UBA

SAFE PATH NETWORK

DOCUMENTATION FOR THE FOLLOWING :

- Power Source
- Weather
- 3D printing Filament

Power Source :

Power Consumption of each component :

Component	Power Consumption (W)
Raspberry Pi 4 Model B	3.4
OV5647 5MP 1080p Camera Module	0.2
PIR Sensor Module HC-SR501	0.065
Night Vision 3W Infrared Light	3.0
SIM800L V2 5V Wireless GSM GPRS Module	2.0
Aluminum Heat Sink with Cooler Fans	0.2

Total Power Calculation :

$P_{total} = 3.4 + 0.2 + 0.065 + 3.0 + 2.0 + 0.2$

P_{total} = 8.865 W

Assuming Power supply voltage as 12V

Total Current Drawn :

$I = P_{total} / V_{power}$

$I = 8.865\ W / 12\ V$

$I \approx 0.739$ A

Considering a Renewable Energy Source :

Daily Energy Consumption :

Energy = Power x Time

Energy = 8.865 W x 24 hrs

Energy = 212.76 Wh/day

This Renewable Energy Source has the following components based on proper power calculation,

- Solar Panel
- Battery Bank
- Charge Controller

Solar Panel :

Total Energy Required = 212.76 Wh/day

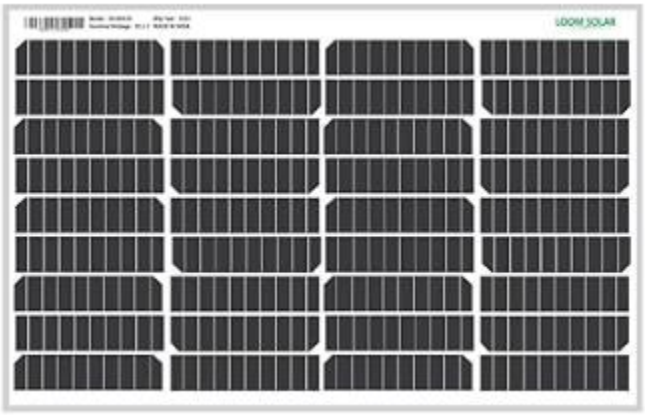
Solar Panel Power = Total Energy Required **/** Peak Sunlight Hrs

(Considering the Peak Sunlight Hrs = 5, based on weather study on specific area)

Solar Panel power = 212.76 **/** 5

Solar Panel Power ≈ 42.55 W

Based on the Solar Panel Power choosing a 50W solar panel.



(Loom Solar Panel 55W-12V for Home Lighting System, Small Battery (20Ah) Charging, Science & DIY Projects | Mono PERC 36 Cells Half Cut Design | Max. Current - 2.62 amps & Max. Voltage - 21 volts)

Price ≈ Rs 2750/-

Battery Bank :

Battery Capacity = Energy Consumption **/** Battery Voltage

Battery Capacity = 212.76 Wh **/** 12 V

Battery Capacity ≈ 17.73 Ah or 17,733 mAh

Safety margin = 30%

= 17.73 x 1.3

Battery Capacity ≈ 23.05 Ah or 23000 mAh

Based on Battery Capacity choosing 12V-25Ah Lead Acid Battery.

(Amptek AT 12V 25Ah SLA battery AGM Solar Battery)

Price ≈ Rs 3000/-

Charge Controller :

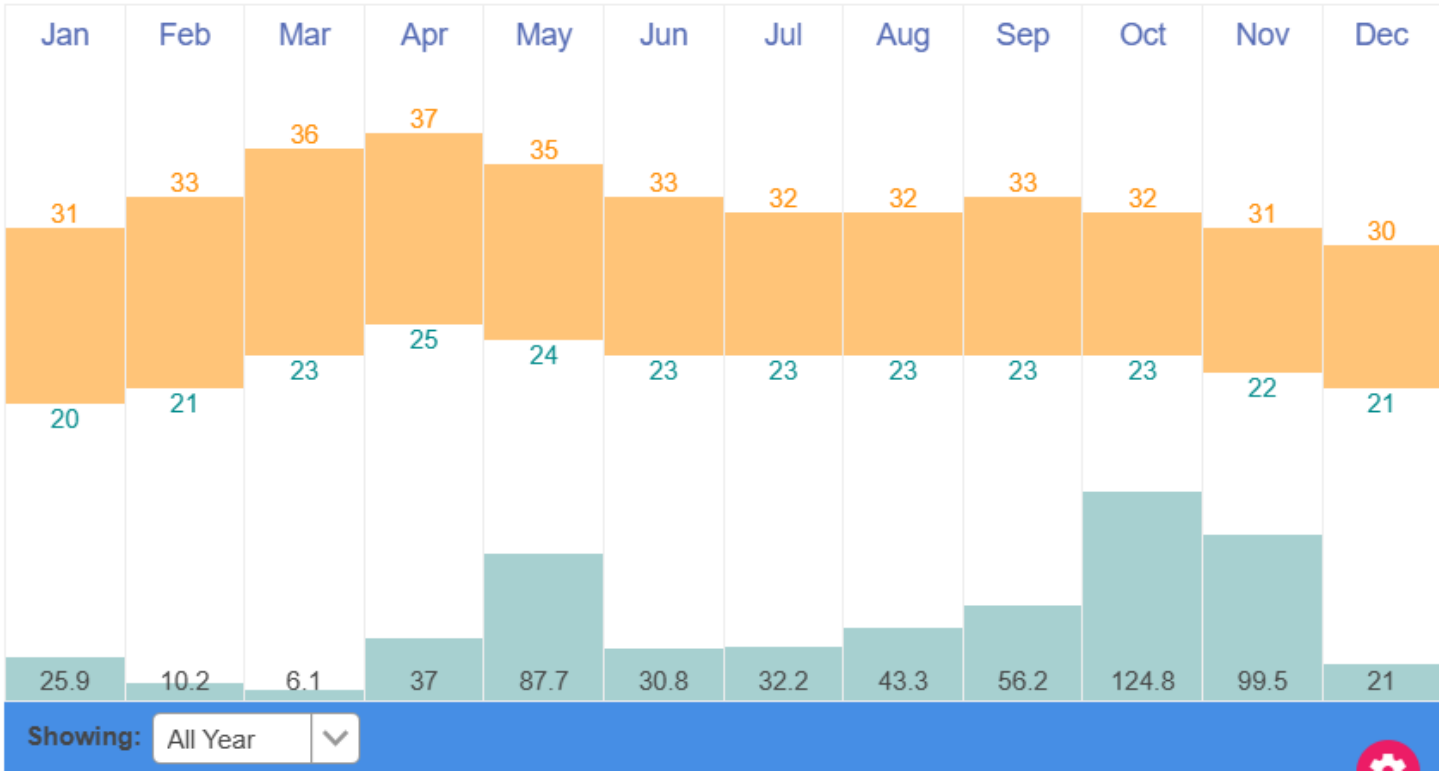
A charge controller ensures that the battery is charged properly and prevents overcharging. For a 50W solar panel and 12V battery, a PWM or MPPT charge controller rated for at least 5A would be suitable.

(amiciSmart Solar Charge Controller 10A, 12V/24V Intelligent Battery Regulator for Lead Acid & Lithium Battery with 3A USB Port and 1 Year Warranty)

Price ≈ Rs 900/-

Other way around, as it is a stationery product that has to be placed in a fixed place, we can consider direct power supply for better product design and ease.

Weather :



Weather conditions in the area of **Iruttupallam** and nearby places over the past year 2023.

High Temp: 37 °C	Precipitation: 47.9 mm	Wind: 21 km/h
Low Temp: 20 °C	Humidity: 66%	Pressure: 1010 mbar
Mean Temp: 28 °C	Dew Point: 20 °C	Visibility: 5 km

The Average temperature over the area was about **28°C** with Precipitation of **36%** and Humidity of **66%.**

3D Printing Filament :

ASA (Acrylonitrile styrene acrylate)

- **Weather and UV Resistant**: Ideal for outdoor use due to its resistance to sunlight and weather conditions.
- **Durable and Impact Resistant**: Offers excellent durability and can withstand significant physical stress.
- **Chemical and Heat Resistant**: Resists chemicals and higher temperatures, suitable for demanding environments.

Price ≈ Rs 2800/- per kg

CR High Performance ASA Filament 1.75mm, 1kg Spool (2.2lbs) 3D Printer Filament, High Temperature Resistance, Perfect for Printing Outdoor Functional Parts, Dimensional Accuracy +/- 0.03mm (Black)

ABS (Acrylonitrile Butadiene Styrene)

- **Strength and Durability**: ABS filament is known for its strength and durability, making it suitable for functional prototypes and end-use parts.
- **Heat Resistance**: It can withstand higher temperatures compared to PLA, making it suitable for applications where heat resistance is necessary.
- **Versatility**: ABS is widely used in 3D printing due to its versatility in applications ranging from automotive parts to household items.

Price ≈ Rs 1250/- per kg

Creality Premium 1.75 mm ABS 3D Printing Filament (White)