Project Design Phase
Proposed Solution Template

Date	10 February 2026
Team ID	LTVIP2026TMIDS84120
Project Name	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
Maximum Marks	2 Marks

Proposed Solution Template:

Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1	Problem Statement (Problem to be solved)	Wind turbine energy output depends heavily on changing weather conditions such as wind speed, temperature, and atmospheric pressure. Existing forecasting methods lack real-time adaptability and accuracy, causing inefficient energy scheduling, grid imbalance, and operational losses for renewable energy providers.
2	Idea / Solution Description	The proposed system uses machine learning models trained on historical weather and turbine data to accurately predict wind energy output. Real-time weather inputs are processed to generate power forecasts through a web-based interface, enabling operators to plan energy distribution, maintenance, and grid integration efficiently.
3	Novelty / Uniqueness	Utilizes multi-parameter weather and turbine features; applies machine learning for non-linear prediction; supports real-time forecasting integrates meteorological and mechanical turbine data in a single predictive model; assists operational decision-making.
4	Social Impact / Customer Satisfaction	Enhances renewable energy efficiency and reliability; supports sustainable energy adoption; reduces energy wastage and downtime; improves power supply stability; increases confidence of energy providers and consumers in green energy systems.
5	Business Model (Revenue Model)	SaaS-based wind energy forecasting platform; subscription services for wind farms and utilities; API licensing to grid operators; enterprise deployment for renewable companies; consulting and customization services.
6	Scalability of the Solution	Scalable across multiple wind farms and regions using cloud deployment and sensor/weather data streams. Models can be retrained with regional datasets and integrated with large-scale turbine monitoring systems, enabling expansion to national or global renewable networks.