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Drawing from the best of the widely dispersed literature in the field and the author's vast professional knowledge and experience, here is today's most exhaustive, one-stop coverage of the fundamentals, design, installation, and operation of industrial refrigeration systems. Detailing the industry changes caused by the conversion from CFCs to non-ozone-depleting refrigerants and by the development of microprocessors and new secondary coolants, *Industrial Refrigeration Handbook* also examines multistage systems; compressors, evaporators, and condensers; piping, vessels, valves and refrigerant controls; liquid recirculation; refrigeration load calculations; refrigeration and freezing of food; and safety procedures. Offering a rare compilation of thermodynamic data on the most-used industrial refrigerants, the Handbook is a mother lode of vital information and guidance for every practitioner in the field.

This book has been written to represent the efficient applications of sustainability upon building designs. The book intends to illustrate various techniques of action of sustainability on building conceptions. The book is divided into four parts and eight chapters. Part I "Introduction into Target Theme" includes a chapter with title "Introductory Chapter." It makes an overview of the meaning and the target of sustainable building and sustainable building material. Part II "Sustainable Building Design, Process, and Management" discusses many forms and concepts of sustainable building and

includes three chapters. Part III "Sustainable Building by Using Energy Efficiency in Building Design" includes one chapter. Part IV "Sustainability in Building Materials: Study Cases" includes three chapters.

Using a qualitative rather than a quantitative approach, presents detailed information based on concepts, rules, guidelines, intuition, and experience for architects in the areas of heating, cooling, and lighting at the schematic design stage. The data explored supports a three-tiered approach--load avoidance, using natural energy sources, and mechanical equipment. Among the topics covered are shading, thermal envelope, passive heating and cooling, electric lighting, and HVAC. Case studies illustrate how certain buildings use techniques at all three tiers for heating, cooling, and lighting. An appendix lists some of the more appropriate computer programs available to the architect for analysis at the schematic design stage.

Updated to include recent advances, this third edition presents strategies and analysis methods for conserving energy and reducing operating costs in residential and commercial buildings. The book explores the latest approaches to measuring and improving energy consumption levels, with calculation examples and Case Studies. It covers field testing, energy simulation, and retrofit analysis of existing buildings. It examines subsystems—such as lighting, heating, and cooling—and techniques needed for accurately evaluating them. Auditors, managers, and students of energy systems will find this book to be an invaluable resource for their work. Explores state-of-the-art techniques and technologies for

reducing energy combustion in buildings. Presents the latest energy efficiency strategies and established methods for energy estimation. Provides calculation examples that outline the application of the methods described. Examines the major building subsystems: lighting, heating, and air-conditioning. Addresses large-scale retrofit analysis approaches for existing building stocks. Introduces the concept of energy productivity to account for the multiple benefits of energy efficiency for buildings. Includes Case Studies to give readers a realistic look at energy audits. Moncef Krarti has vast experience in designing, testing, and assessing innovative energy efficiency and renewable energy technologies applied to buildings. He graduated from the University of Colorado with both MS and PhD in Civil Engineering. Prof. Krarti directed several projects in designing energy-efficient buildings with integrated renewable energy systems. He has published over 3000 technical journals and handbook chapters in various fields related to energy efficiency, distribution generation, and demand-side management for the built environment. Moreover, he has published several books on building energy-efficient systems. Prof. Krarti is Fellow member to the American Society for Mechanical Engineers (ASME), the largest international professional society. He is the founding editor of the ASME Journal of Sustainable Buildings & Cities Equipment and Systems. Prof. Krarti has taught several different courses related to building energy systems for over 20 years in the United States and abroad. As a professor at the University of Colorado, Prof. Krarti has been managing

the research activities of an energy management center at the school with an emphasis on testing and evaluating the performance of mechanical and electrical systems for residential and commercial buildings. He has also helped the development of similar energy efficiency centers in other countries, including Brazil, Mexico, and Tunisia. In addition, Prof. Krarti has extensive experience in promoting building energy technologies and policies overseas, including the establishment of energy research centers, the development of building energy codes, and the delivery of energy training programs in several countries.

This book presents a series of significant methods and examples for the design of sustainable intelligent facades in a variety of contexts. Emphasis is placed on how intelligence has been applied for successful energy-saving efforts in the planning of building envelopes. Readers will find essential information on the core principles involved in designing, calculating and organizing intelligent facades according to the need for a new or retrofitted building. Not only are different materials and technologies considered, but also efficient ways to combine them according to user needs and other project-specific constraints. Illustrations, tables and graphs accompany the text, clarifying the concepts discussed. Architects, facade consultants and all those interested in and energy-saving measures and improved indoor comfort will find this book useful not only as an introduction to the subject but also as a guide to achieving more responsive building methods.

This textbook teaches the fundamentals of building

energy modeling and analysis using open source example applications built with the US DOE's OpenStudio modeling platform and EnergyPlus simulation engine. Designed by researchers at US National Laboratories to support a new generation of high performance buildings, EnergyPlus and OpenStudio are revolutionizing how building energy modeling is taught in universities and applied by professional architects and engineers around the world. The authors, all researchers at National Renewable Energy Laboratory and members of the OpenStudio software development team, present modeling concepts using open source software that may be generally applied using a variety of software tools commonly used by design professionals. The book also discusses modeling process automation in the context of OpenStudio Measures—small self-contained scripts that can transform energy models and their data—to save time and effort. They illustrate key concepts through a sophisticated example problem that evolves in complexity throughout the book. The text also examines advanced topics including daylighting, parametric analysis, uncertainty analysis, design optimization, and model calibration. Building Energy Modeling with OpenStudio teaches students to become sophisticated modelers rather than simply proficient software users. It supports undergraduate and graduate building energy courses in Architecture, and in Mechanical, Civil, Architectural, and Sustainability Engineering.

This book contains the proceedings of the International Congress on Engineering and Sustainability in the XXI

cEntury – INCREaSE 2019, which was held in Faro, Portugal, from October 09 to 11, 2019. The book promotes a multidisciplinary approach to sustainable development, exploring a number of transversal challenges. Among other topics it discusses Climate Changes and Environmental Protection; Renewable Energy; Energy Efficiency in Buildings; Green Governance and Mobility; Water for Ecosystem and Society; Healthy Food; Sustainable Construction; and Sustainable Tourism, offering perspectives from civil, electronics, mechanical, and food engineering.

Meet the challenge of integrating Building Information Modeling and sustainability with this in-depth guide, which pairs these two revolutionary movements to create environmentally friendly design through a streamlined process. Written by an award-winning team that has gone beyond theory to lead the implementation of Green BIM projects, this comprehensive reference features practical strategies, techniques, and real-world expertise so that you can create sustainable BIM projects, no matter what their scale.

Procedures for Commercial Building Energy Audits provides purchasers and providers of energy audit services with a complete definition of good procedures for an energy survey and analysis. It also provides a format for defining buildings and their energy use that will allow data to be shared in meaningful ways. This publication specifically avoids a "cookbook" approach, recognizing that all buildings are different and each analyst needs to exercise a substantial amount of judgment. Instead, Procedures sets out generalized procedures to guide the analyst and the building owner, and provides a uniform method of reporting basic

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information. Different levels of analysis are organized into the following categories: Preliminary Energy Use Analysis Level I Analysis "Walk-Through Analysis Level II Analysis" Energy Survey and Analysis Level III Analysis "Detailed Analysis of Capital-Intensive Modifications The book comes with a CD that provides more than 25 guideline forms, with explanatory material, to illustrate the content and arrangement of a complete, effective energy analysis report. The CD provides these forms in both PDF and Word format, enabling you to customize and print each form. For the downloadable version, the PDF of the book and the guideline forms are included in a single .zip file. You will need WinZip or an equivalent program to open the file. ASHRAE Research Project 669 and ASHRAE Special Project 56.

Since the appearance of the first edition of 'Energy Simulation in Building Design', the use of computer-based appraisal tools to solve energy design problems within buildings has grown rapidly. A leading figure in this field, Professor Joseph Clarke has updated his book throughout to reflect these latest developments. The book now includes material on combined thermal/lighting and CFD simulation, advanced glazings, indoor air quality and photovoltaic components. This thorough revision means that the book remains the key text on simulation for architects, building engineering consultants and students of building engineering and environmental design of buildings. The book's purpose is to help architects, mechanical & environmental engineers and energy & facility managers to understand and apply the emerging computer methods for options appraisal at the individual building, estate, city, region and national levels. This is achieved by interspersing theoretical derivations relating to simulation within an evolving description of the built environment as a complex system. The premise is that the effective application of any simulation tool requires a thorough understanding of

the domain it addresses.

Climate change is believed to be a great challenge to built environment professionals in design and management. An integrated approach in delivering a sustainable built environment is desired by the built environment professional institutions. The aim of this book is to provide an advanced understanding of the key subjects required for the design and management of modern built environments to meet carbon emission reduction targets. In *Design and Management of Sustainable Built Environments*, an international group of experts provide comprehensive and the most up-to-date knowledge, covering sustainable urban and building design, management and assessment. The best practice case studies of the implementation of sustainable technology and management from the BRE Innovation Park are included. *Design and Management of Sustainable Built Environments* will be of interest to urban and building designers, environmental engineers, and building performance assessors. It will be particularly useful as a reference book for undergraduate and postgraduate students in the built environment field.

Since 1994, the European Conferences of Product and Process Modelling ([www.ecppm.org](http://www.ecppm.org)) have provided a review of research, development and industrial implementation of product and process model technology in the Architecture, Engineering, Construction and Facilities Management (AEC/FM) industry. Product/Building Information Modelling has matured significantly in the last few years and has never been closer to having a permanent impact on the AEC/FM industry as a mainstream technology. In this context the 9th European Conference of Product and Process Modelling provided a forum for leading experts to discuss the latest achievements, emerging trends and future directions in product and process modelling technology in this dynamic

and fragmented industry, focusing on integrated project working, value-based life cycle management and intelligent and sustainable buildings and construction. eWork and eBusiness in Architecture, Engineering and Construction 2012 provides a comprehensive overview of topics including BIM in all life-cycle stages, ICT for energy efficiency, smart buildings and environmental performance, energy and building simulation, knowledge and semantic modelling, visualization technologies as well as tools and methods to support innovations in design and construction processes. It further includes the proceedings of the 3rd Workshop on eeBuildings Data Models (Energy Efficiency Vocabularies), which aim to identify ICT Energy Efficiency Vocabularies and Ontologies to foster interoperability of Energy Efficiency Management Systems. eWork and eBusiness in Architecture, Engineering and Construction 2012 will be of interest to academics and professionals working in the interdisciplinary area of information technology in architecture, engineering and construction.

This is the revised and expanded 1998 edition of a popular introduction to the design and implementation of geometry algorithms arising in areas such as computer graphics, robotics, and engineering design. The basic techniques used in computational geometry are all covered: polygon triangulations, convex hulls, Voronoi diagrams, arrangements, geometric searching, and motion planning. The self-contained treatment presumes only an elementary knowledge of mathematics, but reaches topics on the frontier of current research, making it a useful reference for practitioners at all levels. The second edition contains material on several new topics, such as randomized algorithms for polygon triangulation, planar point location, 3D convex hull construction, intersection algorithms for ray-segment and ray-triangle, and point-in-polyhedron. The code in this edition is

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significantly improved from the first edition (more efficient and more robust), and four new routines are included. Java versions for this new edition are also available. All code is accessible from the book's Web site

(<http://cs.smith.edu/~orourke/>) or by anonymous ftp.

Leading architectural firms are now using in-house design simulation to help make more sustainable design decisions. Taking advantage of these new tools requires understanding of what can be done with simulation, how to do it, and how to interpret the results. This software-agnostic book, which is intended for you to use as a professional architect, shows you how to reduce the energy use of all buildings using simulation for shading, daylighting, airflow, and energy modeling. Written by a practicing architect who specializes in design simulation, the book includes 30 case studies of net-zero buildings, as well as of projects with less lofty goals, to demonstrate how energy simulation has helped designers make early decisions. Within each case study, author Kjell Anderson mentions the software used, how the simulation was set up, and how the project team used the simulation to make design decisions. Chapters and case studies are written so that you learn general concepts without being tied to particular software. Each chapter builds on the theory from previous chapters, includes a summary of concept-level hand calculations (if applicable), and gives comprehensive explanations with graphic examples. Additional topics include simulation basics, comfort, climate analysis, a discussion on how simulation is integrated into some firms, and an overview of some popular design simulation software.

This guide is ideal for HVAC design engineers, architects, building owners, facility managers, equipment manufacturers and installers, utility engineers, researchers, and other users of underfloor air distribution (UFAD) technology. UFAD systems are innovative methods for delivering space

conditioning in offices and other commercial buildings. Improved Thermal Comfort, Improved Ventilation Efficiency and Indoor Air Quality, Reduced Energy Use and Reduced Life-Cycle Building Costs -- The guide explains these as some of the advantages that UFAD systems have over traditional overhead air distribution systems. This guide provides assistance in the design of UFAD systems that are energy efficient, intelligently operated, and effective in their performance. It also describes important research results that support current thinking on UFAD design and includes an extensive annotated bibliography for those seeking additional detailed information.

Lightweight aggregate concrete is undergoing something of a renaissance. Although this material has been available for many years, only now is it being used more widely. This book provides a comprehensive review of this growing field from an international perspective.

When used appropriately, building performance simulation has the potential to reduce the environmental impact of the built environment, to improve indoor quality and productivity, as well as to facilitate future innovation and technological progress in construction. Since publication of the first edition of *Building Performance Simulation for Design and Operation*, the discussion has shifted from a focus on software features to a new agenda, which centres on the effectiveness of building performance simulation in building life cycle processes. This new edition provides a unique and comprehensive overview of building performance simulation for the complete building life cycle from conception to demolition, and from a single building to district level. It contains new chapters on building information modelling, occupant behaviour modelling, urban physics modelling, urban building energy modelling and renewable energy systems modelling. This new edition keeps the same chapter

structure throughout including learning objectives, chapter summaries and assignments. Moreover, the book:

- Provides unique insights into the techniques of building performance modelling and simulation and their application to performance-based design and operation of buildings and the systems which service them.
- Provides readers with the essential concepts of computational support of performance-based design and operation.
- Provides examples of how to use building simulation techniques for practical design, management and operation, their limitations and future direction.

It is primarily intended for building and systems designers and operators, and postgraduate architectural, environmental or mechanical engineering students.

Covers design, technology and placement of residential windows, giving step-by-step procedures for assessing the energy performance of windows. The book is aimed at architects, builders, homeowners and those seeking energy-efficient housing, to help them choose from a range of window technologies.

Discover BIM: A better way to build better buildings Building Information Modeling (BIM) offers a novel approach to design, construction, and facility management in which a digital representation of the building product and process is used to facilitate the exchange and interoperability of information in digital format. BIM is beginning to change the way buildings look, the way they function, and the ways in which they are designed and built. The BIM Handbook, Third Edition provides an in-depth understanding of BIM technologies, the business and organizational issues associated with its implementation, and the profound advantages that effective use of BIM can provide to all members of a project team.

Updates to this edition include: Information on the ways in which professionals should use BIM to gain maximum value New topics such as collaborative working, national and major

construction clients, BIM standards and guides A discussion on how various professional roles have expanded through the widespread use and the new avenues of BIM practices and services A wealth of new case studies that clearly illustrate exactly how BIM is applied in a wide variety of conditions Painting a colorful and thorough picture of the state of the art in building information modeling, the BIM Handbook, Third Edition guides readers to successful implementations, helping them to avoid needless frustration and costs and take full advantage of this paradigm-shifting approach to construct better buildings that consume fewer materials and require less time, labor, and capital resources.

"Net zero energy buildings, equilibrium buildings or carbon neutral cities – depending on location and the reasons for making the calculation, the numbers are run differently. The variety of terms in use indicates that a scientific method is still lacking – which is a problem not just in regard to international communication, but also with respect to planning processes as a response to energy challenges. The clarification and meaning of the most important terms in use is extremely important for their implementation. Since October 2008, a panel of experts from an international energy agency has concerned itself with these topics as part of a project entitled "Towards Net Zero Energy Solar Buildings". The objective is to analyse exemplary buildings that are near a zero-energy balance in order to develop methods and tools for the planning, design and operation of such buildings. The results are documented in this publication: In addition to the presentation of selected projects, it is not just architectural showcase projects that are shown – the focus is on relaying knowledge and experience gained by planners and builders. Even if many questions remain unanswered: Project examples that have already been implemented prove on a practical basis that the objective of a zero energy balance is

already possible today."

The agreement reached at the 21st Conference of the Parties (COP21) in Paris could prove to be a historic turning point for reversing the currently unsustainable trends in the global energy system, provided that this heightened low-carbon ambition is translated into fast, radical and effective policy action. Even in the context of low fossil fuel prices, policy support for low-carbon technologies should mobilise all levers available to accelerate research, development, demonstration and deployment (RDD & D) to make decarbonisation the preferred development path. Chief among such levers is governments support for urban energy transitions, a conclusion that is supported by the analysis of Energy Technology Perspectives 2016 (ETP 2016), which shows the vast number and size of cost-effective, sustainable energy opportunities available in cities. Realising this potential, and the multiple non-climate benefits it presents, will require national and local governments to work together effectively

Explores and brings together the existent body of knowledge on building performance analysis Building performance is an important yet surprisingly complex concept. This book presents a comprehensive and systematic overview of the subject. It provides a working definition of building performance, and an in-depth discussion of the role building performance plays throughout the building life cycle. The book also explores the perspectives of various stakeholders, the functions of buildings, performance requirements, performance quantification (both predicted and measured), criteria for success, and the challenges of using performance analysis in practice. Building Performance Analysis starts by introducing the subject of building performance: its key terms, definitions, history, and challenges. It then develops a theoretical foundation for the subject, explores the complexity of performance assessment, and the way that performance

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analysis impacts on actual buildings. In doing so, it attempts to answer the following questions: What is building performance? How can building performance be measured and analyzed? How does the analysis of building performance guide the improvement of buildings? And what can the building domain learn from the way performance is handled in other disciplines? Assembles the current body of knowledge on building performance analysis in one unique resource Offers deep insights into the complexity of using building performance analysis throughout the entire building life cycle, including design, operation and management Contributes an emergent theory of building performance and its analysis Building Performance Analysis will appeal to the building science community, both from industry and academia. It specifically targets advanced students in architectural engineering, building services design, building performance simulation and similar fields who hold an interest in ensuring that buildings meet the needs of their stakeholders.

This practical application reference provides a resource for those seeking to utilize the innovative methods now available to finance energy projects. The full scope of current project financing practices are fully examined and assessed, including coverage of energy service performance contracting, rate of return analysis, measurement and verification of energy savings, and more. Readers will receive the facts they need to assess a project's payback in advance, anticipate and avoid potential risks and/or hidden costs, and assure that your energy project is an overall economic success. Other topics covered include financing international projects and ESCO's (Energy Service Company's) financing.

This comprehensive resource provides expert guidance on how Life Cycle Costing (LCC) can optimize decision-making

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and enhance long-term profit. Sixteen case studies show how to apply LCC to particular facility types and building components, in a new construction and remodeling. This text looks at the non-software aspects of using computerized building energy simulation. If you have been frustrated trying to build faithful models of existing buildings, or have become skeptical of the efficacy of building simulation this book should offer you welcome assistance.

Based on the most recent standards from ASHRAE, the sixth edition provides complete and up-to-date coverage of all aspects of heating, ventilation, and air conditioning. The latest load calculation procedures, indoor air quality procedures, and issues related to ozone depletion are covered. New to this edition is the inclusion of additional realistic, interactive and in-depth examples available on the book website ([www.wiley.com/college/mcquiston](http://www.wiley.com/college/mcquiston)) that enable students to simulate various scenarios to apply concepts from the text. Also integrated throughout the text are numerous worked examples that clearly show students how to apply the concepts in realistic scenarios. The sixth edition has also been revised to be more accessible to students for easier comprehension. Suitable for one or two semester, Junior/Senior/Graduate course in HVAC taught in Mechanical Engineering, Architectural Engineering, and Mechanical Engineering Technology departments.

The important management techniques of the most successful pig producers today are made available in this textbook through the practical advice of an award-winning pig consultant. The book describes and analyzes likely future developments and how they might fit into the economic scene—incorporating a unique econometric (cost-effective) interpretation in addition to research and field trial performance results. The groundbreaking “Business Management” section is based on the experience of advising

on some 3,500 pig farms across 32 countries and is just one of the many in-depth features of this essential guide.

This book outlines the data-driven modelling of building energy performance to support retrofit decision-making. It explains how to determine the appropriate machine learning (ML) model, explores the selection and expansion of a reasonable dataset and discusses the extraction of relevant features and maximisation of model accuracy. This book develops a framework for the quick selection of a ML model based on the data and application. It also proposes a method for optimising ML models for forecasting buildings energy loads by employing multi-objective optimisation with evolutionary algorithms. The book then develops an energy performance prediction model for non-domestic buildings using ML techniques, as well as utilising a case study to lay out the process of model development. Finally, the book outlines a framework to choose suitable artificial intelligence methods for modelling building energy performances. This book is of use to both academics and practising energy engineers, as it provides theoretical and practical advice relating to data-driven modelling for energy retrofitting of non-domestic buildings.

Both the number and percentage of people living in urban areas is growing rapidly. Up to half of the world's population is expected to be living in a city by the end of the century and there are over 170 cities in the world with populations over a million. Cities have a huge impact on the local climate and require vast quantities of energy to keep them functioning. The urban environment in turn has a big impact on the performance and needs of buildings. The size, scale and mechanism of these interactions is poorly understood and strategies to mitigate them are rarely implemented. This is the first comprehensive book to address these questions. It arises out of a programme of work (POLISTUDIES) carried out for

the Save programme of the European Commission. Chapters describe not only the main problems encountered such as the heat island and canyon effects, but also a range of design solutions that can be adopted both to improve the energy performance and indoor air quality of individual buildings and to look at aspects of urban design that can reduce these climatic effects. The book concludes with some examples of innovative urban bioclimatic buildings. The project was coordinated by Professor Mat Santamouris from the University of Athens who is also the editor of the book. Other contributions are from the University of Thessaloniki, Greece, ENTPE, Lyons, France and the University of Stuttgart, Germany.

Accelerated urbanization imposes immense pressure on the dwindling energy sources and fragile ecosystems. Yet, the resource crunch confronting energy supplies can be alleviated if we design and develop future buildings by incorporating sound concepts of energy efficiency and sustainability. Covering 41 projects from India's various climatic zones, this book provides thorough insights into the context, techniques, and benefits of energy-efficient buildings. The projects highlight design responses to varied climatic conditions, appropriate materials and construction methods, implementation of energy-efficient systems, and effective utilization of renewable energy to reduce pressure on grid power. This book will inspire architects, designers, urban planners, engineers, and students to build for a better tomorrow.

These papers, presented at the Fifth Urban Research Symposium in Marseille, France, put into perspective ESMAP's prioritization of city-wide and sector specific urban energy initiatives to make cities energy efficient, providing analytical tools, policy insights, and good practices.

This book brings together concepts from the building,

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environmental, behavioural and health sciences to provide an interdisciplinary understanding of office and workplace design. Today, with changes in the world of work and the relentless surge in technology, offices have emerged as the repositories of organizational symbolism, denoted by the spatial design of offices, physical settings and the built environment (architecture, urban locale). Drawing on Euclidian geometry that quantifies space as the distance between two or more points, a body of knowledge on office buildings, the concept of office and office space, and the interrelationships of spatial and behavioural attributes in office design are elucidated. Building and office work-related illnesses, namely sick building syndrome and ailments arising from the indoor environment, and the menace of musculoskeletal disorders are the alarming manifestations that critically affect employee satisfaction, morale and work outcomes. With a focus on office ergonomics, the book brings the discussion on the fundamentals of work design, with emphasis on computer workstation users. Strategic guidance of lighting systems and visual performance in workplaces are directed for better application of ergonomics and improvement in office indoor environment. It discusses the profiles of bioclimatic, indoor air quality, ventilation intervention, lighting and acoustic characteristics in office buildings. Emphasis has been given to the energy performance of buildings, and contemporary perspectives of building sustainability, such as green office building assessment schemes, and national and international building-related standards and codes. Intended for students and professionals from ergonomics, architecture, interior design, as well as construction engineers, health care professionals, and office planners, the book brings a unified overview of the health, safety and environment issues associated with the design of office buildings.

Buildings are one of the main causes of the emission of greenhouse gases in the world. Europe alone is responsible for more than 30% of emissions, or about 900 million tons of CO<sub>2</sub> per year. Heating and air conditioning are the main cause of greenhouse gas emissions in buildings. Most buildings currently in use were built with poor energy efficiency criteria or, depending on the country and the date of construction, none at all. Therefore, regardless of whether construction regulations are becoming stricter, the real challenge nowadays is the energy rehabilitation of existing buildings. It is currently a priority to reduce (or, ideally, eliminate) the waste of energy in buildings and, at the same time, supply the necessary energy through renewable sources. The first can be achieved by improving the architectural design, construction methods, and materials used, as well as the efficiency of the facilities and systems; the second can be achieved through the integration of renewable energy (wind, solar, geothermal, etc.) in buildings. In any case, regardless of whether the energy used is renewable or not, the efficiency must always be taken into account. The most profitable and clean energy is that which is not consumed.

Proceedings of the 8th International Symposium on Heating, Ventilation and Air Conditioning is based on the 8th International Symposium of the same name (ISHVAC2013), which took place in Xi'an on October 19-21, 2013. The conference series was initiated at Tsinghua University in 1991 and has since become the premier international HVAC conference initiated in

China, playing a significant part in the development of HVAC and indoor environmental research and industry around the world. This international conference provided an exclusive opportunity for policy-makers, designers, researchers, engineers and managers to share their experience. Considering the recent attention on building energy consumption and indoor environments, ISHVAC2013 provided a global platform for discussing recent research on and developments in different aspects of HVAC systems and components, with a focus on building energy consumption, energy efficiency and indoor environments. These categories span a broad range of topics, and the proceedings provide readers with a good general overview of recent advances in different aspects of HVAC systems and related research. As such, they offer a unique resource for further research and a valuable source of information for those interested in the subject. The proceedings are intended for researchers, engineers and graduate students in the fields of Heating, Ventilation and Air Conditioning (HVAC), indoor environments, energy systems, and building information and management. Angui Li works at Xi'an University of Architecture and Technology, Yingxin Zhu works at Tsinghua University and Yuguo Li works at The University of Hong Kong.

Passive and Low Energy Architecture contains the proceedings of the Second International PLEA Conference held in Crete, Greece, on June 28 to July 1, 1983. The book is organized into four parts as the topics of the conference. The first part brings together papers dealing with case studies of individual buildings or

groups of buildings, completed or to be built, and of community planning. The case studies cover examples from 13 countries in Europe, North and Latin America, North Africa, the Middle East, and Asia. The second part contains papers on experimental work and technical developments with passive and low energy systems and components. The third section focuses on the ill-defined but crucial to designers, area of design aids. The fourth section centers on implementation and management of these energy systems, including topics of international programs, education, and training of design professionals. The book will be useful to energy conscious designers, architects, engineers, and planners in this field of interest.

This book incorporates UK and international case studies and essays to identify the overlaps in the interests of energy and building conservation. The relevance and adjustments of qualitative and quantitative frames of reference are introduced, alongside the various expertise of the contributors: architects, designers, conservation consultants and academics. The second part of the book showcases sustainable domestic and non-domestic heritage projects, translating the preceding research into information that practitioners can use in their everyday work. The book will appeal to architecture students, newly qualified professionals and conservation architects and will enhance readers' ambitions, so that they feel equipped and inspired to work with old buildings sensitively, creatively and sustainably.

The Intuitive Guide to Energy Efficiency and Building Improvements Energy Audits and Improvements for

