

**THE INVESTIGATION ON THE APPLICATION OF WIND
ENERGY AS A RENEWABLE ENERGY**

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ABSTRACT

Currently, the six major renewable energy sources discussed are hydro, wind, solar, geothermal ocean and biomass. Each type of renewable energy system has features that are vital to their operation. Each renewable energy system mentioned has advantages and disadvantages. Wind systems as they were ideally suited for small scale generation, particularly in residential areas. This project is to investigate and analyze the wind turbine, rectifier, dc-dc converter and inverter in its structure. The design of a wind turbine system is presented in which the generic components of the systems are AC-DC rectifier, DC-DC converter, DC-AC inverter and three phase passive filter. The project also looks into the requirements and control aspects of the wind system. After which the design and simulation of the system was undertaken using PSCAD. Results from simulation show that as the wind speed increases the wind electrical power is also increase. Therefore, the output power is proportional to the wind speed. From that, it can be concluded that the wind energy is an alternative power sources.

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CHAPTER 1

INTRODUCTION

A growing world economy and an ever increasing population have created an increase in demand for electric power. Conventional power generation schemes consisted of generation facilities located at specific sites, within close proximity to the resources that were to be used. The infrastructure needed to transmit and distribute the generated electric power often required a high capital investment.

The construction of these large generation facilities and transmission networks often hinge on a time consuming resource consent process. It has increasingly become difficult to provide adequate locations to build these large centralized generation schemes. This has caused a shift in the ideology behind electric power generation. By generating power closer to the load centers, the cost incurred for the construction of transmission and distribution networks would decrease.

Distributed power generation incorporates the power generation facilities that provide electric power at a site closer to the load centers (end-user) than the large centralized generation facilities [1]. As the ideology behind distributed generation is quite recent, there is no standardized definition. The process of distributed generation can incorporate both renewable and non renewable energy resources [1].

There are many thousands of wind turbines operating, with a total capacity of 73,904 MW of which Europe accounts for 65% (2006). The average output of one megawatt of wind power is equivalent to the average electricity consumption of about 250 American households. Germany, Spain, the United States, India, and Denmark have made the largest investments in wind generated electricity.