Project Design Phase
Proposed Solution Template

Date	17 February 2026
Team ID	LTVIP2026TMIDS70003
Project Name	Weather-Based Prediction of Wind Turbine Energy
Maximum Marks	2 Marks

Proposed Solution – Wind Turbine Energy Prediction

S.No	Parameter	Description
1	Problem Statement	Wind energy production is highly variable due to weather conditions, making it difficult for energy companies, wind farm operators, and grid managers to forecast output, plan maintenance, and balance supply with demand.
2	Idea / Solution Description	Develop a machine learning–based prediction system using historical turbine data and live weather inputs. The solution integrates a **Random Forest regression model** with a **Flask-based dashboard** and **OpenWeather API** to provide accurate, real-time energy forecasts.
3	Novelty / Uniqueness	- Combines **historical turbine datasets** with **live weather data** for dynamic predictions. - Provides a **user-friendly dashboard** for visualization and interaction. - Focuses on **practical deployment** with cloud scalability and API integration.
4	Social Impact / Customer Satisfaction	- Improves reliability of renewable energy, encouraging wider adoption. - Helps grid operators reduce instability and blackouts. - Supports sustainable energy goals by making wind energy more predictable. - Enhances customer trust in renewable energy investments.
5	Business Model (Revenue Model)	- SaaS model offering subscription-based access to prediction dashboards. - Licensing to energy companies and wind farm operators. - Consulting services for integration with existing grid systems.
6	Scalability of the Solution	- Can be deployed on **cloud platforms (AWS/GCP/Azure)** for large-scale usage. - Supports integration with multiple APIs (weather, grid demand). - Easily extendable to other renewable sources (solar, hydro). - Architecture designed for **microservices and containerization** (Docker/Kubernetes).