Valuation and Pricing of Electricity Delivery Contracts - the Producer's View

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This paper analyzes the valuation and pricing of physical electricity delivery contracts from the viewpoint of a producer with given capacities for production and fuel-storage. Using stochastic optimization problems in discrete time with general state space, the duals of production problems are used to derive no-arbitrage conditions for fuel and electricity prices as well as superhedging values and prices of bilaterally traded electricity delivery contracts. In particular we take the perspective of an electricity producer, who serves contractual deliveries but avoids unacceptable losses. The resulting no-arbitrage conditions, stochastic discount factors and superhedging prices account for typical frictions like limitation of storage and production capacity and for the fact that it is possible to produce electricity from fuel, but not to produce fuel from electricity. Similarities, but also substantial differences to purely financial results can be demonstrated in this way. Furthermore, using acceptability measures, we analyze capital requirements and acceptability prices for delivery contracts, when the producer accepts some risk.

References

 Kovacevic, R.: Valuation and pricing of electricity delivery contracts – the producer's view, Research Report 2015/4, ORCOS Vienna University of Technology, 2015.