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Wind Power for the World Power Electronics for Modern Wind Turbines Wind Turbines Wind Energy Explained Wind Energy For the Rest of Us Understanding Unsteady Aerodynamics of Modern Wind Turbines Using High Fidelity Computational Fluid Dynamics Simulation Wind Energy Comes of Age Understanding Wind Power Technology Wind Energy Generation: Modelling and Control Wind Energy Wind Energy Wind Power Control of Large Wind Energy Systems Wind Energy: A Reference Handbook Harnessing Wind Energy Modeling and Modern Control of Wind Power Wind Power Generation Wind Energy Systems for Electric Power Generation Designing Wind Turbines Aerodynamics of Wind Turbines Advanced Wind Turbine Technology Wind Power Reaping the Wind Towards Data-driven Control for Modern Wind Turbines Power Electronics for Modern Wind Turbines Numerical Simulation of Wind Turbines Wind Power in Power Systems Wind Energy WIND ENERGY Environmental Wind Engineering and Design of Wind Energy Structures Wind Turbine Control Systems Super-Powered Earth Modern Inventions in Energy : Solar Panels and Wind Turbines | Physics Books for Beginners Grade 3 | Children's Physics Books Winds of Change Future of wind Introduction to Wind Turbine Aerodynamics Harvest the Wind Windturbines Multibody Dynamic Analysis of Lightning Protection Systems for Modern Wind Turbines Wind Energy Explained

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. Wind energy harnesses the power of the wind. This clean, renewable energy is growing in its technology and popularity. Readers will learn how it is used, how it compares to other forms of energy and how they may get involved in this exciting growing field some day. Get ready for an Energy Revolution! Wind energy harnesses the power of the wind. This clean, renewable energy is growing in its technology and popularity. Readers will learn how it is used, how it compares to other forms of energy and how they may get involved in this exciting growing field some day. Get ready for an Energy Revolution! This weather forecast calls for power! Readers will learn about humanity’s long history of harnessing wind energy, journeying on boats along the Nile River, past windmills pumping water in ancient China, all the way to modern-day floating wind farms off the coast of Norway. Captivating fact boxes make interesting pit stops along the way, and vibrant photographs provide the scenery as readers travel through this timely science topic about an important renewable source of clean energy. The book contains the research contributions belonging to the Special Issue "Numerical Simulation of Wind Turbines", published in 2020-2021. They consist of 15 original research papers and 1 editorial. Different topics are discussed, from innovative design solutions for large and small wind turbine to control, from advanced simulation techniques to noise prediction. The variety of methods used in the research contributions testifies the need for a holistic approach to the design and simulation of modern wind turbines and will be able to stimulate the interest of the wind energy community. The second edition of the highly acclaimed Wind Power in Power Systems has been thoroughly revised and expanded to reflect the latest challenges associated with increasing wind power penetration levels. Since its first release, practical experiences with high wind power penetration levels have significantly increased. This book presents an overview of the lessons learned in integrating wind power into power systems and provides an outlook of the relevant issues and solutions to allow even higher wind power penetration levels. This includes the development of standard wind turbine simulation models. This extensive update has 23 brand new chapters in cutting-edge areas including offshore wind farms and storage options, performance validation and certification for grid codes, and the provision of reactive power and voltage control from wind power plants. Key features: Offers an international perspective on integrating a high penetration of wind power into the power system, from basic network interconnection to industry deregulation; Outlines the methodology and results of European and North American large-scale grid integration studies; Extensive practical experience from wind power and power system experts and transmission systems operators in Germany, Denmark, Spain, UK, Ireland, USA, China and New Zealand; Presents various wind turbine designs from the electrical perspective and models for their simulation, and discusses industry standards and world-wide grid codes, along with power quality issues; Considers concepts to increase penetration of wind power in power systems, from wind turbine, power plant and power system redesign to smart grid and storage solutions. Carefully edited for a highly coherent structure, this work remains an essential reference for power system engineers, transmission and distribution network operator and planner, wind turbine designers, wind project developers and wind energy consultants dealing with the integration

of wind power into the distribution or transmission network. Up-to-date and comprehensive, it is also useful for graduate students, researchers, regulation authorities, and policy makers who work in the area of wind power and need to understand the relevant power system integration issues. WIND ENERGY GENERATION MODELLING AND CONTROL WIND ENERGY GENERATION MODELLING AND CONTROL With increasing concern over climate change and the security of energy supplies, wind power is emerging as an important source of electrical energy throughout the world. Modern wind turbines use advanced power electronics to provide efficient generator control and to ensure compatible operation with the power system. Wind Energy Generation describes the fundamental principles and modelling of the electrical generator and power electronic systems used in large wind turbines. It also discusses how they interact with the power system and the influence of wind turbines on power system operation and stability. Key features: Includes a comprehensive account of power electronic equipment used in wind turbines and for their grid connection. Describes enabling technologies which facilitate the connection of large-scale onshore and offshore wind farms. Provides detailed modelling and control of wind turbine systems. Shows a number of simulations and case studies which explain the dynamic interaction between wind power and conventional generation. Wind energy technology has progressed enormously over the last decade. In coming years it will continue to develop in terms of power ratings, performance and installed capacity of large wind turbines worldwide, with exciting developments in offshore installations. Designed to meet the training needs of wind engineers, this introductory text puts wind energy in context, from the natural resource to the assessment of cost effectiveness and bridges the gap between theory and practice. The thorough coverage spans the scientific basics, practical implementations and the modern state of technology used in onshore and offshore wind farms for electricity generation. Key features: provides in-depth treatment of all systems associated with wind energy, including the aerodynamic and structural aspects of blade design, the flow of energy and loads through the wind turbine, the electrical components and power electronics including control systems explains the importance of wind resource assessment techniques, site evaluation and ecology with a focus of project planning and operation describes the integration of wind farms into the electric grid and includes a whole chapter dedicated to offshore wind farms includes questions in each chapter for readers to test their knowledge Written by experts with deep experience in research, teaching and industry, this text conveys the importance of wind energy in the international energy-policy debate, and offers clear insight into the subject for postgraduates and final year undergraduate students studying all aspects of wind engineering. Understanding Wind Power Systems is also an authoritative resource for engineers designing and developing wind energy systems, energy policy makers, environmentalists, and economists in the renewable energy sector. Wind-Turbine Aerodynamics is a self-contained textbook which shows how to come from the basics of fluid mechanics to modern wind turbine blade design. It presents a fundamentals of fluid dynamics and inflow conditions, and gives a extensive introduction into theories describing the aerodynamics of wind turbines. After introducing experiments the book applies the knowledge to explore the impact on blade design.The book is an introduction

for professionals and students of very varying levels. Wind energy's bestselling textbook- fully revised. This must-have second edition includes up-to-date data, diagrams, illustrations and thorough new material on: the fundamentals of wind turbine aerodynamics; wind turbine testing and modelling; wind turbine design standards; offshore wind energy; special purpose applications, such as energy storage and fuel production. Fifty additional homework problems and a new appendix on data processing make this comprehensive edition perfect for engineering students. This book offers a complete examination of one of the most promising sources of renewable energy and is a great introduction to this cross-disciplinary field for practising engineers. "provides a wealth of information and is an excellent reference book for people interested in the subject of wind energy." (IEEE Power & Energy Magazine, November/December 2003) "deserves a place in the library of every university and college where renewable energy is taught." (The International Journal of Electrical Engineering Education, Vol.41, No.2 April 2004) "a very comprehensive and well-organized treatment of the current status of wind power." (Choice, Vol. 40, No. 4, December 2002) This textbook is intended to provide an introduction to the cross-disciplinary field of wind engineering. It includes end-of-chapter tutorial sections (solutions manual available) and combines both academic and industrial experience. Winds sweeping across the Great Plains once robbed the Farm Belt of its future, stripping away overworked topsoil and creating the dreaded Dust Bowl of the 1930s. Today, those winds are bringing new hope to the declining rural communities of the central United States. Nowhere is wind's promise more palpable than in Cloud County, Kansas, home to the Meridian Way Wind Farm, whose turbines are boosting farm incomes and bringing green jobs to a community that has watched its children flock elsewhere. Modern wind power is the best thing to hit this stretch of midwestern prairie since the Union Pacific railroad. In Harvest the Wind, Warburg brings us the people behind the green economy-powered resurgence in Cloud County and communities like it across the United States. This corner of Kansas is the first stop on an odyssey that introduces readers to farmers, factory workers, biologists, and high-tech entrepreneurs--all players in a transformative industry that is taking hold across America and around the globe. Harvest the Wind serves as an earthly antidote to the more abstract treatises on global warming and green energy. By showing us how practical solutions are being implemented at the local level, Warburg offers an inspirational look at how we can all pursue a saner and more sustainable energy future. The reader follows a student's journal as the student interviews experts about wind power as an energy source. This engaging book covers wind power's history, how we use wind power today, and how we may use the wind as an energy source in the future. In the contemporary world, wind energy is emerging as one of the most viable alternatives to meet the challenge of increasing energy demand, particularly for electrical energy generation. It is clean, fuel-free and available almost in every country in the world and in abundance in off-shore. This book, now in its Third Edition, covers most of the essential engineering principles, theories and best practices for wind energy development for electricity generation with clear emphasis on state-of-the-art. In this edition, recent developments in wind energy are covered. It includes sections on remote sensing application and re-powering. This

comprehensive book on wind energy is intended as a text for the undergraduate and postgraduate students of Mechanical/Electrical Engineering and students pursuing Energy Studies. It will also serve as a handbook and ready reference for practicing engineers and professionals in the field of wind energy. KEY FEATURES Describes technological advances in wind energy. Deals with wind resource assessment methodology, instrumentation and advanced techniques. Discusses the concepts of aerodynamics for wind turbine blade and rotor. Provides in detail the design concepts for modern horizontal axis wind turbine. Covers layout design, micro-siting and modelling of wind farms. Analyzes the economics of wind energy projects for electricity generation. Focuses on the impact of wind energy on the environment. "Aerodynamics of Wind Turbines is the established essential text for the fundamental solutions to efficient wind turbine design. Now in its second edition it has been entirely updated and substantially extended to reflect advances in technology research into rotor aerodynamics and the structural response of the wind turbine structure. Topics covered include increasing mass flow through the turbine performance at low and high wind speeds assessment of the extreme conditions under which the turbine will perform and the theory for calculating the lifetime of the turbine. The classical Blade Element Momentum method is also covered as are eigenmodes and the dynamic behaviour of a turbine. The new material includes a description of the effects of the dynamics and how this can be modelled in an 'aeroelastic code' which is widely used in the design and verification of modern wind turbines. Further the description of how to calculate the vibration of the whole construction as well as the time varying loads has been substantially updated."--Publisher's website. Among renewable sources wind power systems have developed to prominent s- pliers of electrical energy. Since the 1980s they have seen an exponential increase, both in unit power ratings and overall capacity. While most of the systems are found on dry land, preferably in coastal regions, off-shore wind parks are expected to add signi?cantly to wind energy conversion in the future. The theory of modern wind turbines has not been established before the 20th century. Currently wind turbines with three blades and horizontal shaft prevail. The drivenelectricgeneratorsareoftheasynchronousorsynchronoustype,withorwi- out interposed gearbox. Modern systems are designed for variable speed operation which make power electronic devices play an important part in wind energy conv- sion. Manufacturing has reached the state of a high-tech industry. Countries prominent for the amount of installed wind turbine systems feeding into the grid are in Europe Denmark, Germany and Spain. Outside Europe it is the United States of America and India who stand out with large rates of increase. The market and the degree of contribution to the energy consumption in a country has been strongly in?uenced by National support schemes, such as guaranteed feed-in tariffs or tax credits. Due to the personal background of the author, the view is mainly directed on Europe, and many examples are taken from the German scene. However, the sit- tion in other continents, especially North America and Asia is also considered. As the demand for renewable energy sources has expanded exponentially, a renewed interest for modern wind turbines has been seen recently. In this study, an unsteady aerodynamic analysis of modern wind turbines i.e. 5-MW offshore horizontal axis wind turbine (HAWT) and an innovative hybrid

vertical axis wind turbine (VAWT) is performed. Aerodynamic loadings from the 3D offshore HAWT are calculated. The flow physics around the rotors of the turbines and wake formation behind the wind turbine is studied. Energy harvesting efficiency of 89.02% of the Betz limit has been achieved for this 5-MW offshore wind turbine. Similarly, a 2D unsteady high fidelity computational fluid dynamics analysis approach is carried out to investigate the performance characteristics of an innovative Hybrid Darrieus Modified-Savonius (HDMS) VAWT. As a first step, the performance comparison of Darrieus, Savonius, modified-Savonius (MS) and HDMS VAWT is performed for better understanding of the unsteady flow physics. Then a systematic analysis on HDMS VAWT for torque and power coefficients is conducted for varied wind speeds and tip speed ratios (TSRs). Flow analysis for velocity, pressure and vorticity distribution is carried out, which provides deep insight into rotor performance. Wind energy is now the world's fastest growing energy source. In the past 10 years, the global wind energy capacity has increased rapidly. The installed global wind power capacity has grown to 47.317 GW from about 3.5 GW in 1994. The global wind power industry installed 7976 MW in 2004, an increase in total installed generating capacity of 20%. The phenomenal growth in the wind energy industry can be attributed to the concerns to the environmental issues, and research and development of innovative cost-reducing technologies. Denmark is a leading producer of wind turbines in the world, with an almost 40% share of the total worldwide production. The wind energy industry is a giant contributor to the Danish economy. In Denmark, the 3117 MW (in 2004) wind power is supplied by approximately 5500 wind turbines. Individuals and cooperatives own around 80% of the capacity. Denmark will increase the percentage of energy produced from wind to 25% by 2008, and aims for a 50% wind share of energy production by 2025. Wind technology has improved significantly over the past two decades, and almost all of the aspects related to the wind energy technology are still under active research and development. However, this monograph will introduce some basics of the electrical and power electronic aspects involved with modern wind generation systems, including modern power electronics and converters, electric generation and conversion systems for both fixed speed and variable speed systems, control techniques for wind turbines, configurations of wind farms, and the issues of integrating wind turbines into power systems. P Annotation The introduction of power electronics is changing the basic characteristic of wind turbines from being an energy source to be an active power source. With prices of power electronic devices falling, these solutions become more and more attractive. Power Electronics for Modern Wind Turbines introduce the electrical aspects of modern wind generation systems, including modern power electronics and converters, electric generation and conversion systems for both fixed speed and variable speed systems, control techniques for wind turbines, configurations of wind farms, and the issues of integrating wind turbines into power systems. Designing a wind turbine is an interdisciplinary process that requires an understanding of challenges for all parties involved. The authors deliver an effective and economic way to organize such a design by respecting all the challenges involved. The book provides such insight by utilizing specific examples of existing modern designs. Detailed descriptions and explanations are given for those

components of the wind turbine that are normally developed by the so-called original equipment manufacturers (OEM) of a particular type. The OEM needs to have full knowledge of the complete system that consists of all parts being rotor blades, nacelle, drive train, tower, and foundation including the dynamic properties and the response to the controller action. This full knowledge is called system competence. For a wind turbine the drive train is the most important system. It consists of many components like shafts, bearings, gearbox, and generator for a wind turbine with a gear box; in systems without a gearbox a large generator has to be integrated into the drive train. He cites improvements in the performance, reliability, and cost effectiveness of modern wind turbines to support his contention that wind energy has come of age as a commercial technology. The book provides an overview of modern wind turbine technology and an orientation in the associated technical, economic and environmental fields. It is based on the author's experience gained over more than fifteen years designing wind energy converters with a major industrial manufacturer and, more recently, in technical consulting and in the planning of large wind park installations, with special attention to economics. The book addresses all those professionally involved in research, development, manufacture and operation of wind turbines. "Tens of thousands of wind turbines are in operation worldwide today. This book gives a detailed account of the rise of modern wind energy technology in California and Denmark, its cradle. There is a world of difference between the approaches to the development of wind power in these two countries. In Denmark, groups of neighbors stimulated its decentralized, small-scale use and gradual development, while futuristic-looking large-scale wind farms sprouted like mushrooms on the Californian hills. However, the thriving Californian market did not result in a successful American wind turbine industry. In contrast, the Danish industry currently produces more than half the world output of turbines. In 'Winds of Change', Rinie van Est describes how and to what extent public policies influenced the development of wind energy technology and industry in California and Denmark. He explains the marked differences between the two countries by looking at the way in which policy makers, technicians and entrepreneurs - in interplay - shaped the development of wind power. The book also explores how national political and techno-economic traditions guided the activities of these innovators. The book is highly relevant for policy experts, those working in R&D, corporate managers, environmentalists, scientists and technologists who are looking for ways to keep technological innovation in line with social needs and public demands."--Omslag. Wind energy systems are central contributors to renewable energy generation, and their technology is continuously improved and updated. Without losing sight of theory, Control of Large Wind Energy Systems demonstrates how to implement concrete control systems for modern wind turbines, explaining the reasons behind choices and decisions. This book provides an extended treatment of different control topics divided into three thematic parts including modelling, control and implementation. Solutions for real-life difficulties such as multi-parameter tuning of several controllers, curve fitting of nonlinear power curves, and filter design for concrete signals are also undertaken. Examples and a case study are included to illustrate the parametrization of models, the control systems design with problems and

possible solutions. Advice for the selection of control laws, calculation of specific parameters, which are necessary for the control laws, as the sensitivity functions, is given, as well as an evaluation of control performance based on indices and load calculation. Control of Large Wind Energy Systems covers methodologies which are not usually found in literature on this topic, including fractional order PID and nonlinear PID for pitch control, peak shaving control and extremum seeking control for the generator control, yaw control and shutdown control. This makes it an ideal book for postgraduate students, researchers and industrial engineers in the field of wind turbine control. Advances in Industrial Control reports and encourages the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control. From the solitary windmill standing sentry over a rural homestead to the sleek machinery of a modern wind farm, windmills are a powerful symbol of self-reliance and human ingenuity. Once the province of backyard tinkerers and eccentric inventors, they have over the past two decades entered the mainstream to be embraced by environmentalists, venture capitalists, and policymakers alike. But reaching that point wasn't easy.In Reaping the Wind, journalist Peter Asmus tells the fascinating and convoluted history of commercial wind power in the United States. He introduces readers to maverick scientists and technologists who labored in obscurity, to entrepreneurs and visionary capitalists who believed that a centuries-old idea could be made feasible in the modern world, and to enterprising financial advisers and investors who sought to exploit the last great tax shelter in federal history. Beginning with the early pioneers, from William Heronemus, a former U.S. Navy captain who dreamt of huge floating wind farms off the coast of New England, to the $40 million success story of Jim Dehlsen of Zond, he offers an animated narrative that profiles the colorful cast of characters involved with the development of the American wind power industry.Reaping the Wind is both engaging and instructive, with information about the technologies and policies that drive the industry and give it promise interwoven with the human story of the struggle to develop -- against great odds -- reliable, clean energy from a source as unpredictable and seemingly uncontrollable as the wind. Anyone interested in renewable energy or the human and political drama behind the development of new technologies will find the book an engrossing and enlightening read. This book emphasizes the application of Linear Parameter Varying (LPV) gain scheduling techniques to the control of wind energy conversion systems. This reformulation of the classical problem of gain scheduling allows straightforward design procedure and simple controller implementation. From an overview of basic wind energy conversion, to analysis of common control strategies, to design details for LPV gain-scheduled controllers for both fixed- and variable-pitch, this is a thorough and informative monograph. Scientists and engineers never stop inventing new ways to improve the quality of life. A couple of these inventions focus on energy; and these are the solar panels and wind turbines. This book discusses the technology and uses of solar panels and wind turbines. Go ahead and grab a copy today. Wind Power Generation is a concise, up-to-date and readable guide providing an

introduction to one of the leading renewable power generation technologies. It includes detailed descriptions of on and offshore generation systems, and demystifies the relevant wind energy technology functions in practice as well as exploring the economic and environmental risk factors. Engineers, managers, policymakers and those involved in planning and delivering energy resources will find this reference a valuable guide, to help establish a reliable power supply address social and economic objectives. Focuses on the evolution and developments in wind energy generation Evaluates the economic and environmental viability of the systems with concise diagrams and accessible explanations The book presents a state-of-the-art in environmental aerodynamics and the structural design of wind energy support structures, particularly from a modern computational perspective. Examples include real-life applications dealing with pollutant dispersion in the building environment, pedestrian-level winds, comfort levels, relevant legislation and remedial measures. Design methodologies for wind energy structures include reliability assessment and code frameworks. While covering the fascinating history of wind power as a whole, this timely handbook focuses on current technological developments and the promise—and pitfalls—of wind energy as part of the world's energy future. • Serves as a comprehensive introduction to the topic and a guide for further study • Features expert essays on issues and controversies related to the use of wind energy • Covers the dangers wind power poses to wildlife as well as its impacts on communities' economic development • Profiles key individuals and organizations in the field • Includes statistical information on the production and consumption of wind energy in the United States and around the world This book sheds light on how the modern 3-bladed wind turbine came into being, and who, how and what in the proceeding period caused the success. It looks back over three decades to find the roots of this exciting development, a long cavalcade of developers, inventors, and manufacturers including the Danish authors who themselves were part of the b An essential reference to the modeling techniques of wind turbine systems for the application of advanced control methods This book covers the modeling of wind power and application of modern control methods to the wind power control—specifically the models of type 3 and type 4 wind turbines. The modeling aspects will help readers to streamline the wind turbine and wind power plant modeling, and reduce the burden of power system simulations to investigate the impact of wind power on power systems. The use of modern control methods will help technology development, especially from the perspective of manufactures. Chapter coverage includes: status of wind power development, grid code requirements for wind power integration; modeling and control of doubly fed induction generator (DFIG) wind turbine generator (WTG); optimal control strategy for load reduction of full scale converter (FSC) WTG; clustering based WTG model linearization; adaptive control of wind turbines for maximum power point tracking (MPPT); distributed model predictive active power control of wind power plants and energy storage systems; model predictive voltage control of wind power plants; control of wind power plant clusters; and fault ride-through capability enhancement of VSC HVDC connected offshore wind power plants. Modeling and Modern Control of Wind Power also features tables, illustrations, case studies, and an appendix showing a selection of typical test systems and the code of

adaptive and distributed model predictive control. Analyzes the developments in control methods for wind turbines (focusing on type 3 and type 4 wind turbines) Provides an overview of the latest changes in grid code requirements for wind power integration Reviews the operation characteristics of the FSC and DFIG WTG Presents production efficiency improvement of WTG under uncertainties and disturbances with adaptive control Deals with model predictive active and reactive power control of wind power plants Describes enhanced control of VSC HVDC connected offshore wind power plants Modeling and Modern Control of Wind Power is ideal for PhD students and researchers studying the field, but is also highly beneficial to engineers and transmission system operators (TSOs), wind turbine manufacturers, and consulting companies. Wind Turbines addresses all those professionally involved in research, development, manufacture and operation of wind turbines. It provides a cross-disciplinary overview of modern wind turbine technology and an orientation in the associated technical, economic and environmental fields. It is based on the author's experience gained over decades designing wind energy converters with a major industrial manufacturer and, more recently, in technical consulting and in the planning of large wind park installations, with special attention to economics. The second edition accounts for the emerging concerns over increasing numbers of installed wind turbines. In particular, an important new chapter has been added which deals with offshore wind utilisation. All advanced chapters have been extensively revised and in some cases considerably extended This study presents options to speed up the deployment of wind power, both onshore and offshore, until 2050. It builds on IRENA’s global roadmap to scale up renewables and meet climate goals. Explains how the wind can be used to generate power, describes who uses it, and discusses the benefits and drawbacks to using it as a renewable source of energy. It tousles your hair, blows your balloon away, and scuttles clouds along the sky. Millers have ground corn in windmills with help from wind. And it still has a lot of energy to spare, blowing rooftops off and flattening trees during a storm. Can we make the wind work more for us? Find out how!

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