Ideation Phase

Empathize & Discover

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	4 Marks

Empathy Map Canvas:

An empathy map helps the team deeply understand users by capturing what they **think, feel, see, hear, say, and do**. It enables building solutions grounded in real user needs, operational constraints, and energy management challenges.

Target User Persona: Small & Marginal Farmer (Rain-dependent region in India)

	THINKS & FEELS • Worried about fluctuations in wind speed affecting energy output • Concerned about meeting daily power generation targets	
SEES • Rapid changes in weather conditions • Variations in turbine performance across locations • Energy output reports with inconsistent trends		HEARS • Grid authority warnings about supply-demand imbalance • Discussions about renewable energy variability • Industry experts emphasizing predictive analytics
	SAYS & DOES • Monitors turbine performance dashboards regularly • Adjusts maintenance schedules based on wind conditions • Communicates expected output to grid operators	

PAINS

- Unpredictable wind conditions leading to unstable energy output
- Difficulty in accurate short-term and seasonal forecasting
- Risk of grid instability due to generation mismatch

GAINS

- Accurate weather-driven energy output predictions
- Improved operational planning and turbine utilization
- Better coordination with grid authorities
- Reduced financial and operational risk
- Data-driven renewable energy management

How Our Solution Helps

The **Weather-Based Wind Energy Prediction System** uses historical weather parameters and turbine output data to perform Exploratory Data Analysis (EDA) and build Machine Learning models for accurate energy forecasting.

The system provides:

- Predictive insights on expected energy generation
- Visual dashboards showing performance trends
- Decision-support tools for operators and grid managers
- A simple web-based interface for real-time forecasting