

Narongsak Ruangchom 2008: Evaluations of Bilateral Transactions in Electricity Markets in Aspects of Optimal Dispatch and Transmission Pricing. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Miss Parnjit Damrongkulkamjorn, Ph.D. 51 pages.

This thesis studies bilateral transactions in electricity markets in aspects of optimal dispatch, system flow and transmission pricing using optimal power flow. The study also introduces the evaluation of transmission pricing for all market participants by using nodal prices. The study is done by using MATLAB program called MATPOWER with additional codes for calculating bilateral transactions on a 30-bus system. Optimal power flow is applied to the test system in 3 different cases. The first case study is the system with no bilateral transaction; generators and loads sell and buy power through power pool. The second case is when the system has one bilateral transaction; load at bus 2 buys all its required power from generator at bus 2. The last case is when the system has several bilateral transactions; loads at buses 2, 7 and 8 buy power from generator at bus 2. Using the optimal power flow results, transmission costs, generator revenues and load expenditures in both bilateral and nonbilateral cases are then calculated and compared.

The results from the 30-bus test system show that bilateral transactions could have significant effects on system flow and nodal prices, causing transmission costs to change. The study also concludes that transmission pricing, if applied properly to all market participants, could be an effective tool for the system operator to regulate the use of transmission grids effectively.

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