



## **Abstract**

### **Solar Panel Energy Prediction Using the N-BEATS Method**

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The non-linear, time-dependent nature of solar power complicates its contribution to the grid as intermittency makes day-ahead forecasting all the more necessary, especially with traditional modeling limitations. Therefore, this research implements a day-ahead photovoltaic yield forecasting model via the N-BEATS deep learning architecture, with a tuned XGBoost baseline model for comparison, using real-world data spanning 2017-2023. This work utilizes historical yield predictions and exogenous covariates - irradiance and temperature - as inputs for model tuning, over different time windows, for both models. The test prediction of N-BEATS reports an sMAPE of 8.304 and RMSE of 0.376 on the test set while the baseline XGBoost model reports an sMAPE of 8.771. Thus, the N-BEATS prediction presents an outperforming prediction as N-BEATS is a more effective model for highly temporal, dynamic yields than tree-based models and even serves as a greater-than-average option for reliable solar power management.

Keyowrd, Deep Learning, Nbeats, Solar Powerplant, Forecasting, Time Series