

Design of a novel and efficient lantern wind turbine

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Abstract. Wind turbine generates renewable energy when the forces acted on the turbine blades cause the rotation of the generator to produce clean electricity. This paper proposed a novel lantern wind turbine design compared to a conventional design model. Comparison is done based on simulation on coarse and fine meshing with all the results converged. Results showed that the pressure difference on the surface of novel design lantern wind turbine is much higher compared to the conventional wind turbine. Prototype is already manufactured and experimental result would be discussed in a separate future publication

1. Introduction

The lantern wind turbine is novel designed wind turbine that has multiple blades instead of one blade. Wind turbine is a type of renewable energy. It generates electricity when wind blow that acted as force on the blades of the wind turbine which causes the rotor to rotate produce electricity. United kingdom has the target to achieved 15% of energy consumption which came from renewable energy by 2020 [1]. The renewable energy reduces the use of natural gas (hydrocarbon fossil fuel) to generate electricity. The fossil fuel produces carbon dioxide and carbon monoxide during the incomplete combustion, which lead to environmental pollution [2]. Wind turbine reduces the usage of natural gas (hydrocarbon fossil fuel). In comparison, wind turbine system is capable of producing 5-8GWh of energy annually, which is equal to 1 tonne of burning coal to produce electricity.

As a result, the big and large wind turbine, known as wind farms with high renewable energy source had currently carried out by many countries [3]. However, the conventional wind turbine is huge consume a lot of space. It requires distance to be maintained when these wind turbines are placed. The diameter of a wind turbine can be larger than 124 m with the height of 200 m [4]. The huge and big conventional wind turbine has taken up lots of spaces and a distance is required to place another wind turbine next to it [5]. The development of wind power plant which taken up a lot of space have a direct impact towards citizen and road accessibility. Wind power plant project is usually time consuming therefore it requires the cleaning of lands for development in the particular area, which has the possibility of significant degradation and effects in quality of the ecosystem [6].

The purpose of this study is to reduce the large wind turbine to a smaller scale and improve its efficiency. The concept of this lantern wind turbine is obtained from the airplane nacelles[7]. This wind turbine has been produce with circular blades instead of just normal wind turbine blades. This

