AUTONOMOUS SOLAR PANEL CLEANING ROBOT

By Team Solar Fam

ORGANIZATIONAL CHART

LEAD DESIGNER / FINANCE MANAGER
SAMUEL TEE

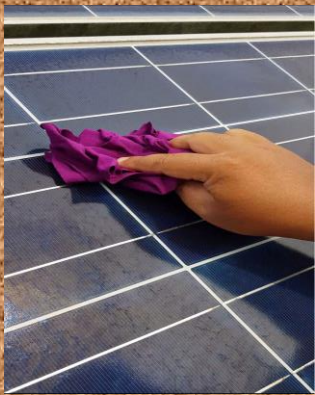**ASSISTANT LEADER / TASK MANAGER**
HAFIS MURTY

LEADER / HEAD PROGRAMMER
ARIELLE WONG

TECHNICIAN / RESOURCE MANAGER
EUGENE GOW

ASSISTANT DESIGNER FOREMAN
ZHARIF NICHOL

1. PROBLEM STATEMENT

Design and build an automated robotic cleaning system that is cost efficient and satisfies the needs for maintenance for a large scale solar farm (Fortune 11).

Expectations & Requirements
- Autonomous
- Effective and efficient
- Lightweight and easy-to-use
- Low cost and maintenance
- Adaptable to shifting arrangements of solar panels
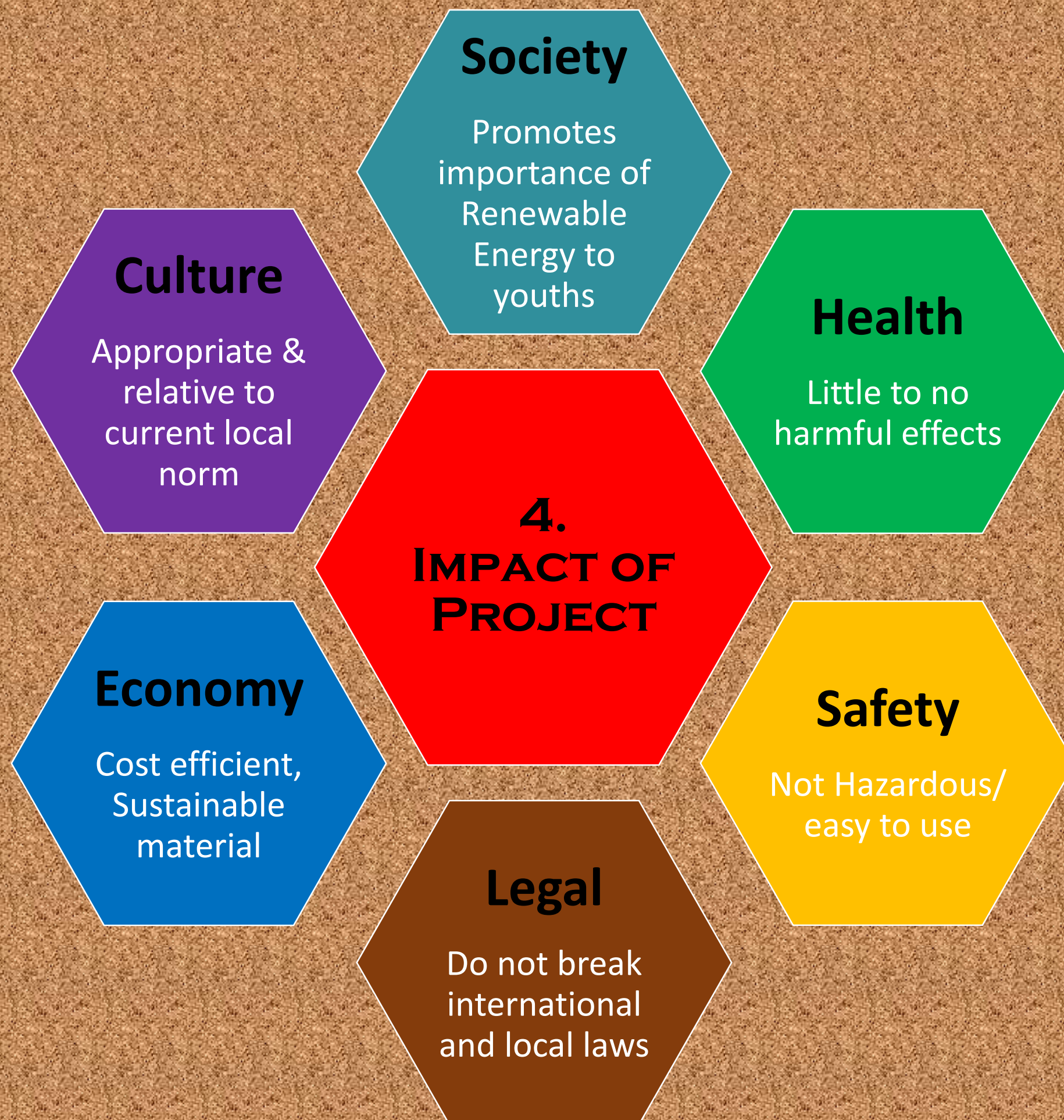- Flexibility in cleaning various types of contaminants
- Has its own dirt tracking system

2. EVOLUTION OF OUR DESIGN
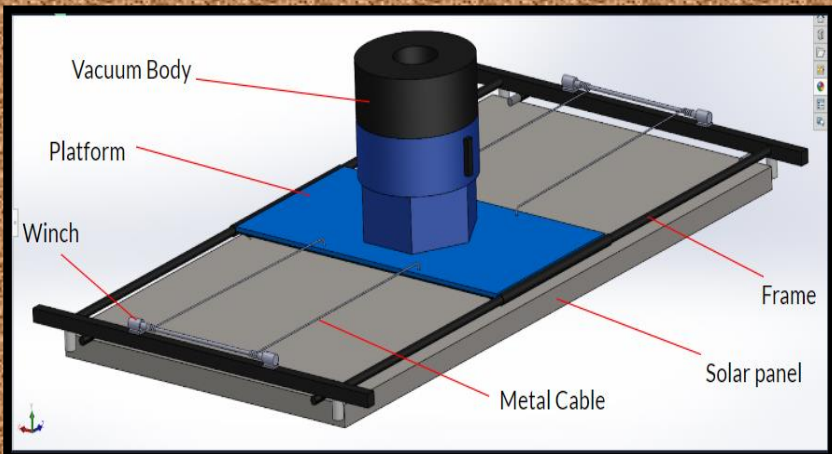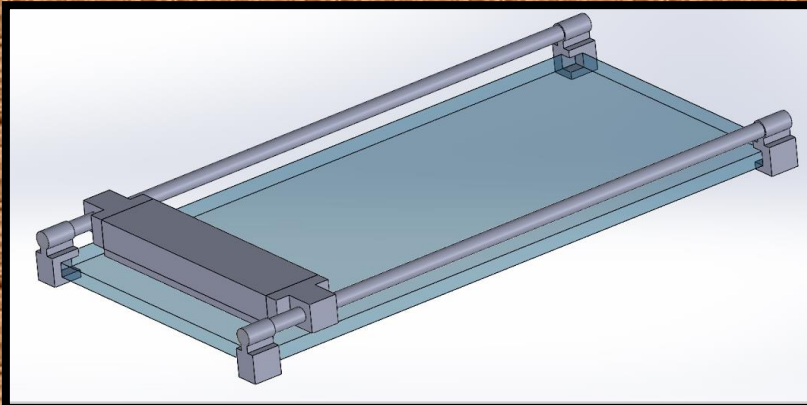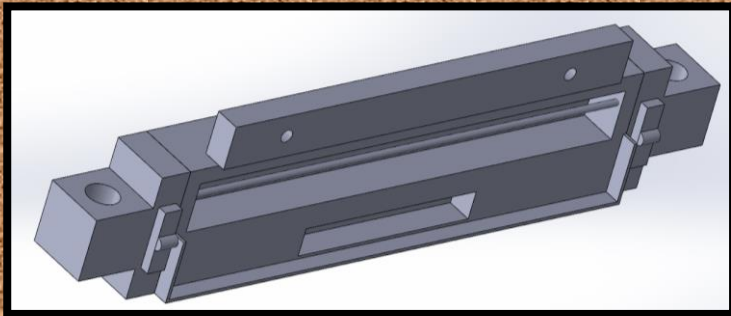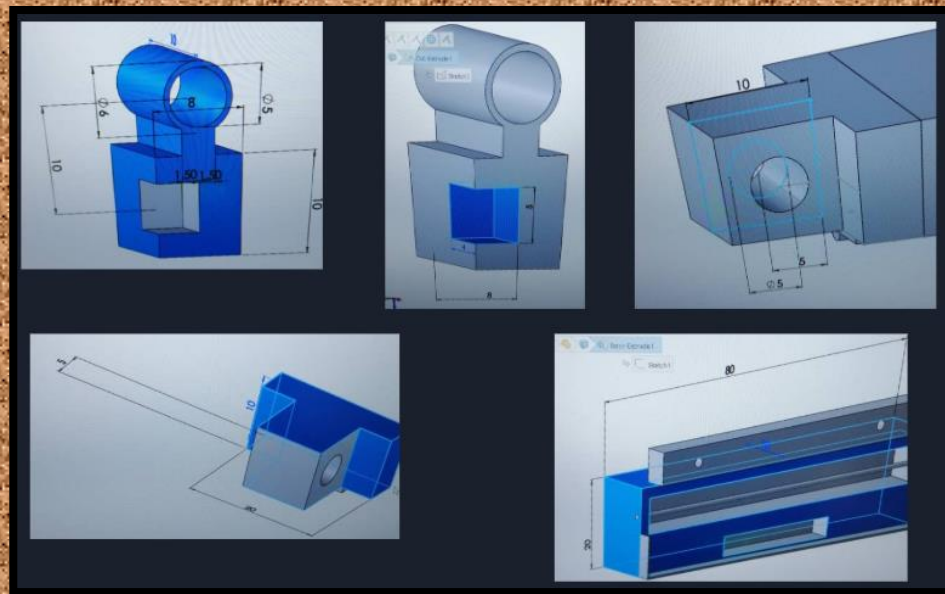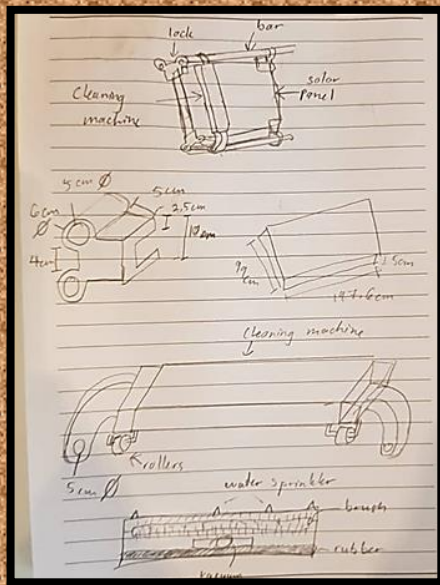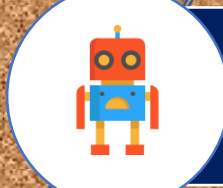
Vacuum Body
Platform
Winch
Frame
Solar panel
Metal Cable

3. BUDGET

No.	Material	Description	Vendor	Unit Price (RM)	Quantity	Total (RM)
		Bill of Material				
1	Aluminium Frame (8m total)	0.13 m x 0.13m x 0.3 m RM 10 per 0.3m = RM 270	Lelong	Rm10/0.3m	8m	RM270
2	Stainless steel body	0.5 m x 0.3m x 0.0005 m = RM 136.55 x 2 = RM 273.10	Online shop	Rm26.20/rod	2m	RM52.40
3	Electrical Cable (5m)	Old project or shopping	Taylors lab/ shopee	Rm 2 per 15cm x 10pc	40	Rm 8.00
4	12V DC motor (x2)	Pudu shop = RM 23	Vendor	RM23/pc	2	RM46
5	Roller Brush	RM 3.34 per pc	Alibaba	RM3.34 per pc	1	RM3.34
6	Vacuum	Karcher Malaysia	Karcher	RM 600 per pc	1	RM600.00
7	Sprinkler system (x2)	Low Pressure	Lelong	RM15 per set	2	RM30
8	Castor wheel (x2)	4.6 cm diameter RM 16 per 4pc= RM 8	Lelong	RM4 per pc	2	RM8
9	Rubber Lip	Wiper	Karcher Malaysia	RM 20 per pc	2	RM40
10	Arduino	Motherboard	Cytron	RM96 per pc	1	RM96
11	Battery	12V Lipo	Cytron	RM12.50 per pc	1	RM12.50
12	Lock	Online shop	Lelong	RM 4 per pc	4	RM16.00
	Grand Total (RM)					RM1,182.24

No.	Material	Description	Vendor	Unit Price (RM)	Quantity	Total (RM)	Project Total (RM)
		Bill of Material					
1	Wiper Washer	Water Sprinkler	Meter Trading	28	1	28	28
2	Carboy Wiper 12"	Rubber Lip	Meter Trading	13	1	13	41
3	Mega Ch340G	Arduino Mega	QQ Trading	60	1	60	101
4	Optical Dust Sensor	Dust Sensor	QQ Trading	50	1	50	151
5	Arduino Motor Shield	Motor Shield	QQ Trading	15	1	15	166
6	Bluetooth Module HC-05	Bluetooth Module	QQ Trading	25	1	25	191
7	Jumper M-F 12cm	10 pc Jumper M-F 12cm	QQ Trading	1.8	1	1.8	192.8
8	Jumper M-M 12cm	10 pc Jumper M-M 12cm	QQ Trading	1.8	1	1.8	194.6
9	Jumper M-F 20cm	10 pc Jumper M-F 20cm	QQ Trading	2	1	2	196.6
10	Jumper M-M 20cm	10 pc Jumper M-M 20cm	QQ Trading	2	1	2	198.6
11	Lipo Battery	Lipo 11.1V 8C 2200 MAh	QQ Trading	62	1	62	260.6
12	Metal Shaft	Metal Shaft (8mm x 400mm)	QQ Trading	14	2	28	288.6
13	Disc Screw Coupling	Shaft Connector (6mm for 8mm Shaft)	QQ Trading	10	4	40	328.6
14	DC Gear motor	Gear Motor (12V 500RPM 37mm)	QQ Trading	43	4	172	500.6
15	Ultrasonic sensor HC SR04	Ultrasonic sensor HC SR04 DC 5V	QQ Trading	6	2	12	512.6
16	Breadboard 400	400 pin Breadboard 8.3*5.5cm	QQ Trading	6	1	6	518.6
17	Pensonic Vacuum	WetDry Vacuum 1200W	HLK Chain Store	226	1	226	744.6
18	Shellac	Shellac	Dian Be Hardware	8.9	1	8.9	753.5
19	Metal wire	Wire Rope (4 m)	Dian Be Hardware	4	1	4	757.5
20	Metal frame	Robot metal frame	Rajini metal works	800	1	800	1557.5
	Grand Total (RM)						1557.5

Society

Promotes importance of Renewable Energy to youths

Culture

Appropriate & relative to current local norm

4. Impact of Project

Health

Little to no harmful effects

Economy

Cost efficient, Sustainable material

Safety

Not Hazardous/ easy to use

Legal

Do not break international and local laws

5. Future recommendations for improvements

- Automated horizontal and vertical movement on frame
- Renewable energy powered vacuum and recycled water source
- Wireless control of components and dust monitoring feature
- Weather resistant materials
- Lighter / compact design and material (Minimalistic, Functional)
- Automated moving sensors (Dust, Ultrasonic)