

Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management

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TEAM ID	LTVIP2026TMIDS90651
PROJECT NAME	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
MAXIMUM MARKS	1 MARK

Chapter 5

Project Planning and Scheduling

5.1 - Project Milestones & Tasks:

1 Data Collection

Objective: Gather high-quality, relevant data required for the project.

Tasks:

- Identify reliable data sources (databases, APIs, web scraping, surveys, etc.)
- Collect structured and unstructured data
- Ensure data relevance and completeness
- Store data in a centralized database or storage system
- Maintain data documentation for reference

Deliverables:

- Raw dataset
- Data source documentation
- Data storage setup

2 Data Pre-Processing

Objective: Clean and prepare the data for model training and analysis.

Tasks:

- Remove duplicates and handle missing values
- Handle outliers and inconsistent data
- Data normalization or scaling

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- Feature engineering and selection
- Encode categorical variables
- Split dataset into training and testing sets

Deliverables:

- Cleaned dataset
- Feature-engineered dataset
- Preprocessing scripts

3 Model Building

Objective: Develop and train a machine learning model.

Tasks:

- Select appropriate algorithm(s)
- Train model using training dataset
- Hyperparameter tuning
- Model validation and evaluation
- Compare performance metrics
- Finalize best-performing model

Deliverables:

- Trained model
- Evaluation report (Accuracy, Precision, Recall, F1-score, etc.)
- Saved model file

4 API Integration

Objective: Expose the trained model via an API for external access.

Tasks:

- Develop REST API endpoints
- Integrate model with backend framework (Flask / FastAPI / Django)

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- Implement request validation
- Add error handling
- Test API responses
- Secure API (authentication if required)

Deliverables:

- Functional API
- API documentation (Swagger/Postman collection)
- Deployment-ready backend

5 Web Integration

Objective: Integrate API into a web-based user interface.

Tasks:

- Design user-friendly frontend interface
- Connect frontend to backend API
- Display model predictions dynamically
- Implement input validation
- Perform end-to-end testing
- Deploy web application

Deliverables:

- Fully functional web application
- User interface design
- Live deployment link (if applicable)