



TEXAS A&M
UNIVERSITY *at* QATAR



The Futuristic Renewable Energy Dominated Grid – Opportunities and Challenges

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Renewable energy generation will dominate in the next smart grid energy paradigm. Hence, the futuristic electric grid will be dominated by power electronics converters, which is called a “Power Electronics Dominated Grid”. The inverters have fast response and lack of inertia support and damping adjustment ability, therefore such grid’s ability to suppress load fluctuations and disturbances is weak. To avoid jeopardizing grid’s stability, the transformation and modernization of the next grid paradigm will be possible if operating the massive amounts of inverters as virtual synchronous machines. Furthermore, dividing the grid into multiple sub-control regions and clusters will support the vision of creating a reliable and stable renewable energy dominated smart grid paradigm.

The talk will focus on explaining the renewable energy dominated smart grid, the challenges associated with it, and the ways to make it achievable, reliable, and stable.

The seminar is organized by the Smart Grid Center – Extension in Qatar in cooperation with the Qatar General Electricity & Water Corporation “KAHRAMAA”.



Haitham Abu-Rub
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Dr. Haitham Abu-Rub holds two PhDs in electrical engineering and the humanities. Dr. Abu-Rub has a long history of teaching and research at universities in many countries, including Qatar, Poland, Palestine, USA, and Germany. Since 2006, Dr. Abu-Rub has been associated with Texas A&M University at Qatar where he is currently a professor and the managing director of the Smart Grid Center – Extension in Qatar. He also served for five years as chair of Electrical and Computer Engineering Program at TAMUQ. Abu-Rub’s main research interests are smart grid, renewable energy systems, power electronic converters, and electric drives. Dr. Abu-Rub has received many prestigious international awards and recognitions, including the American Fulbright Scholarship and the German Alexander von Humboldt Fellowship. He has co-authored more than 450 journal and conference papers, six books, and six book chapters. He is an IEEE Fellow and Co-Editor in Chief of the *IEEE Transactions on Industrial Electronics*.

