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Thermoelectric Energy Generator Based on Arduino

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Abstract: *The project investigates the creation and application of a Thermoelectric Energy Harvesting system based on Arduino. By utilizing thermoelectricity, the system is devised to convert waste heat energy into electrical energy. The report describes the approach taken to build the system, highlighting the components considered and a description of the experimental procedures. The conclusion is that the Arduino based approach is a functional method for harvesting energy from temperature differences. Overall, the project explores an array of sustainable energy solutions and serves as a stepping stone for improved designs of thermoelectric energy harvesting systems. Given the increased amounts of Solid Waste produced in today's society, studying alternative energy sources derived from Solid Waste is essential*

Keywords: Thermoelectric Energy Harvesting

I. INTRODUCTION

Approximately million tons of waste products are being produced in India every year. A bulk of waste is produced in the well-established cities. Waste is the primary reason for environmental issues globally. Natural resources are consumed at a pace equal to the increasing population due to technological and scientific advancement. India is facing a serious waste management problem as a developing country. Thus it is time to think of different options and ways to recycle waste rather than managing waste. The main aim of this project paper is to convert waste materials such as plastics, paper, rubber, rubbish and many other waste items into electrical energy, a circuit will store that energy into the battery and will be used to power entire project. A LED light was lit and pollution free energy was produced, therefore there was not much interest in pollution produced energy. Currently, demand for energy sources, change in conflicts over energy and the global environment had seismic and devastating effects on society on levels from all levels of society. In the world today, energy sources are reduced via the use of filters

The burning of municipal solid waste is a feasible method for generating energy and can prove to be a good alternative method of handling waste.

After a project with respect to generating power from burning municipal solid waste, the following conclusions can be deduced. The kind of project being spoken about has the capability to decrease the amount of waste which can go to the landfill but still contains a renewable source of energy. A good project will involve proper and rational due

diligence and planning, appropriate implementation and operation, and monitoring to ensure the proper emissions control measures exist and to protect the surrounding environment and human health. Further, good community engagement and communication measures are important to build support and address community concerns regarding waste to energy project. On the whole, electricity

generation from waste materials has the potential to contribute to more sustainable energy production and waste management; therefore, it should be considered a good project for communities or organizations to create and put into practice as a large- scale solution for waste management and energy generation. The potential for energy from the burning of municipal solid waste in the future is likely because, as a waste management solution, it is sustainable, especially in a circular economy.

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BLOCK DIAGRAM REPRESENTATION

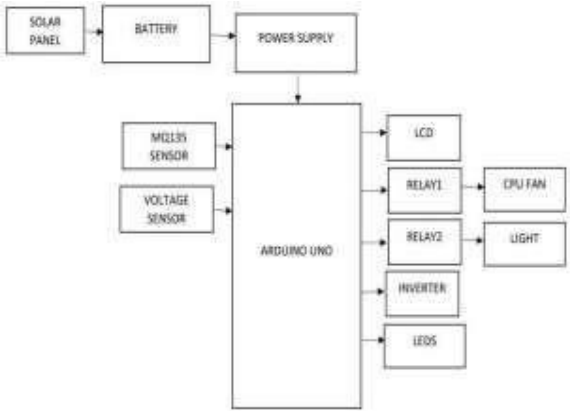

Fig :1.1 Block Diagram Representation

Flow of Burning Source Code to Processor :

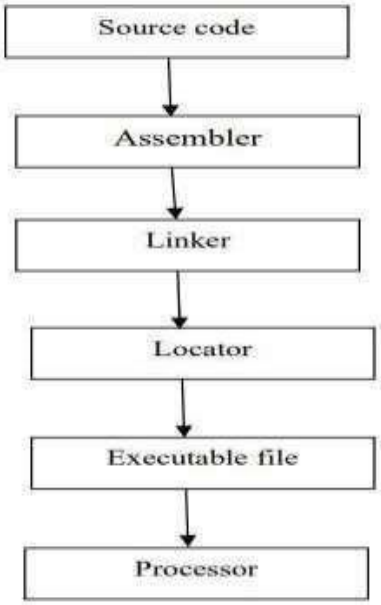

Fig : 1.2 Flow Burning Code Processor

HARDWARE REQUIREMENTS USED :

- LCD
- Solar panel
- Gas detector
- Inverter
- Storage battery
- CPU Fan
- Transformer
- LED
- Arduino Uno

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SOFTWARE REQUIREMENTS USED :
• Arduino IDE

ADVANTAGES

Cost- Effectiveness :

Low Cost: Arduino boards and TEG modules have low costs, so the total project is reasonably priced for the hobbyist, student, and researcher.

Ease of Use :

User-Friendly: Arduino's programming environment is beginner-friendly, with many tutorials and examples available to help new users get started.

II. RESULTS & FUTURE SCOPE

Recycling and resource recovery: The recovery of metals, plastics, and other valuable materials from MSW can assist in lowering the amount of trash that must be treated and generate additional Revenue streams .

OBJECTIVES :

1. Efficiency of Thermal Energy Harvesting: Put in place a technique for efficient harvesting and conversion of thermal energy into electrical energy using. thermoelectric generators.
2. Integration of Arduino: Use Arduino as master controller in a way so that the control, monitoring, and data processing of the data in the thermoelectric energy harvesting process is handled.
3. Optimization of Power Handling: Make optimal use of power handling mechanisms using Arduino to make proper harvested energy utilization to devices.
4. Real-time Data Logging and Monitoring: Perform real-time temperature gradient, energy harvesting monitoring and other associated

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