

Fernando Paganini,

Professor at ORT, Uruguay

Decision making in forward power markets with supply and demand uncertainty.

Abstract

We discuss forward markets of electric energy, where generators and consumers bid for quantities of energy ahead of time, but face uncertainty on their real-time supply or demand, expressed through a probability distribution. This is an increasingly common situation due to the presence of renewables in the grid. Any deviations with respect to forward commitments are settled at ex post prices, which in many markets are differentiated between participants who are long or short. The optimal forward commitment decision falls in the class of the “newsvendor problem” in operations research. We show extensions to the recent literature on this topic, covering in particular the case where demand is elastic in addition to uncertain. Finally, we analyze the integrated forward market where buyers and sellers of random energy interact with dispatchable sellers to determine a clearing price.

Biographical Sketch

Fernando Paganini received his Electrical Engineering and Mathematics degrees from Universidad de la República, Uruguay, in 1990, and his M.S. (1992) and PhD (1996) degrees in Electrical Engineering from Caltech, Pasadena, CA. His PhD thesis received the Wilts and Clauser Prizes from Caltech. From 1996 to 1997 he was a postdoctoral associate at MIT. From 1997 to 2005 he was on the Faculty at the UCLA Electrical Engineering Department. Since 2005 he is Professor of Engineering at Universidad ORT Uruguay. He has held editorial positions in the IEEE/ACM Transactions on Networking, the IEEE Transactions on Automatic Control, and the new IEEE Transactions on Network Science and Engineering. Prof. Paganini is the recipient of the 1995 O. Hugo Schuck best paper award, the 1999 Packard Fellowship, the 2004 George S. Axelby Award, and the 2010 Elsevier Scopus Prize. He is a member of the Uruguayan National Academy of Sciences and a Fellow of the IEEE.