

# Preface

Sustainability and green building design have become powerful household concepts in the past few years. Almost everyone has his or her own ideas about global warming, renewable energy, and high-performance buildings. The copiousness of available information and resources overwhelms and even confuses not only young professionals but even seasoned architects and engineers who are in the frontline of designing energy-efficient sustainable buildings. Therefore, my main aim in writing this book was to present the most essential concepts and necessary tools to young and experienced professionals in order to enable them to perform more in-depth study, make proper decisions, and therefore design and construct high-efficiency sustainable buildings. The topics covered in each of the chapters of this book can be developed to form lengthy books by themselves, but my aim was to introduce the main concepts and not to bore readers with too many details. However, references provided throughout the book would prove helpful to readers who would like to have more in-depth knowledge of the topics covered. The book is mainly targeted toward mechanical and architectural engineers, with a focus on heating, ventilating, and air conditioning systems of building technology. Throughout the book, I have attempted to introduce readers to the most relevant topics for (1) communicating and categorizing knowledge about sustainable and energy-efficient buildings; (2) finding and implementing the significant standards, rules, and regulations for designing and constructing these buildings; (3) understanding the major systems and their associated controls; (4) getting familiarized with the designing and energy modeling tools to predict the estimated performance of these buildings; and (5) recognizing sources of available renewable energies to be utilized for electricity generation or even direct conditioning for these buildings. Finally, I have discussed (6) the concept of uncertainty, which though not a new concept in the academic world has not been developed fully to the extent of being available for industry-wide use. Of course, in the current professional world it is still a completely foreign concept with regard to the way that buildings are designed and their energy consumption is estimated. This can therefore be one of the most effective decision-making tools for estimating energy consumption and therefore in designing buildings.

Some of the chapters presented in this book have been dedicated to describing the current state of building design and construction systems and organizations. On the other hand, a few of the chapters have been written in order to encourage enthusiastic students and engineers to get involved in developing newer and less developed areas. All the sections have been written with a focus on energy-efficient and sustainable methods for the design and construction of buildings.

What distinguishes this book from the rest of the books available in the market is its comprehensive yet straight-to-the-point nature. I have tried to present the concepts and knowledge which are absolutely necessary for students and professionals in the field without diverging into common and century-old thermodynamics, heat transfer, and fluid mechanics formulas which are widely available in most other books. In a nutshell, this book gives shape and organization to readers' understanding of the main energy-related issues relevant to the modern HVAC industry, that is, it focuses on practical material which is missing in other available books.

I hope that this book can be of help to students and professionals who are at the beginning or middle of their professional journeys to design and construct more energy-efficient buildings and therefore contribute to building a sustainable and better world.

Marietta, GA, USA

Javad Khazaii

Energy-Efficient HVAC Design

An Essential Guide for Sustainable Building

Khazaii, J.

2014, XV, 162 p. 45 illus., 39 illus. in color., Hardcover

ISBN: 978-3-319-11046-2