

# Performance study of five-blades lantern-type of Vertical axis wind turbine

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#### INTRODUCTION

- For thousands of years, people have been using wind energy to do their jobs, to grinding grain with windmills and sailboats.
- ➤ Today, wind is becoming more and more popular as a source of renewable energy through the use of wind turbines, for two reasons: the first is that the fuel is no longer sufficiently available as before, and secondly, to preserve the environment and exploit wind energy.
- ➤ A wind turbine consists of three basic parts a tower, blades and a generator. These parts work together to convert energy from wind into electrical energy.
- > When the wind blows, it pushes toward the blades, causing them to spin.
- When the blades rotate, they cause the generator to rotate. The rotation of the generator generates electricity, which can be used to light a light bulb or other device.



## OBJECTIVES

- Providing alternative energy that is less expensive than other energy sources.

- Investing wind energy to preserve the environment instead of power generators that run on fuel.

- To study the performance of lantern five blades VAWT using open loop wind tunnel.



1) What is the highest voltage that can be reached?

2) Does the power increase by increasing the number of revolutions of a fiveblade lantern turbine?

3) Can wind turbines compete other energy sources?

4) Why was the lantern-shaped turbine design chosen?

### **Methodology and Experiments**



### RESULTS

This turbine has been tested in a special laboratory taking into account the appropriate air temperature and density. Then we put the turbine in front of the wind thrust device (Wind tunnel in Aerodynamic Laboratory) about a meter away and installed the device, in order to calculate the number of revolutions and the output power, and the tip speed ratio to power coefficient:

