Trading wind energy on the basis of probabilistic forecasts both of wind generation and of market quantities - DTU Orbit (25/09/2019)

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Wind power is not easily predictable and non-dispatchable. Nevertheless, wind power producers are increasingly urged to participate in electricity market auctions in the same manner as conventional power producers. The aim of this paper is to propose an operational strategy for trading wind energy in liberalized electricity markets and to assess its performance. At first, the so-called optimal quantile strategy is revisited. It is proved that without market power, i.e. under the price-taker assumption, this strategy maximizes expected market revenues. Forecasts of wind power production, of day-ahead and real-time market prices and of the system imbalance are inputs to this strategy. Subsequently, constraining of the bid that maximizes the expected revenues is proposed as a way to overcome the strategy's disregard of practical limitations and, at the same time, of risk. Two constraining techniques are introduced: constraining in the decision space and in the probability space. Finally, the trade of a wind power producer is simulated in a test case for the Eastern Danish (DK-2) price area of the Nordic Power Exchange (Nord Pool) during a 10 month period in 2008. The results of the test case show the financial benefits of the aforementioned strategy as well as the consequent interaction with the electricity market. This study will support a demonstration in the framework of the EU project ANEMOS.plus.

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