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DUAL POWER GENERATION SOLAR PLUS WINDMILL

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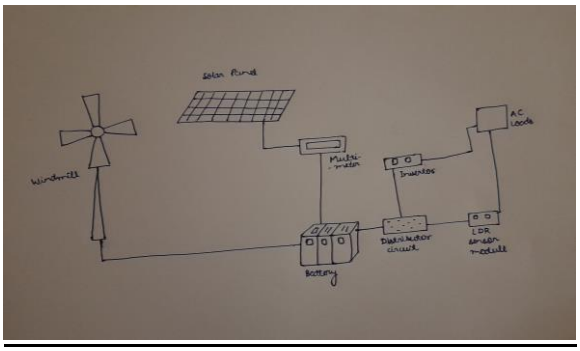
ABSTRACT

The non-renewable energy resources are getting exhausted and the problem of global warming given huge opportunity for researchers to find out the energy crises solution. Non-Conventional energy resources such as wind energy and solar energy have been widely adopted as an alternative source of energy. In this work, an integrated solar and wind energy system were implemented aiming to produce the maximum possible output power from the available renewable energy resources such as solar irradiance and wind energy. The purpose of this project was to design a portable and low cost power system that combines both wind electric and solar electric technologies. Such project is designed efforts to develop a power solution for remote locations such as undeveloped areas and research areas as well enhance the general standard of living of individuals. For developing countries affected by natural disasters. For this reason, it is imperative to design a hybrid system that will deliver a minimum of 1,500 watts of continuous power which is enough to power a wide range of appliances and medical equipment**.**

1. INTRODUCTION

Renewable energy resources are primarily obtained from the nature and available in abundance. Thus, producing electricity with the use of renewable resources like Wind and Solar has been taken up in this project. A Windmill, which rotates when there is enough wind, generates electricity owing to magnetic coupling between the rotating and stationary coil. Here in this project number of horizontally rotating type of Windmill is used. Silicon based cells these are combined together to form a Solar Panel is being used in this project to obtain electrical energy. Dual Power Generation combined Solar and Windmill System will bring into work to both the Solar and Windmill i.e., Wind Turbine Generator to charge a 12V Battery. The System is completely based on the renewable energy resources. The Windmill, when the sufficient amount of wind force strike on blades of windmills by this means we generate sufficient amount of power to charge a battery. Similarly, the Solar Panel which is placed on a fixed panel which sets itself to maximum exposure of the daylight to generate energy enough to charge the battery. Since both of them simultaneously can work in favourable natural conditions, both can charge the battery at a faster pace than they would have individually. Thus, this project is an example how natural resources can be efficiently harnessed to produce electricity at a faster pace and cheaper rate.



2. DESIGN METHODOLOGY

The basic Objective of this project is to increase the efficiency of the power generation. As the electrical power obtained by renewable energy resources is dependent upon weather. So here we are generating power from two renewable energy resources and charging the battery. The battery is getting charged more efficiently. The two renewable energy resources are solar and wind. The windmill has the maximum capacity for power generation of 12v but due to friction it is generating power up to 6v only. It is not directly connected to battery but here we have used diode. Since power flow occurs from high to low and since here power generation is up to 6v only, so the flow of power will get reversed. Instead of charging the battery windmill will take power from the battery itself. So, to overcome this problem we have used diode here. The solar panel is the second source of power generation with maximum power generating capacity of 12v. It can be monitored on multimeter that how much power is getting generated from the solar panel. Further the power generated is getting stored in the battery. The power from the battery is transferred to the loads.

3. PROJECT ANALYSIS

This literature Review contain a brief analysis of individual and combined effect of Wind and Solar hybrid Site description of different locations across India and change in Produced Power by combining effect.

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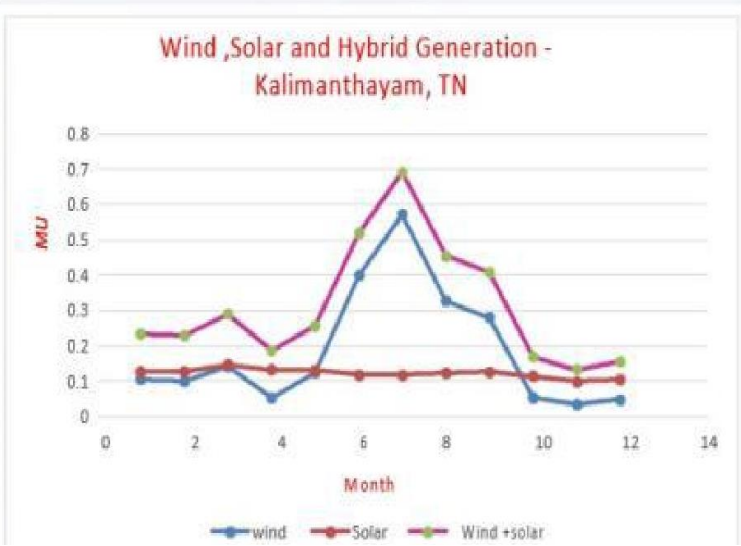
These analyses are shown graphically wherever required.

STATION NAME	Annual Wind Energy Production per MW (kWh)	Annual Solar Energy Production per MW (kWh)	Annual Hybrid Energy Production (kWh)
KALIMANDAYAM	2263184.746	1488038	3751222.746

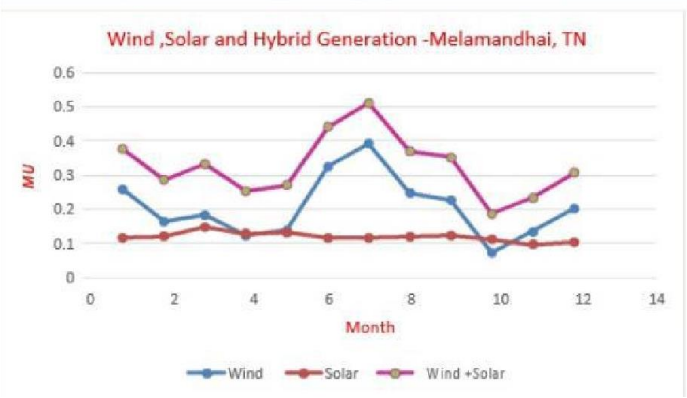
Description of data of site (Tamil Nadu)



Graphically represented data for Power Generation

STATION NAME	Annual Wind Energy Production per MW (kWh)	Annual Solar Energy Production per MW (kWh)	Annual Hybrid Energy Production (kWh)
KARUNGAL/PALAYAM	2649320	1478350	4127669.714

Description of data at Melamandai



Graphically represented data of Power Generation

STATION NAME	Annual Wind Energy Production per MW (kWh)	Annual Solar Energy Production per MW (kWh)	Annual Hybrid Energy Production (kWh)
VERALIMALAI	1993187	1358837	3352024

Description of data at site of Andhra Pradesh

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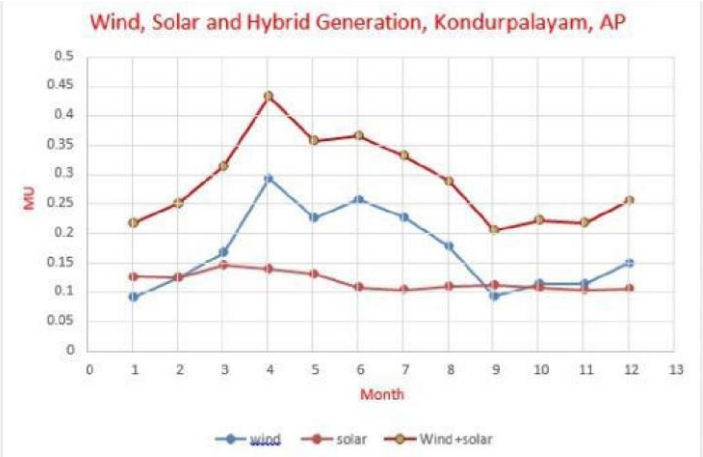
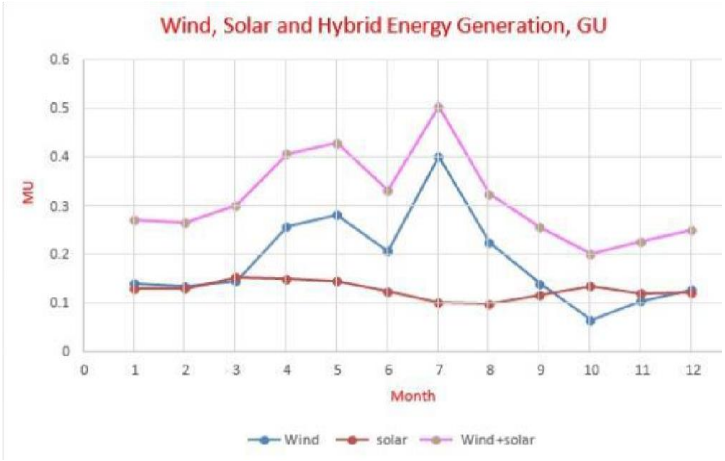


Graphically represented data for Power Generation

STATION NAME	Annual Wind Energy Production per MW (kWh)	Annual Solar Energy Production per MW (kWh)	Annual Hybrid Energy Production (kWh)
HAIKAL	2386807	1597156	3983963

Graphically represented data for Power Generation



Graphically represented data of Power Generation

4. HARDWARE DETAILS

Solar Panel

Such panels are constructional combination of p-v cells which are placed in a framework for installation. The striking photoelectric energy obtained from sunlight is being used to produce electricity by means of photo electric effect.

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Rectifier

A rectifier is an electrical device that converts alternating current to direct current.

Windmill

A windmill is a structure that converts wind power into rotational energy. It contains a number of blades rotates as the fast blowing or sufficient amount of wind energy strike on it. Further this energy can be utilised to generate electricity.

Battery

An electric battery is a source of electric power consisting of one or more electrochemical cells with external connections for powering electrical devices. When a battery is supplying power, its positive terminal is the cathode and its negative terminal is anode.

Distributor Circuit

Distributor circuit is a panel where different voltage distribution is managed. In our project we are using an IC to convert 12v into 5v, which is required to power the LDR sensor module. Other than this one relay is also added to this circuit board which performs switching action on AC load.

Inverter Circuit

Inverter circuit is a panel where DC to AC conversion is to be done. It consists of coils which performs electromechanical actions to convert DC to AC. This AC power is further used by AC loads.

5. CONCLUSIONS

1. Individual Power generated by Wind Mill and Solar is not sufficient to meet the demand of the large power industries.
2. The power generated by individual unit is uncertain and fluctuates over time and seasons.
3. This will lead to shortage of power and also draw Adverse impact on producing industries operating through power from such units.

4. Whereas the combined effect shows the sufficient power to meet the demand of heavy industrial and commercial loads. consistant and monotonically increasing.
5. The cost of hybrid system is less than the individual 2one (solar and wind)
6. Maintainace is easy for combined system and may increase for individual units.
7. The combined power may connected to power grid to fulfil the requirment of other demanding units.

6. APPLICATIONS

1. Since combine effect of both wind and solar can produce more power with greater reliability this can be used in power supply for small and medium power demanding users.
2. Further if AC and DC individual power required it may be provided by windmill and solar respectively.
3. It can be used for military (charging of communication units) and railway signal power.
4. It can be used in high end residential apartments and villas for specific needs.
5. This system help to pump the water to any building. DC power can use to circulate the water through the home.

7. FUTURE SCOPE

1. This type of hybrid system is more effective in terms of economy and power production and can be implemented at larger level.
2. As it is based of combination of two renewable resources so it will continue to work even other resources will deplete.
3. Being eco-friendly it will ideally resource to produce optimal power with proper efficiency and throughout the year.
4. This type of hybrid system can be used for particular household or industrial demand such as working of low or medium power applications.
5. These hybrids can further modified and used for large power demanding loads.

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