

Revolutionising Plastic Recycling with a Solar-Powered Systems

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Abstract

Plastic bags are transporting to many areas by the help of air and contaminate the sea water and river water this leads to distract water livings. On landfill sites where they take around 300 years to photo degrade. They break down into tiny toxic particles that contaminate the soil and waterways and enter the food chain when animals accidentally ingest them. Affect lands and soils. Plastic leaves micro plastics on the earth and affect plants growth and health and also small insects. On January 1, 2019, Central government banned single-use plastics. It was not the first State to do so but it was considered a brave decision by a government that had a question mark over its survival at that point. Even though the plastics are banned, we should take a look at the existing plastic materials which are used and left out. It takes many years for them to decompose. In addition, toxic substances are released into the soil. These are the main cause of serious illness. The polluted environment is a major reason for various diseases which are spreading easily in human beings. These wastages left out as it is are the main reason for trapping the drains and sewers, especially during rains. This can result in a flood-like situation and disrupt the normal life of people. The plastic wastages entering into the water bodies are a major cause of water pollution. Hence, we can conclude that these are deteriorating our environment in every possible way.

Key words

Plastic Recycling ,Solar-Powered System ,Green Technology ,Sustainable Solutions ,Renewable Energy ,Waste Management ,Environmental Impact ,Innovative Design ,Eco-Friendly Practices

1. Introduction

Plastic recycling is the reprocessing of plastic waste into new products. When performed correctly, this can reduce dependence on landfill, conserve resources and protect the environment from plastic pollution and greenhouse gas emissions. Recycling is necessary because almost all plastic is non-[biodegradable](#) and thus builds-up in the environment, where it can cause harm. For example, approximately 8 million tons of waste plastic enter the Earth's oceans every year, causing damage to the aquatic ecosystem and forming large [ocean garbage patches](#). When performed correctly, this can reduce dependence on [landfill](#), conserve resources and protect the environment

from [plastic pollution](#) and [greenhouse gas](#) emissions. Although recycling rates are increasing, they lag behind those of other recoverable materials, such as [aluminium](#), [glass](#) and [paper](#).

1. Innovation

As a remedy, our Team caught up with an innovative idea and worked on this project. With this issue, our team made a plastic recycler which is an Eco-friendly invention and helps to get down the quantity of existing plastic around the places. The Step 1 of the invention is heating the plastic at 160°C and melting down. The whole process is done with the solar power as the ideal source of energy.



1. Materials Used:

From the molten plastic, methanol is able to be extracted and used as a byproduct of solid content. Those materials are taken in consideration to recycling and are installed as shock absorbers in the field of construction and heavy machineries. The solar operated plastic Recycler is monitored by using an IOT sensors which is given below, **INTERFACING ULTRASONIC SENSOR** There is provided an ultrasonic diagnostic system where the ultrasonic probe is detachably connected thereto, and ultrasonic waves gets transmitted from ultrasonic probe into the subject in order to obtain received signals from ultrasonic waves reflected within the subject, thereby displaying diagnosis of image carrying information based on the received signals. It is also

provided that ultrasonic module including a processing circuit for the received signals, being used in the ultrasonic diagnostic system. The ultrasonic diagnostic system has a higher level of computer support. The ultrasonic module is connected through the general-purpose which is interfaced to a computer system. Ultrasonic module has a main element, an analog unit for performing an analog signal processing and it is connected to another computer system.

ARDUINO SETUP

The major tool used in the IoT based smart garbage system is the Arduino. It is used to write and upload the programs to Arduino compatible boards. Arduino IDE is a cross-platform application which is written in functions from C and C++ languages. There are two processes performed one is fork of Arduino IDE and the other one is IDE with Board Manager. how the Arduino is connected along with the two ultrasonic sensors and the Wi-Fi module with the pin connections. Once the process to be performed is coded, it is uploaded to the arduino device and the sensed data from sensors are collected and transferred through the Wi-Fi channel.

SOLAR PANEL

Solar panel is implemented to power the batteries in the system. These Solar panels acts as a way to convert solar power into electrical power. It converts the energy instantly or heats the water with the amount of produced energy. Photo-voltaic cells are the ones made by using the semiconductor structures where the sun beam gets absorbed where electrons are emitted from the atoms to which it is bounded.

1. Collecting and Sorting

Recycling begins with the collection and sorting of waste. Curbside collection operates in many counties, with the collections being sent to a [materials recovery facility](#) or [MBT plant](#) where the plastic is separated, cleaned and sorted for sale.

Manual Separation: Sorting through waste by hand is the oldest and simplest method of separating plastic. In developing countries this may be done by [waste pickers](#), while in a recycling centre workers pick items off a conveyor-belt. It requires low levels of technology and investment, but can have high relative operating costs due to the need for a large workforce. Although many plastic items have identification codes workers rarely have time to look for them, so there are problems of inefficiency and inconsistency in the sorting process. Regardless, even advanced facilities retain manual pickers to troubleshoot and correct sorting errors by equipment. Globally, the process focuses on those materials which are most valuable, such as clear [PET bottles](#), with a significant amount of the waste continuing on to landfill. Working conditions can be unsanitary.

Sensor based Separation

This approach can be highly automated and involves various types of sensors linked to a computer, which analyses items and directs them into appropriate chutes or belts. [Near-infrared spectroscopy](#) can be used to distinguish between polymer types, although it can struggle with black or strongly coloured plastics, as well as composite materials like [plastic-coated paper](#) and [multilayered packaging](#), which can give misleading readings. [Optical sorting](#) such as [colour sorters](#) or [hyperspectral imaging](#) can then further organise the plastics by colour. Sensor based separation is more expensive to install but has the best recovery rates and produces more high-quality products.

1. Result

This device is not existing one, the methanol extracted from this process can be used as an admixture for biofuels and it create huge effect of the society. It greatly supports the Indian Economy to bring down the hiking price of the fuel nowadays. The final recycled material for absorption of heavy shock, will play an active role in the corporate market if made under the make in India concept. It will take the advancement of India towards saving the environment and allowing the Go Green concern World Wide.