There have been dramatic changes in the electric power industry in recent years. The widespread addition of variable resources and distributed resources presents special challenges to system operators, who must cope with increased complexity, the need for observability, and the demands of controlling key system parameters. To further complicate matters, operators must deal with overall system performance that increasingly exhibits interactions between the states of the distribution system and bulk power system and vice versa. All of this occurs at a time of increased concern over cybersecurity threats, exposure to natural disasters, and the need for improved overall system resiliency.

As industry professionals, we must continue to provide reliable service to power system customers, even as the physical and regulatory structure of the power system endures dramatic change. System security requires cross-functional coordination of energy management systems (EMSs) and distribution management systems (DMSs) and their operators. A recipe for success comprises applying the latest advances in the state-of-the-art control centers and using the most modern means of coordinating operations over broad footprints.

In This Issue
This issue of IEEE Power & Energy Magazine summarizes several remarkable advances in controlling the grid. Guest Editor Mladen Kezunovic compiled five well-written articles that showcase major issues and how they can be addressed by the most current EMSs and DMSs worldwide. As summarized in the “Guest Editorial,” the issue discusses measures of resiliency and the need for coordinating across regional and organizational boundaries, the achievement of wide control over regional power systems, the coordination of T&D operations in the backdrop of regulatory unbundling, major advances in EMSs and a smart substation design, and an innovative DMS design. A variety of perspectives is presented about future requirements and design options for EMS and DMS solutions that address the need of integrating designs across EMSs, DMSs, and market management systems.

The issue also contains an article by Fran Li and Yan Du on the applications of artificial intelligence (AI) to the power system. They first explain the fundamental structure of AI by discussing how a computer program beat the world champion at Go, which is one of the world’s most complex games. Game-based strategies present many opportunities for power system analysts in topics ranging from markets to variable resource integration and power system security.

The “In My View” column by Ralph Masiello discusses some of the data challenges presented by the large-scale integration of distributed energy resources and electric vehicles. He identifies the need for big-data analysis, improvements in information technology, and consideration of the EMS/DMS structure. The column and overall issue serve to stimulate further industry discussion on how to “control the seemingly uncontrollable grid.”

Class of 2018 Fellow
The “Awards” column recognizes the 23 new IEEE Fellows who are members
of the IEEE Power & Energy Society (PES). Congratulations on this major accomplishment!

PES Updates
“Leader’s Corner,” by Shay Bahramirad, vice president for New Initiatives and Outreach, reports on the advances made in the New Initiatives and Outreach program. The IEEE prepares our membership for the many challenges our industry faces as the grid becomes more environmentally friendly and technically advanced. Collaboration between the IEEE and industry is bringing the exciting vision of smart cities to reality through shared best practices and developing needed standards.

Looking at History
Rock Brynner wrote an interesting column on the history of public power. He discusses how private monopolies controlled the early formation of electric utilities, but politicians broke up holding companies and introduced public power as an alternative.

Changing the Editorial Guard
This issue represents a changing of the guard for the magazine’s Editorial Board. A sincere thank you for all the hard work and good advice provided by outgoing board members Lalit Goel, Prabha Kundar, and Sakis Meliopoulos. More generally, our industry benefited immeasurably from the wealth of information we learned from you.

This will be Hyde Merrill’s last issue as associate editor, History. I am grateful to my lifelong mentor who always readily and generously shared his depth of knowledge and wisdom with me and our industry at large. It is fitting that his last issue as associate editor will be in this one, given all that I learned from him on state estimation. Many thanks to Hyde for expertly supporting this magazine over the last year. A heartfelt welcome to John Paserba, who will assume the role of associate editor, History. John’s contributions to PES remains unbounded, and we wish him every success in this new role.

Thanks
A special note of appreciation to Mel Olken, who continues to provide guidance and tutelage, and to the IEEE publications staff who make this publication possible. Thanks to the many contributors to this issue, especially our guest editor and authors. A particular note of appreciation to Robert C. Henderson, who provides editorial assistance.

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