

IMPLEMENTATION OF HYBRID SYSTEM MODELING AND POWER EFFICIENCY ENHANCEMENT FOR REMOTE VILLAGE

Anivesh Kumar Gupta ¹, Mr. Yogesh ², Vikas Yadav ³, Mr. Vipin Kumar ⁴

Department of Electrical Engineering, Ganga Institute of Technology and Management, Kablana, Haryana, India

Abstract: A remote village leads about its subjects, accessible assets, pertinent administrations and plans. It comprehends what it needs and when it needs. Remote village activity centers around enhanced asset utilize proficiency, enabled neighborhood self-administration, access to guaranteed fundamental comforts and mindful individual and network conduct to manufacture an energetic and glad society the financial piece of the model ascertains the fuel devoured, the kilo watt hours got per gallon of fuel provided, and the aggregate cost of fuel. The ecological piece of the model ascertains the two particulate issue smart management of power distribution and the climate. Recreations in view of a genuine framework in the remote village region of Bihar-west Purnia were performed for three cases: 1) Diesel Just; 2) Diesel-Battery; and 3) PV with diesel-battery utilizing a one-year day and age.

Keyword: Remote Village Management of Power Distribution, Diesel, PV with Diesel-battery, Diesel-battery.

1. INTRODUCTION

A rural region is a geographic region that is situated outside urban communities and towns, while country territories are otherwise called 'town' in India. In these towns, farming is the main wellspring of job alongside angling, cabin businesses, stoneware, and so forth. As per the Erstwhile Planning Commission of India, a settlement with a most extreme populace of 15,000 is considered as "Town". Quite a bit of India's provincial populace lives in nucleated towns, which most ordinarily have a settlement frame portrayed as indistinct agglomerate. India being a rustic ruled nation, the quickness idea isn't pondered the provincial zones. All regions which are not arranged as urban region are considered as rustic territory. Number of country units or towns in India is approx. 6, 38,588. As indicated by 2011 registration, country region has populace of 68.84%, while urban zone has populace of 31.16% as it were.

1.1 Smart Village and its Importance

Smart town in the present day setting appears to be more sensible as there is a farthest point of development of urban areas which is prompting making of urban wildernesses, where the populace proportion per km of land is path over the coveted standards. To make child strides at first would prompt a crusade at National level once the products of this exertion begin bearing natural products, which unquestionably would be noticeable for all to see sooner than anticipated.

1.2 Aims of Smart Village

To implement the system for improvise the power supply for remote village.

To implement the system in MATLAB through Simulink Model to perform the virtual situation.

2. LITERATURE SURVEY

[1] Rural Village Water Resources Management Project This article looks at network driven different utilize water administrations (MUS) as spearheaded by the Rural Village Water Resources Management Project (RVWRMP) in the Far and Mid-Western advancement areas of Nepal. These locales are described by destitution, remoteness, rough landscape, nourishment frailty, water shortage, and post-struggle inheritance. [2] A Development of Smart Village Implementation Plan for Agriculture The present examination for the most part intended to explore the Malaysian Smart Village venture in a provincial network which is marked as Kg Besting in Malaysia. In particular, the investigation planned to address the real issues looked by the network of agriculturists, recognize the Smart Village pointers and set forward a key arrangement for the Smart Village usage. It was completed among Malaysian ranchers in Kg Besting people group in Malaysia. Information was gathered through an overview, center gathering meetings and archives. [3] Smart City and Geospatial Information Availability, Current Status in Indonesian Cities creating brilliant city requires numerous sorts of data, including geospatial data. Geospatial data fills in as the base information from which other information will be referenced upon. The generation, arrangement and spread of geospatial data in Indonesia are managed by Law 4/2011 on Geospatial Information. Be that as it may, just couple of territories have been mapped at the size of 1:10,000 and 1:5,000. This circumstance left numerous urban areas without vast scale outline to delineate building impressions or bundle limits. To acquire data on the geospatial data accessibility in Indonesian urban communities, a study has been done broadly from April – July 2015, as a feature of an examination on spatial information foundation. 90 urban areas/locale took an interest in the review. The discoveries demonstrate that dominant part of the urban areas/locale have restricted accessibility of expansive scale topographic maps and land allocate. As to creating brilliant urban areas. [4] Tourism improvement of recorded riverbanks in Jatinom Village There are some archeological remain antiques of the Jatinom town establishing figure and an Islamic minister. In the present, the zone of Jatinom has been created into a religious Tourism town albeit most pioneers just go to the place at the convention function as it were. The examination plans to build up the tourism of Jatinom by expanding the capability of riverbanks condition. It utilized an engaging subjective approach. The outcomes demonstrate that the tourism advancement could be acknowledged by consolidating a religious tourism with nature-based tourism, interfacing the tourism questions through simple access, and enhancing the nature of scene. [5]. Work and Unemployment circumstance in India Human culture is creating with fast energy and accomplished different victories for improving its employment. The human progress is witness for different changes identified with it's the improvement through various impetuses like modern advancement, green revaluation, science and innovation, and so on [6] The Indian keen town: Foundation for developing India a shrewd town thinks about its residents, accessible assets,

relevant administrations and plans. It realizes what it needs and when it needs. Brilliant town activity centers around enhanced asset utilize proficiency, enabled nearby self-administration, access to guaranteed essential luxuries and mindful individual and network conduct to manufacture a dynamic and upbeat society. The present research paper examines about rustic improvement in creating world for the up-liftman of occupation of the country masses.

3. PROBLEM IDENTIFICATION

The Village need to a supply a consistent supply of current. Most of Indian town battling through power cut issues. Indeed, even close to town are additionally getting issue for current supply. Close planetary system likewise diminished the issue related with the town requiring little to no effort. It must have some extremely locate the utilized of diesel generator that will give the supply through night and for influencing the water system to reason. This need a powerful supply. So a major absence of high increases current through PV.

3.1 PROPOSED WORK

The talks about the monetary examination and ecological effects of coordinating a photovoltaic (PV) exhibit into diesel-electric power frameworks for savvy towns. MATLAB Simulink is utilized to coordinate the heap with the request and allocate the electrical creation between the PV and diesel-electric generator. The monetary piece of the model figures the fuel expended, the kilo watt hours acquired per gallon of fuel provided, and the aggregate cost of fuel.

The ecological piece of the model computes the 2, particulate issues (PM), and the x discharged to the environment. Recreations in view of a genuine framework in the remote locale of Bihar were performed for three cases:

- 1) Diesel only;
- 2) Diesel-battery; and
- 3) PV with diesel-battery using a one-year time period.

The recreation results were used to figure the vitality payback, the basic payback time for the PV module, and the maintained a strategic distance from expenses of 2, x, and PM. Post-recreation examination incorporates the correlation of results with those anticipated by Hybrid Optimization Model for Electric Renewable.

4. PROPOSED METHODOLOGY

We have thought about after advances, in particular little breeze turbines, sun based PV (SPV) frameworks, batteries, and a diesel generator for back-up for shrewd town. In the crossover framework the electrical request of the Laboratory is AC-coupled, the diesel generator is associated with the AC side of the system and the sun based board, wind turbine and the batteries are associated with its DC side. The traditional back-up diesel generator (DG) is utilized to supplement the sustainable power source framework for crest loads and amid poor asset periods nonpartisan framework.

5. RESULTS AND DISCUSSION

5.1 Introduction

In this section the planned reenactment framework has been utilized to complete the estimations and tests, to check the anticipated aftereffects of the framework. The outcomes acquired from the MATLAB reenactments and handy executions are thought about.

5.2 The Simulation Results of Standalone Hybrid Micro-Grid System

The Simulink MATLAB package version 2013a has been used for modeling and simulating of the system. The Standalone hybrid system variable input and constant output voltage and frequency have been designed as shown in fig 5.1 & 5.2.

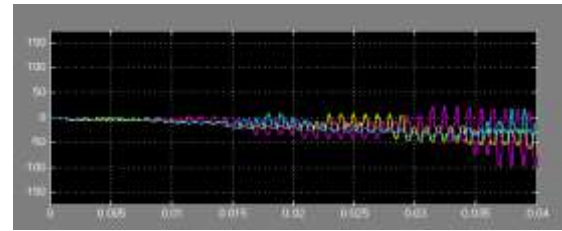


Fig 5.1 output current of hybrid system

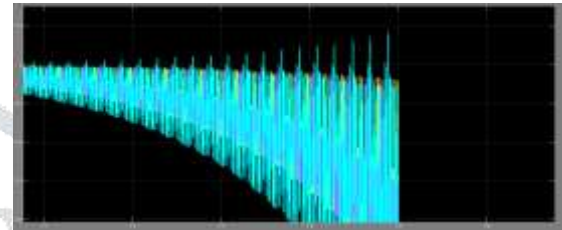


Fig 5.2 output voltage of hybrid system

MPPT subsystem track the maximum power point as shown in fig. 5.3.

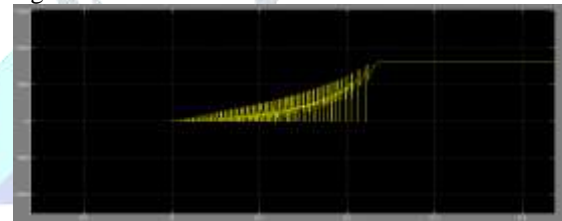


Fig 5.3 output current of MPPT system

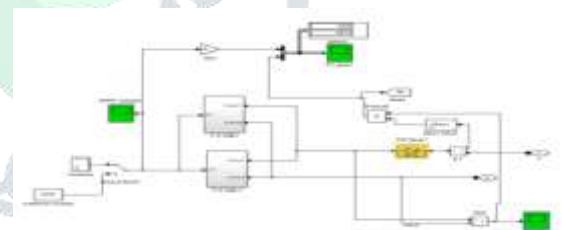


Fig 5.4 PV Subsystem

Wind subsystem is shown in fig. 5.5 a wind turbine is connected with PMSG and produce electricity. Permanent magnet synchronous generator (PMSG) convert mechanical energy from turbine into electric energy. Wind power graph is shown in Fig 5.6.

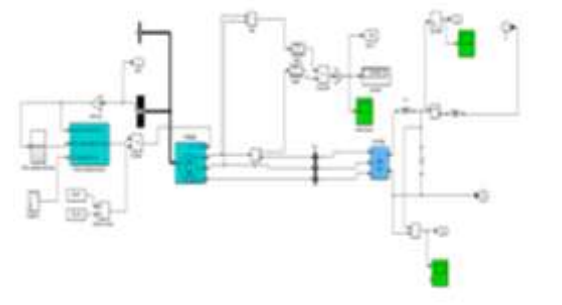


Fig 5.5 Wind subsystem



Fig 5.6 Wind power

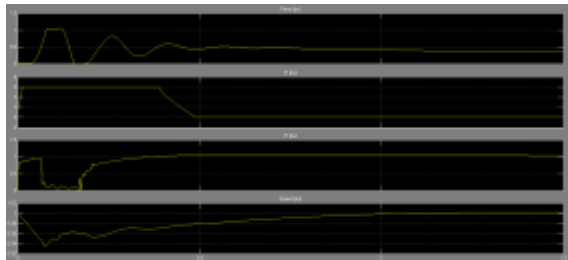


Fig 5.7 Diesel engine outputs

Diesel engine is used to convert chemical energy to electrical energy. The outputs of diesel engine of power, voltage and speed as shown in figure 5.7.

6. CONCLUSIONS AND SUGGESTIONS FOR FUTURE WORK

6.1 Conclusions and Suggestion

This work is presented design and simulation of standalone hybrid micro grid power system and modeling of remote area electric distribution system. This paper investigates the three important works in one project by using MATLAB Simulink.

Throughout the results obtained, the following conclusions can be made:

The work shows a connection four different generation system that consists of PV/Wind/Diesel and operated together to support the load, and illustrated that can be operated more than one sources in one network otherwise they are different in conversion energy sources which in this network it benefited from four different type. The PV system generate electrical energy from the sunlight, the wind turbine system generate electrical energy from wind kinetic energy, the diesel generator induced electrical energy from fuel chemical energy, and the battery that used as a storage energy system, from charging and discharging by a bi-direction converter device can be injected and absorbed power of the system model. This system was tested in a period of simulation time to showing the performance of the system with any varying from the load demand and natural sources. In the standalone mode during operation in the micro-grid system, the voltage and frequency in the system rapidly changed because of the unbalance between the loads with the sources generate, because of it is necessary to compensator system and controlling on it.

Ability to transfer maximum power from photovoltaic system by using MPPT with (P&O) techniques, which is controlled of the duty cycle to regulate the booster and DC voltage in the PV array system to be constant with changing accorded by the sunlight energy. These systems were friendly to the environment, because of using renewable sources instead of the fossil fuel engine system. And these systems were healthy by zero polluting emissions and had minimal operation cost. This type of system has the difficulty of control because of the different sources and independent on the main grid system, and

by fluctuations in the air that effects to it during of annual and period of day and night.

6.2 Future Scope

The future work of this study can be extended to design:

A standalone hybrid PV-Wind-Diesel-Battery with Artificial Neural Network (ANN) controller can be studied, and compared it to the Fuzzy logic controller.

The modeling and intelligent control can be done for the grid connected mode of operation.

The present study work can be enlarged by using another renewable sources to get more energy from nature and increasing generating electrical power to covering load demand.

The purpose control system in this work, can enlarge it by controlling the sources in which situation can be operated or shut down according to changing each of the weather and the load.

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