DATE	28-02-2026
TEAM ID	LTVIP2026TMIDS90651
PROJECT NAME	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
MAXIMUM MARKS	4 MARKS

2.2 - Empathy Map Canvas:

The Empathy Map Canvas is used to understand the needs, challenges, and expectations of the stakeholders involved in wind energy generation and management. In this project, the primary users of the proposed system include wind farm operators, energy planners, grid managers, and maintenance engineers. The empathy map helps in designing a system that is user-centric, practical, and aligned with real-world operational requirements.

1. Thinks:

- Needs accurate and reliable predictions of wind turbine energy output.
- Thinks about how to reduce power fluctuations and improve grid stability.
- Worries about unexpected drops or spikes in power generation due to changing weather.
- Considers how to optimize turbine performance and maintenance schedules.
- Wants to make better decisions using data instead of guesswork.

2. Feels:

- Feels pressure to maintain consistent and reliable power supply.
- Feels concerned about losses caused by poor forecasting and inefficient planning.
- Feels responsible for the safety, performance, and efficiency of wind turbines.
- Feels motivated to adopt smarter, technology-driven solutions.
- Feels frustrated when traditional prediction methods fail to give accurate results.

3. Says:

- “We need more accurate power output forecasts.”
- “Weather changes are making energy planning difficult.”
- “Unexpected power variation affects grid management.”
- “We need a system that can help us plan better and reduce risks.”

- "Data-driven tools can improve our decision-making."

4. Does:

- Monitors weather data and turbine performance regularly.
- Uses historical data and basic models to estimate power output.
- Plans energy distribution and backup power based on forecasts.
- Schedules maintenance based on performance trends and issues.
- Analyses reports and dashboards to track energy production.

5. Pain Points:

- Inaccurate or unreliable power output predictions.
- Difficulty in handling sudden changes in weather conditions.
- Risk of energy loss, grid imbalance, and operational inefficiency.
- Dependence on traditional models that do not adapt well to real-world data.
- Increased operational costs due to poor planning and forecasting errors.

6. Gains:

- More accurate and reliable energy output predictions.
- Better planning and management of power generation and distribution.
- Improved turbine performance and reduced downtime.
- Enhanced decision-making using data-driven insights.
- Increased efficiency, reliability, and sustainability of wind energy systems.