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*Renewable Heating and Cooling*Gerhard Stryi-Hipp 2015-11-20 Renewable Heating and Cooling: Technologies and Applications presents the latest information on the generation of heat for industry and domestic purposes, an area where a significant proportion of total energy is consumed. In Europe, this figure is estimated to be almost 50%, with the majority of heat generated by the consumption of fossil fuels. As there is a pressing need to increase the uptake of renewable heating and cooling (RHC) to reduce greenhouse gas emissions, this book provides a comprehensive and authoritative overview on the topic. Part One introduces key RHC technologies and discusses RHC in the context of global heating and cooling demand, featuring chapters on solar thermal process heat generation, deep geothermal energy, and solar cooling technologies. Part Two explores enabling technologies, special applications, and case studies with detailed coverage of thermal energy storage, hybrid systems, and renewable heating for RHC, along with case studies in China and Sweden. Users will find this book to be an essential resource for lead engineers and engineering consultants working on renewable heating and cooling in engineering companies, as well as academics and R&D professionals in private research institutes who have a particular interest in the subject matter. Includes coverage on biomass, solar thermal, and geothermal renewable heating and cooling technologies Features chapters on solar thermal process heat generation, deep geothermal energy, solar cooling technologies, and special applications Presents case studies with detailed coverage of thermal energy storage, hybrid systems, and renewable heating for RHC Explores enabling technologies and special applications

ICT Innovations for Sustainability - Lorenz M. Hilty 2014-08-06 ICT Innovations for Sustainability is an investigation of how information and communication technology can contribute to sustainable development. It presents clear definitions of sustainability, suggesting conceptual frameworks for the positive and negative effects of ICT on sustainable development. It reviews methods of assessing the direct and indirect impact of ICT systems on energy and materials demand, and examines the results of such assessments. In addition, it investigates ICT-based approaches to supporting sustainable patterns of production and consumption, analyzing them at various levels of abstraction – from end-user devices, Internet infrastructure, user behavior, and social practices to macro-economic indicators. Combining approaches from Computer Science, Information Systems, Human-Computer Interaction, Economics, and Environmental Sciences, the book presents a new, holistic perspective on ICT for Sustainability (ICT4S). It is an indispensable resource for anyone working in the area of ICT for Energy

Efficiency, Life Cycle Assessment of ICT, Green IT, Green Information Systems, Environmental Informatics, Energy Informatics, Sustainable HCI, or Computational Sustainability.

Value Beyond Cost Savings: How to Underwrite Sustainable Properties - Scott R. Muldavin 2010

Photovoltaics and Materials - International Solar Energy Society. American Section 1976

Refrigerating Systems - Terry Welch 2002

Net Zero Energy Buildings (NZEB) - Shady Attia 2018-03-26

Net Zero Energy Buildings (NZEB): Concepts, Frameworks and Roadmap for Project Analysis and Implementation provides readers with the elements they need to understand, combine and contextualize design decisions on Net Zero Energy Buildings. The book is based on learned lessons from NZEB design, construction, operation that are integrated to bring the most relevant topics, such as multidisciplinarity, climate sensitivity, comfort requirements, carbon footprints, construction quality and evidence-based design. Chapters introduce the context of high performance buildings, present overviews of NZEB, cover the performance thresholds for efficient buildings, cover materials, micro-grid and smart grids, construction quality, performance monitoring, post occupancy evaluation, and more. Offers a roadmap for engaging in energy efficiency in high performance buildings projects Combines solid grounding in core concepts, such as energy efficiency, with a wider context that includes the technical, socio-cultural and environmental dimensions Covers key areas for decision-making Provides a logical framework to analyze projects in the context of environmental change Presents worldwide examples and cases for different climates and societies

Automatic Controls - Kevin Pennycook 2001

Climate-responsive Design - Remco Looman 2017-01-02

This PhD-thesisidentifies the knowledge that is needed in the early stages of the design process and showshow to transfer and transform that knowledge to the field of the architect in orderfor them to successfully implement the principles of climate-responsive design."

Sustainable Construction Processes - Steve Goodhew 2016-04-13

This book explores the concepts and practicalities that lead to sustainable construction. It breaks new ground by providing the reader with the underlying principles of how to build sustainably and then assesses many of the tools required for the task. From energy to materials and from procurement to operation, all aspects play their part in turning a theoretically sustainable building project into a reality. There are many guidelines for the designer on how to maximise the sustainability of buildings but this resource text supplements these by focusing on the construction and operational aspects of sustainable buildings, as well as some of the more fundamental design-related considerations. • Offers an excellent text for those learning to construct, design and operate sustainable buildings. • Covers the drivers for sustainable construction, definitions, historical impacts, climate change and global, regional and individual responses. • enables the construction professional to achieve optimum solutions, both in design, process and the aftercare of buildings. • evaluates the effectiveness of different renewable technologies and provides guidance on the practicalities of their use. • Alerts the reader to future trends in this field.

Water Distribution Systems - Reginald Brown 2003

Problem-Based Learning John F. Barell 2006-12-20

A step-by-step guide for teaching your students to think critically and solve complex problems! Problem-based learning expert John Barell troubleshoots the PBL process for teachers, drawing from practical classroom experience. Step-by-step procedures make this remarkably effective teaching model accessible and highly doable for all teachers, from beginners to veterans. This standards-based, teacher-friendly second edition of the author's popular PBL guide includes: Examples showing problem-based learning in action Answers to frequently asked

questions on standards-based implementation Thorough guidelines for developing problems for students to solve Rubrics and assessment tips to ensure that standards are met

Engineered Transparency - Michael Bell 2008-11-04

Glass is one of the most ubiquitous and extensively researched building materials. Despite the critical role it has played inmodern architecture in the last century, we have yet to fully comprehend the cultural and technological effects of thiscomplex and sophisticated building material. Engineered Transparency brings together an extraordinary, multidisciplinary group of international architects, engineers, manufacturers, and critics to collectively reconsider glasswithin the context of recent engineering and structural achievements. In light of these advancements, glass hasreemerged as a novel architectural material, offering new and previously unimaginable modes of visual pleasure andspatial experience. Engineered Transparency presents a portfolio of projects featuring cutting-edge glass designs by todays most innovative architects, including SANAA's acclaimed Glass Pavilion at the Toledo Museum of Art, Yoshio Taniguchi's MoMA expansion in New York City, and Steven Holl's Nelson-Atkins Museum in Kansas City. With contributions by foremost thinkers in the field of architecture and design including historians Kenneth Frampton, Antoine Picon, and DetlefMertins; cultural critics Beatriz Colomina, Joan Ockman, and Reinhold Martin; engineers Werner Sobek, Guy Nordenson,and Richard Tomasetti; and architects Kazuyo Sejima, Steve Holl, and Elizabeth Diller, Engineered Transparency redefines glass as a 21st century building material and challenges our assumptions about its aesthetic, structural, and spatial potential.

Net zero energy buildings - Karsten Voss 2012-12-10

"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."

Climate Change 2014 - Groupe d'experts intergouvernemental sur l'évolution du climat. Working group 3

Building Skins - Christian Schittich 2006-01-01

The external facades of a building are more than a protective mantle, or an intelligent skin regulating temperature and light, they also determine its very appearance. By unusual choices of materials and the use of complex technology, facades have become increasingly significant in recent years. External surfaces are being perceived as an integral part of the building and are therefore being designed as such. This volume focuses on the wide-ranging aspects of facade design, from the selection and use of materials to the advanced technical possibilities now open to the architect. A wide array of carefully selected international examples show the theory in the practice. All plans, details, and large scale sections of the facades have been researched with the high degree of competence typical of the editorial staff from the review Detail. Expert authors provide the essential information needed to plan and design facades and elucidate on the latest developments in technology and materials.

Intelligent Building Control Systems - John T. Wen 2017-12-04

Readers of this book will be shown how, with the adoption of ubiquituous

sensing, extensive data-gathering and forecasting, and building-embedded advanced actuation, intelligent building systems with the ability to respond to occupant preferences in a safe and energy-efficient manner are becoming a reality. The articles collected present a holistic perspective on the state of the art and current research directions in building automation, advanced sensing and control, including: model-based and model-free control design for temperature control; smart lighting systems; smart sensors and actuators (such as smart thermostats, lighting fixtures and HVAC equipment with embedded intelligence); and energy management, including consideration of grid connectivity and distributed intelligence. These articles are both educational for practitioners and graduate students interested in design and implementation, and foundational for researchers interested in understanding the state of the art and the challenges that must be overcome in realizing the potential benefits of smart building systems. This edited volume also includes case studies from implementation of these algorithms/sensing strategies in to-scale building systems. These demonstrate the benefits and pitfalls of using smart sensing and control for enhanced occupant comfort and energy efficiency.

Sensors for Measurement and Control - Peter Elgar 1998

Written as a complementary text to TecQuipment's sensors teaching package, but useful as a stand alone reference, Sensors for Measurment and Control describes the principles and applications of sensors used in engineering.

Transition to Sustainable Buildings - Organisation for Economic Co-operation and Development 2013

Buildings are the largest energy consuming sector in the world, and account for over one-third of total final energy consumption and an equally important source of carbon dioxide (CO2) emissions. Achieving significant energy and emissions reduction in the buildings sector is a challenging but achievable policy goal. Transition to Sustainable Buildings presents detailed scenarios and strategies to 2050, and demonstrates how to reach deep energy and emissions reduction through a combination of best available technologies and intelligent public policy. This IEA study is an indispensible guide for decision makers, providing informative insights on: cost-effective options, key technologies and opportunities in the buildings sector; solutions for reducing electricity demand growth and flattening peak demand; effective energy efficiency policies and lessons learned from different countries; future trends and priorities for ASEAN, Brazil, China, the European Union, India, Mexico, Russia, South Africa and the United States; implementing a systems approach using innovative products in a cost effective manner; and pursuing whole-building (e.g. zero energy buildings) and advanced-component policies to initiate a fundamental shift in the way energy is consumed.

Guide to Ownership, Operation and Maintenance of Building Services - 2000

Boilers - Chartered Institution of Building Services Engineers 2002

Energy Technology Innovation - Arnulf Grubler 2014

An edited volume on factors determining success or failure of energy technology innovation, for researchers and policy makers.

An Office Building Occupant's Guide to Indoor Air Quality - 1997

State-Of-The-Art Review of Co2 Demand Controlled Ventilation Technology and Application - Steven J. Emmerich 2001

The control of outdoor air intake rates in mechanically ventilated bldgs. based on indoor carbon dioxide (CO2) levels, often referred to as CO2 demand controlled ventilation (DCV), has the potential for reducing the energy consumption assoc. with bldg. ventilation in commercial and institutional bldgs. CO2 DCV has been studied for 20+ years, but questions still remain re: the actual energy savings potential as a function of climate, ventilation system features, and bldg. occupancy. In addition, questions exist as to the indoor air quality impacts of the approach and the best way to implement CO2 DCV in a given bldg. This report presents a state-of-the-art review of CO2 DCV technology and application incl. discussion of the concept and its application, and a

literature review.

Energy Management Handbook - Wayne C. Turner 2013

1997 ASHRAE Handbook - American Society of Heating, Refrigerating and Air-Conditioning Engineers 1997

Our Energy Future - Justin Healey 2009

Over the past 30 years, total energy consumption in Australia has more than doubled, while energy consumption per person has increased by almost 40%. How will Australia manage future increases in energy consumption when there is also a pressing need to reduce greenhouse emissions and slow down climate change? The country¿s energy needs will have to transition from diminishing and polluting non-renewable sources of energy to renewable sources. So what is the future of fossil fuels? Can the Mandatory Renewable Energy Target of 20% of Australia¿s energy supply by 2020 make a real difference? Topics in Our Energy Future include: carbon capture and storage; 'clean coal¿ technology; peak oil; nuclear power; boosting Australia¿s energy efficiency and productivity; and household energy-saving tips. The book also explores the major renewables in detail ¿ solar, wind, hydroelectricity, geothermal, bio-energy, wave energy, and the potential of hydrogen power.Chapter 1 Energy Generation, Use and EfficiencyChapter 2 Future of Fossil Fuels and Renewable EnergyGlossary; Fast Facts; Web Links; Index

Transducers, Sensors & Detectors - Robert G. Seippel 1983

Intelligent Building Systems - Albert Ting-pat So 2012-12-06

Intelligent building is the future of our building industry; all commercial, residential, industrial and institutional buildings will be designed towards the goal of `intelligent buildings'. The most important aspect of an intelligent building is the building systems, such as electrical services, heating, ventilation and air-conditioning systems, vertical transportation systems, and life safety systems, which must operate intelligently and efficiently to enhance the activities of the occupants. Intelligent Building Systems explains what already exists in a modern intelligent building and describes what is currently being developed by researchers to improve human comfort, working efficiency and energy performance for buildings in the 21st century. Intelligent Building Systems is divided into three parts. The first part gives a quick review of the structure, terminology, layout and operating principles of most standard modern building systems. The second part introduces the background material necessary to understand intelligent building systems, including information on electronics technology, fundamental mathematics, and techniques in artificial intelligence and signal processing. These first two parts are the foundation for the final part, which consists of research works carried out by the authors and other researchers in the application of artificial intelligence to building systems. The technologies presented will encourage readers to envision new and innovative ideas on possible future applications. Intelligent Building Systems is relevant to practitioners and researchers in the area of architectural science and engineering, electrical and mechanical services and intelligent buildings. It may also be used as a text for advanced courses on the topic.

Understanding Building Automation Systems - Reinhold A. Carlson 1991

This book is a response to the growing trend to upgrade existing commercial and industrial buildings for energy savings and improved security. Integrated Building Automation Systems provide technology to address these needs. The authors describe the major systems in detail, together with their compo

Global Energy Assessment - Global Energy Assessment Writing Team 2012-08-27

Independent, scientifically based, integrated, policy-relevant analysis of current and emerging energy issues for specialists and policymakers in academia, industry, government.

Guide to Best Practice Maintenance & Operation of HVAC Systems for Energy Efficiency - Lasath Lecamwasam 2012

Zero Emission Buildings - Anne-Grete Hestnes 2017-01-20

Zero Emission Buildings shows what can be achieved when researchers

and practitioners work together to develop the building performance level of tomorrow that is needed today. This book is based on the research and development activities performed in the Research Centre on Zero Emission Buildings (the ZEB Centre) from 2009 to 2017. Emissions of CO2 and other greenhouse gases must be reduced to limit global warming. Thus, the goal of the ZEB Centre has been to develop knowledge, competitive products, and solutions for existing and new buildings whose production, operation, and demolition give zero emissions of greenhouse gases, while also considering the users' needs for comfort and flexibility. The results presented here are based on research, as well as experience, from the development of nine real demonstration buildings. The key knowledge areas needed when designing, building, and operating zero emission buildings is discussed in detail. This book should be read by students of architecture and engineering, as well as practitioners looking for ways to contribute to a sustainable future. [Subject: Architecture, Environmental Studies, Sustainability & Green Design]

Challenging Glass - Freek Bos 2008

Contains topics that range from glass joints, fixings and adhesives to architectural designs to the strength, stability and safety of glass. This book also covers issues such as laminates and composite designs, glass lighting, the curving and bending of glass and the many facades of glass.

Facades - Adrian Smith + Gordon Gill Architecture 2022-09-12

Facades: Beauty. Utility. Performance illustrates the depth and breadth of the many innovative exterior wall facades that were designed from 2007-2020 at Adrian Smith + Gordon Gill Architecture (AS+GG). The featured projects, both built and unbuilt, are explored through photographs, renderings, model images, detail drawings, narratives, and illustrations. Each project addresses a series of environmental concerns, offering site-specific, performative solutions and innovative techniques that harvest resources and maximize efficiencies.

HVAC Maintenance and Operations Handbook - Robert C. Rosaler 1998

Keep your HVAC system running in peak condition—and avoid costly breakdowns and inefficiencies. Just turn to this first comprehensive guide to the proper maintenance, operations, and performance of heating, ventilating, and air conditioning (HVAC) systems and related components. Written by a team of leading HVAC pros, the handbook provides everything you need to effectively operate and maintain heating equipment...distribution equipment...cooling systems...pumps...valves...and boilers. It also provides proper procedures for indoor air quality (IAQ) control and system commissioning.

Controls and Automation for Facilities Managers - Viktor Boed 1998-06-23

Building owners and managers expect fully automated and energy efficient operations, on line diagnostic of systems parameters to prevent failures, and on line diagnostic of problems prior to exposing occupants to deteriorating environmental conditions. A simple HVAC control is no longer acceptable by current standards. Controls and Automation for Facilities Managers examines principles and applications of HVAC engineering, outlining information for design, development of operations, logic, systems diagnostics, and building of environmental conditions with reliability and minimum operating cost. The book moves from the principles of mechanical engineering (related to HVAC systems) through DDC applications engineering, thereby summarizing complex topics of electrical engineering for mechanical engineers. Individual chapters: Provide essential information on related mechanical (HVAC) engineering, controls strategies, and examples of basic algorithms for on line diagnostics Guide (DDC) application engineers to a more thorough understanding of mechanical engineering disciplines (i.e., the psychrometric chart) as well as guide mechanical engineers to a more thorough understanding of DDC applications engineering (i.e., direct digital controllers and systems) Outline information on current topics Discussions also include: Indoor air quality - presenting material for facilities engineers as well as controls and consulting engineers Utilities metering - describing the distribution of real time data over a network, including consumption, alarms, diagnostics, trends, and reports On line problem diagnostics - outlining HVAC and environmental problems

Controls and Automation for Facilities Managers serves as an exceptional guide for facilities managers and engineers, architects and consulting engineers, vendors and contractors, and other professionals in the design, application, and implementation of controls and automation systems for industrial, educational, institutional, and governmental facilities. This reference will enhance design, systems implementation, systems operation, and maintenance, effecting the ultimate goal of its readers - implementation of fully automated environmental control systems, trouble-free operation, and optimization of operating and maintenance cost.