Keynote Address – VI

Dynamic Modeling for Analysis of Wind Farm and Grid Interaction

By
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Abstract

Electrical generation, transmission and distribution systems all over the world have entered a period of significant renewal and technological change. There have been phenomenal changes/deployments in technology of generation driven by the worldwide emphasis on energy from wind and solar as a sustainable solution to our energy need. Increasingly energy demand from heating and transportation will be met by electricity. So, to accommodate changes in either end the transmission grid is required to operate in more responsive manner. This is the most credible challenge in smart transmission grid operation today. Some of the recent wind farm operations have grabbed media headlines of not being connectable to the grid. While the debate is on whether it is the wind farm or the grid is the cause, the balance of the debate is shifting towards the integration and control aspect of these two technologies.

This keynote will briefly mention the recent major problems in connecting big wind farms to the grid. It will then identify few possible specific technical reasons supported by the general technical insights gathered from detailed technical study conducted at Bikash Pal's research group at Imperial College London. Future research challenges and opportunities will be highlighted.

Biography

Bikash Pal is a Professor of Power Systems at Imperial College London (ICL). He is research active in power system stability, control, and estimation. He led UK-China research consortium project on grid scale storage: Stability and Control of Power Networks with Energy Storage, He also led the UK side of UK-India smart grid research consortium project, Reliable and Efficient System for Community Energy Solution – RESCUES. His research is conducted in strategic partnership with ABB, GE Grid Solutions, UK, and National Grid, UK. UK Power Networks. He has worked with National Grid on a wind farm and series compensator interaction project. ALSTOM and GE commissioned sequel of projects with him to analyse and solve wind farm HVDC grid interaction problems (2013-present). Prof Pal was the chief technical consultant for a panel of experts appointed by the UNFCCC CDM (United Nations Framework Convention on Climate Change Clean Development Mechanism). Norwegian Grid Operator STATNET has consulted him for a technical study on Offshore HVDC grid development in the North Sea. He has offered trainings in Chile, Qatar, UAE, Malaysia and India in power system protections, stability and control topics. He has developed and validated a prize winning 68-bus power system model, which now forms a part of IEEE Benchmark Systems as a standard for researchers to validate their innovations in stability analysis and control design.

Prof. Pal chairs an IEEE Working Group in state estimation for power distribution applications. He was the Editor-in-Chief of IEEE Transactions on Sustainable Energy (2012-2017). He is IEEE Periodical Committee member and effective from 2019 also Vice President, PES Publications. In 2016, his research team won the President's outstanding research team award at Imperial College London (ICL). He is Fellow of IEEE for his contribution to power system stability and control. He is an IEEE Distinguished Lecturer in Power distribution system estimation and control. He was Editor-in-Chief of IET Generation, Transmission and Distribution (2005-2012). He has published about 100 papers in IEEE Transactions and IET journals. Two of his papers in power system stability and control topics have received annual best journal paper award. He has co-authored three books and two award winning IEEE Task Force/Working Group reports. He was Mercator Professor sponsored by German Research Foundation (DFG) at University of Duisburg-Essen in 2011. He was faculty at IIT Kanpur, India. He holds a Visiting Professorship at Tsinghua University, China.