

## Buildings Efficiency Guidance Climate Action Transparency

The design, construction, operation, and retrofit of buildings is evolving in response to ever-increasing knowledge about the impact of indoor environments on people and the impact of buildings on the environment. Research has shown that the quality of indoor environments can affect the health, safety, and productivity of the people who occupy them. Buildings are also resource intensive, accounting for 40 percent of primary energy use in the United States, 12 percent of water consumption, and 60 percent of all non-industrial waste. The processes for producing electricity at power plants and delivering it for use in buildings account for 40 percent of U.S. greenhouse gas emissions. The U.S. federal government manages approximately 429,000 buildings of many types with a total square footage of 3.34 billion worldwide, of which about 80 percent is owned space. More than 30 individual departments and agencies are responsible for managing these buildings. The characteristics of each agency's portfolio of facilities are determined by its mission and its programs. In 2010, GSA's Office of Federal High-Performance Green Buildings asked the National Academies to appoint an ad hoc committee of experts to conduct a public workshop and prepare a report that identified strategies and approaches for achieving a range of objectives associated with high-performance green federal buildings. *Achieving High-Performance Federal Facilities* identifies examples of important initiatives taking place and available resources. The report explores how these examples could be used to help make sustainability the preferred choice at all levels of decision making. *Achieving High-Performance Federal Facilities* can serve as a valuable guide federal agencies with differing missions, types of facilities, and operating procedures.

America's economy and lifestyles have been shaped by the low prices and availability of energy. In the last decade, however, the prices of oil, natural gas, and coal have increased dramatically, leaving consumers and the industrial and service sectors looking for ways to reduce energy use. To achieve greater energy efficiency, we need technology, more informed consumers and producers, and investments in more energy-efficient industrial processes, businesses, residences, and transportation. As part of the America's Energy Future project, *Real Prospects for Energy Efficiency in the United States* examines the potential for reducing energy demand through improving efficiency by using existing technologies, technologies developed but not yet utilized widely, and prospective technologies. The book evaluates technologies based on their estimated times to initial commercial deployment, and provides an analysis of costs, barriers, and research needs. This quantitative characterization of technologies will guide policy makers toward planning the future of energy use in America. This book will also have much to offer to industry leaders, investors, environmentalists, and others looking for a practical diagnosis of energy efficiency possibilities.

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 basic features and contents of BEECs and the commonly adopted compliance and enforcement approaches. "Implement the green strategies outlined in Dan Esty's and Andrew Winston's bestseller *Green to Gold*" Hard-nosed business advice for gaining competitive advantage through sustainability action in buildings and operations, information technology, product design, sourcing, manufacturing, logistics and transportation, marketing, accounting, and other key business functions Whether you are a climate change skeptic or an environmentalist, sustainability issues cannot be ignored in today's corporate world. With rising energy and natural resource costs, intensified regulations, investor pressures, and a growing demand for environmentally friendly products, sustainability is no longer an option—it's a business imperative. Unlike many green business books, the *Playbook* skips the environmental ideology and deals exclusively with tools and strategies that have been shown to cut costs, reduce risks, drive revenues, and build brand identity. Builds on Dan Esty and Andrew Winston's prizewinning *Green to Gold*, which has become a business classic and a staple of management training across the world. Shows in detail how each business function or department can achieve an eco-advantage over the competition Offers frameworks, checklists, and action plans applicable to any business—big or small, in manufacturing or services The *Green to Gold Business Playbook* gives you the tools to make green work-and work profitably-for your business.

There remains significant uncertainty about the exact scope and timing of climate change-related impacts on water resources, but the National Water Program and its partners need to assess emerging climate change information, evaluate potential impacts of climate change on water programs, and identify needed responses. This report is an initial effort to evaluate how best to meet our clean water and safe drinking water goals in the context of a changing climate. The ideas and response actions outlined here are the product of a cooperative effort among the EPA water program managers in national and Regional offices. A wide range of stakeholders participated in initial listening session meetings. Illustrations.

Climate change continues to impact our health and safety, the economy, and natural systems. With climate-related protections and programs under attack at the federal level, it is critical for cities to address climate impacts locally. Every day there are new examples of cities approaching the challenge of climate change in creative and innovative ways—from rethinking transportation, to greening city buildings, to protecting against sea-level rise. *Climate Action Planning* is designed to help planners, municipal staff and officials, citizens and others working at local levels to develop and implement plans to mitigate a community's greenhouse gas emissions and increase the resilience of communities against climate change impacts. This fully revised and expanded edition goes well beyond climate action plans to examine the mix of policy and planning instruments available to every community. Boswell, Greve, and Seale also look at process and communication: How does a community bring diverse voices to the table? What do recent examples and research tell us about successful communication strategies? *Climate Action Planning* brings in new examples of implemented projects to highlight what has worked and the challenges that remain. A completely new chapter on

vulnerability assessment will help each community to identify their greatest risks and opportunities. Sections on land use and transportation have been expanded to reflect their growing contribution to greenhouse gas emissions. The guidance in the book is put in context of international, national, and state mandates and goals. Climate Action Planning is the most comprehensive book on the state of the art, science, and practice of local climate action planning. It should be a first stop for any local government interested in addressing climate change.

Climate change is one of the most important environmental problems faced by Planet Earth. The majority of CO<sub>2</sub> emissions come from burning fossil fuels for energy production and improvements in energy efficiency shows the greatest potential for any single strategy to abate global greenhouse gas (GHG) emissions from the energy sector. Energy related emissions account for almost 80% of the EU's total greenhouse gas emissions. The building sector is the largest energy user responsible for about 40% of the EU's total final energy consumption. In Europe the number of installed air conditioning systems has increased 500% over the last 20 years, but in that same period energy cooling needs have increased more than 20 times. The increase in energy cooling needs relates to the current higher living and working standards. In urban environments with low outdoor air quality (the general case) this means that in summer-time one cannot count on natural ventilation to reduce cooling needs. Do not forget the synergistic effect between heat waves and air pollution which means that outdoor air quality is worse in the summer aggravating cooling needs. Over the next few years this phenomenon will become much worse because more people will live in cities, more than 2 billion by 2050 and global warming will aggravate cooling needs. An overview of materials to lessen the impact of urban heat islands Excellent coverage of building materials to reduce air conditioning needs Innovative products discussed such as Thermo and Electrochromic materials

The book aims to provide a basis for design and construction of resource-efficient buildings. The main concepts follow the vision of a European Sustainable Building as defined in the 2-years Smart-ECO research project funded by European Commission under the Sixth Framework Program. The focus is concentrated on innovations enabling the building sector to meet the requirements originating from the sustainability concept. Innovation is considered at different scales: micro (product, service and process), meso (sector, supply chain, region and system) and macro (economy-wide).

Furthermore, the book focuses on aspects of relevance when striving to implement innovative technologies in building design: an integrated design process is indispensable to obtain a Smart-ECO building, independently of how effective a single technology is. Each chapter provides information on fundamental aspects of innovations towards resource-efficient buildings, shows examples and makes further guidance by way of a dedicated bibliography. Case studies are predominantly recent projects or experiences improving understanding and encouraging implementation.

This dissertation, "An Evaluation of the Feasibility of Implementing Energy Efficiency Measures in Commercial Buildings in Hong Kong" by Hou-yip, Hsiao, ???, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: ?In 2006, over 160 countries have ratified the Kyoto Protocol, which is an international agreement concerning the climate change. It sets binding targets for reducing greenhouse gas ("GHG") emissions (UNFCCC, 2006) and these countries were committed to do so. Reduction on GNG emission becomes a common but differentiated responsibility over these countries, including China and Hong Kong. In Hong Kong, The Government of the Hong Kong Special Administrative Region ("HKSAR") was also committed to reduce GHG emissions by implementing difference measures (EPD, 2010). In view of 60 percent of GHG emission in Hong Kong is generated by electricity generation, reduction on electricity consumption for building operations is the main means of achieving reduction on GHG emissions. Since Hong Kong had been treated as international financial centre, over 60 percent of the total electricity consumption was contributed by the commercial sector. To promote energy efficiency so as to accomplish reduction on electricity consumption, both HKSAR and other green organization, such as BEAM Society and U.S. Green Building Council, had set up numerous reference guidelines. However, these guidelines may applicable to new buildings but not in most commercial building in Hong Kong which were aged and multi-owned. In these aged and multi-owned commercial building, the concern of energy efficiency was not involved during design stage. In view of durable nature of commercial building, energy efficiency hardly be achieved unless substantial implementation of measures. However, capital cost and alteration work were needed to be considered for such implementation which causing difficulties for most of the single block building. As advised by Electrical and Mechanical Department, the Building Manager is one of the key persons in building energy efficiency and conservation as it is the one who operate all building services installation so as to suit the needs of the occupants. This dissertation is an attempt to evaluate the feasibility of implementing energy efficiency measures in these commercial buildings in Hong Kong from the management point of view. DOI: 10.5353/th\_b4834187 Subjects: Commercial buildings - Energy conservation - China - Hong Kong

This book is written as a practical guide to those interested in the pursuit of energy resilience at a local scale. Examples are drawn from four key community types: military bases, healthcare campuses, educational campuses and municipal governments. The book then describes a framework for developing an energy resilience plan that applies to each. While the focus is clearly on the U.S., understanding the energy resilience threat and conducting long-range energy resilience planning will benefit communities all over the globe. Part I describes the specific energy security threats that are facing local institutions and communities, the specific impact of an energy shock, and the advantages offered by pursuit of energy resilience. Part II provides concrete guidance and allows managers to assess where their institution lies on the energy resilience spectrum and they would like to be. Part III describes the three main areas of energy efficiency, on-site generation, and emergency planning.

Building on unique data, this book analyses the efficacy of a prominent climate change mitigation strategy: voluntary programs for sustainable buildings and cities. It evaluates the performance of thirty-five voluntary programs from the global north and south, including certification programs, knowledge networks, and novel forms of financing. The author examines them through the lens of club theory, urban transformation theory, and diffusion of innovations theory. Using qualitative comparative analysis (QCA) the book points out the opportunities and constraints of voluntary programs for decarbonising the built environment, and argues for a transformation of their use in climate change mitigation. The book will appeal to readers interested in sustainable city planning, climate change mitigation, and voluntarism as an alternative governance mechanism for achieving socially and environmentally desirable outcomes. The wide diversity of cases from the global north and south generate new insights, and offers practical guidelines for designing effective programs.

Based on a major international forum held in Rome in 2008, this volume brings together leading climate change experts from an array of fields to engage holistically with the climate change discourse as it shifts from mitigation to adaptation, with particular attention to the urban environment. It is a pioneering effort to broaden the discursive field, and is likely to remain a landmark study on the subject for a generation.

Climate change how influences business? Why does climate change influence business building damage? With climate changes seemingly impacting many areas of the United States, water usage is a new consideration for areas that formerly had no water shortages. Droughts in various areas of the country force organizations and individuals to reconsider how they waste water and mandate cutbacks. Creative innovations are needed to make these rapid and dramatic reductions possible for most organizations. Resource conservation is another area with major potential for savings within existing buildings. So, climate change can bring negative influence to damage any properties, such as offices will be easily to be damaged, consequently, it will bring high repair expenditure to any businessmen. I shall explain as below: The initial focus of most industry sustainability guidelines began with construction of new buildings. The ability to influence sustainable outcomes is most easily identified by contrasting a traditional building, or one built without consideration of integrated systems and savings, with a new, highly integrated, high-performance structure. The design and commissioning provides great momentum for the sustainability movement as more and more organizations become familiar with the USGBC's Leadership in Energy and Environmental Design (LEED) guidelines and the need to improve our total life-cycle costs through design, construction, the long operational period, and final disposal. Acceptance of new building improvements has been well embraced. Sustainability Applied to Existing Buildings Operations Of primary interest to facility managers is the ability to support the organization and provide high-performance spaces for accomplishing organizational objectives. Reduction of energy usage is the most visible, and most easily documented, feature of sustainable building systems. With energy costs soaring, mandates to dramatically reduce energy usage are widespread worldwide. Facility managers are ordered to keep cost escalations within sometimes unrealistic ranges, and are also charged with continuing to keep the organization and its workers comfortable and productive in their workspaces. All of above property damage cost will be caused by global bad climate change influences. How businessmen act to fight climate change? There is a risk that as the immediate crisis wanes and its economic consequences become clearer, we cast aside longer-term aspirations in pursuit of short-term easy fixes, many of which would have adverse environmental consequences. These include rolling back environmental standards, stimulating the economy by subsidising fossil-fuel-heavy industries and focusing on making more things, rather than using them better. Hence, it bring this question due to climate change can bring negative influence to businesses, how businessmen act to fight climate change? Business action on climate change includes a range of activities relating to global warming, and to influencing political decisions on global-warming-related regulation, such as the Kyoto Protocol. Major multinationals have played and to some extent continue to play a significant role in the politics of global warming, especially in the United States, through lobbying of government and funding of global warming deniers. Business also plays a key role in the mitigation of global warming, through decisions to invest in researching and implementing new energy technologies and energy efficiency measures. (See also individual and political action on climate change.) What is the impact of climate change on business?

High performance buildings maximize operational energy savings; improve comfort, health, & safety of occupants & visitors; & limit detrimental effects on the environment. These Guidelines provide instruction in the new methodologies that form the underpinnings of high performance buildings. They further indicate how these practices may be accommodated within existing frameworks of capital project administration & facility management. Chapters: city process; design process; site design & planning; building energy use; indoor environment; material & product selection; water mgmt.; construction admin.; commissioning; & operations & maintenance.

White paper.

This guide to green 'retro-fitting' for corporate real estate, facility managers and occupiers struggling to reduce their building's carbon footprint will help in the planning and management of a sustainable refurbishment programme. Facilities managers have a key role in improving and maintaining a building's sustainability credentials over its whole life – through benchmarking and developing improvement strategies, energy efficiency measures and installation of low carbon technologies, as well as through waste minimisation and appropriate material use. The first part of the book gives the context, providing the structure and linkage between the other chapters, together with an overview on sustainable development and refurbishment projects separately and the value gained from a sustainable refurbishment. Part 2 details the regulatory and financial drivers, together with market pressures, and provides an overview of where this is leading together with the implications for sustainable refurbishment. Part 3 provides technical support on carbon measures, helping to determine the feasibility of good practices as part of the refurbishment. Included is a review of energy efficiency, renewable and low carbon technologies and embodied carbon to enable lifecycle carbon calculations, together

with the necessary behavioural change aspects needed to embed the changes. Linkages and benefits between the technologies will be highlighted. Part 4 reviews refurbishment from a wider environmental perspective, understanding the challenges and opportunities that exist for particular developments from a materials, water, biodiversity and transport perspective. Throughout the book, checklists are provided on typical activities and good practice that should be performed. These are expanded through relevant case studies and examples to show-case previous good practices and lessons learnt. The book is structured to allow a matrix approach, with Parts 3 and 4 providing the technical information necessary to deliver a sustainable refurbishment; with sector relevance and best practice with case studies throughout the book.

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 (CO<sub>2</sub>) 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 indispensable 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.

The Energy Independence and Security Act of 2007 (EISA) was passed with the goal 'to move the United States toward greater energy independence and security.' Energy security and independence cannot be achieved unless the United States addresses the issue of energy consumption in the building sector and significantly reduces energy consumption in buildings. Commercial and residential buildings account for approximately 40% of the U.S. energy consumption and emit 50% of CO<sub>2</sub> emissions in the U.S. which is more than twice the total energy consumption of the entire U.S. automobile and light truck fleet. A 50%-80% improvement in building energy efficiency in both new construction and in retrofitting existing buildings could significantly reduce U.S. energy consumption and mitigate climate change. Reaching these aggressive building efficiency goals will not happen without significant Federal investments in areas of computational and mathematical sciences. Applied and computational mathematics are required to enable the development of algorithms and tools to design, control and optimize energy efficient buildings. The challenge has been issued by the U.S. Secretary of Energy, Dr. Steven Chu (emphasis added): 'We need to do more transformational research at DOE including computer design tools for commercial and residential buildings that enable reductions in energy consumption of up to 80 percent with investments that will pay for themselves in less than 10 years.' On July 8-9, 2010 a team of technical experts from industry, government and academia were assembled in Arlington, Virginia to identify the challenges associated with developing and deploying new computational methodologies and tools that will address building energy efficiency. These experts concluded that investments in fundamental applied and computational mathematics will be required to build enabling technology that can be used to realize the target of 80% reductions in energy consumption. In addition the finding was that there are tools and technologies that can be assembled and deployed in the short term - the next 3-5 years - that can be used to significantly reduce the cost and time effective delivery of moderate energy savings in the U.S. building stock. Simulation tools, which are a core strength of current DOE computational research programs, provide only a part of the answer by providing a basis for simulation enabled design. New investments will be required within a broad dynamics and control research agenda which must focus on dynamics, control, optimization and simulation of multi-scale energy systems during design and operation. U.S. investments in high performance and high productivity computing (HP2C) should be leveraged and coupled with advances in dynamics and control to impact both the existing building stock through retrofits and also new construction. The essential R & D areas requiring investment are: (1) Characterizing the Dynamics of Multi-scale Energy Systems; (2) Control and Optimization Methodologies of Multi-scale Energy Systems Under Uncertainty; and (3) Multiscale Modeling and Simulation Enabled Design and Operation. The concept of using design and control specific computational tools is a new idea for the building industry. The potential payoffs in terms of accelerated design cycle times, performance optimization and optimal supervisory control to obtain and maintain energy savings are huge. Recent advances in computational power, computer science, and mathematical algorithms offer the foundations to address the control problems presented by the complex dynamics of whole building systems. The key areas for focus and associated metrics with targets for establishing competitiveness in energy efficient building design and operation are: (1) Scalability - Current methodology and tools can provide design guidance for very low energy buildings in weeks to months; what is needed is hours to days. A 50X improvement is needed. (2) Installation and commissioning - Current methodology and tools can target a three month window for commissioning of building subsystems; what is needed is one week. A 10X improvement is needed. (3) Quality - Current design tools can achieve 30% accuracy; what is needed to make design decisions is 5% with quantification of uncertainty. A 5X improvement is needed. These challenges cannot be overcome by raw computational power alone and require the development of new algorithms. Here algorithms mean much more than simulating the building physics but need to be inclusive of a much better understanding of the building and the control systems associated with the building and to capture the entire set of dynamics. The algorithms must represent computationally new mathematical approaches to modeling, simulation, optimization and control of large multi-scale dynamic systems and bringing these elements to bear on industry in simulation enabled design approaches.

The UK government has committed to reducing the nation's carbon emissions by 80% by 2050. Buildings currently use almost half of the UK's generated energy and they are now the focus of an unprecedented drive to cut energy use in our homes, offices, schools, libraries – in fact in almost every building, public or private. Delivering Sustainable Buildings: an industry insider's view offers peer-to-peer insights and advice from a leading practitioner in this field and brings together in one book an overview of the main issues to consider when creating energy-efficient and sustainable buildings. A resource to dip into for practical advice, which is both highly readable and also backed up by in-depth technical knowledge, giving the important points to note and common pitfalls to avoid. Based on observations of an author with hands-on experience of dealing with the various elements of the building services engineering industry, the book gives a unique insight into the particular challenges faced by designers, project managers, contractors and installers working to deliver lower carbon and sustainable building projects

and operation. There is a lot of guidance on sustainable buildings available from reputable sources including BRE, CIBSE, B&ES, ECA and BSRIA. This book is different in that it speaks directly to contractors and practitioners, with practical messages dealing with real on-site challenges, offering practical advice based on experience. Many contractors are now faced with a business choice of offering services related to issues of the energy hierarchy, minimising energy use, providing good building automation and controls and then looking further at microgeneration/renewables. Here they must decide what technologies might be suitable for their businesses, as well as considering what level of training is required before they or their employees can start to work with these technologies. *Delivering Sustainable Buildings: an industry insider's view* will help specialist contractors and facilities managers understand sustainable buildings at the strategic level (legislation, finance, training) and then to offer practical advice on various aspects of sustainable buildings (water use, energy-efficient building services, commissioning and keeping the building maintained to optimum performance) to their clients.

Passivhaus is the fastest growing energy performance standard in the world, with almost 50,000 buildings realised to date. Applicable to both domestic and non-domestic building types, the strength of Passivhaus lies in the simplicity of the concept. As European and global energy directives move ever closer towards Zero (fossil) Energy standards, Passivhaus provides a robust 'fabric first' approach from which to make the next step. The *Passivhaus Designers Manual* is the most comprehensive technical guide available to those wishing to design and build Passivhaus and Zero Energy Buildings. As a technical reference for architects, engineers and construction professionals the *Passivhaus Designers Manual* provides: State of the art guidance for anyone designing or working on a Passivhaus project; In depth information on building services, including high performance ventilation systems and ultra-low energy heating and cooling systems; Holistic design guidance encompassing: daylight design, ecological materials, thermal comfort, indoor air quality and economics; Practical advice on procurement methods, project management and quality assurance; Renewable energy systems suitable for Passivhaus and Zero Energy Buildings; Practical case studies from the UK, USA, and Germany amongst others; Detailed worked examples to show you how it's done and what to look out for; Expert advice from 20 world renowned Passivhaus designers, architects, building physicists and engineers. Lavishly illustrated with nearly 200 full colour illustrations, and presented by two highly experienced specialists, this is your one-stop shop for comprehensive practical information on Passivhaus and Zero Energy buildings.

This book explores the new rules and codes that are required in order to foster the implementation of smart city technologies with a view to meeting the environmental and energy challenges posed by dynamic contemporary cities with increasing populations. In particular, it proposes a methodological approach suitable for use when devising a smart urban/building code for local administrations, taking into account the current European regulatory framework (directives and technical norms) and evaluating the economic feasibility of the suggested measures. A case study is made of a large Mediterranean city in Italy that can be regarded as a paradigm of urban evolution, where a traditional individualism poses a cultural obstacle to the emerging need to share resources. Further features include a smart cities atlas, explanation of how to create local rules for sustainable building restoration/construction, and guidance on economic evaluation of the impact of building automation and passive measures for energy efficiency. The book, which has a multidisciplinary perspective, will be of value to all who are interested in the transition to smart cities that can meet sustainable development targets.

The building sector contributes up to 40 per cent of greenhouse gas emissions, mostly from energy use during the life time of buildings. Identifying opportunities to reduce these emissions has become a priority in the global effort to reduce climate change. This publication provides an overview of current knowledge about greenhouse gas emissions from buildings, and presents opportunities for their minimisation.

• New York Times bestseller • The 100 most substantive solutions to reverse global warming, based on meticulous research by leading scientists and policymakers around the world "At this point in time, the *Drawdown* book is exactly what is needed; a credible, conservative solution-by-solution narrative that we can do it. Reading it is an effective inoculation against the widespread perception of doom that humanity cannot and will not solve the climate crisis. Reported by-effects include increased determination and a sense of grounded hope." —Per Espen Stoknes, Author, *What We Think About When We Try Not To Think About Global Warming* "There's been no real way for ordinary people to get an understanding of what they can do and what impact it can have. There remains no single, comprehensive, reliable compendium of carbon-reduction solutions across sectors. At least until now. . . . The public is hungry for this kind of practical wisdom." —David Roberts, *Vox* "This is the ideal environmental sciences textbook—only it is too interesting and inspiring to be called a textbook." —Peter Kareiva, Director of the Institute of the Environment and Sustainability, UCLA In the face of widespread fear and apathy, an international coalition of researchers, professionals, and scientists have come together to offer a set of realistic and bold solutions to climate change. One hundred techniques and practices are described here—some are well known; some you may have never heard of. They range from clean energy to educating girls in lower-income countries to land use practices that pull carbon out of the air. The solutions exist, are economically viable, and communities throughout the world are currently enacting them with skill and determination. If deployed collectively on a global scale over the next thirty years, they represent a credible path forward, not just to slow the earth's warming but to reach drawdown, that point in time when greenhouse gases in the atmosphere peak and begin to decline. These measures promise cascading benefits to human health, security, prosperity, and well-being—giving us every reason to see this planetary crisis as an opportunity to create a just and livable world.

This green growth country assessment for FYR Macedonia defines and assesses the economic costs and benefits of a shift to greener growth for FYR Macedonia, with a focus on climate action. Multi-sector analytic work tied together by macroeconomic modeling generated a detailed green growth path to 2050. While addressing today's economic challenges, policymakers need to keep the long-term in mind, both the likely impact of a changing climate on water, agriculture, and infrastructure and growing obligations to mitigate greenhouse gas emissions. This consideration is particularly important for decisions on long-lived infrastructure such as power supply, irrigation, or urban streets, water distribution, and sewers. Innovative modeling of water as a constraint on growth as the climate becomes warmer and drier quantified the tough tradeoffs that will be needed to balance competing demands from agriculture, the power sector, and municipalities and industry. A greener energy sector needs to aim at increased supply security, reduced greenhouse gas emissions, and increased supply efficiency: more generation to avoid blackouts and expensive imports; lignite and oil replaced by gas and renewables in the supply mix; and aggressive energy efficiency measures in industry, buildings, and households. Providing better transport services while containing accelerating emissions growth will require better fuel efficiency, more use of rail and public transport, and an integrated approach to urban

transport that maximizes local cobenefits. Urban areas, especially the capital city of Skopje hold the potential to lead on greener growth. In recent years, urban sprawl, driven by growth in the number of single family houses that use wood for heating and private cars for commuting, has pushed up the energy intensity of urban life as well as the cost of delivering infrastructure services to a less-dense community. The country also needs to plan for the impact of a changing climate on the reliability and quality of infrastructure services. Planners need to decide whether to build infrastructure to be more resilient today or wait to see what happens and spend more on maintenance and rehabilitation (or replacement) later. For FYR Macedonia, the top priorities for infrastructure adaptation over the next decade include urban drainage systems, health and education facilities and municipal buildings. The main local cobenefit of mitigation will be reduction of air pollution, which is among the highest in Europe. Particulate matter pollution from industry, the power sector, and road paving can be abated through better equipment while the other large and unusual source of air pollution--the widespread use of wood for heat by urban households--can be reduced in the near-term by more modern stoves and in the long-term by better heating options. An economy-wide macroeconomic assessment estimates the impact on growth and employment of packages of green growth actions across sectors and provides advice on priorities for public investment. Climate investments pose costs upfront but provide benefits both now and later. Adaptation interventions (which protect tomorrow's output from climate damage) are found to be less costly to growth and employment in the short-term than mitigation measures (which reduce greenhouse gas emissions) once sector results are integrated into a general equilibrium model. Under a 'green' climate action scenario, moderate adaptation measures in agriculture and water and incremental expenses in the climate-proofing of physical infrastructure would amount to the equivalent of around 0.1 percent of annual GDP, while moderate mitigation measures would require the mobilization of resources constituting about one percent of annual GDP. More ambitious climate action, under a 'super-green' scenario, would require water sector investments that reach one percent of GDP by 2015 while mitigation investments require two percent of GDP by 2020. Green climate action would together generate short-term losses to national income of more than two percent if financing is mobilized domestically, while super-green action induces even bigger losses. However, both moderate and ambitious climate action promise a medium- to long-term boost in the level of GDP—reaching 1.5 to 2 percent by 2050.

The indoor environment affects occupants' health and comfort. Poor environmental conditions and indoor contaminants are estimated to cost the U.S. economy tens of billions of dollars a year in exacerbation of illnesses like asthma, allergic symptoms, and subsequent lost productivity. Climate change has the potential to affect the indoor environment because conditions inside buildings are influenced by conditions outside them. Climate Change, the Indoor Environment, and Health addresses the impacts that climate change may have on the indoor environment and the resulting health effects. It finds that steps taken to mitigate climate change may cause or exacerbate harmful indoor environmental conditions. The book discusses the role the Environmental Protection Agency (EPA) should take in informing the public, health professionals, and those in the building industry about potential risks and what can be done to address them. The study also recommends that building codes account for climate change projections; that federal agencies join to develop or refine protocols and testing standards for evaluating emissions from materials, furnishings, and appliances used in buildings; and that building weatherization efforts include consideration of health effects. Climate Change, the Indoor Environment, and Health is written primarily for the EPA and other federal agencies, organizations, and researchers with interests in public health; the environment; building design, construction, and operation; and climate issues. NOTE: NO FURTHER DISCOUNT FOR THIS PRINT PRODUCT -- OVERSTOCK SALE -- Significantly reduced list price Helps property owners, preservation professionals, and stewards of historic buildings make informed decisions when considering energy efficiency improvements to historic buildings. This brief targets primarily small-to medium-size historic buildings, both residential and commercial. However, the general decision-making principles outlined here apply to buildings of any size and complexity. This guidance is provided in accordance with the Secretary of the Interior's Standards for Rehabilitation to ensure that the architectural integrity of the historic property is preserved. Other related products: A Do-It-Yourself Guide to Sealing and Insulating With Energy Star: Sealing Air Leaks and Adding Attic Insulation is available here: <https://bookstore.gpo.gov/products/sku/055-000-00684-9> Preservation Briefs: 15-23 (2007) is available here: <https://bookstore.gpo.gov/products/sku/024-005-01256-7> The Seismic Rehabilitation of Historic Buildings is available here: <https://bookstore.gpo.gov/products/sku/024-005-01322-9> Renovation & Historic Preservation resources collection can be found here: <https://bookstore.gpo.gov/catalog/science-technology/construction-archit...>"

This book highlights selected papers presented during the bi-annual World Renewable Energy Network's 2019 Med Green Forum. This international forum highlights the importance of growing renewable energy applications in two main sectors: Electricity Generation and Sustainable Building. The papers highlight the most current research and technological breakthroughs illustrating the viability of using renewable energy to satisfy energy needs. Coverage includes a broad range of renewable energy technologies and applications in all sectors – electricity production, heating and cooling, agricultural applications, water desalination, industrial applications, and transport. Presents leading-edge research in green building, sustainable architecture, and renewable energy; Covers a broad range of renewable energy technologies and applications in all sectors; Contains case studies and examples to enhance practical application of the technologies presented.

Energy Rating is a crucial consideration in modern building design, affirmed by the new EC Directive on the energy performance of buildings. Energy represents a high percentage of the running costs of a building, and has a significant impact on the comfort of the occupants. This book represents detailed information on energy rating of residential buildings, covering: \* Theoretical and experimental energy rating techniques: reviewing the state of the art and offering guidance on the in situ identification of the UA and gA values of buildings. \* New experimental protocols to evaluate energy performance: detailing a flexible new approach based on actual energy consumption. Data are collected using the Billed Energy Protocol (BEP) and Monitored Energy Protocol (MEP) \* Energy Normalization techniques: describing established methods plus a new Climate Severity Index, which offers significant benefits to the user. Also included in this book are audit forms and a CD-ROM for applying the new rating methodology. The software, prepared in Excel, is easy to use, can be widely applied using both deterministic and experimental methods, and can be adapted to national peculiarities and energy policy criteria. Energy Performance of Residential Buildings offers full and clear treatment of the key issues and will be an invaluable source of information for energy experts, building engineers, architects, physicists, project managers and local authorities. The book stems from the EC-funded SAVE project entitled EUROCLASS. Participating institutes included: \* University of Athens, Greece \* Belgium Building Research Institute, Belgium \* University of Seville, Spain \* Royal Institute of Technology, Sweden

The Food and Agriculture Organization of the United Nations (FAO) estimates that 815 million people in the world today are chronically hungry. After declining for over a decade, in 2017 global hunger is on the rise again. According to this year's estimates, the world must, by 2050, produce 49 percent more food than in 2012 as populations grow and diets change. At the same time, almost 80 percent of the poor live in rural areas where people depend on agriculture, fisheries or forestry as their main source of income and food. If temperatures continue to rise, then progress towards eradicating hunger and ensuring the sustainability of our natural-resource base to achieve the 2030 Agenda for Sustainable Development will be at risk. This publication presents FAO's key messages on climate change and food security. It includes examples of FAO's support to countries so they are better able to adapt to the impacts of climate change in the agricultural sectors. It also brings together FAO's most up-to-date knowledge on climate change, including the tools and methodologies used to support countries' climate commitments and action plans.

Universities and colleges are in a unique position to take a leadership role on global warming. As communities, they can strategize and organize effective action. As laboratories for learning and centers of research, they can reduce their own emissions of greenhouse gases, educate students about global warming, and direct scholarly attention to issues related to climate change and energy. This book offers practical guidance for those who want to harness the power of universities and other institutions, and provides perspectives on how to motivate change and inspire action within complex organizations.

Climate change is occurring. It is very likely caused by the emission of greenhouse gases from human activities, and poses significant risks for a range of human and natural systems. And these emissions continue to increase, which will result in further change and greater risks. America's Climate Choices makes the case that the environmental, economic, and humanitarian risks posed by climate change indicate a pressing need for substantial action now to limit the magnitude of climate change and to prepare for adapting to its impacts. Although there is some uncertainty about future risk, acting now will reduce the risks posed by climate change and the pressure to make larger, more rapid, and potentially more expensive reductions later. Most actions taken to reduce vulnerability to climate change impacts are common sense investments that will offer protection against natural climate variations and extreme events. In addition, crucial investment decisions made now about equipment and infrastructure can "lock in" commitments to greenhouse gas emissions for decades to come. Finally, while it may be possible to scale back or reverse many responses to climate change, it is difficult or impossible to "undo" climate change, once manifested. Current efforts of local, state, and private-sector actors are important, but not likely to yield progress comparable to what could be achieved with the addition of strong federal policies that establish coherent national goals and incentives, and that promote strong U.S. engagement in international-level response efforts. The inherent complexities and uncertainties of climate change are best met by applying an iterative risk management framework and making efforts to significantly reduce greenhouse gas emissions; prepare for adapting to impacts; invest in scientific research, technology development, and information systems; and facilitate engagement between scientific and technical experts and the many types of stakeholders making America's climate choices.

Greenhouse gas emissions by the livestock sector could be cut by as much as 30 percent through the wider use of existing best practices and technologies. FAO conducted a detailed analysis of GHG emissions at multiple stages of various livestock supply chains, including the production and transport of animal feed, on-farm energy use, emissions from animal digestion and manure decay, as well as the post-slaughter transport, refrigeration and packaging of animal products. This report represents the most comprehensive estimate made to-date of livestock's contribution to global warming as well as the sectors potential to help tackle the problem. This publication is aimed at professionals in food and agriculture as well as policy makers.

The publication features a range of articles that encourage the sharing of best practice and the development of new technologies and initiatives and illustrates the opportunities for business and governments to reduce costs and increase profits while tackling climate change. This edition is focused on three themes: mitigation and adaptation, technology, and finance. It also describes positive actions organizations can take to reduce their carbon footprint and thereby their costs. Some of these actions require little investment in time or money, while others require substantial time and capital. But what they all require is a commitment to succeed.--Publisher's description.

Mastering Legal Matters: Navigating Climate Change—Its Impacts and Effects on Green Buildings and Trading Programs is a collection of three chapters that addresses how climate change affects human health and the environment, and discusses what is being done to reduce its current and future impacts. Contained in this unique offering are the following: •Global Climate Change examines the factual background of climate change and its legal implications both nationally and internationally. Coverage includes discussions of greenhouse gases (GHGs); U.S. policy on climate change; the role of the Clean Air Act in regulating GHGs; climate change litigation; and regional, state, local, corporate, and voluntary efforts to address climate change. •Green Buildings and Sustainable Development explains the concept behind green buildings, which is to increase the energy efficiency of buildings and reduce building impacts through better siting, design, construction, operation, maintenance, and removal. The chapter looks at green building rating systems (including LEED); federal, state, and local laws concerning green buildings; and non-governmental and private green building initiatives. Practical advice for drafting green building contracts is also provided. •Environmental Trading Programs answers the questions: What are environmental trading programs and how do they work? Briefly, these programs are being used to reduce air pollution, abate water pollution, replace critical species habitat, and achieve reductions in greenhouse gases. Along with discussing the general concepts applicable to environmental trading programs, the chapter examines the two main categories of trading programs and describes how individual environmental trading programs work.

Lists the California code regulations for energy efficient standards for residential and nonresidential buildings. Changes made since the 1992 version are marked with a bar in the outside margin and the index is also expanded to include many more useful terms. Changes focus on improving compliance by more clearly describing the responsibilities of each party in the compliance and construction process. Numerous charts and tables.

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.

Climate Action Planning A Guide to Creating Low-Carbon, Resilient Communities Island Press

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