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Autore	Clough, Katy
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Nota di contenuto	Cover; SmartGrids; Title Page; Copyright Page; Table of Contents; Foreword; Chapter 1. SmartGrids: Motivation, Stakes and Perspectives; 1.1. Introduction; 1.1.1. The new energy paradigm; 1.2. Information and communication technologies serving the electrical system; 1.3. Integration of advanced technologies; 1.4. The European energy perspective; 1.5. Shift to electricity as an energy carrier (vector); 1.6. Main triggers of the development of SmartGrids; 1.7. Definitions of SmartGrids; 1.8. Objectives addressed by the SmartGrid concept; 1.8.1. Specific case of transmission grids 1.8.2. Specific case of distribution grids 1.8.3. The desired development of distribution networks: towards smarter grids; 1.9. Socio-economic and environmental objectives; 1.10. Stakeholders involved the implementation of the SmartGrid concept; 1.11. Research and scientific aspects of the SmartGrid; 1.11.1. Examples of the development of

innovative concepts; 1.11.2. Scientific, technological, commercial and sociological challenges; 1.12. Preparing the competences needed for the development of SmartGrids; 1.13. Conclusion; 1.14. Bibliography

Chapter 2. From the SmartGrid to the Smart Customer: the Paradigm Shift

2.1. Key trends; 2.1.1. The crisis; 2.1.2. Environmental awareness; 2.1.3. New technologies; 2.2. The evolution of the individual's relationship to energy; 2.2.1. Curiosity; 2.2.2. The need for transparency; 2.2.3. Responsibility; 2.3. The historical model of energy companies; 2.3.1. Incumbents in a natural monopoly; 2.3.2. A clear focus on technical knowledge; 2.3.3. Undeveloped customer relationships; 2.4. SmartGrids from the customer's point of view; 2.4.1. The first step: the data revolution

2.4.2. The second step: the establishment of a smart ecosystem

2.4.3. The consumers' reluctance; 2.5. What about possible business models?;

2.5.1. An unprecedented global buzz... and the search for a business model; 2.5.2. Government research into a virtuous model of regulation; 2.5.3. An opening for new stakeholders; 2.6. Bibliography; Chapter 3. Transmission Grids: Stakeholders in SmartGrids; 3.1. A changing energy context: the development of renewable energies; 3.2. A changing energy context: new modes of consumption; 3.3. New challenges; 3.4. An evolving transmission grid; 3.5. Conclusion

3.6. Bibliography

Chapter 4. SmartGrids and Energy Management Systems; 4.1. Introduction; 4.2. Managing distributed production resources: renewable energies; 4.2.1. Characterization of distributed renewable production; 4.2.2. Integrating renewable energies into the management process; 4.3. Demand response; 4.4. Development of storage, microgrids and electric vehicles; 4.4.1. New storage methods; 4.4.2. Microgrids; 4.4.3. Electric vehicles; 4.5. Managing high voltage direct current connections; 4.6. Grid reliability analysis; 4.6.1. Model-based stability analysis

4.6.2. Continuous measurements-based analysis: phasor measurement units

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Sommario/riassunto

On a worldwide basis, the development of SmartGrids is a consistent answer to the problem of an efficient and sustainable delivery of electric energy through distribution grids. SmartGrids are a combination of information and communication technologies and new energy technologies. There are many different definitions of the concept of SmartGrids and thus it appears indispensable to gather the knowledge available from both industry and research laboratories in one book. Distributed generation is rightly receiving an increased amount of attention and will become an integral part of urban ener

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