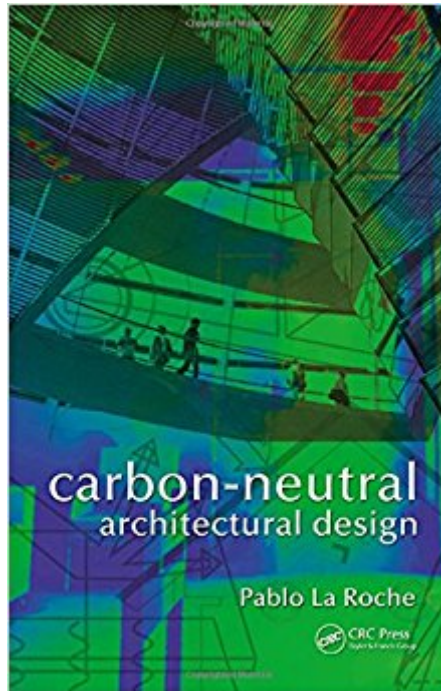


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# Carbon-Neutral Architectural Design



## Synopsis

The energy used to operate buildings is one of the most significant sources of greenhouse gas emissions. To lessen the human impact on climate, it is necessary to reduce these building-related emissions. New legislation, as well as market and financial pressures, are driving architects and developers to create low-carbon buildings. While it is possible to achieve many of these reductions through appropriate climate-responsive design, many architects are not trained to do this. Filling an urgent need for a design reference in this emerging field, *Carbon-Neutral Architectural Design* describes how to reduce building-related greenhouse gas emissions through appropriate design techniques. This full-color book presents strategies and methods to achieve CO<sub>2</sub> reductions, with an emphasis on control of energy flows through the building envelope and passive heating and cooling strategies. *Strategies for Designing Buildings with a Smaller Carbon Footprint* Examining climate change and its relationship with buildings, the book begins with a look at the sources of emissions and how these are produced as a result of interactions between buildings and the surrounding environment. It then introduces a carbon-neutral architectural design process (CNDP) and a roadmap that can be adjusted for different types of projects. Discussing climate analysis and solar geometry, the book explores how understanding the climate where a building is located helps to identify the design strategies that are best suited to that location—whether warm and humid, warm and dry, temperate, or cold. It looks at psychrometrics and how to achieve thermal comfort with minimum emissions. The book also explains how building fabric can be used to control energy flows by conduction, radiation, and convection—helping to reduce overheating and overcooling—and how to incorporate passive cooling and heating systems through appropriate design. The book includes useful references, equations, and illustrations, as well as a comparison of free carbon counting tools that can be used for residential building design. Drawing on the author's extensive experience in teaching and practice, this is a valuable resource for anyone who wants to reduce the carbon footprint of buildings. Find more study resources at the American Institute of Architects' Carbon Neutral Design Project web site. What's next for green building? See what Dr. La Roche has to say in this video on the HMC Architects blog.

## Book Information

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## Customer Reviews

Pablo La Roche is Professor in the Department of Architecture and Adjunct Professor at the Lyle Center for Regenerative Studies at California State Polytechnic University Pomona, where he has coordinated and taught design studios, environmental control systems, advanced electives, and seminars. In 2008 he led an interdisciplinary team of faculty and students that won the National Council of Architectural Registration Boards (NCARB) Grand Prize for the Department of Architecture. He has a Bachelors in Architecture and a Masters of Science in Architecture from Universidad del Zulia, Venezuela, and a PhD in Architecture from the University of California, Los Angeles. Dr La Roche has extensive international experience in designing passive cooling systems, low-energy sustainable architecture, and affordable housing, and has published more than 120 papers on these topics in conferences and journals in the Americas, Europe, Asia, and Australia. He has also been a technical reviewer for many international scientific conferences in the Americas, Europe, and India. Dr. La Roche is the principal author of *Keeping Cool: Guidelines to Avoid Overheating in Buildings* (2001), the sixth book in a series published by the Passive Low Energy Architecture Association (PLEA). Dr. La Roche is also the Director of Sustainable Design at HMC Architects, where he leads this California-based architecture firm's ArchLab group, dedicated to advancing high-performance low-carbon architecture. He is a registered architect in Venezuela and a LEED BD+C accredited professional in the USA. His projects, emphasizing sustainability and affordability, have been published or received awards in Latin America and Europe. For more information about Dr. La Roche, see Dr. La Roche's web site at Cal Poly Pomona, Zero Carbon Design, and HMC Architects.

Worthwhile purchase, very useful book and reference guide.

This book takes you through basic and advanced concepts for designing environmentally responsive structures. It is a design tool aiming to educate and assist students and professionals in understanding the ways building envelopes interface with the environment, and not argue about politics and/or "green policies". The author has been teaching such concepts for years, and as a refreshing change from the norm the book is written in an easy to follow language and its logical layout takes you through advanced concepts without too much struggle. The above is aided by the easy to follow illustrations (virtually one on every page, if not more) which are informative and thorough, while analytical tables and formulas are also provided and will be more valuable after the second or third pass of the book. It is not a back-to-back read, yet at no point a boring technical essay. I believe it deserves an easy to reach place on your library, as shuffling through it for every new project might provide you with useful ideas and examples.

As a student of Building Science this book has been a great support for having the answer to various basic topics of this area at hand. Daylighting, thermal comfort, climate and architecture, building envelope, passive systems, etc. Concise explanations of the principles behind each area, supported by examples and images.

For those practitioners, academics, and students interested in designing the zero net energy buildings of tomorrow, this is the book that you need on your bookshelf and desk today. As an architect and sustainability consultant, I use two or three books for ongoing reference when it comes to identifying the why and how for more progressive approaches to passive design. Pablo La Roche's "Carbon Neutral Architectural Design" is one of those. As an example, I could find no good reference info for "Earth Tube" cooling, but happily found that La Roche's book had a section devoted to this, which enabled our team to identify possibly strategies we might employ and model. We were also interested in the best way to look at Life Cycle impact of our proposed building. We found great guidance info on the tools available, some of them simple, some more complex, that saved our team time and analysis. We are coming to realize that beyond a book to read for sheer enjoyment, La Roche has created a road map of the most progressive approaches for the changing aspects of the architectural and sustainability professions.

Dr. Pablo La Roche's new book titled Carbon-Neutral Architectural Design is a great addition to the literature on sustainable architecture. This book goes beyond the traditional "green" design manual by first outlining the basics of sustainability and then demonstrating how theoretical concepts can

become integrated into the everyday practice of designers and developers. From climate analysis and thermal comfort to passive heating and solar geometry, Dr. La Roche's book will prove to be a great reference for anyone interested in helping make a difference towards a carbon-neutral world. Both for the student and practitioner, this book will not disappoint those looking for an impressive design reference that lays out an innovative carbon-neutral architectural design process.

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