

Study on Control Reserve Assessment of thermal power plants (Evaluation Index of Load Frequency Control Capability and Its Application to an Improvement Effect of Coal Power Plant Operation)

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Abstract

This report proposes an evaluation method of the load frequency control performance of thermal power plants, and describes its impact on supply-demand balance of power system. The proposed method enhances the market value of a control reserve capacity to power generation units with wide adjustable range, high response speed, and low standby power output.

Using the IEEJ standard model (AGC30 model) and a unit commitment tool we have developed, the fuel costs and CO₂ emissions of thermal power plants and system frequency deviations were assessed based on several scenarios. The operational performance improvement of coal-fired power plants (especially, shortening activation time and lowering minimum output rate) enhances load frequency control capabilities, and these coal-fired power plants have their competitive advantage to conventional LNG power plants. In a supply-demand situation where coal power plants lose the energy market share by increase of renewable energy generation, an active utilization of the improved coal power plants in load frequency control contributes to fuel cost reduction, renewable energy utilization, and system frequency stability