

Energy Design Strategies For Retrofitting Methodology Technologies Renovation Options And Applications

EnerPHit Natural Ventilation for Infection Control in Health-care Settings Net Zero Energy Buildings Passive Energy Strategies for Mediterranean Residential Buildings 1994 ACEEE Summer Study on Energy Efficiency in Buildings: Demonstrations and retrofits Energy Efficient Buildings Retrofitting of Heritage Structures Design Solutions for nZEB Retrofit Buildings Sustainable Retrofitting of Commercial Buildings The Passivhaus Handbook Facade Refurbishment Toolbox Architectural Research Addressing Societal Challenges Volume 1 Sustainable Retrofit and Facilities Management Sustainable Ecological Engineering Design A Handbook of Sustainable Building Design and Engineering Deep Energy Retrofit Mainstreaming Building Energy Efficiency Codes in Developing Countries Heating, Cooling, Lighting Energy-efficient Office Refurbishment Energy Design Strategies for Retrofitting Energy-Efficient Building Systems Assessment of Daylight Performance in Buildings Cost-Effective Energy Efficient Building Retrofitting Energy Simulation in Building Design Hawaiian Design Architectural Research Addressing Societal Challenges Retrofitting the Built Environment Low Energy Cooling for Sustainable Buildings Retrofitting the Built Environment Energy-Efficient Electrical Systems for Buildings Buildings for Education Sustainable Retrofitting of Commercial Buildings Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers Solar Thermal and Biomass Energy Deep Energy Retrofit Guide for Public Buildings ZEMCH: Toward the Delivery of Zero Energy Mass Custom Homes Green Planning for Cities and Communities Positive Energy Homes Design Professional's Guide to Zero Net Energy Buildings Towards a Sustainable Northern European Housing Stock

EnerPHit

This long-awaited reference guide provides a complete overview of low energy cooling systems for buildings, covering a wide range of existing and emerging sustainable energy technologies in one comprehensive volume. An excellent data source on cooling performance, such as building loads or solar thermal chiller efficiencies, it is essential reading for building services and renewable energy engineers and researchers covering sustainable design. The book is unique in including a large set of experimental results from years of monitoring actual building and energy plants, as well as detailed laboratory and simulation analyses. These demonstrate which systems really work in buildings, what the real costs are and how operation can be optimized – crucial information for planners, builders and architects to gain confidence in applying new technologies in the building sector. Inside you will find valuable insights into: the energy demand of residential and office buildings; facades and summer performance of buildings; passive cooling strategies; geothermal cooling; active thermal cooling technologies, including absorption cooling, desiccant cooling and new developments in low power chillers; sustainable building operation using simulation. Supporting case study material makes this a useful text for senior

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undergraduate students on renewable and sustainable energy courses. Practical and informative, it is the best up-to-date volume on the important and rapidly growing area of cooling.

Natural Ventilation for Infection Control in Health-care Settings

This guideline defines ventilation and then natural ventilation. It explores the design requirements for natural ventilation in the context of infection control, describing the basic principles of design, construction, operation and maintenance for an effective natural ventilation system to control infection in health-care settings.

Net Zero Energy Buildings

Despite recent improvements in energy efficiency being made in new build, it is important that the existing commercial building sector also take action to meet emission reduction targets. The objectives and challenges of such action will reduce the risk of the sector becoming obsolete due to high energy use and poor environmental performance. This book presents a theory-based, practice-support methodology to deal with sustainable retrofitting opportunities for existing commercial buildings in warm climates using bioclimatic design as the basis. The book has four main parts, focusing on eco-design and renovation, bioclimatic retrofitting, technological and behavioural change and case studies of retrofitting exemplars. In the first part, the context of climate change effects on design and renovation at the city scale is discussed. The second part looks at bioclimatic retrofitting as a 'design guide' for existing buildings, highlighting the significance of architectural design and engineering systems for energy performance. The technological and behavioural contexts of the existing building sector – policies, modelling, monitoring and trend analysis in respect to energy and environmental performance – are covered in part three. The final part gives some case studies showing the effectiveness of strategies suggested for effective environmental performance. This book is a must-have guide for all involved in the design and engineering of retrofitting projects in warm climates.

Passive Energy Strategies for Mediterranean Residential Buildings

Proven Strategies and Solutions for Reducing Energy Consumption Property and facility managers can turn to Energy-Efficient Building Systems as a one-stop guide to operating and maintaining commercial building systems at peak efficiency. Designed to help reduce energy costs and meet environmental standards, this state-of-the-art productivity tool contains fully illustrated, real-world examples of successful green building projects that have achieved significant, energy-saving results. From energy management and auditing, HVAC systems, cooling towers, and pumping systems to lighting, electrical systems, automation, and building envelope, this expert resource takes readers step by step through procedures

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for getting optimal performance from every building system. For each system, the book presents the latest methods for improving efficiency identifying promising new solutions evaluating their feasibility and estimating actual savings. Comprehensive and authoritative, Energy-Efficient Building Systems enables building professionals to: Get an in-depth understanding of the principles of each building system Select the most efficient systems for any nonresidential building Maximize energy efficiency with practical strategies and solutions Utilize hands-on methods for evaluating feasibility and estimating savings Review real-world examples of successful green building projects Inside This Cost-Saving Energy Guide • Energy Management and Energy Auditing • Air-Conditioning and Central Chiller Systems • Boilers and Heating Systems • Pumping Systems • Cooling Towers • Air Handling and Distribution Systems • Lighting Systems • Building Electrical Systems • Building Automation Systems • Building Envelope

1994 ACEEE Summer Study on Energy Efficiency in Buildings: Demonstrations and retrofits

The combined challenges of health, comfort, climate change and energy security cross the boundaries of traditional building disciplines. This authoritative collection, focusing mostly on energy and ventilation, provides the current and next generation of building engineering professionals with what they need to work closely with many disciplines to meet these challenges. A Handbook of Sustainable Building Engineering covers: how to design, engineer and monitor a building in a manner that minimises the emissions of greenhouse gases; how to adapt the environment, fabric and services of existing and new buildings to climate change; how to improve the environment in and around buildings to provide better health, comfort, security and productivity; and provides crucial expertise on monitoring the performance of buildings once they are occupied. The authors explain the principles behind built environment engineering, and offer practical guidance through international case studies.

Energy Efficient Buildings

The physical upgrading of the existing domestic and industrial building stock to improve energy performance is an essential part of a transition to a low carbon society. Successfully retrofitting buildings to improve energy performance is not simply a technological challenge, it is a complex socio-technical problem that needs to be addressed in a co-ordinated way, utilising skills and knowledge from a range of industrial and academic backgrounds. Within both the academic and practitioner communities there is a growing understanding of the scale and nature of the problem, one which encompasses issues such as policy and regulation, people and behaviour, supply chain and process, as well as issues of technology. Retrofitting the Built Environment discusses the factors that impact on the retrofit problem, providing a clear analysis of the main issues that the academic and industrial communities must engage with to resolve the problems of domestic energy and retrofit. The book is divided into four broad sections: Understanding the Problem Policy and Regulation Implementing and Evaluating

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Retrofit People and Communities Academic and industrial researchers, policy makers and industry practitioners will find each section covers a mix of policy, technical and social science issues, presented by both academic and industry authors, giving a wide and detailed perspective of the issue. The Editors Will Swan is a Senior Lecturer in Buildings Retrofit in the School of the Built Environment at the University of Salford. He leads a number of projects in the field of sustainable retrofit, covering a number of topics including monitoring, behaviour and retrofit project delivery, as part of Salford's Applied Energy and Buildings Research Group. He sits on the Greater Manchester Buildings Group and also is Chair of the Retrofit Innovation Group. Philip Brown is Director and Senior Research Fellow at the Salford Housing & Urban Studies Unit (SHUSU) at the University of Salford. He is the lead academic on end-use energy demand within the Applied Energy and Buildings Research Group, and sits on Greater Manchester's Low Carbon Economic Area group for Customer Engagement.

Retrofitting of Heritage Structures

This book discusses energy efficient buildings and the role they play in our efforts to address climate change, energy consumption and greenhouse gas emissions by considering buildings and the construction sector's unique position along a critical path to decarbonisation from a multi-perspective and holistic viewpoint. Topics covered in the book range from daylighting, building topology comparison, building envelope design, zero energy homes in hot arid regions, life-cycle considerations and energy efficiency analysis to managing energy demand through equipment selection. Each chapter addresses an important aspect of energy efficient building and serves as a vital building block towards constructing a timely and relevant body of knowledge in energy efficient buildings.

Design Solutions for nZEB Retrofit Buildings

Governments across the globe are setting targets for reducing their carbon emissions. For example, the UK Government has committed to an eighty per cent reduction by 2050, when twenty-eight million buildings that currently exist will still be standing; this represents a challenge to improve the energy efficiency of more than one building per minute between now and 2050! This is a problem that needs tackling worldwide and is a challenge to both the refurbishment sector of the global construction industry and to those who own and operate existing buildings. Sustainable Retrofit and Facilities Management provides comprehensive guidance to those involved in the refurbishment and management of existing buildings on minimizing carbon emissions, water consumption and waste to landfill, along with enhancing the long term sustainability of a building. Practical guidance is provided on measures that can be used to improve the efficiency and sustainability of existing buildings, through both good management and refurbishment. Also explored is the relationship between the refurbishment of existing buildings, facility management and the wider community infrastructure. The book looks at management tools such as post occupancy evaluation, building health checks, energy management software, green

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building management toolkits and green leases. Illustrated throughout with case studies and examples of best practice, this is a must-have handbook for engineers, architects, developers, contractors and facility managers.

Sustainable Retrofitting of Commercial Buildings

The starting point of the research is the need to refurbish existing residential building stock, in order to reduce its energy demand, which accounts for over one fourth of the energy consumption in the European Union. Refurbishment is a necessary step to reach the ambitious energy and decarbonisation targets for 2020 and 2050 that require an eventual reduction up to 90% in CO2 emissions. In this context, the rate and depth of refurbishment need to grow. The number of building to be renovated every year should increase, while the energy savings in renovated buildings should be over 60% reduction to current energy demand. To achieve that, not only is it necessary to find politics and incentives, but also to enable the building industry to design and construct effective refurbishment strategies. This research focuses on refurbishment of the building envelope, as it is very influential with regard to energy reduction.

The Passivhaus Handbook

Through research and proven practice, the aim of the International Conference of Sustainable Ecological Engineering Design for Society (SEEDS) is to foster ideas on how to reduce negative impacts on the environment while providing for the health and well-being of society. The professions and fields of research required to ensure buildings meet user demands and provide healthy enclosures are many and diverse. The SEEDS conference addresses the interdependence of people, the built and natural environments, and recognizes the interdisciplinary and international themes necessary to assemble the knowledge required for positive change.

Facade Refurbishment Toolbox

This book presents an approach to energy-efficient building design, which takes into account the most important challenges in climate change mitigation and adaptation in Southern Europe. It outlines a specific approach related to residential buildings and their intergenerational and vulnerable occupants, such as ageing population and users in fuel poverty. It also focuses on the use of passive energy measures throughout the year, and on pursuing a realistic and affordable approach to the efficient rehabilitation of resilient residential buildings. In addition, the book presents case studies that include surveys, monitoring, and simulation of residential buildings in Spain and other Southern European representative locations, in order to go further on the study of this challenging topic.

Architectural Research Addressing Societal Challenges Volume 1

This title deals with the many advantages associated to the use of natural light, comparing architectural experiences, technological devices and calculation methods. It provides an introduction to the problems and solutions of enhancing and conveying the right dose of daylight inside buildings, giving attention to energy savings and visual comfort

Sustainable Retrofit and Facilities Management

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.

Sustainable Ecological Engineering Design

The preservation of heritage architecture is a cultural objective rigorously pursued by communities and nations wishing to promote their history, civilisation and aesthetic achievements. Structures built in the remote past by traditional methods have suffered the consequences of extreme loading events, such as earthquakes, over long time periods. Retrofitting is an approach based on recent technological developments and scientific knowledge, whereby modern construction methods and materials are applied to the repair and strengthening of historical structures. This book aims to inform on current retrofitting techniques, their application to various types of historical architecture and their effectiveness to fulfil their purpose. Retrofitted structural forms covered in the book vary widely from age old places of worship, such as churches, mosques and temples, as well as castles and palaces to more modern, distinguished private residences or public buildings, some of them designed by well known architects. Their methods of construction range from traditional, such as stone or brick masonry to more recent textile block systems and even reinforced concrete frameworks. Reference is made to detailed visual inspections of damaged structure providing valuable insight into possible causes of failure; such inspections

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are usually combined with material characterisation which is an essential input to numerical modelling for assessing the behaviour of the structure before and after retrofitting. The book describes strengthening techniques for masonry walls including re-pointing, injection grouting and the use of steel ties. The use of reinforced concrete is proposed in the form of cast-in-place walls, jackets or tie-beams; that of carbon fibre reinforced laminates for strengthening walls and slabs. Innovative use of materials, such as shape memory alloys, self-compacting concrete or thin lead layers is also suggested. Particular attention is given to methods for moderating the consequences of destructive earthquakes. Seismic energy absorbing devices and base isolation systems are two effective means of providing protection against future seismic events although their application is often met with many technical challenges in practice. Retrofitting of Heritage Structures Against Earthquakes will be of interest to members of academic institutions, government or private cultural preservation establishments and specialist consultant engineers. The book contains very practical, technical advice on many issues; this would be of considerable interest to construction companies specialising in repairs and maintenance of historical structures.

A Handbook of Sustainable Building Design and Engineering

Deep Energy Retrofit

This open access book presents theoretical and practical research relating to the vast, publicly financed program for the construction of new schools and the reorganization of existing educational buildings in Italy. This transformative process aims to give old buildings a fresh identity, to ensure that facilities are compliant with the new educational and teaching models, and to improve both energy efficiency and structural safety with respect to seismic activity. The book is divided into three sections, the first of which focuses on the social role of the school as a civic building that can serve the needs of the community. Innovations in both design and construction processes are then analyzed, paying special attention to the Building Information Modeling (BIM) strategy as a tool for the integration of different disciplines. The final section is devoted to the built heritage and tools, technologies, and approaches for the upgrading of existing buildings so that they meet the new regulations on building performance. The book will be of interest to all who wish to learn about the latest insights into the challenges posed by, and the opportunities afforded by, a comprehensive school building and renovation program.

Mainstreaming Building Energy Efficiency Codes in Developing Countries

This book provides detailed information on how to set up Deep Energy Retrofits (DERs) in public buildings, and shares in-depth insights into the current status of the major technologies, strategies and practical best practice examples of how to cost-effectively combine them. Case studies from Europe are analyzed with respect to energy use before and after

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renovation, reasons for undertaking the renovation, co-benefits achieved, resulting cost-effectiveness, and the business models employed. The building sector holds the potential for tremendous improvements in terms of energy efficiency and reducing carbon emissions, and energy retrofits to the existing building stock represent a significant opportunity in the transition to a low-carbon future. Moreover, investing in highly efficient building materials and systems can replace long-term energy imports, contribute to cost cutting, and create a wealth of new jobs. Yet, while the technologies needed in order to improve energy efficiency are readily available, significant progress has not yet been made, and “best practices” for implementing building technologies and renewable energy sources are still relegated to small “niche” applications. Offering essential information on Deep Energy Retrofits, the book offers a valuable asset for architects, public authorities, project developers, and engineers alike.

Heating, Cooling, Lighting

Energy-efficient Office Refurbishment

Never were energy use and security of energy supply as high on the international political agendas as they are now. There seems to be a consensus that energy savings and sustainable energy production must have a high priority. Because the energy use in the residential and non-residential sectors account for a large part of the total energy use, new programs are being developed in order to limit the consumption of energy in these sectors and a lot of attention is put into increasing the energy efficiency of the existing building stock.

Energy Design Strategies for Retrofitting

Presents seven strategies for energy efficient architectural design in Hawaii -- orientation and building form, solar control, daylighting, natural ventilation, landscaping, building systems and material selection and equipment efficiency. Provides architects with practical design guidelines to serve as a basis for decision making during the conceptual and schematic stages of a project. Drawings, graphs and photos.

Energy-Efficient Building Systems

Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers presents current techniques and technologies for energy efficiency in buildings. Cases introduce and demonstrate applications in both the design of new buildings and retrofit of existing structures. The book begins with an introduction that includes energy consumption

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statistics, building energy efficiency codes, and standards and labels from around the world. It then highlights the need for integrated and comprehensive energy analysis approaches. Subsequent sections present an overview of advanced energy efficiency technologies for buildings, including dynamic insulation materials, phase change materials, LED lighting and daylight controls, Life Cycle Analysis, and more. This book provides researchers and professionals with a coherent set of tools and techniques for enhancing energy efficiency in new and existing buildings. The case studies presented help practitioners implement the techniques and technologies in their own projects. Introduces a holistic analysis approach to energy efficiency for buildings using the concept of energy productivity Provides coverage of individual buildings, communities and urban centers Includes both the design of new buildings and retrofitting of existing structures to improve energy efficiency Describes state-of-the-art energy efficiency technologies Presents several cases studies and examples that illustrate the analysis techniques and impact of energy efficiency technologies and controls

Assessment of Daylight Performance in Buildings

Little has been published on the subject of energy-efficient refurbishment of offices, despite the growing need to refurbish older office building stock throughout Europe, and the global requirement to conserve energy. The book suggests the most energy efficient and environmentally friendly way to refurbish offices using examples of real buildings and designs wherever possible. Each case study includes a building description, the retrofitting strategy, passive and low energy technologies used, energy assessment, comfort and environment assessment, financial assessment, client and market assessment, and conclusion. This practical design manual will be invaluable for architects and engineers specialising in the refurbishment of commercial buildings.

Cost-Effective Energy Efficient Building Retrofitting

In the United States, direct energy use in buildings accounts for 39% of carbon dioxide emissions per year—more than any other sector. Buildings contribute to a changing climate and warming of the earth in ways that will significantly affect future generations. Zero net energy (ZNE) buildings are a practical and cost-effective way to reduce our energy needs, employ clean solar and wind technologies, protect the environment, and improve our lives. Interest in ZNE buildings, which produce as much energy as they use over the course of a year, has been growing rapidly. In the Design Professional's Guide to Zero Net Energy Buildings, Charles Eley draws from over 40 years of his own experience, and interviews with other industry experts, to lay out the principles for achieving ZNE buildings and the issues surrounding their development. Eley emphasizes the importance of building energy use in achieving a sustainable future; describes how building energy use can be minimized through smart design and energy efficiency technologies; and presents practical information on how to incorporate renewable energy technologies to meet the lowered energy needs. The book identifies the building types and

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climates where meeting the goal will be a challenge and offers solutions for these special cases. It shows the reader, through examples and explanations, that these solutions are viable and cost-effective. ZNE buildings are practical and cost-effective ways to address climate change without compromising our quality of life. ZNE buildings are an energizing concept and one that is broadly accepted yet, there is little information on what is required to actually meet these goals. This book shows that the goal is feasible and can be practically achieved in most buildings, that our construction industry is up to the challenge, and that we already have the necessary technologies and knowledge.

Energy Simulation in Building Design

'As we move towards the 2016 zero carbon target in house building, Passivhaus construction looks like becoming not just popular in the UK, but commonplace. This is a no-nonsense and engaging introduction on how to do it.' Kevin McCloud The Passivhaus Handbook is an essential guide for anyone wanting to realise a supremely comfortable, healthy and durable home with exceptionally low energy costs. Passivhaus design focuses on getting the building fabric right, to achieve ultra-low energy consumption in the most cost-effective manner. The approach is relevant to a wide range of building types and climates. Passivhaus methodology can be combined with elements of other building standards, such as the UK's Code for Sustainable Homes (CSH), or with other sustainable building goals, such as a commitment to using low-impact or natural building materials. Whether you are building an extension, retrofitting your house or starting from scratch, and whether you are new to low-energy design or already have some experience, this book will help you navigate around the potential pitfalls and misconceptions. It brings together current thinking and best practice. The book includes: A clear explanation of the underlying building physics and terminology. Detailed information on key elements of Passivhaus: avoiding air leakage, designing out thermal (cold) bridges, moisture management and ventilation strategy. Practical advice on setting up a project, including developing a motivated project team. A discussion of economic considerations and the policy context in the UK. As pressure on global resources increases and energy prices continue to rise, the Passivhaus approach, proven over 20 years, meets the challenge of ultra-low-energy building for the future.

Hawaiian Design

Heating, Cooling, Lighting, the leading guide to environmental control systems design for over 25 years, provides future architects and practicing professionals with the knowledge and tools needed to design a sustainable built environment at the schematic design stage. This book treats heating, cooling, and lighting not as isolated topics, but as integrated parts towards manipulating the environment to achieve net zero consumption. Responding to current industry trends, this Fifth Edition has been completely restructured based on net zero design strategies. Reflecting the latest developments in codes, standards, and rating systems for energy efficiency, this Fifth Edition includes three new chapters: Retrofits - best practices

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for efficient energy optimization in existing buildings, Integrated Design - strategies for synergizing passive and active design, and Design Tools - how to utilize the best tools to benchmark a building's sustainability and net zero potential; as well as an extensively updated Lighting chapter. Instructor's have access to an Instructor's Manual that includes exercises, projects, discussion questions, and web resources.

Architectural Research Addressing Societal Challenges

Energy-Efficient Electrical Systems for Buildings offers a systematic and practical analysis and design approaches for electrical distribution and utilization systems in buildings. In addition to meeting the minimal safety requirements set by the National Electrical Code (NEC), the design approach consider the life-cycle cost analysis of designing energy efficient electrical distribution systems as well as integrating renewable energy technologies into both residential and commercial buildings. The book first provides a general overview of basic power systems commonly available in buildings. Then, detailed discussions of various components of typical building electrical distribution system are outlined through several chapters including transformers, protection devices, conductors and conduits, power and lighting panels, and motor control centers. The book includes several illustrations and numerous examples and analysis exercises are included, along with detailed design examples.

Retrofitting the Built Environment

The escalating interdependency of nations drives global geopolitics to shift ever more quickly. Societies seem unable to control any change that affects their cities, whether positively or negatively. Challenges are global, but solutions need to be implemented locally. How can architectural research contribute to the future of our changing society? How has it contributed in the past? The theme of the 10th EAAE/ARCC International Conference, "Architectural Research Addressing Societal Challenges", was set to address these questions. This book, Architectural Research Addressing Societal Challenges, includes reviewed papers presented in June 2016, at the 10th EAAE/ARCC International Conference, which was held at the facilities of the Faculty of Architecture of the University of Lisbon. The papers have been further divided into the following five sub-themes: a Changing Society; In Transit - Global Migration; Renaturalization of the City; Emerging Fields of Architectural Practice; and Research on Architectural Education. The EAAE/ARCC International Conference, held under the aegis of the EAAE and of the ARCC, is a conference organized every other year, in collaboration with one of the member schools/ universities of those associations, alternatively in North America or in Europe.

Low Energy Cooling for Sustainable Buildings

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Positive energy homes enable people to live healthy and comfortable lives with energy left over to share. Creating a house you love that produces surplus energy is surprisingly easy with a thorough understanding of how buildings work and careful attention to detail in construction. The Passive House standard, with its well-proven track record, forms the basis for creating positive energy homes. This book explores the Passive House 'fabric first' approach, as well as the science and practicalities of effective ventilation strategies, smart options for heating and cooling, daylight harvesting, and efficient lighting and appliances. Positive Energy Homes provides home owners world-wide, architects and builders with an understanding of the principles and technical details of building these houses.

Retrofitting the Built Environment

In order to meet UK Carbon reduction commitments for 2020 and 2050 building owners will be required to upgrade their buildings to meet an increasingly stringent set of energy performance requirements. In the absence of any clear advice from UK Government on how this can be achieved, the EnerPHit standard offers a very clear methodology. This is a practical guide that gives architects the tools to retrofit buildings to the highest EnerPHit standard. It equips the reader with the key information on EnerPHit (as the most effective benchmark for performance), the practical know-how and tips to ensure effective retrofit throughout all Plan of Work stages of a project to the EnerPHit standard. Backed with real-life case studies, it enables you to understand how to achieve successful outcomes tailored to suit available budgets and programmes.

Energy-Efficient Electrical Systems for Buildings

This book concerns renewable energy sources and in particular, it collects the state-of-the-art in thermal solar techniques and biomasses. Conventional energy sources based on oil, coal and natural gas are damaging economic and social progress, the environment and human life. Many people are concerned about these problems and wish to address the symptoms as a matter of urgency, but not all understand the basic causes and consequently do not realize that not only technological, but also social changes are required. It is now widely acknowledged that renewable energy capacity has to be increased by exploiting its enormous potential. A policy of energy sustainability can't leave solar energy exploitation out of consideration. Besides being the origin of almost all the other energy sources, renewable and conventional, excluding geothermic, nuclear and gravitational (tides) ones, the energy provided by the Sun is free, endless and clean (the devices used to exploit solar energy are characterized by very low emissions while running). Moreover solar energy is easy to harness and distribute (it is particularly abundant in many world areas with depressed and difficult economic situation). Very few books treat so diffusely the state-of-the-art in thermal solar technologies and especially biomasses, a topic in which there is a bit of confusion due to the very wide range of technologies related to this area. Renewable energy

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education is a relatively new field and previously it formed a minor part of traditional university courses. However, over the past decade, several new approaches have emerged: we see these in the new literature and, even more clearly, in new books. The present treatise, in the authors' auspices, represents a contribution to this new 'incoming science'.

Buildings for Education

The EAAE/ARCC International Conference, held under the aegis of the EAAE (European Association for Architectural Education) and of the ARCC (Architectural Research Centers Consortium), is a conference organized every other year, in collaboration with one of the member schools / universities of those associations, alternatively in North America or in Europe. The EAAE/ARCC Conferences began at the North Carolina State University College of Design, Raleigh with a conference on Research in Design Education (1998); followed by conferences in Paris (2000), Montreal (2002), Dublin (2004), Philadelphia (2006), Copenhagen (2008), Washington (2010), Milan (2012) and Honolulu (2014). The conference discussions focus on research experiences in the field of architecture and architectural education, providing a critical forum for the dissemination and engagement of current ideas from around the world.

Sustainable Retrofitting of Commercial Buildings

Construction projects, once they are completed, are intended to exist in the skylines of cities and towns for decades. Sustainable technologies seek to take these existing structures and make them environmentally friendly and energy efficient. Design Solutions for nZEB Retrofit Buildings is a critical scholarly resource that examines the importance of creating architecture that not only promotes the daily function of these buildings but is also environmentally sustainable. Featuring a broad range of topics including renewable energy sources, solar energy, and energy performance, this book is geared toward professionals, students, and researchers seeking current research on sustainable options for upgrading existing edifices to become more environmentally friendly.

Optimal Design and Retrofit of Energy Efficient Buildings, Communities, and Urban Centers

This book presents 18 in-depth case studies of net zero energy buildings—low-energy building that generate as much energy as they consume over the course of a year—for a range of project types, sizes, and U.S. climate zones. Each case study describes the owner's goals, the design and construction process, design strategies, measurement and verification activities and results, and project costs. With a year or more of post-occupancy performance data and other project information, as well as lessons learned by project owners and developers, architects, engineers, energy modelers, constructors, and operators, each case study answers the questions: What were the challenges to achieving net zero

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energy performance, and how were these challenges overcome? How would stakeholders address these issues on future projects? Are the occupants satisfied with the building? Do they find it comfortable? Is it easy to operate? How can other projects benefit from the lessons learned on each project? What would the owners, designers, and constructors do differently knowing what they know now? A final chapter aggregates processes to engage in and pitfalls to avoid when approaching the challenges peculiar to designing, constructing, and owning a net zero energy building. By providing a wealth of comparable information, this book which will flatten the learning curve for designing, constructing, and owning this emerging building type and improve the effectiveness of architectural design and construction.

Solar Thermal and Biomass Energy

The physical upgrading of the existing domestic and industrial building stock to improve energy performance is an essential part of a transition to a low carbon society. Successfully retrofitting buildings to improve energy performance is not simply a technological challenge, it is a complex socio-technical problem that needs to be addressed in a co-ordinated way, utilising skills and knowledge from a range of industrial and academic backgrounds. Within both the academic and practitioner communities there is a growing understanding of the scale and nature of the problem, one which encompasses issues such as policy and regulation, people and behaviour, supply chain and process, as well as issues of technology. Retrofitting the Built Environment discusses the factors that impact on the retrofit problem, providing a clear analysis of the main issues that the academic and industrial communities must engage with to resolve the problems of domestic energy and retrofit. The book is divided into four broad sections: Understanding the Problem Policy and Regulation Implementing and Evaluating Retrofit People and Communities Academic and industrial researchers, policy makers and industry practitioners will find each section covers a mix of policy, technical and social science issues, presented by both academic and industry authors, giving a wide and detailed perspective of the issue. The Editors Will Swan is a Senior Lecturer in Buildings Retrofit in the School of the Built Environment at the University of Salford. He leads a number of projects in the field of sustainable retrofit, covering a number of topics including monitoring, behaviour and retrofit project delivery, as part of Salford's Applied Energy and Buildings Research Group. He sits on the Greater Manchester Buildings Group and also is Chair of the Retrofit Innovation Group. Philip Brown is Director and Senior Research Fellow at the Salford Housing & Urban Studies Unit (SHUSU) at the University of Salford. He is the lead academic on end-use energy demand within the Applied Energy and Buildings Research Group, and sits on Greater Manchester's Low Carbon Economic Area group for Customer Engagement.

Deep Energy Retrofit Guide for Public Buildings

This book summarizes the experiences and lessons learned in the development and implementation of building energy efficiency codes (BEECs) from Europe and USA, as well as from China, Egypt, India and Mexico. It serves as a primer on the

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basic features and contents of BEECs and the commonly adopted compliance and enforcement approaches.

ZEMCH: Toward the Delivery of Zero Energy Mass Custom Homes

Providing a coherent and realistic vision of the implications of the energy issue in the future development of our cities; places emphasis on the links between very specific and technical topics and the most challenging issues concerning energy savings and the transition to a low carbon society. A great part of the built environment in most European cities consists of buildings dating from 60s to early 90s, for residential purposes: this stock clearly presents several problems related to its functional layout, as well as its energy/thermal behaviour. Applying sustainable and energy savings principles to retrofitting interventions on the stock above is one of the most urgent challenges to be met in the very near future. Giving some examples and case studies, this book investigates retrofitting interventions in terms of energy balance: from design strategies to choice of materials and components; from market trends analysis to economical assessment, from the targeted energy performance to the energy investments needed for achieving it. The reader will benefit from the real life experiences and related results described in this book and acquire all the tools for a constructive evaluation of the different options available to him/her, when faced with retrofitting interventions, thanks to a global view of all the issues involved.

Green Planning for Cities and Communities

Whilst sustainability is already an important driver in the new building sector, this book explores how those involved in refurbishment of commercial building are moving this agenda forward. It includes chapters by developers, surveyors, cost consultants, architects, building physicists and other players, on the role they each can play in enabling refurbishment to be commercially, environmentally and socially sustainable. Case studies from northern climates show real examples of different building types, ages and uses and will demonstrate what action has been taken to create more sustainable buildings. The chapters raise and discuss all the relevant issues that need to be considered in retrofitting decision making. Changing standards, planning, process management, financing, technical issues, site organisation, commissioning and subsequent building management are all considered. The book demonstrates that buildings can be made comfortable to occupy, easy to manage and low in energy demand and environmental impact.

Positive Energy Homes

Cost-Effective Energy Efficient Building Retrofitting: Materials, Technologies, Optimization and Case Studies provides essential knowledge for civil engineers, architects, and other professionals working in the field of cost-effective energy efficient building retrofitting. The building sector is responsible for high energy consumption and its global demand is

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expected to grow as each day there are approximately 200,000 new inhabitants on planet Earth. The majority of electric energy will continue to be generated from the combustion of fossil fuels releasing not only carbon dioxide, but also methane and nitrous oxide. Energy efficiency measures are therefore crucial to reduce greenhouse gas emissions of the building sector. Energy efficient building retrofitting needs to not only be technically feasible, but also economically viable. New building materials and advanced technologies already exist, but the knowledge to integrate all active components is still scarce and far from being widespread among building industry stakeholders. Emphasizes cost-effective methods for the refurbishment of existing buildings, presenting state-of-the-art technologies Includes detailed case studies that explain various methods and Net Zero Energy Explains optimal analysis and prioritization of cost effective strategies

Design Professional's Guide to Zero Net Energy Buildings

In this book, leading international experts explore the emerging concept of the zero energy mass custom home (ZEMCH) – designed to meet the need for social, economic, and environmental sustainability – and provide all of the knowledge required for the delivery of zero energy mass customized housing and community developments in developed and developing countries. The coverage is wide ranging, progressing from explanation of the meaning of sustainable development to discussion of challenges and trends in mass housing, the advantages and disadvantages of prefabricated methods of construction, and the concepts of mass customization, mass personalization, and inclusive design. A chapter on energy use will aid the reader in designing and retrofitting housing to reduce energy demand and/or improve energy end-use efficiency. Passive design strategies and active technologies (especially solar) are thoroughly reviewed. Application of the ZEMCH construction criteria to new buildings and refurbishment of old houses is explained and the methods and value of building performance simulation, analyzed. The concluding chapter presents examples of ZEMCH projects from around the world, with discussion of marketing strategy, design, quality assurance, and delivery challenges. The book will be invaluable as a training/teaching tool for both students and industry partners.

Towards a Sustainable Northern European Housing Stock

This book addresses key issues across the field of sustainable urban planning, and provides a unique reference tool for planners, engineers, architects, public administrators, and other experts. The evolution of cities and communities is giving rise to pressing energy and environmental problems that demand concrete solutions. In this context, urban planning is inevitably a complex activity that requires a sound analytical interpretation of ongoing developments, multidisciplinary analysis of the available tools and technologies, appropriate political management, and the ability to monitor progress objectively in order to verify the effectiveness of the policies implemented. This book is exceptional in both the breadth of its coverage and its focus on the interactions between different elements. Individual sections focus on strategies and tools

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for green planning, energy efficiency and sustainability in city planning, sustainable mobility, rating systems, and the smart city approach to improving urban-scale sustainability. The authors draw on their extensive practical experience to provide operational content supplementing the theoretical and methodological elements covered in the text, and each section features informative case studies.

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