

Hydrogen and Renewable Energy Systems: An Overview

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Speaker:

Dr. Muhammad Khalid

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Abstract:

To date, a variety of energy storage technologies have been investigated to mitigate the impact of renewable intermittency in an electric power distribution system. Among other technologies, battery energy storage is currently considered as the most popular and promising option. Concurrently, in terms of practical renewable applications most of these solutions, however, remain expensive predominantly due over-dimensioning, technological limitations, complex operational strategies, and/or environmental restrictions. Nevertheless, energy storage has gained a lot of traction over the last few years due to recent technological advancements. Lately, hydrogen storage technology has been considered to facilitate a key role towards sustainable development owing to its flexibility as a fuel and capability/tenacity as long-term energy storage solutions. However, this technology remains challenging limiting its effective contribution towards establishing innovative solutions in renewable energy sector. In this talk, the speaker will give an overview of hydrogen systems pertaining to their production, storage, and utilization. Moreover, a keen emphasis will be given towards integrating hydrogen storage technologies in renewable energy systems. The objective of this introductory talk is to introduce fresh graduate students in electrical engineering towards the multi-faced challenges and opportunities of hydrogen systems.

Bio:

Dr. Muhammad Khalid received his PhD degree in Electrical Engineering from the School of Electrical Engineering & Telecommunications (**EE&T**) at the University of New South Wales (UNSW), Sydney, Australia in 2011. He worked there initially as a Postdoctoral Research Fellow for three years and then he continued as a Sr. Research Associate at the Australian Energy Research Institute in the School of **EE&T** at UNSW for another two years. Currently, he is serving as an Associate Professor in the Electrical Engineering Department at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Kingdom of Saudi Arabia. His current research interests include the optimization and control of battery energy storage systems for large-scale grid-connected renewable power plants (particularly wind and solar), distributed power generation and dispatch, and smart grids. He was the recipient of a highly competitive post-doctoral writing fellowship from UNSW in 2010.