ABSTRACT

Issues in conventional street light system have triggered some researches in improving reliability of the system. Mostly, the researches are aimed to deal with high power consumption and high cost implementation issue. Optimization in supply side and efficiency in load side of the street light are two of key points in this issue. This study designs and simulates combination of Hybrid Renewable Energy System (HRES) and efficient Light Emitting Diode (LED) as improvement of conventional street light system. HRES replaces fossil fuel that copes with availability, price, and environment problem. LED supplants conventional light bulb to achieve more efficient lighting in term of intensity, power consumption, and price. At first, initial data is collected to model the design. Based on the model, power flow analysis of the street light system is calculated. Minimum and maximum configuration of the design is also known from the analysis. The minimum and maximum configuration, then, is used as population that will be processed in Genetic Algorithm. Optimal configuration on both supply and load is evaluated in Genetic Algorithm process. Loss of Power Supply Probability (LPSP) and Cost of Energy (COE) are two objectives that are used in the evaluation. Result from the entire simulation outcomes optimum unit size of the designed street light system. This result is analyzed to get significant contribution in improvement of street light system, maximize system reliability, and minimize system cost implementation.

KEYWORD

Street Light, HRES, Genetic Algorithm, LPSP, COE