

**GRASS CUTTING MACHINE USING SOLAR PANELS**

Tejas Sudam Dalavi

Sagar Ramchandra Bhakare

Ganaraj Tanaji Palave

Jay Bhaurao Sirsat

**Guided By**

Prof.G.D. Shelake

JSPM's Rajarshi Shahu Collage of Engineering, Tathwade Pune 411033

**ABSTRACT**

The sun has always provided the majority of the energy needed for life on earth. Direct uses of solar energy included drying clothes, curing agricultural produce, preserving food, and other tasks. Even today, the fuel that powers our homes—wood, petrol, paraffin, hydroelectricity, and even our food—gets its energy indirectly from the sun. Solar energy is practically limitless. Our needs for energy are significantly outweighed by the total energy we receive from the sun. Humans have been dependent on fuels, electricity, and wind energy since the industrial revolution. In many nations, research and testing into solar and wind energy are ongoing for human growth, thus we created our novel idea for a solar-powered lawn mower. Grass cutting machines are advancing today.

**Keywords:**

Solar energy, mowing the lawn, energy use, and pollution.

**INTRODUCTION**

Moving the mower with a regular electric mower is a hassle and no one enjoys it. Mowing is not easy for seniors and young people. Lawn mowers moving with the engine cause noise pollution due to engine noise and localized air pollution due to combustion within the engine. Also, in the case of engine drive, periodic maintenance such as changing the engine oil is required. Electric solar lawns are environmentally friendly, but they can also be uncomfortable. In addition to electric lawn mowers, electric lawn mowers are also dangerous and not everyone can use them without problems. Even if your electric mower has a cord, mowing can be problematic and dangerous. The prototype is also charged from a solar panel.

**METHODOLOGY**

How a solar powered lawn mower works is that the panels are placed in a specific arrangement at a 25 degree angle to easily catch the high intensity radiation from the sun. As we have studied before, these solar panels convert solar energy into electrical energy. This electrical energy is stored in batteries via electrical cables. The motor is connected to the battery via a connecting cable. A mechanical circuit breaker terminal is provided between these two mechanical circuit breaker terminals. Start and stop the engine. Power is transmitted from this motor to the rotating blade mechanism, and the blade rotates at 2000 rpm to mow the grass. The solar powered grass trimmer is equipped with 4 swivel casters for easy movement around the lawn. The motor and blade assembly is mounted on a jig that can be moved vertically up and down to cut grass height as needed. The whole thing is so light that anyone can easily move it.

**LITERATURE SURVEY**

1] A self-efficient and sustainable solar-powered robotic lawnmower. (December 2015) Srishti Jain, Amal Karol, Shashkant Patil

This article presents a breakthrough solar-powered robotic lawn mower, an autonomous lawn mower that allows users to mow grass with minimal effort.

Here in the project he used a 12V 310mA solar panel. The solar panel has his 24 solar cells, each supplying his 0.5V.

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2] Automatic Solar Mower (February 2017) Rutuja A. Yadav, Nayana V. Chavan, Monika B. Professor Patil, V.A. Mane

The system includes automated tasks for guidance and other obstacle detection. A power supply consisting of a battery and a solar panel is mounted on top of the robot to alleviate power issues.

The system switches to automatic mode and the robot's infrared sensor compares mown grass to uncut grass.

If no obstacle is detected, the microcontroller drives the vehicle's motors forward. When the sensor detects an obstacle, the microcontroller stops the mower motor to prevent damage to objects/people/animals.

3] Design and Implementation of an Automated Solar Grass Cutter (April 2017) Bidgar Pravin Dilip, Nikhil Bapu Pagar, Vickey S. Ugale, Sandip Wani, Prof. Sharmila M.

In this article, we will analyze the operation and principle of operation of automatic lawn mowers. Another goal is that the automatic lawnmower must continuously monitor its surroundings to distinguish between grass and concrete. They wanted an ultrasonic sensor that would detect if the mower was heading towards an object.

The design includes a microcontroller, multiple sensors and a solar charging system. Combining these elements completes the robotic lawnmower.

4] Mowing with solar power (January-June 2017) Bhagyashri R. Mr. Patil, Mr. Sagar S. Patil

Use this concept to mow grass on farmlands, lawns and small plants in gardens. Solar powered agricultural equipment designs include direct current (DC) motors, rechargeable batteries, solar panels, stainless steel blades, and control switches. The purpose of the project is to design and build a remote-controlled mower. The device consists of straight wings and is not affected by climatic conditions.

### OBJECTIVE

- Building eco-friendly, non-polluting, economical and efficient.
- To prepare without external power, the machine performs its own actions.
- The battery is automatically charged using solar energy (renewable energy).
- Developing an automatic lawn mower that works with solar energy, avoiding the shortcomings of older lawn mowers.
- To avoid India's energy crisis. Reduce manpower, operating and maintenance costs.
- Keep the environment clean and healthy.

### CONSTRUCTIONS

The main components of a solar powered lawn mower are:

- Frame
- Solar panel
- Battery
- DC motor
- Castor wheel
- Blades
- Paint

#### 1. Frame

Base frame A hollow square tube made of mild steel is used for the frame. The tube is cut to the desired size using a cutting machine. The ends of the tube he cuts at a 45 degree angle to form a rectangular frame. After cutting, the ends of the square tubes are ground smooth and ready for welding. Weld square tubes together to form a rectangular base frame.



## 2. Solar Panels

There is a limit to how much power a single solar panel can generate. Most installations contain multiple modules. A photovoltaic system typically includes a panel or array of solar modules, a solar inverter, possibly a battery or solar tracker, and connecting cables. The amount of electricity produced by the solar panel is less than the amount needed to run the motor, so a timer is used to control this. This circuit limits the operating time of the system, resulting in longer battery charge times for all-day operation.



## 3. Batteries

Accumulators or secondary batteries are batteries that store electrical energy as chemical energy and can convert this chemical energy into electrical energy when needed. The application of an external power source to convert electrical energy into chemical energy is called charging the battery. The process of converting chemical energy into electrical energy to supply power to an external load is called discharging a secondary battery. When you charge a battery, current flows through it and chemical changes occur inside the battery. These chemical changes absorb energy as they occur. When the battery is connected to an external load, the chemical reaction reverses and the absorbed energy is released as electrical energy and supplied to the load.

## 4. DC motor

To achieve a high speed of 2000rpm and high torque, our project uses a DC motor from a car engine.



## 5. Caster wheel

To move the 50 mm-diameter body, we employed the caster wheel. Moving heavy objects requires the use of caster wheels. Body movement is made simple by the caster. A caster (also known as a castor) is a wheel that is not powered and is intended to be attached to the bottom of a bigger object (the "vehicle") to allow for movement of that object.

There may be a brake feature on common, inexpensive casters, which stops the wheel from turning. A lever is frequently used to accomplish this, pressing a brake cam on the wheel. However, a swivel caster can still move slightly by turning in a small circle at an offset distance from the wheel.



An extra rotational lock on the vertical shaft of a more complicated type of swivel caster, commonly referred to as a total lock caster, prevents either wheel rotation or shaft swivelling, offering exceptionally solid support. Both of these locks can be used simultaneously or independently. The caster becomes a directional caster, but one that may be locked to roll in one direction along any horizontal axis, if the vertical shaft is secured but the wheel can still turn.

It can be helpful in some situations to be able to lock or brake all of the casters at once, rather than having to circle around and manually engage a mechanism on each one. It is possible to achieve this by utilising a central lock mechanism that is activated by a stiff ring that surrounds each swivel caster and is placed just above the wheel. This ring lowers and presses down on the wheel, stopping both wheel and swivel motion. A different approach is to use a central lock caster, which includes a rotating cam in the middle of each vertical caster shaft that descends to a braking mechanism at the base of each caster.

## 6. Blades

An edged part of a tool, weapon, or machine that is intended to cut, stab, slash, chop, slice, shove, or scrape surfaces or materials is referred to as a blade. A flaking stone, like flint, metal (often steel), ceramic, or other substance can be used to create a blade. Hacksaw blades in this instance are made of 20mm wide by 300mm long high speed steel.

## 7. paint

Spray paint, also known as aerosol paint, is paint that is stored in a pressurized container and releases a mixture of paint and propellant (usually pressurized gas or compressed air) through a valve. The result is a fine, even mist that can be easily applied to a variety of surfaces. Spray painting is one of the three main methods of applying paint, along with brushes and rollers, and is generally easier to achieve faster, cleaner, and more even painting.

### ADVANTAGES

- Does not cause environmental pollution.
- As it uses solar power, there are no gasoline costs.
- A longer solar panel's lifespan.
- Less maintenance is necessary because there is no friction between the pieces.
- Because the battery serves as a backup, it can be utilised at night.
- High performance.
- We can cut down on energy waste.
- Very user-friendly.
- Lightweight and portable in any location.
- Easy to put together and take apart.
- Its small design.

### LIMITATIONS

- Manual operation
- Long time necessary to remove grass
- Difficult to use during rainy seasons

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### APPLICATIONS

- The football pitch
- The cricket ground
- Every garden
- Each Every Playground
- It can be applied in a home garden.
- Can also be used in public parks.
- It is applicable to college.
- It can be applied to party schemes.

### CONCLUSION

Our project titled "Manufacturing a Solar Powered Lawnmower" was successfully completed with satisfactory results. It makes it easier for the person taking over the project to make more changes. This project is more suitable for the general public as it offers more benefits. H. No fuel costs, no pollution or fuel residue, less wear due to fewer moving parts, and can be powered by solar energy. This allows people to do more physical exercise and is easier to handle. Due to its proximity to the equator, solar energy (unconventional energy) is readily available, making battery charging easy and environmentally friendly. However, solar lawn mowers have a high initial investment. To curb global warming and ozone depletion, the Indian government is now offering subsidies for solar power systems. The industry is mass-producing these components, potentially reducing the cost of the system. Therefore, it is expected that in the future all devices will be powered by solar energy. This system provides the ability to recharge the battery while the solar powered lawnmower is in operation. Therefore, it is also very suitable for mowing. These batteries can potentially be recharged during the day, so they can operate at night as well.

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### GUIDE

Prof. G.D. Shelake lecturer at JSPM's Rajarshi Shahu Collage Of Engineering,  
Tathawade Pune

#### AUTHOR

Tejas S. Dalavi Pursuing Graduation in BTech in Mech Engineering From JSPM's Rajarshi Shahu Collage Of Engineering Pune.

Sagar R. Bhakare Pursuing Graduation in BTech in Mech Engineering From JSPM's Rajarshi Shahu Collage Of Engineering Pune.

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