

Preface

Ever since the oil crisis in 1973, it has been understood that a large amount of the energy consumed in buildings for their heating, cooling, and lighting is directly linked to the way in which the buildings are designed. Different categories of buildings have different energy needs. But at the same time, energy consumption of buildings for cooling and heating needs is dictated by the climate, the type of building, and the equipment that has been installed. In addition, with recent climatic changes, especially the constant temperature increases, which affect the built environment, the need to record the actual situation and promote good practices becomes imperative.

At the same time, it was realized that a densely built urban environment creates a microclimate on its own, affecting energy balance. It is obvious that without a correct interpretation of climatic, geographic, and location parameters, meeting the goals in a project *a posteriori* would be very difficult. An improved architectural approach improves both energy efficiency and indoor environmental quality and, consequently, the quality of life of the inhabitants. Also, a series of technologies has been incorporated in building design, utilizing solar energy in order to achieve lighting, heating, and cooling, with minimal conventional energy consumption.

In that sense, this book gathers all available information on energy efficiency in the built environment in areas with similar climatic conditions, to southern European countries. Notably, it tries to cover a gap by presenting concentrated information of the most important building sectors: residential, commercial, healthcare, and educational. Emphasis is on the existing building stock because improving its energy performance and using renewables is crucial not only for achieving the EU's 2020 targets, but also for meeting long-term objectives of climate and energy strategies. Also, it presents an overview of the development of energy technology, analyzing the trends and of systems used to decrease demand, as well as examining strategies for energy-saving, evolving, and renewable energies.

The goals of this book are to clarify the present trade-offs inherent in defining sustainability, to study technology and technology-intensive options, and

to provide a framework for assessing decision-making. These goals are of key importance, as through the development and implementation of effective energy conservation policies, the success and the need for further energy conservation in the building sector, as well as the importance of the implementation of renewables, are addressed. Special attention is given to the growing debate about the impact of climate change and internal temperatures in buildings—one of the major reasons for fuel poverty and therefore an increase in mortality.

The book is, in fact, a handbook on energy efficiency for readers wanting to understand the performance of different types of buildings. Current regulations in each country and expected mid-term trends provide important context. It includes four different parts with 25 chapters—all contributions from highly recognized experts—covering most of the countries with temperate climates, such as Spain, France, Italy, Greece, and Cyprus. But experts from other countries, such as Ireland and Austria, also contributed to the book, presenting the most promising developments in their fields of expertise.

This volume is organized as a handbook that provides information not only for the scientific world but also for the wider public, which needs to know about energy efficiency in order to discuss and brainstorm among themselves about how the transition to a sustainable energy future can be achieved.

Therefore, Part I focuses on the challenges and priorities for a sustainable built environment. It presents seven chapters on energy and the built environment, its policies, and how building performance is affected by climate change. In addition, users' behavior is analyzed and evaluated in order to understand how it affects building performance and, in reverse, how building performance affects employment. Part II describes the actual performance of building stock and provides data on construction market activity, performance levels of recently built or renovated buildings, and steps beyond sustainability for various buildings. Part III analyzes the maturity, reliability, efficiency, cost, and market availability of technologies that decrease the demand for energy for building supply. Last but not least, Part IV describes tools and strategies for microclimatic analysis of the built environment.

In general, energy-intensive services and “luxuries” are ignored and factors that impact the wider public, such as the use of solar energy, are introduced. From that point of view, the wider objective is to provide readers with the background and methodologies to develop their own conceptualization of energy efficiency and a possible roadmap towards Net Zero Energy Buildings (nZEB).

Energy Performance of Buildings

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