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Renewable energy utilization for power generation and role of energy storage and demand response for improved reliability

It is expected that demand for electricity will increase rapidly with population growth around the globe in the foreseeable future. The increase in demand dictates the need for rapid increase in generation capacity, much of which is expected to be in the form of emission -free renewable energy power generation, including the highly heterogeneous energy sources such as wind and solar. We have already seen the growth of such power generation in the past decade. This presentation evaluates the potential of several different renewable energy resources with a focus on the potential energy of sun for solar Photovoltaic and solar heat for power generation and for hydrogen production. The opportunities and challenges associated with the use of sustainable, but variable renewable energy power generation sources and the role of energy storage and demand response in mitigating their variability in grid-tied and off-grid (islanded) applications will be discussed. Intelligent power management of multisource micro grids for reduced emission, improved reliability and resiliency, and a vision for a future renewable-energy-based Hydrogen-economy society will also be presented.

Biography

Hashem Nehrir has over 40 years of university teaching and research experience. He is a Professor at the Department of Electrical and Computer Engineering at Montana State University (MSU). His research encompasses modeling, control, and power management of alternative energy power generation systems, load control (demand response) and application of artificial intelligence for micro grid power management for resiliency and self-healing of power systems. He is Life Fellow of IEEE, the 2010 recipient of MSU's Wiley Faculty Award for Meritorious Research, the 2016 recipient of IEEE Power and Energy Society (PES) Ramakumar Family Renewable Energy Excellence Award, and the current Vice Chair of the Renewable Energy Technologies Subcommittee of IEEE-PES. He has lectured on his research and educational activities in ten countries around the globe.

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