K J Somaiya College of Engineering
A Constituent College of Somaiya Vidyavihar University

Template for Problem formulation

Need Statement:

Since the fuel prices not only in India but throughout the world is increasing day by day thus there is a tremendous need to search for an alternative to conserve these natural resources. Thus, a solar bicycle which is an electric vehicle that provides an alternative by harnessing solar energy to charge the battery and provides required voltage to run the motor.

Roll Number	Name of Student	Role played
16010221008	Jossil Johnson	Designer
16010221038	Eshan Trivedi	Designer
16010321048	Arya Singh	Customer
16010521038	Yash Sawantdesai	Customer
16010221068	Arya Latkar	Designer
16010521048	Arya J. Singh	Customer
16010221018	Vijit Trivedi	Customer
16010521018	Shriyash Suryawanshi	Customer

Table 1: List of the sample Questionnaire to design the problem

Questions such as	This question helps the designer to
1. What will be the maximum cost of the product?	**Identify client's objective**
2. How much does it travel in a single charge?	
3. Can we use it in the night?	
4. Is the cycle functionable in all weather conditions?	
5. Is the cycle suitable in all terrain?	
1. What is the warranty for the cycle?	**Identify constraints**
2. What is the approximate weight of the cycle?	
3. Will the tyre hold the weight of the solar panel?	
1. How comfortable is the ride?	**Establish functions**
2. Does the cycle have a speedometer?	

3. What are the security functions of the cycle?	

Table 2 The information obtained through basic research and Survey

Observation and from Lit.Survey	Requirements
1. There is not enough space for water-bottle	Bottle Holder can be installed at the crossbar of the cycle.
2. There is no disk brake	We couldn't attach disc brakes since we had solar panels attached to the cycle. thus, we have installed power brakes.
3. Shirt is stained due to absence of mud guard	Mud guard can be installed
4. Function box is not touchscreen	Accessible through mobile app
5. Not suitable for the older generation and kids.	The solar cycle was specifically designed for the young adults.

1.1 Establish client's objectives: -

1. We have two variants – i) The Aluminium Alloy Cycle – Rs. 20,000/-
   ii) The Carbon Fibre Cycle - Rs. 25,000/-
2. The solar panels are attached to the wheels of the cycle in such a way that it automatically charges as an when it is used, so it can travel as long as there is proper sunlight.
3. There is a Battery connected to the cycle which stores solar energy when the cycle is not in use, thus making it easier for the customer to use it even at night.
4. The Solar Cycle can also be ridden during monsoon season and winter season, but since it would be working on the battery it won't be much efficient as during the summers.
5. Yes, the cycle can be used in all terrain, since it has A/T tires or All-Terrain tires, which are designed to perform on-and off-road, providing traction and comfort in wet, dry, and snowy conditions and also it is really easy to remove from a muddy jam since it is accelerated by powerful motors.

1.2 Identify constraints: -

1) The Battery and the Solar Panel have 3 Years of warranty and the Frame of the Cycle has 1 Year warranty.
2) The solar cycle approximately weighs 10kilograms.
3) Yes, the cycle is designed in such a way that it easily can hold the weight of the solar panel and won't cause hindrance to the customer's ride.

1.3 Establish functions

1. The cycle seat has an external Silicone-Gel saddle cover and is made up of memory foam.
2. The cycle has a multifunction box fitted near the handle bar, which can only be operated through a mobile app.
3. The cycle can only be accessed through your biometrics that are captured on your phone through the mobile app, thus ensuring safety for your cycle.

Revised Problem Statement:

Electric bicycles (e-bikes) are considered a sustainable alternative to automobile transportation today. Even though it has few minor drawbacks it is high time that we realise the need to take necessary measures to save the planet from depleting due to all the pollution and price hike in the fuel and thus the idea of a Solar Cycle itself is a lot more beneficial and sustainable for the planet and for the next generation. Thus, solar bicycle can become a very vital alternative to the fuelled automobile thus manufacturing it is very essential.