Transmission & Generation Expansion Investment Coordination: Transition from Game-Theoretic to Mechanism Design Approach ☆

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Abstract

In this paper, we will consider the long term transmission and generation capacity expansion and associated investment coordination problem in the situation, where there are multiple Transmission Planners (TPs), as well as competitive Generation Owners (GOs). In such a setting, each of the agents acts to maximize its own utility. However, this is contingent upon what the other TPs are planning to do. Here, we first present a survey of game-theoretic approaches in complete details, which is part of the existing literature, in order to solve this problem, along with the simulation results. Subsequently, we point out, that this approach might not always lead to maximizing the overall social surplus of the bigger geographical region, and hence, we consider some alternative mechanism design approaches, culminating in a handful of market mechanism designs, based on distributed optimization algorithms, that needs to be implemented by an entity, called the Market Overseer (MO).

Keywords: Nash Equilibrium, Market Mechanism Design, Horizontal Coordination, Vertical Coordination, Stochastic Optimization, APP

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1.1. Sample subsection

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[☆]The objective of this paper is to survey and summarize the existing body of literature and research work in this particular field, from the last few years, particularly in the context of the Nordic electric power market.

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¹I also want to inform about...

²Small city

Appendix A. Section in Appendix

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