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电力市场

电力市场中考虑灵活性措施的发电投资决策分析

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摘要：

电力市场改革使发电投资面临了众多不确定性和潜在的市场化风险，这对发电投资的灵活性提出了较高的要求。考虑电力市场环境下发电投资灵活性的特点，提出了发电投资决策的灵活性分析框架，并以扩展的净现值作为灵活性策略评估指标，应用实物期权理论对投资策略进行评估。分别对乐观、一般和悲观的市场环境中燃料成本和电价等不确定性因素进行模拟，分析各投资阶段的项目收益波动情况。针对基本投资、扩容投资和放弃投资等3种灵活性策略，构建了市场环境下考虑灵活性措施的二叉树模型，并对灵活性策略的期权价值和扩展的净现值进行评估。以一个300 MW的燃气蒸汽联合循环电厂容量投资为例，比较分析考虑灵活性措施前后的净现值，验证了该模型的有效性和合理性。

关键词：

Analysis on Investment Decision of Power Generation Project in Electricity Market Considering Flexible Tactics

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Abstract:

The market-oriented reform of electric power industry makes the investment for power generation project be faced with uncertainty and a lot of potential market risks, so it raises a higher claim for the flexibility of power generation investment. Considering the feature that in electricity market environment the power generation investment is flexible, an analysis framework to analyze the flexibility of investment decision of power generation project, and taking the expanded net present value (NPV) as the evaluation index for flexible tactics, the investment strategy is evaluated by use of the theory of real option. The uncertain factors such as fuel costs and electricity prices and so on are simulated in optimistic, pessimistic and common market environments respectively, and the fluctuation of project incomes in different investment stages are analyzed. In allusion to three flexible tactics, namely basic investment, investment for increasing generation capacity and withdraw investment, a binary tree model in market environment, in which the flexible tactics are taken into accouont, is built, and the option values of flexible tactics as well as expanded NPV are evaluated. Taking the capacity investment for a combined cycle gas turbine (CCGT) power plant with capacity of 300MW for example, the NVPs before and after the consideration of flexible tactics are compared and analyzed, thus the effectiveness and reasonableness of the proposed model are verified.

Keywords:

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