ASSESSING THE FEASIBILITY AND POTENTIAL OF VERTICAL AXIS WIND TURBINES (VAWTs) AS A SUSTAINABLE ENERGY SOURCE FOR REMOTE UNIVERSITY SETTINGS

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Abstract: The global energy landscape is undergoing a transformative shift, driven by the imperative to reduce greenhouse gas emissions and mitigate the impacts of climate change. Vertical axis wind turbines (VAWTs) present a promising alternative for electricity generation due to their distinct advantages over traditional horizontal axis turbines. This paper reviews the current state of vertical wind turbine technology and explores its potential for enhancing re-newable energy production at institutional level in remote settings of Sri Lanka. In the context of Sri Lanka and institutional built environment, the unique design characteristics of VAWTs, such as their ability to operate in turbulent wind conditions and their lower noise profile compared to horizontal axis turbines, are discussed. As the case study, University College of Kuliyapitiya is considered where the practicality of lighting up college streets with lamps are experimented with a model of Vertical axis wind turbine to measure the potential of using a real life model and its efficiency on the matter. The paper also examines recent advancements in VAWT efficiency and performance that contribute to improved energy capture. By evaluating technological, contextual and social factors, this paper aims to provide a comprehensive overview of vertical wind turbine technology and its role in advancing sustainable energy solutions.

Keywords: Vertical Axis Wind Turbine, Renewable energy, Institutional built environment