

Balancing Cost, Operation and Performance in Integrated Hydrogen Hybrid Energy System

Abstract

This paper shows the way to design the aspects of a hybrid power system that will target remote users. It emphasizes on the hydrogen hybrid power system to obtain a reliable autonomous system with the optimisation of the components size and the improvement of the capital cost. This system is chosen to provide electricity for a small and remote located community. A methodology is developed for calculating the correct size of the system and for optimizing the management. The main power for the hybrid system comes from the photovoltaic panels, while the fuel cell and secondary batteries are used as backup units. The optimization software used for this paper is the hybrid optimization model for electric renewables (HOMER). HOMER is a design model that determines the optimal architecture and control strategy of the hybrid system. It can also determine the sensitivity of the outputs to changes in the inputs. It performs an hourly time series analysis on each of hundreds or thousands of different system configurations