

**UNIVERSITI TEKNOLOGI MARA
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**AERODYNAMIC INFLUENCES AND
GENERATOR IN DUCTING SYSTEM**

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ABSTRACT

Renewable energy is commonly described as an energy that comes from natural resources such as sun, wind, biomass, biogas, rainfall, and geothermal. However, renewable energy or green technology as it is popularly known can also originate from engineering processes such as in pipe lines or ducting systems particularly in Heat Ventilation Air Conditioner (HVAC) system. One of the requirements is to ensure a consistent and stable temperature in buildings with a standard operating system. Harvesting energy in an HVAC system is efficient since the air supply which is based on the operating system of a building. In this paper, energy harvested in static equipment, which is a type of ducting system is explored for low power application of 50Watt power generation. The objectives are to investigate the design of blade for wind turbine in ducting system based in lift and drag force and also to observe the power production of the wind turbine by using 50Watt of generator. The experiment carried out through the reading of cubic feet per meter (CFM) air flow in the ducting system by using device such as anemometer to get the CFM in alternative current (AC) and direct current (DC). Based on the analysis on single ducting in PVC pipe, it is found that for 700CFM, the distance for generator of less than 20cm produce a desired more than 11V output voltage. For 1000CFM, all generators produce the desired output voltage of 11V. This project describes the design and development of harvesting energy in ducting system (exhaust) for low power application for 50 watt power generation. It can be concluded that 1000CFM is the ideal parameter for the speed in the ducting. The analysis on the generator in HVAC system is successfully achieved.

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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

There are many forms of renewable energy such as sunlight, wind, hydroelectric power, etc. Each of the renewable energy have different result in producing a power. These project are act as a platform to introduce the renewable energy that is the wind energy to produce a maximum power. The wind are chosen because of its characteristics which is clean, free and always available. Some country have been introduced about wind turbine energy. But in Malaysia, its hard to implement it due to unstable wind speed. According to the researcher, in wind turbine the output torque and power depends on the incoming wind speed [1]. Hence, the purpose of this project is to identify a new and cost effective method of producing energy. HVAC system or duct system are introduced and it is good to harvest the energy inside the ducting system. The duct system are used in air heating and air cooling at a building or home. The duct system is a collection of tubes or pipes that distributes the heated or cooled air to the various space inside a building [2]. Usually it can be seen at the mall or commercial buildings. The wind inside the furnace are in high pressure and it definitely suitable to build a wind turbine inside the ducting system.

In addition, inside the duct system or HVAC system, there is a blade, synchronous generator, PWM inverter and converter and voltage inverter. At the blade, there is an aerodynamic model attach to it. This aerodynamic model help the