



# Design and Construction of High-Performance Homes: Building Envelopes, Renewable Energies and Integrated Practice

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## Design and Construction of High-Performance Homes: Building Envelopes, Renewable Energies and Integrated Practice From Brand: Routledge

Both professionals and students are increasingly committed to achieving high-performance metrics in the design, construction and operation of residential buildings. This book responds to this demand by offering a comprehensive guide which features:

- architectural innovations in building skin technologies which make lighter more transparent buildings high performing
- energy-free architectural design principles and advances in building-integrated photovoltaics
- essential engineering principles, controls and approaches to simulation for achieving net zero
- the advantages of integrated design in residential construction and the challenges and opportunities it engenders
- detailed case studies of innovative homes which have incorporated low-energy design solutions, new materials, alternative building assemblies, digital fabrication, integrated engineering systems and operational controls.

Divided into four parts, the book discusses the requisite AEC (Architecture, Engineering and Construction) knowledge needed when building a high-performance home. It also communicates this information across four case studies, which provide the reader with a thorough overview of all aspects to be considered in the design and construction of sustainable homes. With contributions from experts in the field, the book provides a well-rounded and multi-faceted approach.

This book is essential reading for students and professionals in design, architecture, engineering (civil, mechanical and electrical), construction and energy management.

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#### Review

"To prevent the worst of climate change, high-performance buildings are now a necessity, and this book is a great resource to make such buildings a reality. It clearly recognizes that high performance is not just a technical challenge, but also requires an understanding of people's behaviors and the complexity of social arrangements."

Norbert Lechner, *Auburn University, USA*

"From design and analysis, to project construction and delivery, to new materials and techniques, the book carefully collects top authors, content, and case studies to help explicate what the editor describes as "energy-free architectural design". As well illustrated as it is written, this book convincingly merges the range of historical, technical, theoretical, and architectural obligations that presuppose our understanding of higher-performance buildings."

Kiel Moe, *Harvard Graduate School of Design, USA*

"This book insightfully spans some difficult gaps that have hindered our ecological aspirations in residential design: between the warm sense of home and the cold hard benchmarks of performance; from aesthetic to ethical considerations, between the hardware and the integrated systems; between available technology and material construction; and between simulation models and real-world cases"

Leonard Bachman, *Gerald D. Hines College of Architecture, University of Houston, USA*

#### About the Author

**Franca Trubiano** is a Registered Architect (O.A.Q., Int. Assoc. AIA) and Assistant Professor at Penn Design, University of Pennsylvania where she received her doctoral degree and conducts research in construction technology, emerging materials, tectonic theory, integrated design and architectural ecologies.

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