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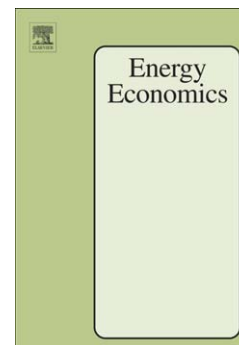
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Economic Externalities in Transmission Network Expansion Planning

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Abstract

This paper discusses investing in transmission capacity and its link with investing in generation capacity. Since opportunity costs in transmission and generation capacity are dependent, externalities arise when investment decisions are decentralized. Externalities are market failures which appear when a decision of a particular agent changes another agent's welfare, but not vice versa. When generation and transmission investment decisions are made separately, generation investment introduces negative externalities to transmission planning. A centralized multistage stochastic model is formulated for finding the Pareto optimal solution of investments in transmission and generation capacity. Using the model, we show some examples of externalities in transmission planning for the IEEE 24-bus test system and the Peruvian system. Finally, we found that for the Peruvian system simultaneous optimal planning of generation and transmission capacity gave significant savings, around \$585 million, which represents 10% of the total cost.

JEL classification: L94; L51

Keywords: Transmission planning, Externalities, Investing in generation.

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