

# **Modeling of third party access tariffs and portfolio gas purchases of CCGTs in the self-unit commitment problem**

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## **Abstract-**

The structure of the operational costs of gas fired units (GFU) in real power systems is much more complex than what standard unit-commitment (UC) models consider in the state-of-the-art formulations. On the one hand, when a generation company owning several GFUs procures its gas -either totally or partially- at the gas spot market, the final fuel price will depend on the total gas purchases. This fact couples the operation of all the GFUs as it is impossible to build individual cost functions for each generator. On the other hand, as any other gas consumer, the generation company has to pay the gas Third Party Access (TPA) tariffs. The generation company must contract in advance the monthly TPA capacity for each gas exit point and depending on such decision, the final variable cost of the GFUs will be different. This paper states the importance of modeling properly both issues and presents a novel mathematical formulation that can be embedded in a self-UC model. The presented example case highlights the benefits of the proposed formulation.

**Index Terms-** CCGT, electricity market, gas market, profit maximization, third party access (TPA), unit commitment (UC).

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