Ideation Phase
Define the Problem Statements

Date	15 February 2026
Team ID	LTVIP2026TMIDS62246
Project Name	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
Maximum Marks	2 Marks

Customer Problem Statement Template: Wind Turbine Energy Prediction

Energy companies, wind farm operators, and grid managers are increasingly dependent on renewable energy sources to meet growing demand and reduce reliance on fossil fuels. Wind energy is a critical part of this transition, but its production is highly variable due to weather conditions. Customers feel uncertain when wind energy production fluctuates due to unpredictable weather conditions. They want reliable forecasting tools that help them plan energy distribution effectively and reduce operational risks.

I am	Strategic Grid Manager overseeing energy stability.	A Strategic Energy Grid Manager responsible for balancing supply and demand within a renewable energy network.
I'm trying to	Forecast wind energy output accurately.	Accurately predict wind turbine power generation to optimize grid dispatch and minimize energy waste.
but	Wind volatility makes prediction difficult.	Weatier intermittency and complex variables like wind direction make raw forecasts unreliable for grid planning.
because	Legacy tools lack advanced ML models.	Current systems fail to integrate multi-dimensional data like wind speed and theoretical power curves effectively.
which makes me feel	Anxious about grid instability.	Apprehensive and pressured by the risks of power outages and inefficient energy procurement costs.

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel

PS-1	I am a Wind Farm Operator	I'm trying to forecast wind turbine energy output accurately	But weather conditions change frequently	Because wind speed and direction directly affect energy production	Which makes me feel uncertain about operational planning
PS-2	I am an Energy Grid Manager	I'm trying to balance renewable energy with traditional energy sources	But wind energy production is inconsistent	Because renewable output depends heavily on weather variations	Which makes me feel concerned about grid stability