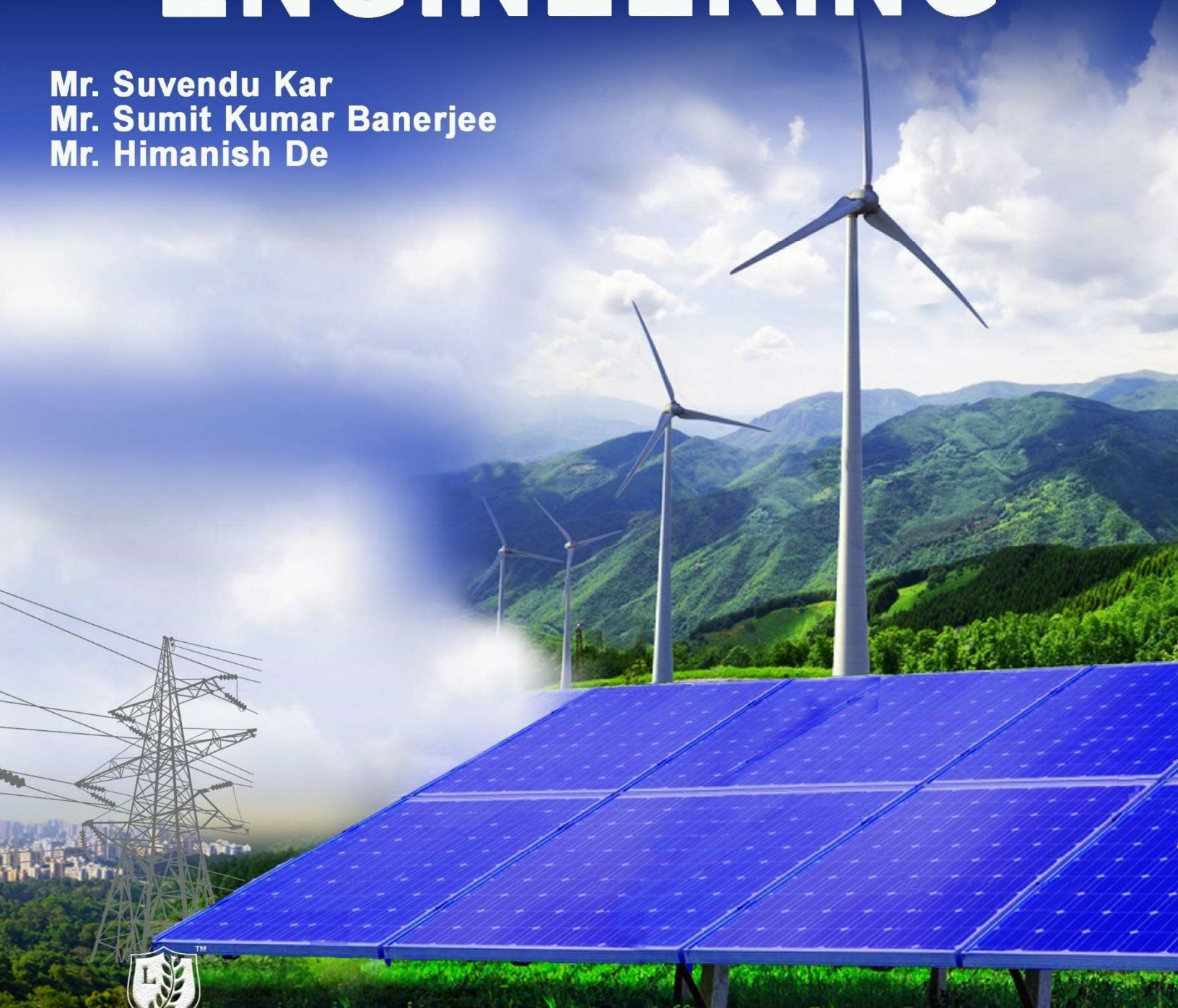


ENERGY SCIENCE AND ENGINEERING

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Preface

Energy science and engineering are playing a central role in the current technological and developmental debates. The analysis of fuels, machines, and conversion devices is not the only application of the study of energy; topics of sustainability, environmental responsibility, resource security, and physical infrastructure that underpins modern society are also included. This book demonstrates that energy should be considered as an engineering problem as well as a scientific issue and directly related to civil engineering, environmental systems, and the built environment. This volume is prepared to present in a systematical and easy way the basic principles of energy science. The first chapter introduces the concept of energy, the different forms of energy, the law of conservation of energy, the history of human use of energy, energy systems and the connection between energy, society, sustainability and climate change. The discussion is then elaborated in subsequent chapters on energy sources, energy and environment, and civil engineering projects related to energy systems, providing a logical sequence leading from the basic concepts to the applied knowledge.

The book is written in an academic tone yet in a pedagogically useful manner. Each chapter features a conceptual explanation as well as a classification, a technical description, figures, tutorials, key points, and review questions, with answers, all tied together. The structure aims to facilitate the process of teaching, learning and preparing for exams in the classroom, as well as self-study and to foster greater recognition and awareness of the importance of energy in Sustainable Development.

One of the specific areas that has received a special emphasis in the energy science is its practical application for civil engineering. In the field of energy infrastructure including dams, pipelines, power plants, wind turbine foundations, solar energy installations, containment facilities and green buildings, engineers are not only expected to master construction and materials, but also their operating environment as part of the energy system. This book attempts to make the step between theory and practice that suits the undergraduate and interface post graduate courses.

We hope that readers of this book will use it as a basis for further research in energy science and engineering, and as an example of how the technical and environmental issues that will affect the future of energy systems.

Acknowledgement

Many people and organizations have helped make this book possible, and for this we are grateful. A wide range of teachers, mentors and academics have imparted to us their knowledge and understanding of the Energy science and engineering, and their commitment and dedication to excellence which has had a significant impact. Preparation of this work has been inspired by their contributions in our professional development over the years.

We would like to express our gratitude to the students whose questions, curiosity and motivation for learning prompted us to present the content in a clear, structured and pedagogically rewarding way. In the classroom, they introduced concepts of fundamental physics and engineering applications, emphasising the need to come up with a resource that connected both fundamental ideas to practical engineering applications.

We also recognize the work of the many researchers, scientists, engineers, and teachers whose scholarly papers and impactful research advances have helped to advance the fields of energy science, environmental sustainability and engineering practice. The volume has been enriched by the body of knowledge developed by the global academic community.

We would like to express our gratitude to the editors and production staff at Learnet Publishing for their help and wisdom in getting this manuscript published. They have been extremely helpful in the reviewing, design and publishing process.

Last but not least we would like to thank our family members who provided us with unconditional support, patience and understanding throughout the different phases of writing the book and compiling it. They continuously encouraged us to do this, giving us the motivation to complete this.

We hope this book will make a difference to students' academic development and will be a valuable reference for anyone interested in the interdisciplinary field of energy science and engineering. We accept suggestions for future improvement and welcome your constructive criticism which might help correct errors that may still exist in this work, if any.

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