

## Ideation Phase

### Define the Problem Statements

Date	13 February 2026
Team ID	LTVIP2026TMIDS83348
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:

Create clear problem statements from the customer's point of view to guide solution design. These statements help the team empathize with users and focus on real-world challenges faced by stakeholders.

### Problem Statements (PS)

#### PS-1 (Wind Farm Operator Persona)

1. I am a wind farm operator managing multiple wind turbines in a renewable energy plant.
2. I'm trying to forecast daily and seasonal energy output to ensure efficient power generation and grid commitments.
3. But I do not have access to highly accurate, weather-driven predictive insights tailored to my specific turbine locations.
4. Because weather conditions such as wind speed, temperature, and air density change frequently and impact power generation unpredictably.
5. Which makes me feel uncertain about meeting energy targets, managing operational costs, and ensuring stable power supply to the grid.

#### PS-2 (Grid Manager / Energy Distribution Authority Persona)

1. I am a grid manager responsible for balancing electricity supply and demand across regions.
2. I'm trying to integrate wind energy efficiently into the power grid without causing instability or overloading.

3. But fluctuating wind power generation makes it difficult to predict real-time supply accurately.
4. Because renewable energy sources are highly dependent on dynamic weather conditions and lack precise forecasting tools.
5. Which makes me feel challenged in maintaining grid stability and ensuring uninterrupted electricity distribution.

## PS-3 (Renewable Energy Policy Maker / Energy Analyst Persona)

1. I am a renewable energy policymaker focused on sustainable energy planning and carbon reduction targets.
2. I'm trying to evaluate wind energy performance trends and future production capacity for long-term planning.
3. But the available data is scattered and not integrated into a predictive, data-driven decision-support system.
4. Because insights into weather impact on energy output are not analyzed in a unified and actionable manner.
5. Which makes me feel limited in designing proactive renewable energy policies and optimizing national energy strategies.

## Proposed Direction (Solution Focus)

Develop an **Exploratory Data Analysis (EDA) and Machine Learning-based Weather-Driven Wind Energy Prediction System** that analyzes historical weather parameters and turbine output data to forecast energy generation.

The system will provide:

- Accurate energy output predictions
- Visual dashboards for performance trends