

Coordination of generation and transmission development through generation transmission charges - a game theoretical approach

Y. Tohidi; L. Olmos Camacho; M. Rivier Abbad; M.R. Hesamzadeh

Abstract-

Transmission charges aim to recover the cost of transmission network investments and provide efficient locational signals to new generators. In this paper, we investigate the effect of these charges on the development of new generation capacities in the system. Generation expansion planning is decided by strategic generation planners (SGPs) trying to maximize their profits, while transmission line investments are planned by a central planner and regulatory body aimed at minimizing the overall operation and network investment costs of the system. Regulatory transmission charges (RTCs) are calculated according to the marginal responsibility of generation investment on transmission network investment costs. An iterative algorithm is proposed to model the interaction taking place between the central planner and SGPs. The developed methodology is applied to a 2-node illustrative example and the IEEE-RTS96, and effects of RTCs on investment decisions of SGPs are analyzed.

Index Terms- Generation expansion planning; Game theory; Marginal transmission charges.

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