

**DESIGN, FABRICATION AND TESTING OF A STAND ALONE ONE-HUNDRED WATT
HYBRID WIND-SOLAR POWER GENERATION SYSTEM PROTOTYPE**

A Project Study Report

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ABSTRACT

This paper presents the design, fabrication, and testing of a standalone one-hundred-watt hybrid wind-solar power generation system prototype. The proposed prototype combines the power generated from wind and solar energy to create a reliable and efficient off-grid power solution. The design of the hybrid system incorporates a charge controller for wind and solar, battery bank, wind turbine, solar panel and inverter to manage the energy flow and provide a stable power output. The fabrication of the prototype involved the construction and integration of the wind turbine and solar panel. The mechanical components were carefully assembled, and electrical connections were established following standard practices to ensure safe and efficient operation. The testing phase involved evaluating the performance and efficiency of the hybrid system prototype under various operating conditions using the wind tunnel. Performance parameters such as power output, voltage, and energy conversion efficiency, wind speed, solar irradiance, were measured and analyzed. The prototype was subjected to different wind speeds and solar irradiance levels to assess its ability to harness and convert renewable energy into usable electrical power. The experimental results demonstrated that the hybrid wind-solar power generation system prototype achieved reliable and efficient operation, generating a stable output of 15 watts, and a 100 watt load for

duration of at least 3 hours. The system exhibited normal energy conversion efficiency. The battery bank effectively stored excess energy for later use, ensuring continuous power supply even during periods of low wind or solar availability. The prototype's compact design and efficient operation make it suitable for various applications, including remote areas, outdoor activities, and emergency power backup.