



Smart Grid: Fundamentals of Design and Analysis

By James Momoh

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The book is written as primer hand book for addressing the fundamentals of smart grid. It provides the working definition the functions, the design criteria and the tools and techniques and technology needed for building smart grid. The book is needed to provide a working guideline in the design, analysis and development of Smart Grid. It incorporates all the essential factors of Smart Grid appropriate for enabling the performance and capability of the power system. There are no comparable books which provide information on the “how to” of the design and analysis.

The book provides a fundamental discussion on the motivation for the smart grid development, the working definition and the tools for analysis and development of the Smart Grid. Standards and requirements needed for designing new devices, systems and products are discussed; the automation and computational techniques need to ensure that the Smart Grid guarantees adaptability, foresight alongside capability of handling new systems and components are discussed. The interoperability of different renewable energy sources are included to ensure that there will be minimum changes in the existing legacy system.

Overall the book evaluates different options of computational intelligence, communication technology and decision support system to design various aspects of Smart Grid. Strategies for demonstration of Smart Grid schemes on selected problems are presented.

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Smart Grid: Fundamentals of Design and Analysis By James Momoh Bibliography

- Sales Rank: #1283822 in Books
- Published on: 2012-03-20
- Original language: English
- Number of items: 1
- Dimensions: 9.70" h x .75" w x 6.40" l, 1.11 pounds
- Binding: Hardcover
- 232 pages

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Editorial Review

From the Back Cover

Learn how to design smart grids, the energy delivery systems of the future

A smart grid is an electrical grid that can monitor, predict, and intelligently respond to the behavior of all electric power suppliers and consumers connected to it in order to deliver reliable and sustainable electricity services as efficiently as possible. Smart Grid sets forth the fundamental analysis and design schemes for developing actual working smart grids. Readers will find all the guidance, tools, and techniques needed to design smart grids that meet the needs of government, industry, and consumers, including:

- Standards and requirements for designing essential devices, systems, and products
- Automation and computational techniques to design adaptable smart grids
- Simulation tools for modeling smart grid performance
- Incorporation of sustainable and renewable energy sources
- Evaluation of different options for computational intelligence, communication technology, and decision support

Throughout the book, detailed examples of smart grid design and development strategies are provided based on different community constraints and energy needs.

Given the ever-rising costs of dwindling fossil fuel energy supplies, the need to provide sustainable energy as efficiently as possible has never been greater. This pioneering book is a must-read for electrical and power engineering professionals and students, giving them the tools needed to move from the concept of a smart grid to its actual design and implementation. Moreover, it will enable regulators, policymakers, and energy executives to understand the future of energy delivery systems.

About the Author

JAMES MOMOH, PhD, is Professor in the Department of Electrical and Computer Engineering and Director of the Center for Energy Systems and Control at Howard University. Dr. Momoh also serves as Principal Consultant at Bonneville Power Administration. He has authored or coauthored several books, including *Operation and Control of Electric Energy Processing Systems* and *Economic Market Design and Planning for Electric Power Systems*, both from Wiley-IEEE Press. Dr. Momoh is dedicated to the development of interdisciplinary research and education programs in systems engineering, energy systems, and power economics.

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