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2.3.2 Characterizing the Observed Wind Resource; 2.3.3 Estimating the Hub Height Resource; 2.3.4 Climate Adjustment; 2.3.5 Wind Flow Modeling; 2.3.6 Uncertainty in Wind Resource Assessment; 2.3.7 Project Design and Energy Production; Suggestions for Further Reading; 3. Siting a Wind Project; 3.1 Site Selection; 3.2 Regional Wind Resource Information; 3.2.1 Wind Resource Maps; 3.2.2 Wind Measurements; 3.3 Field Surveys; 3.4 Tower Placement; 3.4.1 Dedicated Towers 3.4.2 Existing Multi-Use Tall Towers 3.5 Permitting for Wind Monitoring; 3.6 Land Lease Agreements; 3.7 Questions for Discussion; Suggestions for Further Reading; 4. Monitoring Station Instrumentation and Measurements; 4.1 Basic Measurements; 4.1.1 Horizontal Wind Speed; 4.1.2 Wind Direction; 4.1.3 Air Temperature; 4.2 Additional Measurements; 4.2.1 Vertical Wind Speed; 4.2.2 Heated Anemometers; 4.2.3 Delta Temperature; 4.2.4 Barometric Pressure; 4.2.5 Relative Humidity; 4.2.6 Global Solar Radiation; 4.3 Recorded Parameters and Sampling Intervals; 4.3.1 Average; 4.3.2 Standard Deviation 4.3.3 Maximum and Minimum 4.4 Data Loggers; 4.5 Data Storage Devices; 4.5.1 Data Processing and Storage; 4.5.2 Storage Devices; 4.6 Data Transfer Equipment; 4.6.1 Manual Data Transfer; 4.6.2 Remote Data Transfer; 4.7 Power Sources; 4.7.1 Household Batteries; 4.7.2 Solar Battery Systems; 4.7.3 AC Power; 4.7.4 Other Power Options; 4.8 Towers and Sensor Support Hardware; 4.8.1 Towers; 4.8.2 Sensor Support Hardware; 4.9 Wiring; 4.10 Measurement System Accuracy and Reliability; 4.10.1 Accuracy; 4.10.2 Reliability; 4.11 Questions for Review and Discussion; References; Suggestions for Further Reading 5. Installation of Monitoring Stations 5.1 Equipment Procurement; 5.2 Equipment Acceptance Testing and Field Preparation; 5.2.1 Acceptance Testing; 5.2.2 Field Preparation Procedures; 5.3 Installation Team; 5.4 Safety; 5.5 Determination of True North; 5.6 Tower Installation; 5.6.1 New Tilt-Up Towers; 5.6.2 New Lattice Towers; 5.6.3 Existing Towers; 5.7 Sensor and Equipment Installation; 5.7.1 Anemometers; 5.7.2 Wind Vanes; 5.7.3 Temperature and Other Sensors; 5.7.4 Data Loggers and Associated Hardware; 5.7.5 Sensor Connections and Cabling; 5.7.6 Grounding and Lightning Protection 5.8 Site Commissioning

Sommario/riassunto

A practical, authoritative guide to the assessment of wind resources for utility-scale wind projects-authored by a team of experts from a leading renewable energy consultancy The successful development of wind energy projects depends on an accurate assessment of where, how often, and how strongly the wind blows. A mistake in this stage of evaluation can cause severe financial losses and missed opportunities for developers, lenders, and investors. Wind Resource Assessment: A Practical Guide to Developing a Wind Project shows readers how to achieve a high standard of resource a
