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Introduction to Electric Power Systems; 2.1 DC Circuit Concepts; 2.1.1 Energy, Watts and Power; 2.1.2 Losses; 2.2 AC Circuit Concepts; 2.3 Reactive Power; 2.3.1 Mathematics of Reactive Power; 2.3.2 Control of Reactive Power; 2.3.3 Ohm's Law on AC Circuits; 2.3.4 Three-Phase Power; 2.4 The Elements of an Electric Power System; 2.5 Electricity Generation; 2.5.1 The Key Characteristics of Electricity Generators; 2.6 Electricity Transmission and Distribution Networks; 2.6.1 Transmission Networks; 2.6.2 Distribution Networks; 2.6.3 Competition and Regulation 2.7 Physical Limits on Networks; 2.7.1 Thermal Limits; 2.7.2 Voltage Stability Limits; 2.7.3 Dynamic and Transient Stability Limits; 2.8 Electricity Consumption; 2.9 Does it Make Sense to Distinguish Electricity Producers and Consumers?; 2.9.1 The Service Provided by the Electric Power Industry; 2.10 Summary; Questions; Further Reading; 3 Electricity Industry Market Structure and Competition; 3.1 Tasks Performed in an Efficient Electricity Industry; 3.1.1 Short-Term Tasks; 3.1.2 Risk-Management Tasks; 3.1.3 Long-Term Tasks; 3.2 Electricity Industry Reforms 3.2.1 Market-Orientated Reforms of the Late Twentieth Century 3.3 Approaches to Reform of the Electricity Industry; 3.4 Other Key Roles in a Market-Orientated Electric Power System; 3.5 An Overview of Liberalised Electricity Markets; 3.6 An Overview of the Australian National Electricity Market; 3.6.1 Assessment of the NEM; 3.7 The Pros and Cons of Electricity Market Reform; 3.8 Summary; Questions; Further Reading; Part III: Optimal Dispatch: The Efficient Use of Generation, Consumption and Network Resources 4 Efficient Short-Term Operation of an Electricity Industry with no Network Constraints

Sommario/riassunto

Bridges the knowledge gap between engineering and economics in a complex and evolving deregulated electricity industry, enabling readers to understand, operate, plan and design a modern power system With an accessible and progressive style written in straight-forward language, this book covers everything an engineer or economist needs to know to understand, operate within, plan and design an effective liberalized electricity industry, thus serving as both a useful teaching text and a valuable reference. The book focuses on principles and theory which are independent of any one
