

# Electricity Generation from Dry Waste Materials with Automatic Solar Tracking System

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## Abstract

This project aims to minimize dry waste generation and environmental pollution by converting waste into electricity through a controlled heating process. The collected dry waste is segregated to exclude materials such as glass and petroleum products that affect the heating efficiency. The generated heat is converted into electrical energy using heating sensors and panels, and the energy is stored in batteries for later use. An automatic solar tracking system is also integrated to capture solar energy during the day, while at night, electricity is produced by burning dry waste.

## Introduction

This project aims to reduce dry waste generation and pollution by converting waste into electricity through a controlled heating process. Collected dry waste is segregated to exclude materials such as glass and petroleum products that can hinder heating efficiency. The heat generated is converted into electrical energy using heating sensors and panels, and the stored power is used for various applications. During the day, an automatic solar tracking system captures solar energy and converts it into electricity, while at night, energy is produced by burning dry waste.

Globally, around 2.01 billion tonnes of municipal solid waste (MSW) are produced each year, with 3.3% not treated responsibly. The global average waste generation is 0.74 kg per person per day, and developed nations contribute 34% of this waste. In India, about 62 million tonnes of MSW are generated annually, with only 20% treated and 50% disposed of in landfills. This study promotes sustainable waste management by transforming dry waste—such as paper, cardboard, plastics, and textiles—into a renewable energy source. The goal is to reduce landfill dependency, lower pollution levels, and support a circular economy by utilizing waste as a valuable resource for power generation.

## Literature survey

1)Municipal dry waste was gasified using plasma in 2019 at N.U. for waste-to-value processing. Energy Rev. 2019, 116, 109461; Renew. Sustain. The more popular conventional gasification process turns garbage into synthetic gas, or syngas, which is then burned to provide thermal energy or, after purification, electrical energy. Temperatures range from 1000 to 2000 °C, depending on the gasifying agent. Plasma gasification, which is done at 3000–14,000 °C, is a more recent and inventive subgroup

2) A Comparative Analysis of a Causal Municipal Solid Waste Management Model for Sustainable Cities in Vietnam. source. preserved. Reuse and recycle An essential component of human activity is the management of solid municipal waste (MSW). Inadequate MSW impacts people's health and lives and causes major environmental issues. Economic progress is eventually slowed down by this; society must build thoughtful infrastructure around MSW.

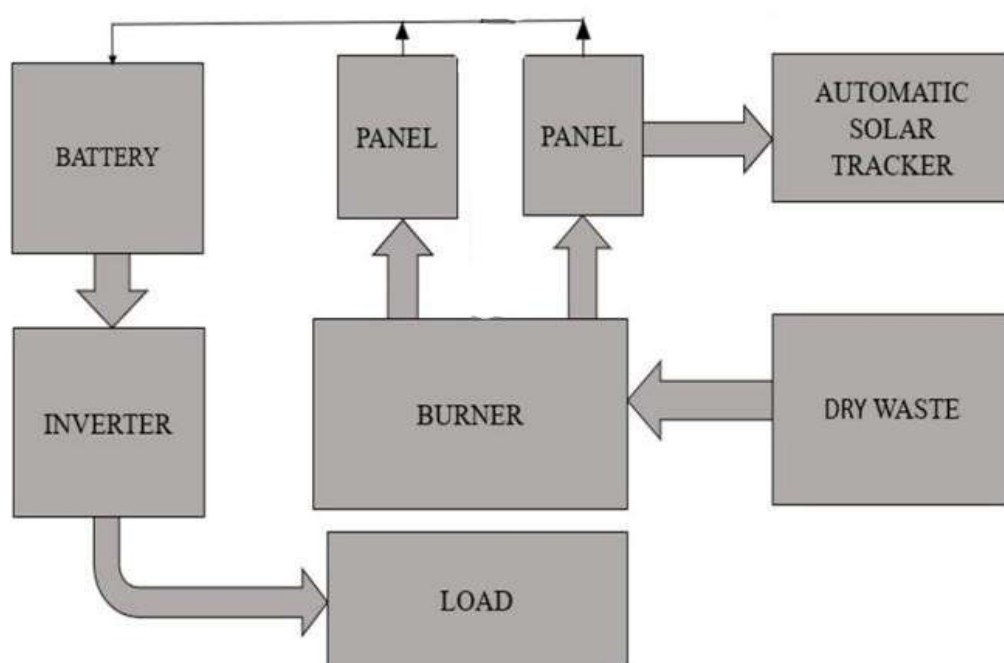
3)The problem is getting worse and needs to be addressed more quickly because trash production is rising along with earnings, consumerism, and urbanization. Global sustainable development goals (SDGs) including SDG 7 "Affordable and clean energy" and SDG 11 "Sustainable cities and communities" are supported by waste-to-energy program

## Methodology

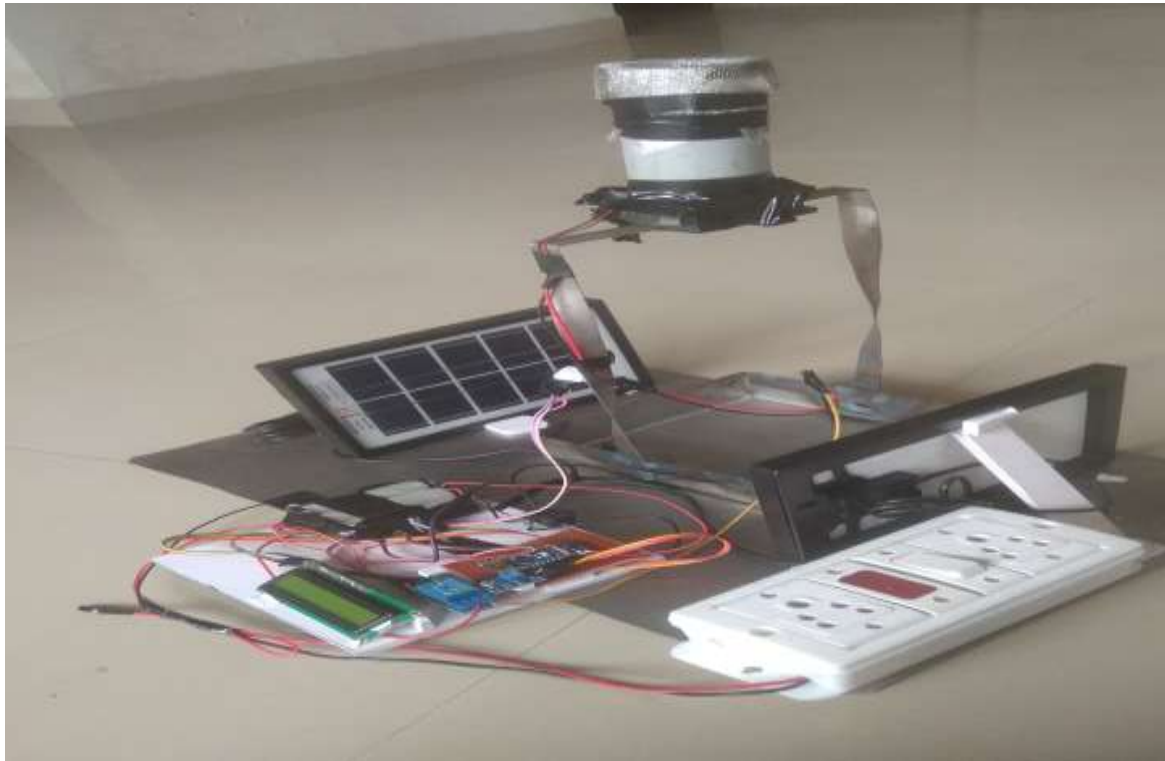
The methodology for the project involves several key steps. First, a thorough review of existing literature and technologies related to waste-to-energy conversion and solar tracking systems is conducted. Next, the system architecture is designed, incorporating waste processing units, solar tracking mechanisms, energy storage systems, and control interfaces. Following this, a prototype of the integrated system is developed and subjected to extensive testing to evaluate performance and identify areas for improvement. Data collected during testing is analyzed to assess system effectiveness and guide optimization efforts. Once optimized, the system undergoes validation through real-world testing and demonstration. Throughout the process, documentation is maintained, and reports are prepared to communicate findings and outcomes effectively. This systematic approach ensures the development of a reliable and efficient solution for electricity generation from dry waste materials with an automatic solar tracking system. This methodology outlines the steps to generate electricity from dry waste using an Automatic Solar Tracking System, which optimizes energy production by tracking the sun's movement. This innovative approach combines waste management with renewable energy production, providing a sustainable for both.

By following this methodology, the Automatic Solar Tracking System can optimize electricity generation from dry waste, providing a sustainable and renewable energy source. This innovative approach reduces waste disposal costs, generates clean energy, and contributes to a circular economy.

## Block Diagram



## Project Snapshot



## Working

Hardware construction and trial for electricity generation from dry waste materials with an automatic solar tracking system is a multiplex process that involves designing, building, and integrating several components to generate a functional and efficient system. The system consists of many key components, including: 1. Dry Waste: Trash-to-energy also known as trash-to-energy plants, use non reusable dry waste to generate electricity and heat between a process called controlled combustion. 2. Burner: This Components is used to converting dry waste into heat and light. 3. Automatic Solar Tracking System: This component makes sure maximum energy immersion by adjust the solar panels to track the sun's movement. The solar tracking system is equipped with sensors and motors to improve energy generation. 4. Solar Panels: The solar panels converting sunlight into electricity, supplementing the electricity generated from the light. The construction process requires designing and fabricating each component, followed by gathering and installing. The system is then integrating, and testing and commission are carried out to makes sure ideal performance. Testing and commissioning involve functional testing of each component and the whole system, showing testing to makes sure efficient electricity generation, safety testing to warranty safe operation, calibration of the solar tracking system and final commissioning and handover to the end-user. Challenges in this project includes efficient gasifier of dry waste materials, definitive and Exact solar tracking and continuity, power quality and firmness, and system maintenance and balance.

## Expected Result

Coming to the Results of this Project of Electricity Generation from Dry Waste Materials with Automatic Solar Tracking System. There are different ways for producing electricity from the day time our result with using the Solar panels we can directly drag the Energy from the sun and then we can convert it into Electrical Energy.

## Conclusion

1) In this project the generation of electricity from the dry waste by the heating process. These materials have been used for the generation of electricity by heating process by controlling the pollution by using the pollution filter and also the automatic solar tracking system. The filter has been setup in order to control the pollution while heating process has been going on. The results obtained after doing this process is analyzed and its efficiency for generating electricity.

2) In the world the dry waste generation is increasing day by day everywhere. In order to control that solid waste generation by controlling the pollution for the purpose of generation of electricity. In this project we show that how to generate electricity from dry waste successfully by the process of heating. We cannot control the pollution completely but we can control the pollution for up to some extent. We can generate electricity from dry waste by the process of heating and we can supply that electricity for the use. In this project there are two ways of generation of electricity is explained.

3) In day time with using the Automatic solar tracking system it will drag the light from the sun and converts into power and in night time we can make electricity by burning the waste. We are reducing the dry waste and without decomposing in the landfill sites. Thus, we can say that we completely show that generation of electricity from dry waste by the heating process

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