Abstract

Using Real Options Theory to Price Electricity Forward Contracts

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Since the liberalisation of the electricity markets in many countries, including Australia, there has been a substantial research aiming to produce a benchmark pricing methodology for forward electricity contracts. Up-to-date, there are two schools of thoughts. The first one essentially applies the risk-neutral valuation approach (with some adjustment) and the second one uses simple actuarial principles based on expectation of future prices and the concept of certainty equivalent of contingent claims.

With these two approaches, the forward pricing problem based on spot electricity prices remains an unsolved problem because the underlying asset (electricity) is not storable (economically) and cannot be traded from one period to the next.

The theory of trading claims on non-tradeable assets (real options) is seen to have a natural application to electricity.

The talk will start by a brief overview of the Australian electricity market. Then we will go through the following discussion points:

1. Detailed specification of the half-hourly electricity forward contract as an instrument to hedge pool price risk.
2. Specification of the dynamics of the weekly average price by peak and off-peak periods and discussion of the link to forward contracts.
3. Forward contracts pricing using real options theory
4. Derivation of a recursion formula for electricity forward prices
5. Discussion, questions and answers