

Date	1 oct 2025
Team ID	LTVIP2025TMIDS40838
Project Name	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy
Maximum Marks	3 Marks

## Phase 3: Model Development

### 1. Initial Model Training & Evaluation

#### Models Considered:

- Linear Regression
- Random Forest Regression
- Gradient Boosting Regression
- XGBoost Regression

#### Training Steps:

1. Input preprocessed data into models
2. Train on training dataset
3. Evaluate using RMSE, MAE,  $R^2$  score

#### Evaluation Metrics:

- RMSE: Root Mean Square Error
- MAE: Mean Absolute Error
- $R^2$  Score: Coefficient of determination

**Expected Outcome:**

Identify baseline model with satisfactory performance for further tuning.

## **2. Model Selection Report**

**Document: Model Selection Report Template**

**Best Performing Model:**

- Model with lowest RMSE and highest  $R^2$
- Explain feature importance
- Compare predicted vs actual energy output
- Recommend model for optimization and deployment