Weather-Based Prediction of Wind Turbine Energy Output

This report presents a next-generation approach to predicting wind turbine energy output using weather parameters such as wind speed, temperature, and humidity. Accurate prediction improves grid stability, maintenance planning, and renewable energy integration.

Objectives

- Analyze weather parameters affecting wind energy
- Build predictive machine learning models
- Improve efficiency and forecasting accuracy

Methodology

The system collects weather data, preprocesses it, and applies machine learning algorithms such as Linear Regression and ensemble models to predict power output.

Sample Dataset

Wind Speed (m/s)	Temperature (°C)	Humidity (%)	Power Output (kW)
5.2	28	65	120
8.1	30	60	260

Conclusion

Weather-based prediction models significantly enhance the reliability of wind energy forecasting. Future work includes deep learning and real-time weather API integration.