

SIMULATION OF MICROGRID (INTERCONNECTION OF RENEWABLE ENERGY SOURCES)

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Abstract - Undoubtedly, one of humanity's greatest achievements is electricity. It has made our life significantly easier. Almost all of our everyday chores are made easier because of electricity. Our house is filled with electric appliances for example, television, fan, refrigerator, oven, etc. we cannot imagine our life without electricity. However, production of electricity causes harm to our environment. For this reason, we have decided to make a device that can successfully switch between multiple sources of electricity that are generated by renewable methods. This paper will showcase the successful implementation of this device and its impact on our daily life, its working, principles behind it and various other related things.

Key Words: Automated System, Biofuel, Energy Transmission, Electricity, Fossil Fuel Alternative, Microgrid, Power Supply

1. INTRODUCTION

Our main source of electricity is generated by power plants which uses conventional methods for the production of electricity, as a result, it causes pollution which can result in irreversible harm to our environment. But in order to satisfy our daily demands we cannot simply discontinue its usage. There are various methods of producing without the electricity by renewable sources of energy as well, like wind, solar, biogas, etc. but their drawback is that they cannot be used 24 hours a day. But the solution for this is switching to another source of energy when the other runs out and switching back to main source when none of the sources are available. This will significantly reduce the usage of the main source of electricity.

2. Body of Paper

To convert DC into AC[3]. As we know the electricity obtained from renewable sources such as solar, wind, biogas, etc. are in DC, but most of the appliances work on AC. In order to use that electricity, we must convert DC into AC, to do that we need an inverter.

The main task of our project is to use electricity generated from biogas. The electricity that is produced through biogas by burning it and using the heat or hot pressurized steam to run the

turbines to generate electricity. The electricity that is produced by turbines or steam engines are in DC form. As we know most of the appliances are works on AC. In order to use the electricity, we must convert DC into AC. Therefore, inverters are must.

There are 3-phase [3] bridge inverters. They are connected (star or angular or delta fashion). The three-phase bridge inverter is divided into six working regions. To reduce switching losses. That is by using high frequency (50 Hz). new inverter can be made and how it will be better than the existing one, in terms of high-quality voltage and current wave form, reduced switching losses, high-quality output.

In our project we are trying to switch energy autonomously whenever required, in order to do that we must know the concept of micro-grid [2]. The micro-grid is a system that helps in changing the energy source.

We are taking 3 energy sources that are solar energy, biogas energy and the main supply. In day time it is wise to use solar energy, but when the sun goes down and solar energy is reduced and comes to an end, we want to switch the energy source from solar energy to biogas energy automatically. In order to achieve that we have to use micro grid. We want to use the micro grid in Islanded mode. In Islanded mode the main supply is cut off and the energy is taken from other supply in our case renewable source of energy.

Micro grid, its mode [2] (Islanded). Introduces [2] to distributed generation (DG). It talks about how a micro grid can be connected to 4 sources. It mainly explains about Islanded mode, which is nothing but turning off the main supply and using the other supplies that are available until they burned out. A [2] new micro grid can be made and how it is better than the existing one in terms of size, weight and overall cost of manufacturing.

Our project aim is to give an uninterrupted power supply to the users. As we are using electricity produced from renewable source of energy (Mainly biogas) which is in DC form, but as we know most of the appliances works on AC. In order to use the electricity produced from a renewable source of energy, we must have to convert Direct Current into Alternating Current using an inverter.

As we want an uninterrupted power supply, as I explain before we must use an inverter or more precisely UPS inverter (Uninterrupted Power Supply). Know about [1] UPS inverters. It shows [1] modes of inverters that are widely used are online inverter and off-line inverter. Shows [1] schematic diagrams for both types of inverters. Shows [1] the optimum voltage at which

the inverter can give the best results. New inverter is better than the previous one in terms of frequency [1], switching losses, and overall cost of manufacturing.

3. CONCLUSIONS

This project on the whole allows us to research and understand the modeling and configuration of microgrids and how we can effectively interconnect it with renewable energy sources to contribute maximum to the green energy technology and resolve the energy crises starting on a small scale.

The success of this model both in the virtual and in-real environment offers an ultimate tool to investigate internal power grids and fair distribution of power as it switches to different supplies on priority.

We also did research on various uses of biofuel, its importance, the use of its by-products (briquettes and pellets), and how our method reduces the process to make it (from 8 weeks to 24 hours).

As a future perspective, a common simulation of several microgrids and distribution networks supports the analysis of the involvement of renewables in power-controlled balanced systems.

Various studies show that the current fossil fuel supply will not last for long and we cannot rely on other countries for the supply of fossil fuels because of the rising prices which makes biogas a better alternative. This automated system will work in such a way as to customize blocks of energy for per se, a small community or individual structures such as hotels, schools, and hospitals. Since electricity that is generated from biogas and solar is being used, it reduces the dependency on fossil fuels for electricity generation. This innovation could save us a hefty amount that the government has to pay for oil imports and also adds to preserving the environment by preventing burning such fuels that cause pollution.

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