## *ABSTRACT*

This research aims to forecast carbon emission prices, which are very difficult to predict due to their high volatility and irregular patterns. This study uses carbon emission price data from investing.com, covering the period from January 2, 2012, to March 31, 2025. Several previous studies have shown that while hybrid models can outperform single models, they are often overly complex like *Prophet-LSTM-BP*. Therefore, this research attempts to use a simpler hybrid approach by combining the strengths of the *Prophet* model, which excels at predicting linear data, and *Long Short-Term Memory* (LSTM), which is effective for non-linear data, further refined with residual approach. This study also conducts a comparison of four models: a standalone Prophet, a standalone *LSTM*, a Hybrid *Prophet-LSTM*, and a *Hybrid Prophet-LSTM* (Residual). The performance of each model is measured using *Root Mean Squared Error* (RMSE), *Mean Absolute Error* (MAE), and *Mean Absolute Percentage Error* (MAPE) metrics. The results show that the best-performing model is the *Hybrid Prophet-LSTM* (Residual), which on the test data achieved an *RMSE* of 1.6773, an *MAE* of 1.3541, and a *MAPE* of 1.87%. This outcome proves that combining the *Prophet* and *LSTM* models is an effective strategy for forecasting complex carbon price data.



**Keywords**: *Carbon Emission, Forecasting, Hybrid Model, Long Short-Term Memory, Prophet*