Preface

The constantly changing landscape of Renewable and Alternative Energy makes it challenging for experts and practitioners to stay informed of the field’s most up-to-date research. That is why Information Science Reference is pleased to offer this three-volume reference collection that will empower students, researchers, and academicians with a strong understanding of critical issues within Renewable and Alternative Energy by providing both broad and detailed perspectives on cutting-edge theories and developments. This reference is designed to act as a single reference source on conceptual, methodological, technical, and managerial issues, as well as provide insight into emerging trends and future opportunities within the discipline.

*Renewable and Alternative Energy: Concepts, Methodologies, Tools and Applications* is organized into six distinct sections that provide comprehensive coverage of important topics. The sections are:

1. Fundamental Concepts and Theories;
2. Development and Design Methodologies;
3. Tools and Technologies;
4. Utilization and Applications;
5. Critical Issues and Challenges; and

The following paragraphs provide a summary of what to expect from this invaluable reference tool.

Section 1, “Fundamental Concepts and Theories,” serves as a foundation for this extensive reference tool by addressing crucial theories essential to the understanding of Renewable and Alternative Energy. Introducing the book is *An Overview to Thermal Solar Systems for Low Temperature: Outlining the European Norm 12976* by Vicente González-Prida and Anthony Raman; a great foundation laying the groundwork for the basic concepts and theories that will be discussed throughout the rest of the book. Section 1 concludes, and leads into the following portion of the book with, *Solar Energy Potential as Support for Sustainable Development of Romanian Economy* by Dorel Dusmanescu.

Section 2, “Development and Design Methodologies,” presents in-depth coverage of the conceptual design and architecture of Renewable and Alternative Energy. Opening the section is *Sustainable Design of Photovoltaics: Devices and Quantum Information* by Mihai V. Putz et al. Through case studies, this section lays excellent groundwork for later sections that will get into present and future applications for Renewable and Alternative Energy. The section concludes with an excellent work by Jagatheesan Kalianathan, Anand Baskaran, and Nilanjan Dey, titled *Automatic Generation Control of Thermal-Thermal-Hydro Power Systems with PID Controller using Ant Colony Optimization*. 
Section 3, “Tools and Technologies,” presents extensive coverage of the various tools and technologies used in the implementation of Renewable and Alternative Energy. Section 3 begins where Section 2 left off, though this section describes more concrete tools at place in the modeling, planning, and applications of Renewable and Alternative Energy. The first chapter, *Intelligent Computing on the Basis of Cognitive and Event Modeling, and Its Application in Energy Security Research* by L. V. Massel, V. L. Arshinsky, and A. G. Massel, lays a framework for the types of works that can be found in this section. The section concludes with *Wind-Thermal Integrated Power System Scheduling Problem Using Cuckoo Search Algorithm* by K. Chandrasekaran and Sishaj P. Simon. Where Section 3 described specific tools and technologies at the disposal of practitioners, Section 4 describes the use and applications of the tools and frameworks discussed in previous sections.

Section 4, “Utilization and Applications,” describes how the broad range of Renewable and Alternative Energy efforts has been utilized and offers insight on and important lessons for their applications and impact. The first chapter in the section is titled *Use of Hydrogen and Fuel Cells for Refrigerated Transport* written by Raquel Garde et al. This section includes the widest range of topics because it describes case studies, research, methodologies, frameworks, architectures, theory, analysis, and guides for implementation. The breadth of topics covered in the chapter is also reflected in the diversity of its authors, from countries all over the globe. The section concludes with *Evaluation of Renewable Energy Alternatives using Hesitant Fuzzy TOPSIS and Interval Type-2 Fuzzy AHP* by Başar Öztayşi and Cengiz Kahraman.

Section 5, “Critical Issues and Challenges,” presents coverage of academic and research perspectives on Renewable and Alternative Energy tools and applications. The section begins with *Low Carbon Footprint: The Supply Chain Agenda in Malaysian Manufacturing Firms* by Muhammad Shabir Shaharudin and Yudi Fernando. Chapters in this section will consider theoretical approaches and offer alternatives to crucial questions about Renewable and Alternative Energy. The section concludes with *Hybrid Supply Chain Strategies in Wind Business* by Jordi Castelló, Rodolfo de Castro, and Andrea Bikfalvi.

Section 6, “Emerging Trends,” highlights areas for future research within the field of Renewable and Alternative Energy, opening with *Revolution of Energy Storage System in Smart Grids* by Jianhui Wong and Yun Seng Lim. This section contains chapters that look at what might happen in the coming years that can extend the already staggering amount of applications for Renewable and Alternative Energy. The final chapter of the book looks at an emerging field within Renewable and Alternative Energy, in the excellent contribution, *Creative Energy Alternatives: Cheap and Clean Future Energy for Turkey* by Esin Okay.

Although the primary organization of the contents in this multi-volume work is based on its six sections, offering a progression of coverage of the important concepts, methodologies, technologies, applications, social issues, and emerging trends, the reader can also identify specific contents by utilizing the extensive indexing system listed at the end of each volume. As a comprehensive collection of research on the latest findings related to using technology to provide various services, *Renewable and Alternative Energy: Concepts, Methodologies, Tools and Applications*, provides researchers, administrators and all audiences with a complete understanding of the development of applications and concepts in Renewable and Alternative Energy. Given the vast number of issues concerning usage, failure, success, policies, strategies, and applications of Renewable and Alternative Energy in countries around the world, *Renewable and Alternative Energy: Concepts, Methodologies, Tools and Applications* addresses the demand for a resource that encompasses the most pertinent research in technologies being employed to globally bolster the knowledge and applications of Renewable and Alternative Energy.