Project Design Phase
Problem – Solution Fit Template

Date	17 February 2026
Team ID	LTVIP2026TMIDS70003
Project Name	Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management
Maximum Marks	2 Marks

Problem – Solution Fit Template: Wind Turbine Energy

Energy companies, wind farm operators, and grid managers face significant challenges due to the unpredictable nature of wind energy production.

- **Energy Companies** struggle to forecast energy output accurately, making distribution and pricing inefficient.

- **Wind Farm Operators** cannot plan maintenance effectively, risking downtime during high wind activity.

- **Grid Operators** find it difficult to balance renewable energy with traditional sources, leading to instability in the grid.

Solution

A machine learning–powered prediction system that uses historical turbine data and live weather inputs to forecast wind energy output.

- **Accurate Forecasting: Predicts energy production based on weather conditions, enabling better planning.**

- **Maintenance Optimization: Identifies low-output periods for scheduling turbine maintenance.**

- **Grid Integration: Provides reliable predictions to help grid operators balance renewable and traditional energy sources.**

Purpose:

- ☑ **Solve complex forecasting and operational problems in renewable energy management.**

- ☑ **Increase adoption of wind energy by making it more predictable and dependable.**

- ☑ **Sharpen communication with stakeholders by providing clear, data-driven insights.**

- ☑ **Build trust with energy companies and operators by solving costly inefficiencies.**

- ☑ **Improve the renewable energy ecosystem by aligning production with demand and infrastructure needs.**

Template:

	1. CUSTOMER SEGMENT(S) CS	**6. CUSTOMER CONSTRAINTS** CC	**5. AVAILABLE SOLUTIONS** AS	
Define CS, fit into CC	Who is your customer? i.e. working parents of 0-5 y.o. kids	What constraints prevent your customers from taking action or limit their choices of solutions? i.e. spending power, budget, no cash, network connection, available devices.	Which solutions are available to the customers when they face the problem or need to get the job done? What have they tried in the past? What pros & cons do these solutions have? i.e. pen and paper is an alternative to digital notetaking	**Explore AS, differentiate**
Focus on J&P, tap into BE, understand RC	**2. JOBS-TO-BE-DONE / PROBLEMS** J&P	**9. PROBLEM ROOT CAUSE** RC	**7. BEHAVIOUR** BE	**Focus on J&P, tap into BE, understand RC**
	Which jobs-to-be-done (or problems) do you address for your customers? There could be more than one; explore different sides.	What is the real reason that this problem exists? What is the back story behind the need to do this job? i.e. customers have to do it because of the change in regulations.	What does your customer do to address the problem and get the job done? i.e. directly related: find the right solar panel installer, calculate usage and benefits; indirectly associated: customers spend free time on volunteering work (i.e. Greenpeace)	
Identify strong TR & EM	**3. TRIGGERS** TR	**10. YOUR SOLUTION** SL	**8. CHANNELS of BEHAVIOUR** CH	**Extract online & offline CH of BE**
	What triggers customers to act? i.e. seeing their neighbour installing solar panels, reading about a more efficient solution in the news.	If you are working on an existing business, write down your current solution first, fill in the canvas, and check how much it fits reality. If you are working on a new business proposition, then keep it blank until you fill in the canvas and come up with a solution that fits within customer limitations, solves a problem and matches customer behaviour.	**8.1 ONLINE** What kind of actions do customers take online? Extract online channels from #7	
	4. EMOTIONS: BEFORE / AFTER EM		**8.2 OFFLINE** What kind of actions do customers take offline? Extract offline channels from #7 and use them for customer development.	
	How do customers feel when they face a problem or a job and afterwards? i.e. lost, insecure > confident, in control - use it in your communication strategy & design.			

References:

1. https://www.ideahackers.network/problem-solution-fit-canvas/
2. https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe