Project Design Phase
Proposed Solution Template

Date	8 February 2026
Team ID	LTVIP2026TMIDS89922
Project Name	Weather-Based Prediction of Wind Turbine Energy Output
Maximum Marks	2 Marks

Proposed Solution:

S.No.	Parameter	Description
1	Problem Statement	Wind turbine energy output is difficult to forecast accurately due to variable weather conditions, leading to inefficient energy management, poor maintenance scheduling, and grid imbalance.
2	Idea / Solution Description	Develop a machine learning-based system that predicts wind turbine energy output by analyzing historical turbine and weather data. Integrate real-time weather data using OpenWeatherMap API and provide an easy-to-use web interface built with Flask to deliver accurate forecasts.
3	Novelty / Uniqueness	Unlike traditional manual or rule-based methods, this solution leverages Random Forest regression to capture complex relationships between weather parameters and turbine output. Real-time weather integration and interactive web UI make it accessible and actionable.
4	Social Impact / Customer Satisfaction	Enables better renewable energy utilization, reducing dependency on fossil fuels. Helps energy companies and grid operators optimize resources, reduce downtime, and lower carbon footprints, thus contributing to sustainable energy goals and higher customer trust.
5	Business Model (Revenue Model)	Can be offered as a SaaS product to energy companies and wind farm operators via subscription. Alternatively, packaged as a consultancy service including deployment, customization, and ongoing support.
6	Scalability of the Solution	The modular design allows easy integration of additional weather parameters, more turbines, or other renewable sources. Can be extended to cloud deployment and multi-user access for wider adoption.