

SPECIAL ISSUE

THE EVOLUTION OF SMART GRIDS

Edited by C. Kang, D. Kirschen, and T. C. Green

694 A Cyber-Physical-Social Perspective on Future Smart Distribution Systems

By Y. Wang, C.-F. Chen, P.-Y. Kong, H. Li, and Q. Wen

| INVITED PAPER | This article discusses the coupling relationships among the cyber, physical, and social aspects in the digitalization evolution of smart grid.

725 DLMP of Competitive Markets in Active Distribution Networks: Models, Solutions, Applications, and Visions

By X. Wang, F. Li, L. Bai, and X. Fang

| INVITED PAPER | This article comprehensively reviews the formulation and solution of distribution locational marginal price in the distribution-level electricity market.

744 Transition to Digitalized Paradigms for Security Control and Decentralized Electricity Market

By F. Bellizio, W. Xu, D. Qiu, Y. Ye, D. Papadaskalopoulos, J. L. Cremer, F. Teng, and G. Strbac

| INVITED PAPER | This article analyzes the potential of utilizing digitalization techniques for reliability enhancement and cost reduction in local electricity markets.

762 Massively Digitized Power Grid: Opportunities and Challenges of Use-Inspired AI

By L. Xie, X. Zheng, Y. Sun, T. Huang, and T. Bruton

| INVITED PAPER | This article illustrates the opportunities and challenges on utilizing use-inspired artificial intelligence into digitized power grid.

788 Data-Driven Security and Stability Rule in High Renewable Penetrated Power System Operation

By N. Zhang, H. Jia, Q. Hou, Z. Zhang, T. Xia, X. Cai, and J. Wang

| INVITED PAPER | This article discusses how to extract accurate and compatible security and stability rules in high renewable penetrated power systems based on machine-learning frameworks.

806 A Review of Modeling and Applications of Energy Storage Systems in Power Grids

By F. Calero, C. A. Cañizares, K. Bhattacharya, C. Anierobi, I. Calero, M. F. Z. de Souza, M. Farrokhhabadi, N. S. Guzman, W. Mendieta, D. Peralta, B. V. Solanki, N. Padmanabhan, and W. Violante

| INVITED PAPER | This article covers the modeling and application of various energy storage systems into smart grid.

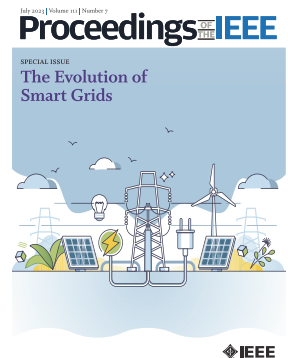
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DEPARTMENTS

691 SCANNING THE ISSUE
The Evolution of Smart Grids

By C. Kang, D. Kirschen, and T. C. Green

916 FUTURE SPECIAL ISSUES/SPECIAL SECTIONS



On the Cover:
This month's cover image nicely captures the elements of a smart grid which include renewable energy sources, distribution/transmission centers, and much more.

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SPECIAL ISSUE: The Evolution of Smart Grids

832 Power System Stability With a High Penetration of Inverter Based Resources

By Y. Gu and T. C. Green

| INVITED PAPER | This article extends the existing categories of power system stability to accommodate the dynamic characteristics of high integrated inverter-based resources.

854 Dynamic Performance Modeling and Analysis of Power Grids With High Levels of Stochastic and Power Electronic Interfaced Resources

By J.-K. Kim, J. Kang, J. W. Shim, H. Kim, J. Shin, C. Kang, and K. Hur

| INVITED PAPER | This article presents recent efforts to advance power system dynamics by incorporating uncertainty, variability, and EMT dynamics of inverter interfaced stochastic renewables.

873 Disturbance Propagation in Power Grids With High Converter Penetration

By H. Cui, S. Konstantinopoulos, D. Osipov, J. Wang, F. Li, K. L. Tomsovic, and J. H. Chow

| INVITED PAPER | This article examines and discusses the influence of wave-like disturbance propagation by the high-level integration of converter-based resources in power networks.

891 Enabling 100% Renewable Power Systems Through Power Electronic Grid-Forming Converter and Control: System Integration for Security, Stability, and Application to Europe

By K. Strunz, K. Almunem, C. Wulkow, M. Kuschke, M. Valescudero, and X. Guillaud

| INVITED PAPER | This article analyzes the key function of grid-forming resources to maintain system security in 100% renewable power systems.

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