

***FORECASTING OF FOSSIL ENERGY CONSUMPTION IN
INDONESIA USING ARIMA (AUTOREGRESSIVE
INTEGRATED MOVING AVERAGE)***

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ABSTRACT

Fossil energy consumption in Indonesia has been continuously increasing in line with economic growth and national development, while the high dependency on fossil energy remains a major challenge in achieving the *Net Zero Emission* (NZE) target by 2060. This study aims to predict Indonesia's fossil energy consumption using the ARIMAX (*Autoregressive Integrated Moving Average with Exogenous Variables*) method with *Gross Domestic Product* (GDP) as the exogenous variable. The data used consists of Indonesia's fossil energy consumption in TWh and GDP data for the period 1965–2024, obtained from Our World in Data and the World Bank. The modeling process involved natural logarithm transformation, stationarity testing using the *Augmented Dickey-Fuller* (ADF) Test, and ACF and PACF analysis to determine candidate models. The best model obtained was ARIMAX(3,2,1) with an AIC of 341.64, MAPE of 5.21% categorized as Very Good, MAE of 111.71 TWh, RMSE of 171.20 TWh, and R^2 of 0.7173. As a visualization medium, the FossilTrack website was developed using the Flask framework based on Python, evaluated through Black Box Testing and *User Acceptance Testing* (UAT) involving 10 respondents with an average score of 90.17% categorized as Very Feasible.

Keywords : ARIMA, ARIMAX, *Fossil Energy*, *FossilTrack*, *Forecasting*, GDP.