# Residual demand curves for modeling the effect of complex offering conditions on day-ahead electricity markets

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**Abstract— Residual demand curves (RDCs) can be used to represent the strategic interaction of participants in electricity markets. RDCs relate the energy that an agent can buy or sell in one hour with the clearing market price that would be obtained in such hour, assuming the market is organized as simple bid independent auctions. Despite the fact that they have been widely used in the literature, the existence of time and/or spatial constraints in the market clearing algorithm makes the RDCs not directly applicable. This paper tries to overcome these difficulties by extending the concept of RDCs to zonal pricing markets where complex offering conditions and transmission constraints are taken into account. Therefore, the RDCs are redefined in order to capture such effects, which are usually neglected or oversimplified. A new method for computing the redefined RDCs is established and its application to the Iberian electricity market is presented. The results show that modeling complex conditions and transmission constraints in RDCs can have a significant effect when compared to the standard approach found in the literature. Therefore, the method presented in this paper modeling the effect of firm's decisions on market prices in a more accurate way.**

**Index Terms— Residual Demand Curves, Electricity Markets, complex offers, inter-temporal constraints, transmission constraints, market splitting.**

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**Citation:**
*Portela, J.; Muñoz, A.; Sánchez-Úbeda, E.F.; García-González, J.; González Hombrados, R.; "Residual demand curves for modeling the effect of complex offering conditions on day-ahead electricity markets", IEEE Transactions on Power Systems, vol.32, no.1, pp.50-61. January, 2017.*