

Strategic management of multi-year natural gas contracts in electricity markets

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Abstract-

Combined cycle gas turbine (CCGT) plants show some advantages, such as better economies of scale, or lower CO₂ emission rates, in comparison to other technologies. In addition, due to their flexible operation, CCGT plants are a useful support for the integration of the growing renewable energy installed capacity. Consequently, during the last years, CCGT plants have proliferated in electricity systems, increasing the global demand of natural gas (NG). In order to guarantee the NG supply and to hedge the price volatility, electricity generation companies (Gencos) sign supply contracts with NG producers. Typically, NG producers force long-term contracts in order to recover their huge capital investments. Therefore, Gencos should optimize the exercise of the supply contracts in the long-term scope in order to maximize their profits in the electricity market. However, the optimal exercise of the supply contracts on behalf of the Gencos could be impeded because of possible bottlenecks in the NG system. Accordingly, this paper proposes a methodology to incorporate both the characteristics of NG supply contracts and the congestions in the NG system in an electricity market model that could support the decision-making process on behalf of the Gencos. A study case illustrates the methodology.

Index Terms- Contract management, electricity market, equilibrium models, natural gas market

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