

# Long Term electricity bilateral contracts

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## Mathematical models

Electricity markets offer a way to trade on a hourly/daily, basis quantities of electricity at a given price. The short term producer's maximum profit problem has been discussed in [another section](#). However for risk management reasons the producers may want to stipulate longer term bilateral contracts with third parts, i.e. (large) consumers. The problem of defining the amount and the price of such over the counter transactions can be seen as an simulation/optimization one. It is also a simulation problem since the long term horizon calls for the estimation of the future conditions of the spot market, that remains an alternative. Although rare, a producer, especially a small one, may in fact want to go spot for all its capacity. The final goal is indeed maximizing the profit while maintaining a certain - quantity and price - risk.

## Modeling and algorithmic considerations

From a modelling standpoint, the bilateral contract definition, involves, the price risk profile and the future conditions of the spot market. Moreover the bilateral contracts are typically equipped with hourly profile (or blocks of hours) of demand from the counterpart. Therefore the inclusion of some simplified technical constrains of the power plants must be considered (at least maximum capacity and ramp constraints). All in all, given a certain demand profile requested, the problem can define as variables price and quantity and try to optimize a custom objective function that takes into account the revenues, the costs, and the risk reduction with respect of pure spot trading along the considered horizon.

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