter is filled with benchmarks and metrics for sustainable infrastructure and design, based on performance data collected by Fraker and his students. Fraker thoroughly describes the coordinated operation of the various systems of water infrastructure, waste infrastructure, renewable energy generation, green space, land use, and transportation in terms of the estimated benefits and impacts. Often, these systems overlap and reinforce each other in terms of inputs and outputs from a cradle-to-cradle perspective, and

energy savings occur at the point of integration, yielding many co-benefits. The book contains an abundance of diagrams, making for a visual yet quantitative read. Fraker presents the data, which are largely descriptive, graphically where possible. Given the variety of graphic styles, more standardization of the drawings across the individual chapters may have highlighted useful similarities or dissimilarities of the case studies more clearly. One of the most methodologically intriguing aspects is the inclusion and application of LEED-ND credits at the end of each chapter as a way of systematically ranking overall sustainability in the four neighborhoods. This provides a hopeful grounding of the projects in the North American context, illustrating how they would fare with the popular market-based green neighborhood rating system.

The fifth chapter provides graphical comparisons across the four cases, which is helpful in illuminating differences and similarities between the four neighborhoods. The sixth and final chapter provides a critical roadmap for the United States, as a focus on policy transfer is now crucial from a planning practitioner's perspective. The new challenge of the twenty-first century will be translating sustainable urban design precedents from Europe to the US context. Given the long history of social democracy and acceptance of environmental principles as a political platform in both Sweden and Germany, attention needs to be paid to the current municipal code and regulatory barriers for such "whole systems" approaches in North America. If application of such sustainable urban design precedents is not only achievable but necessary for a better future, then future research must focus on integrating design into US policy frameworks and planning regulation, as well as the implications for the design-development process. Fraker is right that research needs to focus on the feasibility of advanced sustainable systems in an age of outdated planning codes, regulations, and city policies.

Although the book covers the environmental systems well, Fraker pays only brief attention to the economic and social tiers of sustainability. There are some vague references to social housing and affordability in all cases, but more investigation and inquiry is needed. Although the intention of the book is to focus on energy efficiency and renewable energy benchmarks, clearer metrics and performance standards regarding the social and economic elements—such as affordable housing, livability, and fiscal viability—are warranted here.

This book is most useful to urban-design practitioners and urban-design educators who are interested in sustainability and zero-carbon design. Fraker's thorough investigation imparts a variety of knowledge to the reader, including (1) broad framework strategies for creating successful sustainable neighborhoods, (2) integrated infrastructure plans for achieving aggressive energy reductions at the community scale, (3) sustainable design

and low-energy goals for neighborhood-scale green development, and (4) detailed designs for specific sustainable infrastructure elements, such as living machines, anaerobic digesters, and swales. The book provides a clear and artfully illustrated explanation of the latest trends in whole systems integration at the neighborhood scale, including the principles of urban metabolism. Overall, Fraker lays out a hopeful road map for building a green and sustainable future.