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Descrizione fisica	1 online resource (X, 349 p. 183 illus., 139 illus. in color.)
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Soggetti	Renewable energy resources Energy systems Ocean engineering Renewable and Green Energy Energy Systems Offshore Engineering
Lingua di pubblicazione	Inglese
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Chapter1: Reliability-Based Design Optimization of Wind Turbine Systems -- Chapter2: Computational Fluid Dynamics Methods For Wind Turbines Performance Analysis -- Chapter3: Gearbox of wind turbine -- Chapter4: A New Multiscale Modeling and Simulation of Rolling Contact Fatigue for Wind Turbine Bearings -- Chapter5: Lightning Analysis of Wind Turbines -- Chapter6: Advanced Wind Turbine Blade Dynamics -- Chapter7: Advanced health condition monitoring of wind turbines -- Chapter8: Advanced repairing of composite wind turbine blades and advanced manufacturing of metal gearbox components -- Chapter9: Modeling and analysis of offshore floating wind turbines -- Chapter10: Advanced Wind Turbine Control -- Chapter11: Wind Power and Ramp Forecasting for Grid Integration -- Chapter12: Emerging Technologies for Next-Generation Wind Turbines.
Sommario/riassunto	This book introduces the current challenges in modern wind turbine analysis, design and development, and provides a comprehensive examination of state-of-the-art technologies from both academia and industry. The twelve information-rich chapters cover a wide range of topics including reliability-based design, computational fluid dynamics,

gearbox and bearing analyses, lightning analysis, structural dynamics, health condition monitoring, advanced techniques for field repair, offshore floating wind turbines, advanced turbine control and grid integration, and other emerging technologies. Each chapter begins with the current status of technology in a lucid, is easy-to-follow treatment, then elaborates on the corresponding advanced technology using detailed methodologies, graphs, mathematical models, computational simulations, and experimental instrumentation. Relevant to a broad audience from students and faculty to researchers, manufacturers, and wind energy engineers and designers, the book is ideal for both educational and research needs. Presents the latest developments in reliability-based design optimization, CFD of wind turbines, structural dynamics for wind turbine blades, off-shore floating wind turbines, advanced wind turbine control, and wind power and ramp forecasting for grid integration; Includes techniques for wind turbine gearboxes and bearings, evaluation of lightning strike damage, health condition monitoring and reparation techniques; Illustrates theories and operational considerations using graphics, tables, computational algorithms, simulation models, and experimental instrumentation; Examines unique, innovative technologies for wind energy.