Wind Power Integration: Exploring Impacts and Alternatives

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Over the past decade, there has been ever increasing attention paid to more sustainable sources of energy. The idea of harnessing wind energy has been at the forefront of this discussion, for its significant potential for both energy production and also for destabilizing the existing power system. Over the past decade there have been no less than fifteen in-depth wind integration studies conducted by various Independent System Operators (ISOs) and outside consultancy firms. These all conclude that existing systems have the capability to absorb small amounts of energy from wind (< 10% of capacity), though at higher levels, new operational strategies will be required. This is also an exciting time for the power industry as the evolution of the industry accelerates into the highly-touted "smart grid" era. In this presentation we will discuss some of the challenges of using high levels of wind energy, as well as some of the future grid strategies that can be used to overcome these challenges, including storage, responsive demand, and self-reserves. In particular, I will discuss some of the simulation and optimization approaches applicable to investigating possible solutions.