

Abstract

This paper presents a comparative analysis of control techniques used on induction generators for stand-alone Pico hydropower schemes. The techniques were tested on a prototype Pico hydropower system modeled for the site developed in western Uganda by the Centre for Research in Energy and Energy Conservation. The case study scheme to date is manually operated, a process that requires constant attention due to variations in load. This demonstrated the need for an automatic load controller. The site specifications were considered when designing models using Matlab simulink employing the automatic load control techniques. These model designs are simple so that it is affordable for local practical application. The proposed designed control techniques presented in this paper are composed of logic gates, IGBT switch, uncontrolled diode rectifier, the PID controller and other semiconductor devices supplying an electrical load and a ballast load. In addition, the response of the case study site and the Matlab model to load variations is presented.