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GREEN TECHNOLOGIES

Concepts, Methodologies, Tools and Applications

Information Resources Management Association, USA VOLUME III

Green Technologies:
Concepts, Methodologies, Tools and Applications

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Volume III

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Preface

Green technology is the IT community's contribution to growing environmental responsibility. Green technology is the science and theory behind implementing technological systems while minimizing negative impact on the world. As our population expands and our resource consumption increases, it is important to take steps toward sustainable advancement.

The constantly changing landscape of green technology 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 green technology 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.

Green Technology: Concepts, Methodologies, Tools and Applications is organized into eight 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 Application, (5) Organizational and Social Implications, (6) Managerial Impact, (7) Critical Issues, and (8) Emerging Trends. 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 green technology. Chapters such as *Green Health* by Nina Godbole, and *Planning Sustainable Communities* by Paul Donehue give an introduction and overview of green technology in a contemporary business environment. *Information and Communication Technologies for a more Sustainable World* by Lorenz M. Hilty discusses the potential contribution of Information and Communication Technology (ICT) to the dematerialization of the industrial societies and introduces a conceptual framework which accounts for positive and negative impacts of ICT on physical flows. Additional selections focus on providing backgrounds and introductions to specific concepts within green technology. These and several other foundational chapters provide a wealth of expert research on the elemental concepts and ideas surrounding green technology.

Section 2, ***Development and Design Methodologies***, presents in-depth coverage of the conceptual design and architecture of green technology. Designing and implementing effective processes and strategies are the focus of such chapters as *A Comprehensive and Practical Green ICT Framework* by Graeme Philipson, and *A Framework for the Implementation of Eco-Efficient Business Systems* by Maha Shakir. *Modeling of Green Supply Chain Logistics* by Hsin-Wei Hsu fills a gap in case-based green supply chain management models by proposing a more generalized model. With contributions from leading international researchers, this section offers copious developmental approaches and design methodologies for green technology.

Section 3, ***Tools and Technologies***, presents extensive coverage of the various tools and technologies used in the development and implementation of green technology. This comprehensive section includes such chapters as *A BIM Based Application to Support Cost Feasible 'Green Building' Concept Decisions*, by Goh Bee Hua, and *Sustainable Product Service Systems* by David Ness, which describe various techniques and models for sustainable development. *Using Knowledge Management Tools in Fostering Green ICT Related Behavior Change* by Magda Hercheui discusses the role of Green ICT in improving the management of information and knowledge about sustainability in order to promote behavior change. Finally, chapters such as *Energy Management System Using Wireless Sensor Network* by Ekata Mehul and Rahul Shah present tools to adapt to the challenges of sustainable energy systems. In all, this section provides coverage of a variety of tools and technologies that inform and enhance modern green technology.

Section 4, ***Utilization and Application***, describes how green technology has been utilized and offers insight on important lessons for their continued use and evolution. Including chapters such as *An Australian Rules Football Club Approach To Green ICT* by Jeffrey Phuah, and *Green Product Retrieval and Recommendations System* by Yi-Chun Liao, this section investigates numerous methodologies that have been proposed and enacted in green technology, as well as their results. As this section continues, a number of case studies in the use of green technology are presented from multiple industries across the world, in selections such as *Assessing Environment-Climate Impacts in the Nile Basin for Decision-making* by Farid El-Daoushy, Breaking Out from Lock-In by Gert-Jan Hospers, and *Green Urban Planning and Design for Smarter Communities* by Ozge Yalciner Ercoskun. Contributions found in this section provide comprehensive coverage of the practicality and current use of green technology.

Section 5, ***Organizational and Social Implications***, includes chapters discussing the organizational and social impact of green technology. *Adopting Green ICT in Business* by Subramanian Chitra explores the benefits and pitfalls associated with adopting green ICT in a business setting. *Communication, Information and Sustainability* by Marco Tortora analyzes the connections between geography, communication, organization, and sustainability. *From Traditional Non-Sustainable Production to Closed Loop Manufacturing* by Paulina Golinska_Addresses the issues related to materials management for closed loop manufacturing. This section continues with *The Negative Impact of ICT Waste on Environment and Health* by Walied Askarzai, which discusses the negative impacts of ICT waste on the environment and health. Overall, these chapters present a detailed investigation of the complex relationship between individuals, organizations and green technology.

Section 6, ***Managerial Impact***, presents focused coverage of green technology as it relates to improvements and considerations in the workplace. *Balancing Green ICT Business Development with Corporate Social Responsibility (CSR)* by Marco Garito outlines topics relating to the design, development, and implementation of green ICT. Other chapters such as *Business Processes Management for a Green Telecommunications Company* by Ramesh Balachandran discuss management considerations, the evaluation and adoption of B2B applications, and the technical infrastructure supporting these systems. In all, the chapters in this section offer specific perspectives on how managerial perspectives and developments in green technology inform each other to create more meaningful user experiences.

Section 7, ***Critical Issues***, addresses vital issues related to green technology, which include customer relationship management, critical success factors and the business strategies. Chapters such as *The Role of the Business Analyst in Green ICT* by Adriana Beal, and *Decision Criteria for Green Management Information Systems* by Tagelsir Mohamed Gasmelseid discuss the success of green technology based on people and processes. Additional selections, such as *Information and Communication Technologies for the Good Society* by Wolfgang Hofkirchner, *Information and Communication Technology As Key Infrastructure for Sustainable Cities* by Motoo Kusakabe, and *Natural Resources Accounting for Sus-*

tainable Development by Ramakrishna Nallathiga address critical success factors in the deployment of green technology.

Section 8, ***Emerging Trends***, highlights areas for future research within the field of green technology, while exploring new avenues for the advancement of the discipline. Beginning this section is *Paving the Way towards Virtual Biorefineries* by Jörg Bremer and Barbara Rapp. This selection explores the drawbacks and opportunities of existing approaches to biomass logistics. Innovative new technologies are presented in *Technological Change and the Transformation of Global Agriculture* by Alejandro Nin-Pratt, and *The Optimizing WEB* by Aditya K. Ghose and Graham Billiau explores the merits of simulation systems before discussing their effectiveness. These and several other emerging trends and suggestions for future research can be found within the final section of this exhaustive multi-volume set.

Although the primary organization of the contents in this multi-volume work is based on its eight 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 providing various services, *Green Technology: Concepts, Methodologies, Tools and Applications*, provides researchers, administrators and all audiences with a complete understanding of the development of applications and concepts in green technology. Given the vast number of issues concerning usage, failure, success, policies, strategies, and applications of green technology in organizations, *Green Technology: Concepts, Methodologies, Tools and Applications* addresses the demand for a resource that encompasses the most pertinent research in green technology development, deployment, and impact.

List of Contributors

Contents

Volume I

Section I. Fundamental Concepts and Theories

This section serves as the foundation for this exhaustive reference tool by addressing crucial theories essential to the understanding of green technology. Chapters found within these pages provide an excellent framework in which to position green technology within the field of information science and technology. Individual contributions provide overviews of the history of green technology, the impact of information systems on organizations, and overviews on various green technology processes such as green health and sustainable urban development. Within this introductory section, the reader can learn and choose from a compendium of expert research on the elemental theories underscoring green technology.

Section II. Development and Design Methodologies

This section provides in-depth coverage of conceptual architectures, frameworks and methodologies related to the design and implementation of green technology. Throughout these contributions, research fundamentals in the discipline are presented and discussed. From broad examinations to specific discussions on particular frameworks and infrastructures, the research found within this section spans the discipline while also offering detailed, specific discussions. Basic designs, as well as abstract developments, are explained within these chapters, and frameworks for designing successful sustainable system architectures, integrating new technologies, and developing and implementing efficient processes are included.