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A Single-Buyer Model of Imbalance Cost Pass-Through Pricing Forecasting in the Malaysian Electricity Supply Industry

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Abstract

The imbalance cost pass-through (ICPT) is a flexible component of the incentive-based regulation (IBR) that empowers power producers to adjust tariffs in response to variable fuel prices, thereby enhancing the economic resilience of electricity generation. In Malaysia, the Energy Commission has conducted biannual reviews of fuel and other generation costs. Any cost savings or increases identified during these reviews will be passed on to customers in the form of rebates or surcharges. Meanwhile, if an increment in the ICPT price signal can be provided to electricity providers and consumers, early preparation for operation budgeting can be realised, and energy management program development can be properly prepared. Due to this reason, this study proposes ICPT price forecasting for the electricity market in Peninsular Malaysia that will benefit the stakeholders. The study aims to construct an ICPT-related baseline model for the peninsular generation data by employing three forecasting methods. The forecasting performance is analysed using the mean absolute percentage error (MAPE). In light of our findings, the ARIMA method is one of the most accurate forecasting methods for fuel prices compared to the moving average (MA) and LSSVM methods. The observed price differences between the ARIMA and LSSVM models for ICPT are minimal. The ICPT price for July–December 2022 and January–June 2023 is MYR 0.21/kWh for the ARIMA and MYR 0.18/kWh for LSSVM, which are close to the actual TNB's ICPT tariff. As for forecasting, the ICPT price is expected to drop in the next announcement. The findings of this study may have a positive impact on the sustainability of the energy sector in Malaysia. © 2024 by the authors.

Author keywords

electricity market; electricity price; forecasting; incentive-based regulation; machine learning; time series

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