1. Record Nr. UNINA9910830878703321

Titolo	Power grid operation in a market environment : economic efficiency and risk mitigation / / edited by Hong Chen
Pubbl/distr/stampa	Piscataway, New Jersey : , : IEEE Press/Wiley, , [2017] [Piscataqay, New Jersey] : , : IEEE Xplore, , [2016]
ISBN	1-119-08292-7 1-119-08280-3 1-119-08301-X
Descrizione fisica	1 online resource (287 p.)
Collana	IEEE Press series on power engineering
Disciplina	621.319
Soggetti	Electric power systems - Economic aspects Electric power distribution - Economic aspects Electric power transmission - Economic aspects
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
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Sommario/riassunto

Covers the latest practices, challenges and theoretical advancements in the domain of balancing economic efficiency and operation risk mitigation This book examines both system operation and market operation perspectives, focusing on the interaction between the two. It incorporates up-to-date field experiences, presents challenges, and summarizes the latest theoretic advancements to address those challenges. The book is divided into four parts. The first part deals with the fundamentals of integrated system and market operations, including market power mitigation, market efficiency evaluation, and the implications of operation practices in energy markets. The second part discusses developing technologies to strengthen the use of the grid in energy markets. System volatility and economic impact

introduced by the intermittency of wind and solar generation are also addressed. The third part focuses on stochastic applications, exploring new approaches of handling uncertainty in Security Constrained Unit Commitment (SCUC) as well as the reserves needed for power system operation. The fourth part provides ongoing efforts of utilizing transmission facilities to improve market efficiency, via transmission topology control, transmission switching, transmission outage scheduling, and advanced transmission technologies. Besides the state-of-the-art review and discussion on the domain of balancing economic efficiency and operation risk mitigation, this book: . Describes a new approach for mass market demand response management, and introduces new criteria to improve system performance with large scale variable generation additions. Reviews mathematic models and solution methods of SCUC to help address challenges posed by increased operational uncertainties with high-penetration of renewable resources. Presents a planning framework to account for the value of operational flexibility in transmission planning and to provide market mechanism for risk sharing Power Grid Operations in a Market Environment: Economic Efficiency and Risk Mitigation is a timely reference for power engineers and researchers, electricity market traders and analysts, and market designers.