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From Smart Grid to Future Grid, Challenges and Opportunities

by

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ABSTRACT

With the development of smart grid across the world in many nations, the focus of research has gradually shifting toward a future intelligent grid in order to effectively achieve the emission reduction objectives and best utilise renewable energies. Current work on smart grid is mainly on setting up the smart infrastructures to facilitating digital information flow within the smart grid network which includes cyber network and physical power network. However, in view of wider system connectivity and investment efficiency, system wide development toward a future intelligent grid is becoming increasingly important and has been recognised in many nations. A future grid may include the electricity network (together with its cyber network for control and communication) as well as the primary energy network for gas, water and other primary energy resources. This presentation outlines the research development toward a future grid including system security, co-optimisation planning, as well as an overview of the research work of the team directed by Prof Dong.

BIOGRAPHY

Professor Z.Y. Dong obtained Ph.D. from the University of Sydney in 1999. He is Professor and Head of School of Electrical and Information Engineering, the University of Sydney, and a contractor with Ausgrid and EPRI, USA. His immediate role is Ausgrid Chair and Director of Centre for Intelligent Electricity Networks (CIEN), the University of Newcastle, Australia. He also worked at the Hong Kong Polytechnic University and as system planning manager with Transend Networks, Australia. His research interest includes smart grid, power system planning and stability, load modeling, renewable energy, electricity market, and computational methods. He is an editor of IEEE TRANSACTIONS ON SMART GRID, IEEE PES LETTERS, Elsevier/State Grid Journal of Modern Power Systems and Clean Energy. He is an international Advisor for the lead Chinese journal of Automation of Electric Power Systems. He also serves as guest editor for International Journal of Systems Science.

He has been a contractor with EPRI, USA since 2001. He has over 10 EPRI projects, 12 ARC grants, 4

grants under HK RGC & ITF scheme, 1 theme based ($64m) project in Hong Kong, and many industrial R&D and consulting projects in power system planning, stability, smart grid, electricity market analysis and load modeling areas. He leads the $12m CSIRO flagship project of Future Grid for gas and electricity network co-planning. He also worked with Australia and US Defense, and Australia Federal Government Department of Broadband and Digital Economy on smart grid cyber security project. He is a member of IEEE taskforce on power system cascading failure, and a chapter coordinator for CIGRE work group on load modeling. He is the Deputy Chair for Smart Grid Australia and leads its research domain on cyber physical systems. He is member representing SGA at International Federation of Smart Grid. Prof Dong has published over 400 technical papers/books/book chapters, and received over $10 million (his part) research and industrial grants. He has over 3400 citations and an H-index of 30. Prof Dong has been supervising/co-supervising over 20 PhD students now, and has over 20 PhD graduates under his supervision. They work in industry and research/academia in Australia, Europe, Asia and America. He established a team of 28 at Ausgrid Centre for Intelligent Electricity Networks to provide RD&D support for the $100m (+$500m from Ausgrid) Smart Grid, Smart City demonstration project.

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