

## ABSTRACT

Aviation safety instruments are devices or systems designed to improve the safety of flight operations. One of them is the airfield lighting instrument or Airfield Lighting, which is a lighting system installed in and around the airfield area to provide visual guidance to pilots during the landing, takeoff and ground movement phases during the day or night in clear or bad weather conditions. The aim is to improve the safety of aircraft operations and provide the necessary guidance for navigation around the airport.

One of the many airfield lighting is the runway guard light. This light has a vital function as a marker for pilots and airside area workers that they will enter an active runway. Considering the important role of this type of signal light, it is hoped that its performance must be reliable and can be expected to continue operating in accordance with Annex 14 Aerodromes published by ICAO (International Civil Aviation Organization). For this reason, the design that will be made adopts a hybrid system by combining solar power and wind power. The solar panels will be installed with motorization, the windmill will also be designed in such a way that both the voltage and current output will be monitored to be able to alternate manually and automatically. The voltage and current will be processed to determine which generator will supply the battery so that the battery is not disconnected and is always fully charged. The resulting measurement figures and their control will be accessible to users via an internet-connected application.

The expected outcome of this research is that the reliability of the RGL lamp is achieved and makes it easier for operators to control, maintain and monitor where the location of the lamp is far from the operator's standby room. Then this system can also be adopted for application in households as a renewable energy transition that has benefits and economic value.

Key words: solar energy, wind energy, renewable energy