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Nota di contenuto	Cover; Contents; Acknowledgments; About the Authors; Abbreviations; Executive Summary; Tables; Table ES.1: Strategies to Manage Variability of Renewables in System Operations and Some Prerequisites for Their Application and Effectiveness; Chapter 1 The Challenges of Integrating Wind and Solar Generation; Introduction; Wind and Solar Development; Figures; Figure 1.1: Leading Countries in Installed Wind Capacity, 2010; The Operational Challenges in Integrating Wind and Solar Generation; Figure 1.2: Top 10 Countries in Solar Photovoltaic (PV) Capacity, 2010, by Percent Table 1.1: Leading Countries in Energy Penetration from Wind Energy (2009, unless otherwise indicated)Boxes; Box 1.1: Variable Renewable Sources: Dispatchable, But Not Controllable; Box 1.2: What Grid Codes Can and Cannot Do; Understanding Electricity Systems' Operational Time Frames and the Impact of the Variability of Wind and Solar Generation; Figure 1.3: Power System Operation Time Frames; Table 1.2: Flexibility Characteristics of Some Generation Technologies; Summary of Findings from Variable Generation Integration Studies and

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### Sommario/riassunto

The paper 'Challenges and Approaches to Electricity Grids Operations and Planning with Increased Amounts of Variable Renewable Generation: Emerging Lessons from Selected Operational Experiences and Desktop Studies' focuses on analyzing the impacts of variable renewable energy on the operation and planning of the the power system (mostly, generation system). It is aimed at informing stakeholders in power utilities, regulatory bodies and other relevant audiences, on the fundamentals of technical challenges and approaches to operate electricity grids with renewable energy. It covers renewable ene

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