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**NEW PRODUCT DEVELOPMENT
COURSE CODE - MEE1009**

FACULTY – Venkatesan S

SLOT – E2

SOLARZ: SOLAR CHARGER

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Abstract:

The electricity necessities of the world including India are elevated at disturbing rate and the power demand has been increasing. The fossil fuels (i.e., coal, petroleum and natural gas) and other conventional resources, presently used for generation of electrical energy. It is not sufficient or suitable to keep Generation with ever increasing demand of the electrical energy of the world. The generation of electrical power by cold based steam power plant and nuclear power plants causes pollution, which is likely to be more harmful in future due to large generating capacity on one side and it Became tough Because greater awareness of the people in this respect. With the existing push in the direction of sustainable, clean sources of power, it is no surprise that solar power has become one of the most popular alternative energy sources. Free and available everywhere, the power of the sun can be employed to power everything like cell phones and MP3 player.

This project aims to develop a Portable Case Solar Battery Charger that can be carried anywhere for the use of electronic and electrical devices. The function Battery charger circuit is to control the output voltage of the solar panel by using a variable resistor in the circuit.

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INDTRODUCTION TO PROJECT:

In this project we are using the concept of energy harvesting by using solar energy for battery charging purpose. Solar Charger (solarz) is a environment-friendly product. It works in a very simple manner of absorbing solar energy, conversion into electrical energy and storage into the lithium battery. The voltage output element releases electrical energy. The product needs to be exposed to the sun for long hours so that it can accumulate sufficient energy into its lithium battery. Once charged, it can be used for charging even in the night as it uses absorbed solar energy present in the battery. By using this we can charge our mobile battery in remote areas where there is a problem of electricity.

SOLAR CHARGER->ABSORBTION->ELECTRICAL ENERGY

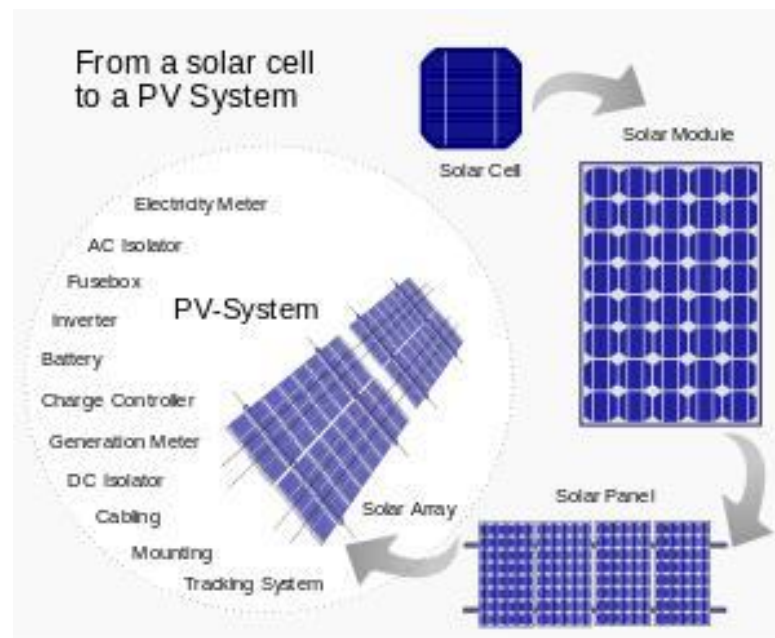
How Does A Solar Charger Work?

Components the solar charger consist of:

- ▶ A solar panel
- ▶ A rechargeable battery
- ▶ A charge controller

The Solar Panel

► The solar panel is made up of photovoltaic (PV) cells. In common with all photovoltaic/ PV cells, they contain light-sensitive materials that convert sunlight into small amounts of electrical current. When sunlight shines onto the solar panel, the resulting electricity is sent to the battery, subject to the regulating effects of the charge controller (see below). The sunlight can be direct (for best results), or indirect (less ideal).



The Rechargeable Battery

A solar charger can recharge lead batteries, NiCad batteries or for best performance, nickel-metal hydride (NiMH) batteries. The battery stores the electricity generated by the solar panel for later use by any electrical devices that are connected to it. This point bears emphasizing: the battery allows for maximum usage of the solar charger in two key respects:

- It accumulates energy generated by the solar panel, so that the resulting electricity can be delivered at a far faster rate than a solar panel could achieve on its own.
- Perhaps even more importantly, this stored energy is also available around the clock, including at night time.



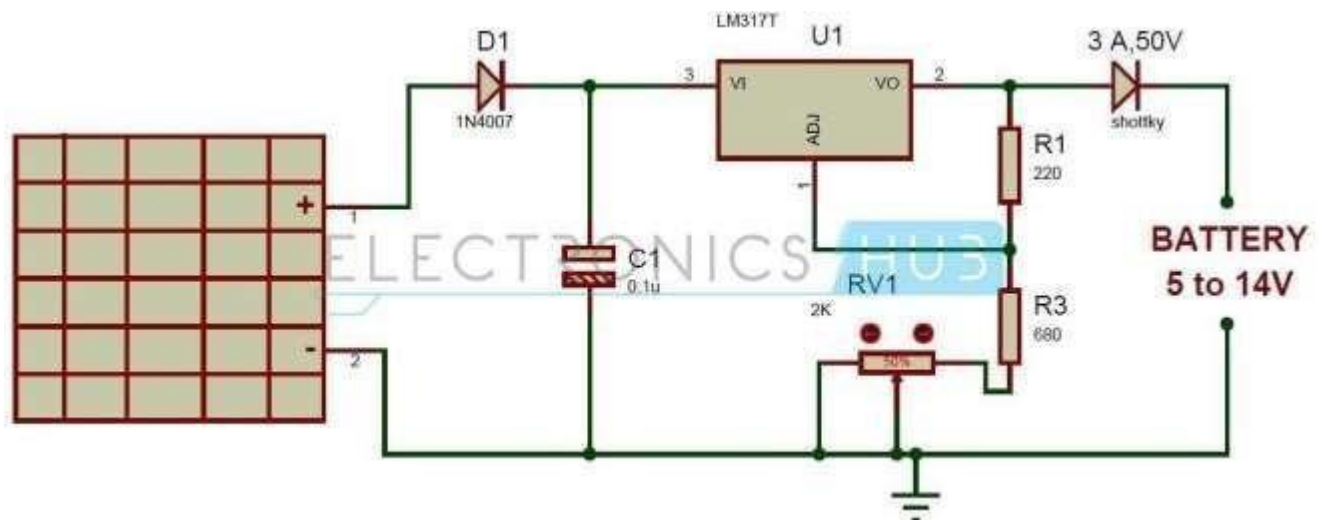
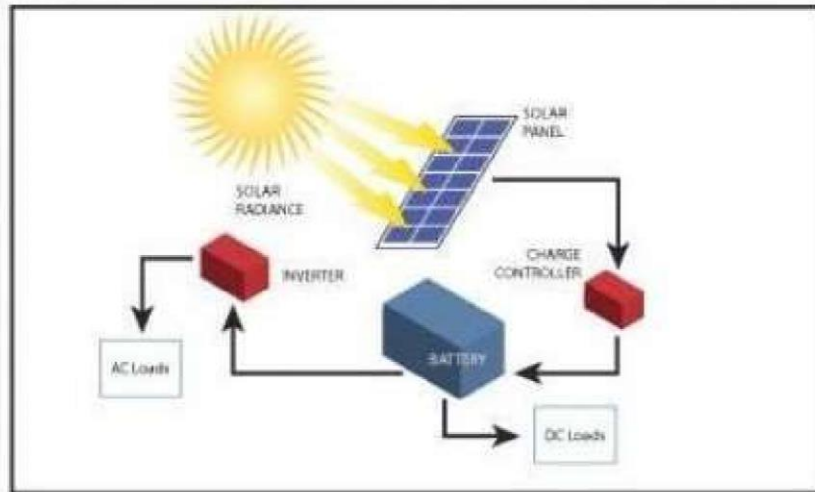
Charge Controller

- Since the voltage produced by solar panels can vary depending on the amount of sunlight it receives, a charge controller is included with a solar charger to regulate the amount of voltage delivered.



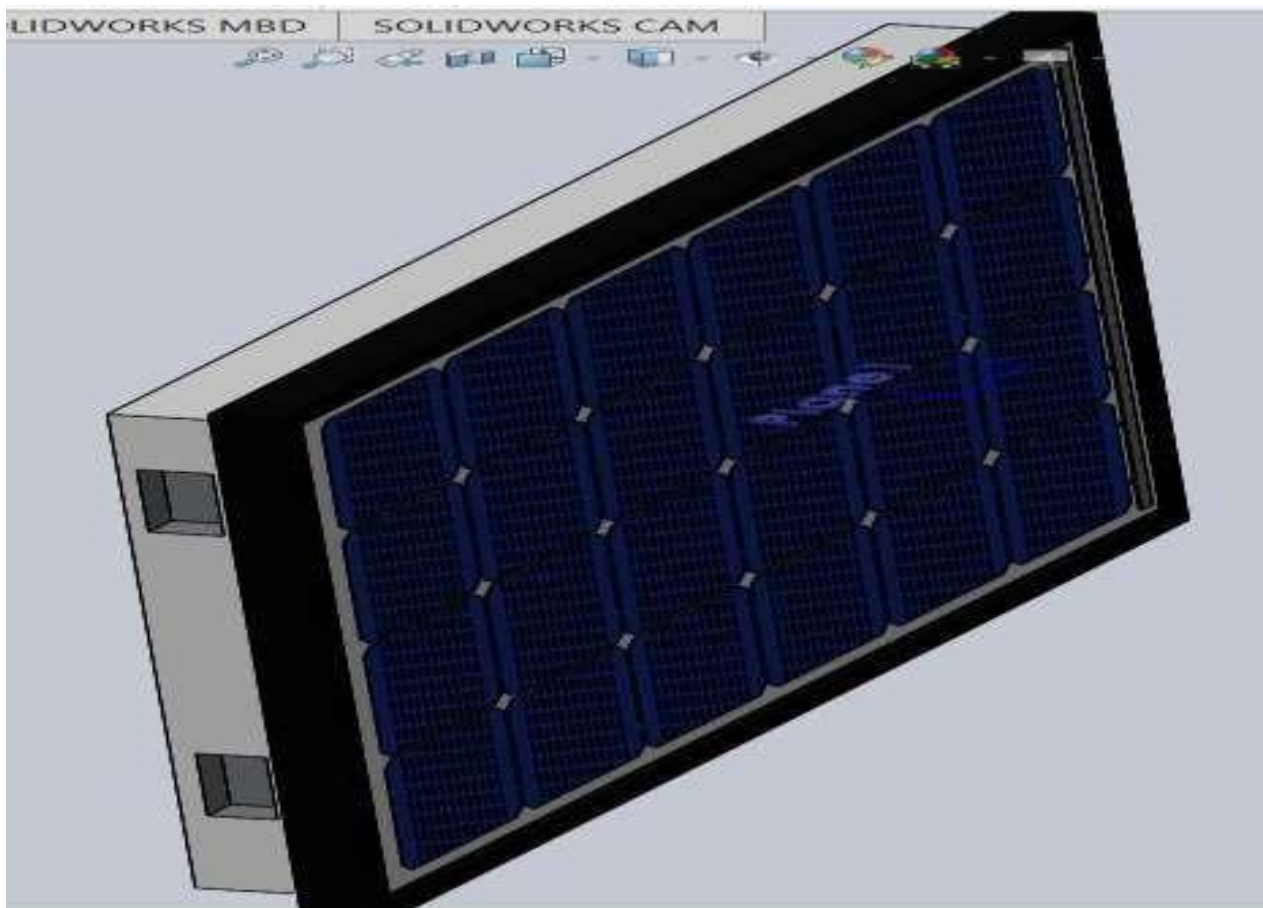
Parts of the Project

- Project have three parts
 - Solar Panel
 - Voltage Regulator IC's
 - Capicator

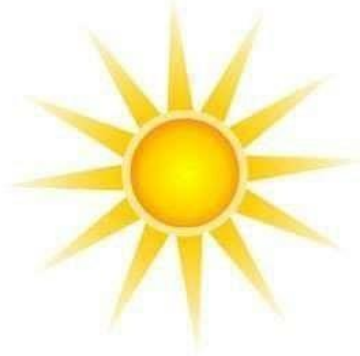


ADVANTAGES

- ❖ Cost Effective: Compared to the other mobile chargers, the solar chargers are cost effective as it absorbs power from the sun. It does not require electric power
- ❖ Versatile: It is also known to be versatile as it can be used for all types of mobile phones
- ❖ Uninterrupted Power Supply: One of the greatest advantages of solar mobile phone charger is that it can be used to charge mobiles even during power outages.
- ❖ Emergency Purposes: Another benefit is that it hardly requires any electrical outlet. It can therefore be used during emergencies and outdoor purposes.
- ❖ Compact Design: Solar mobile phone chargers are compact in size and are easy to carry.



Laptop Charging Solution

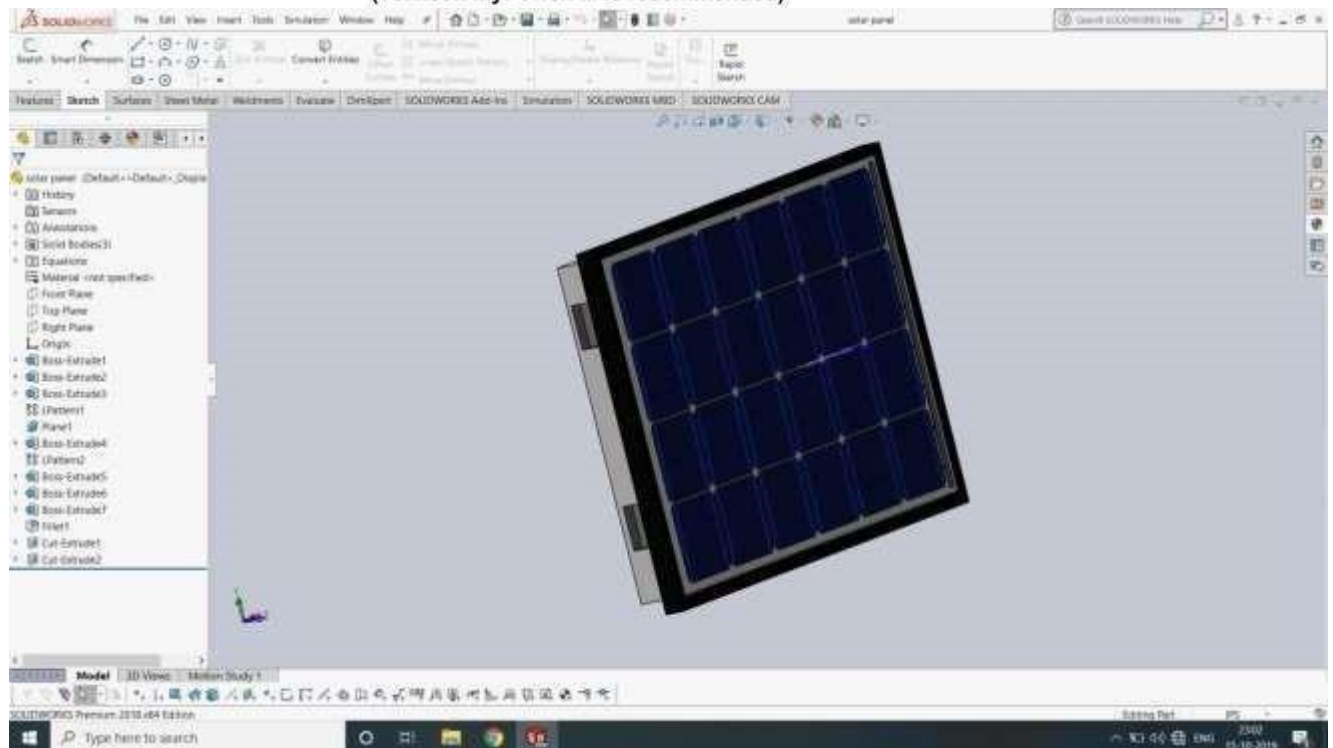


Electronic Device



Battery

(Tekkeon MyPowerAll is recommended)



BUSINESS ANALYSIS

#	Product	Need	Imp
1	Solar charger	Light weight	3
2	Solar charger	Durable	3
3	Solar charger	Creates no pollution	5
4	Solar charger	Has only initial cost	2
5	Solar charger	Minimal maintainence cost	4
6	Solar charger	Long life	5
7	Solar charger	No replacements required	2
8	Solar charger	Portable/easy to carry	5
9	Solar charger	Reusable materials	1
10	Solar charger	Easily compatible	4

► **Key strategic decisions such as alliances:** As Solarz promises to charge the mobile phones and similar other gadgets, it will be launched with a strategic alliance with local mobile manufacturer. The alliance will be aimed at co-branding their product with solar charger so that they can ensure customers a steady power, even in offshore locations and remote areas. Strategic alliance is an important decision to be made in new product development and business plan. It is essential to the correct partner so that it can make a product launch successful (Herring, Jones & Bailey, 2009). . In the bulk sale strategy, local mobile phone manufacturers will be a partner. People continue to buy the products, such as laptops, mobile phones and digital camera from established brands. It will help in automatic association of Solarz to innovative and wireless power device. The partners will market the products that will help in branding Solarz.

Customer needs

Metric table:

#	Needs	Metric	Imp	units
1	4,5	Manufacturing cost	2	Rupee/Dollar
2	2	Strength	3	Wb
3	1	Total mass	4	Kg/gm/mg
4	8	Assembly time	2	Days/Hours/Minutes
5	9	Material reusability	1	(Depends)
6	6	Life of a single unit	5	Years
7	1,2,6,10	Standards	4	Binary
8	3,6	Effectiveness	5	
9	8,10	Compatibility	3	List
10	6	Testing of each to detect defects	3	Standards

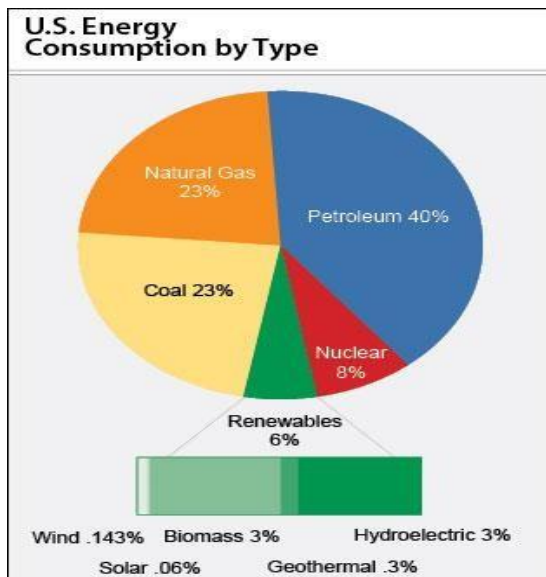
Metric Needs	Manuf act-uring cost	Strenght ↑	m Assem a bly s s time	Reuseabilit y	L if e	Standard	Effecti - venes s	Com patib- ility	Testing
Light weight			*						
Durable		*							
Creates no pollution				*					
Initial cost	*								
Low-maintenance				*		*	*		
Long life					*		*		
No-replacement				*	*				
Portable			*				*	*	
Reusable				*	*				
Compatible						*	*	*	*

#	Product	Need	Imp	foldable	disc form	portable	twister
1	Solar charger	Light weight	3	**	***	*	*
2	Solar charger	Durable	3	**	***	***	*****
3	Solar charger	Creates no pollution	5	*	****	**	**
4	Solar charger	Has only initial cost	2	****	***	*	*
5	Solar charger	Minimal maintainence cost	4	****	***	**	*
6	Solar charger	Long life	5	***	****	*****	**
7	Solar charger	No replacements required	2	**	****	***	*****
8	Solar charger	Portable/easy to carry	5	**	****	***	*****
9	Solar charger	Reusable materials	1	**	***	*****	**
10	Solar charger	Easily compatible	4	*	*	***	**

Trade off:

Though solar-generated electricity has significant advantages over other sources when it comes to CO₂ emissions, it is not entirely without environmental consequences. Solar facilities can use large areas of land, threaten wildlife habitats, harm birds, and affect the landscape's scenic character and recreational and cultural sites. Some impacts may be mitigated but usually at an increased cost. The Tradeoff's handout provides facts that can help students make judgments about which consequences may be worth risking to get the benefits of solar-generated electricity.

Light from the sun can be converted directly to electricity by means of a "photovoltaic cell." Most PV cells are made from wafers of silicon. When sunlight strikes a PV cell, electrons flow between the silicon layers. This current of electrons is then channeled through metal contacts attached to the cell.



Ideal and marginal values

Set ideal and marginally acceptable target values for each metric.

- 1) At least X
- 2) At most X
- 3) Between X and Y
- 4) Exactly X (A set of discrete values)

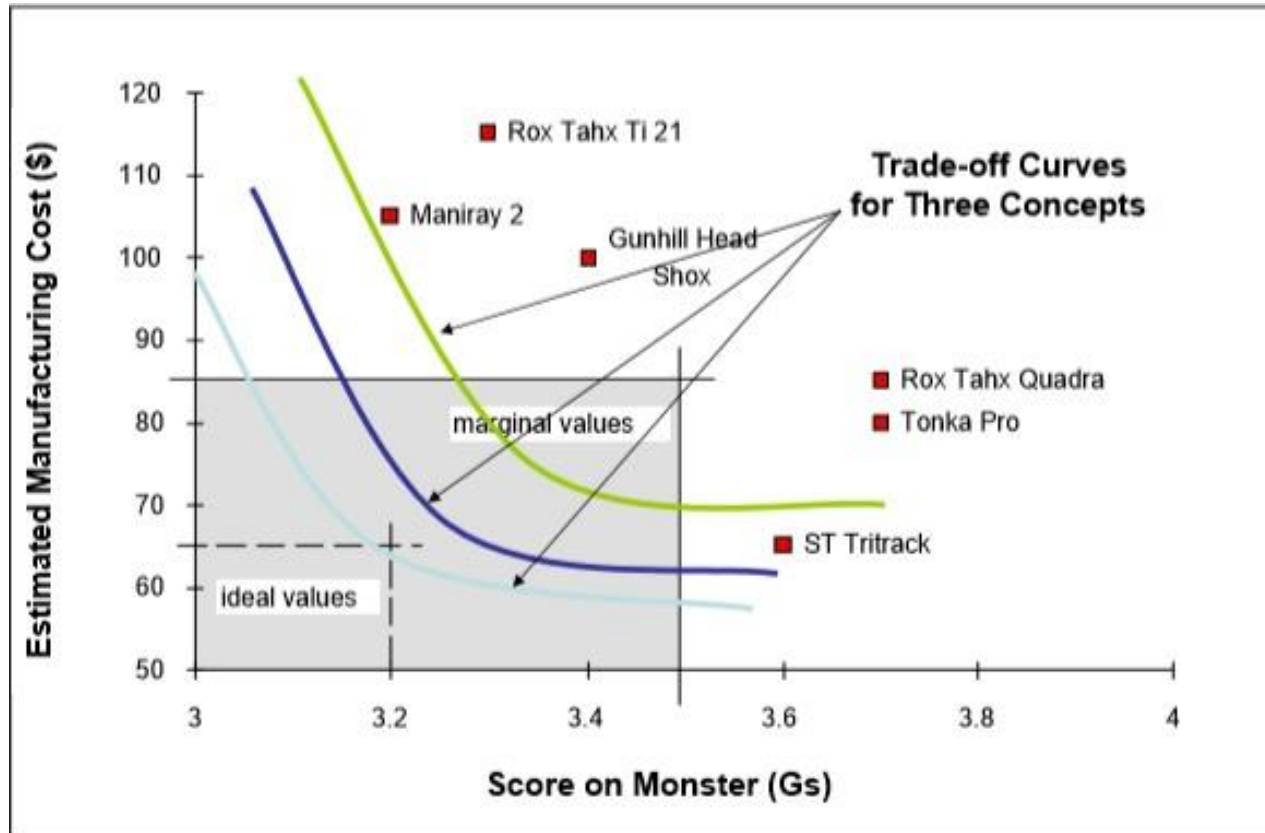
S. No.	Metric	Units	Marginal	Ideal
1	Manufacturing Cost	Rupee/Dollar	1000-2000	1500-2500
2	Load	N	480-800	650-700
3	Total Mass	Kg/gm/mg	< 1.4	<1.1
4	Material Reusability	Depends	<60	<35
5	Assembly Time	Days/Hours/Minutest	<10	8-10
6	Life of a single unit	Years	<10-30	15-25

Cost model

Developing a cost model of the product:

- Goal is to make sure product can be produced at a reasonable cost and how much uncertainty is there in the technical and cost models?
- Is concept chosen by team best for target market, or might it be more suitable for another market or segment.

Specification trade off:



FINAL SPECIFICATIONS:

S. No.	Metric	Units	value
1	Manufacturing Cost	Rupee/Dollar	2000
2	Strength	<u>Wb</u>	675
3	Total Mass	Kg/ <u>gm</u> /mg	<1.1
4	Assembly Time	Days/Hours/Minutes	9
5	Material Reusability	Depends	<45
6	Life of a single unit	Years	10-15
7	Standards	Binary	4
8	Effectiveness	Standards	<u>Satndards</u>
9	Compatibility	List	Standards
10	Testing to detect defects	Standards	standards

UNDERSTANDING THE PROBLEM:

MISSION STATEMENT:

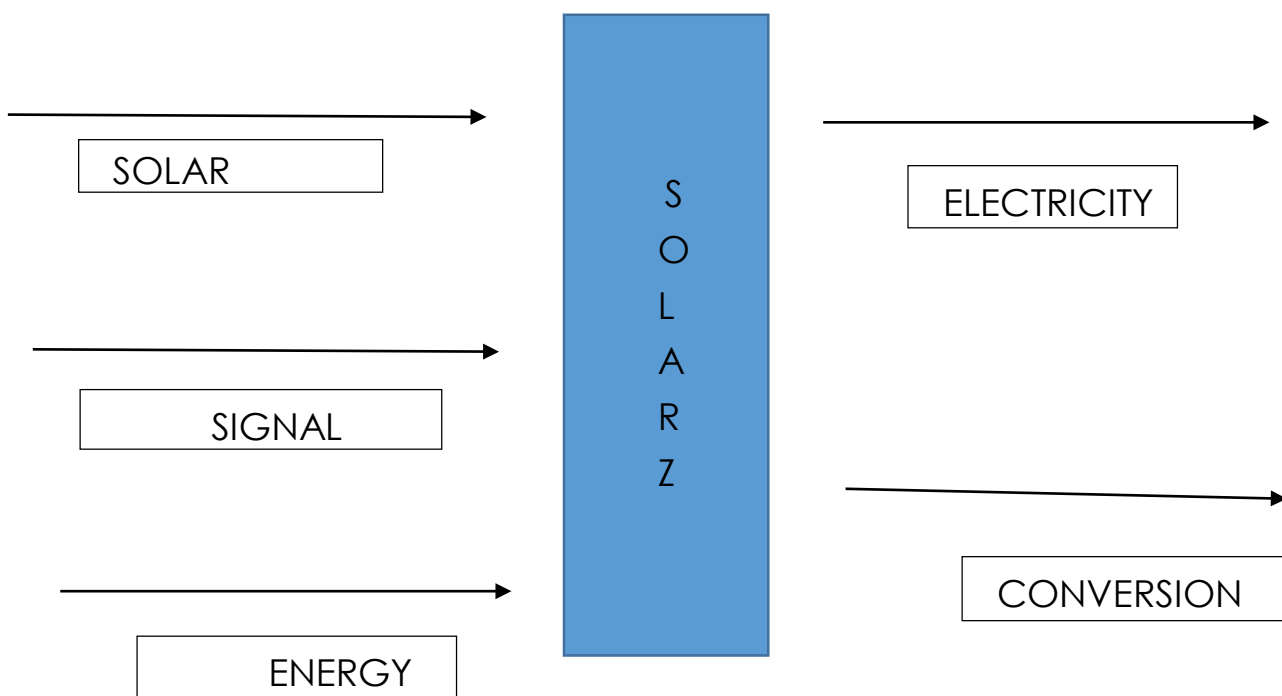
1. IT USES SOLAR ENERGY
2. COMPATIBLE TO UV RAYS
3. USE TO CONVERT TO ELECTRICAL ENERGY

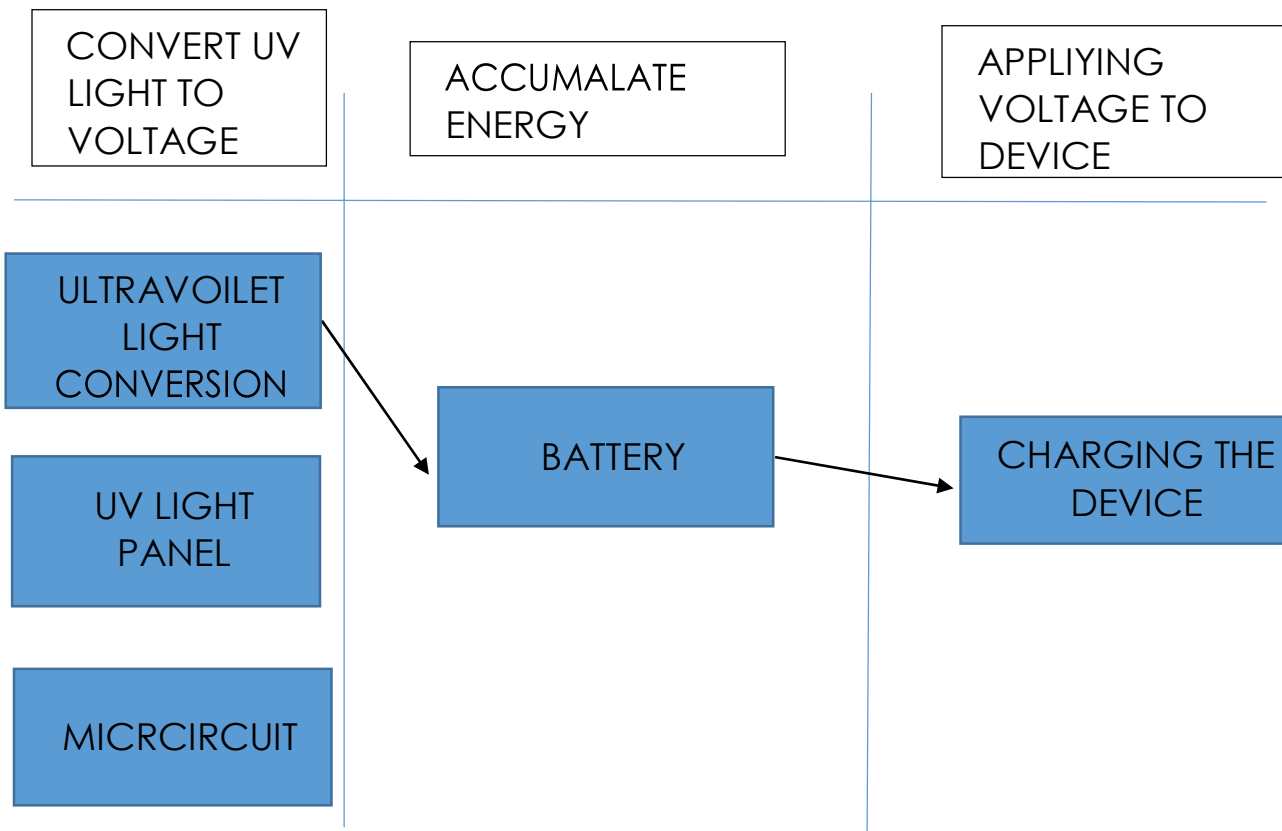
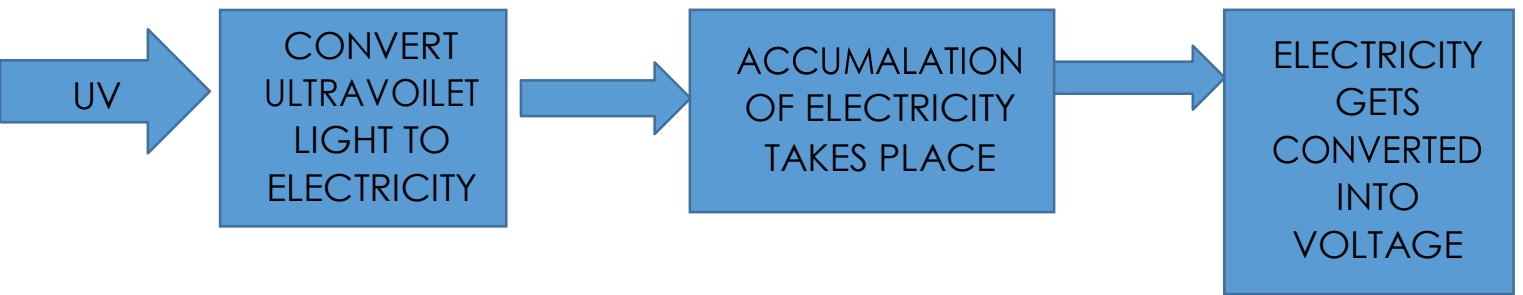
ASSUMPTIONS:

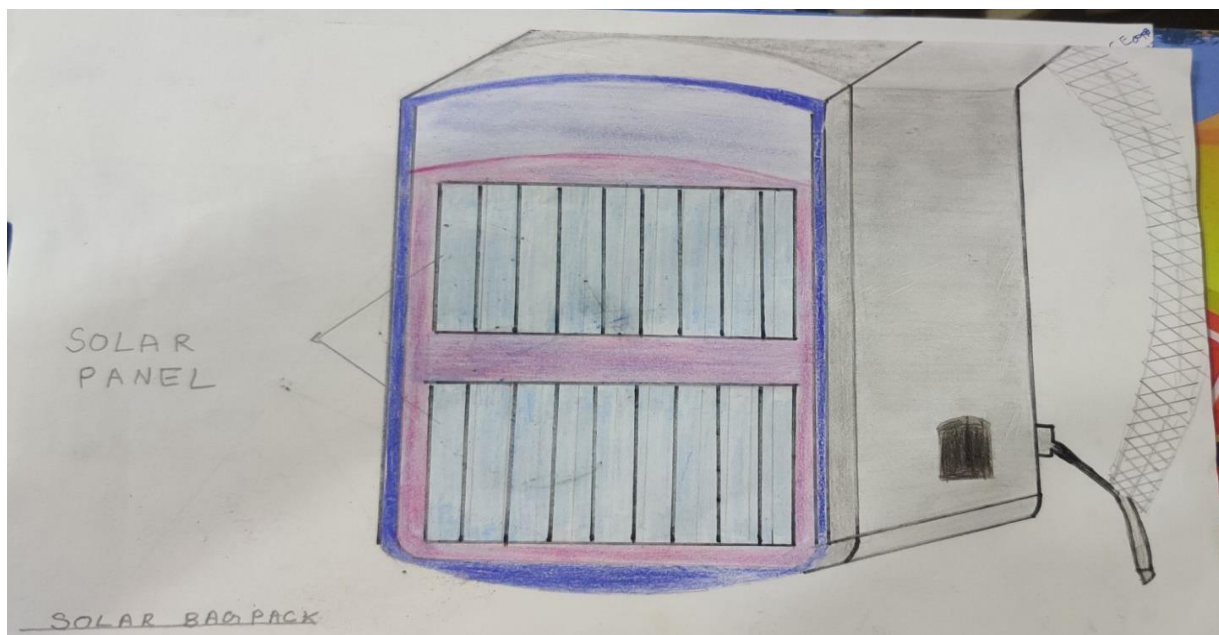
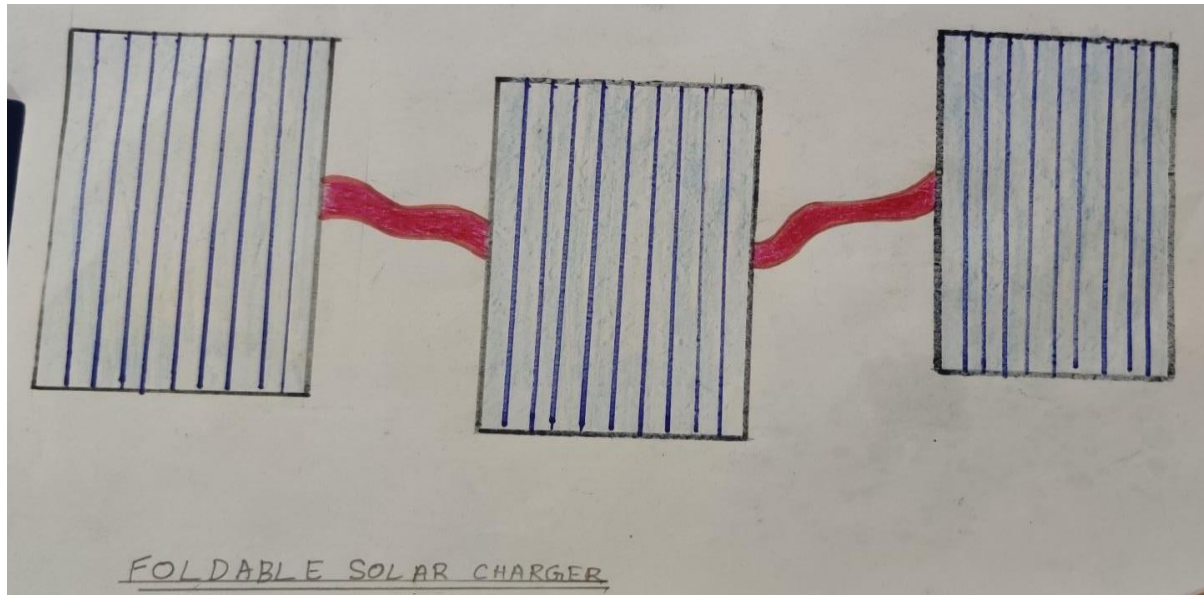
1. CONVERT UV LIGHT TO ELECTRICITY
2. PORTABLE
3. NO WASTAGE

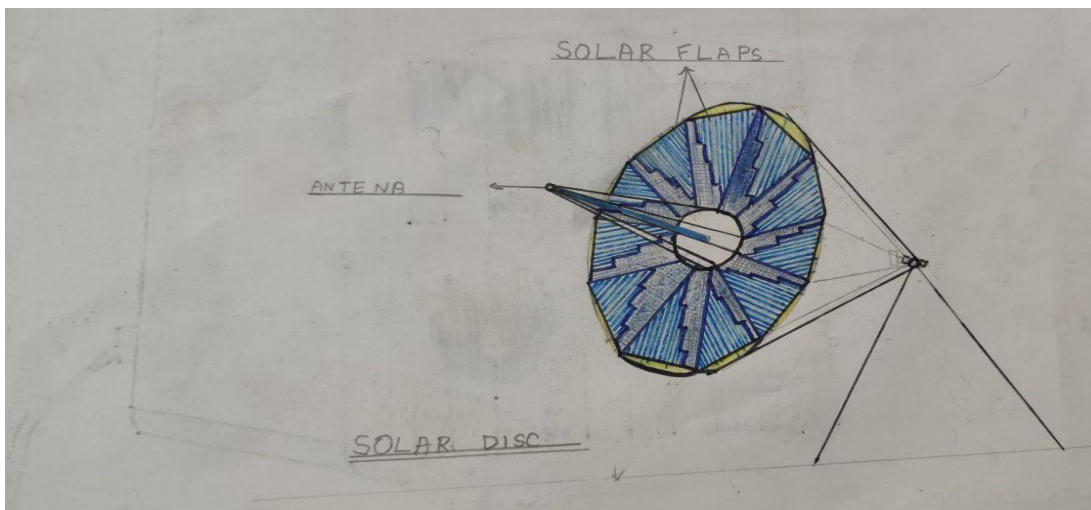
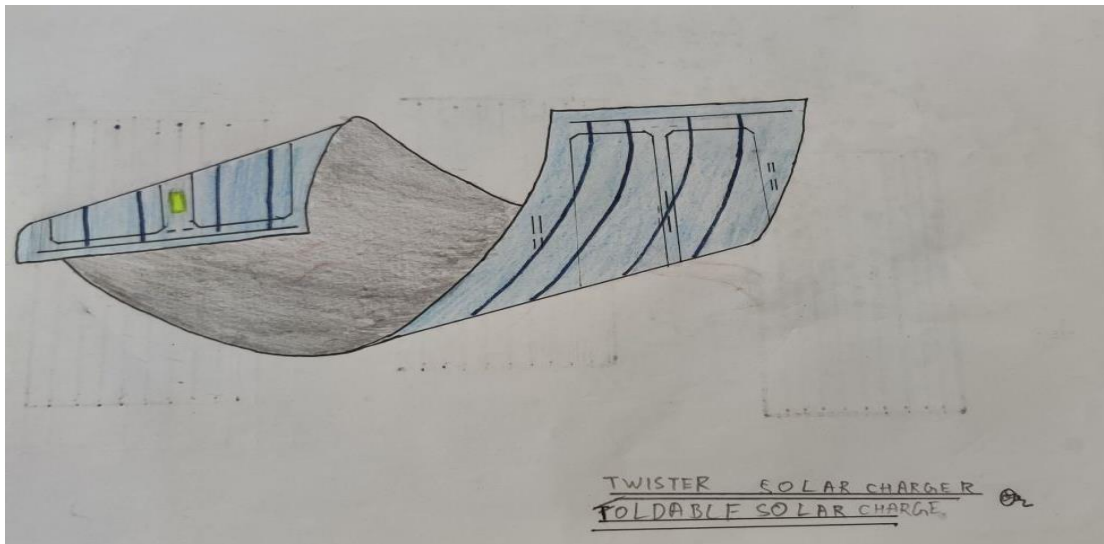
SPECIFICATIONS:

1. TOOL WEIGHT=300-400GM
2. CONVERTING UPTO=5000MAh









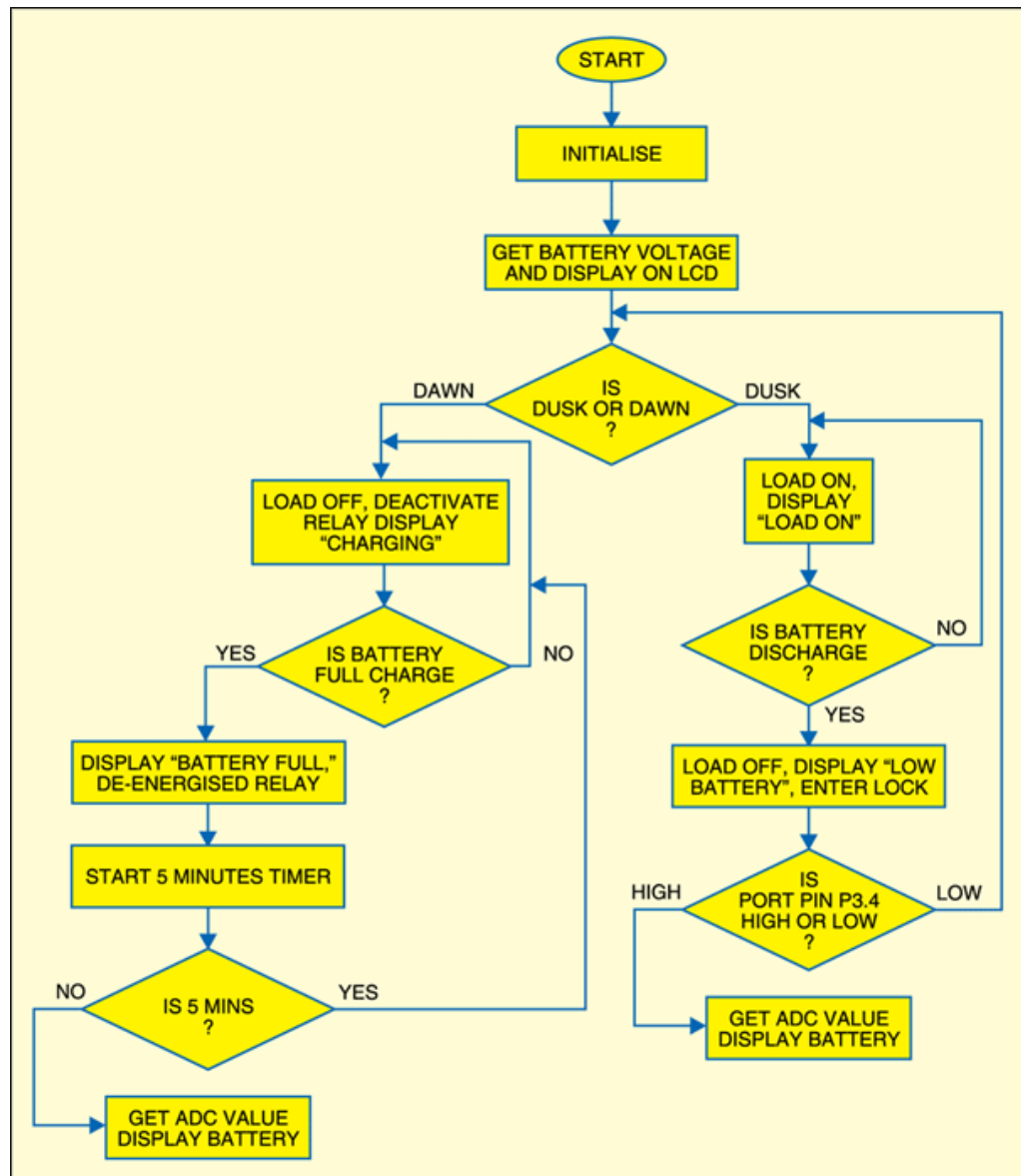
	COMPOSITES	THIN FLIMS	NESTING	ADDITIONAL DIMENSION	USE AND RETRIVE
DIMENSION			Nesting helps improving dimensioning		
STRENGHT	Strength increases by use of mixture of composites				
SHAPE			Shapes can be changed /nested according to the user		
EASE TO USE	Mixture of composites make it ease to use			Layers and user friendly interface makes it ease to use.	
MATERIAL USED		Use of graphite for conduction is used			Material used in the product can be retrived and reused

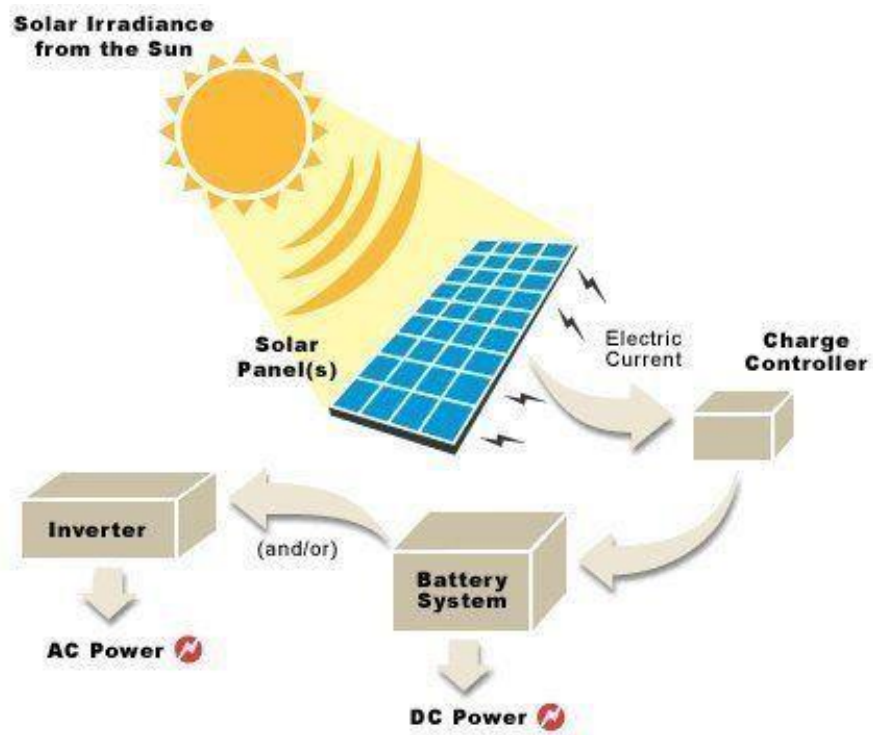
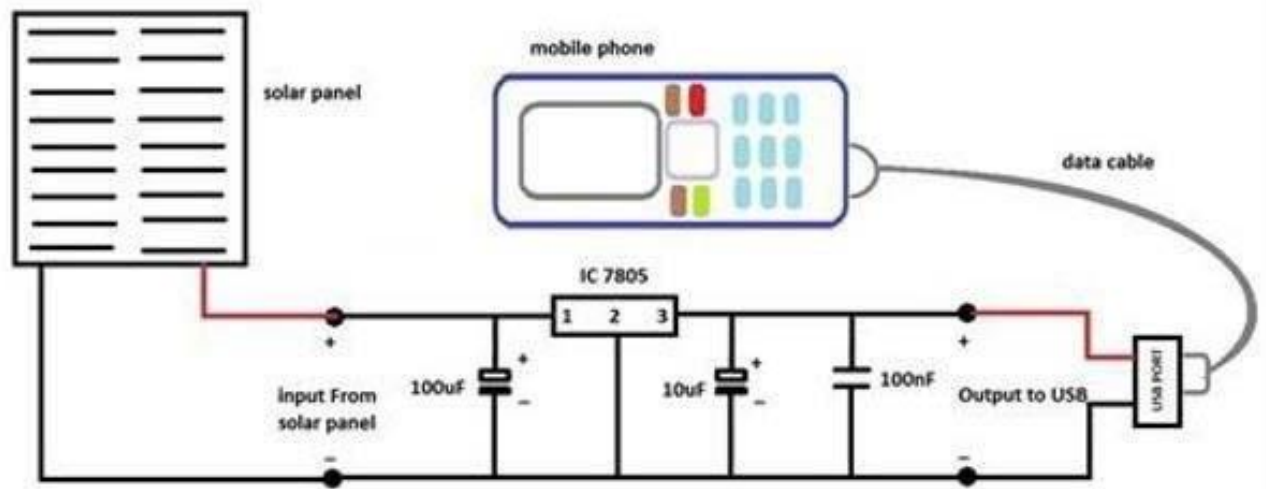
	A	B	C	D	REFERENCE
EASE TO USE	+	+	+	-	0
EASE TO HANDLE	0	+	0	0	0
LOAD HANDLELING	+	+	+	+	0
EASE TO MANUFACTURE	-	-	-	+	0
ACCURACY	-	+	+	-	0
PROBABILITY	+	+	--	+	0
PLUSES	3	5	3	3	
MINUS	2	1	2	2	
TOTAL	1	4	1	1	
RANK	2	1	2	2	
CONTINUE	NO	YES	NO	NO	

		A		B		C		D	
	WEIGHT	RATING	WEIGHT SCORE	RATING	WEIGHT SCORE	RATING	WEIGHT SCORE	RATING	WEIGHT SCORE
EASE TO HANDELING	5%	3	0.15	3	0.15	4	0.2	4	0.2
EASE TO MANUFACTURE	20%	3	0.6	3	0.6	2	0.5	2	0.4
EASE TO USE	15%	3	0.45	4	0.6	4	0.6	3	0.45
DURABILITY	15%	2	0.3	5	0.75	4	0.6	3	0.45
PROBABILITY	10%	3	0.3	3	0.3	3	0.3	3	0.3
ACCURACY	25%	3	0.75	3	0.75	2	0.4	3	0.75
POWER GENERATION	10%	2	0.2	3	0.3	5	0.5	5	0.5
	TOTAL		2.75		3.45		3.1		3.05
	RANK		4		1		2		3
	CONTINUE		NO		DEVELOP		NO		NO

CONCEPT OF PRODUCT

The main aim of this product is to be able to come up with an invention that comes in handy and is portable so that no electrical device battery ever dies.





MODIFICATIONS MADE IN THE DESIGN

Advances in the design are made to avoid human error, while manufacturing and while operating the product, to make it a user friendly device it uses smart boards and sensors which help it to provide an interface which helps the user to view the amount of charge on the SOLARZ and find out the devices connecting the solarz to transfer the required amount of charge needed and nothing more.

MORDERN SOLAR CHARGER



CONCLUSION

The knowledge and experienced that I and my teammate has gained from this project work is that earlier we never knew the process which is involved in making a product. Now, we are much aware that how a product is made and what are the steps involved in it, at first there is designing of product, then there is the development of its prototype, then there is a review on product's prototype both within the team/company and then followed by a few people/critic who would give suggestion to improve on design to make it more user-friendly. We chose this project on solar charger as we know that solar energy is found in abundant and is going to be the bright light in future. After completion of UG programmed if he/she becomes a design engineer, he/she would very well know the importance of designing and how to best design it for getting better result. They would also know and follow all the necessary steps required to make the design of the product the best/one of a kind.