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Editorial

Editorial to the 'Special Issue-Analyzing energy storage systems for the applications of renewable energy sources' of AIMS Energy

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Renewable energy use has been increasing during the last decade to reduce greenhouse gas emission and to diminish the use of conventional fuels such as coal, oil and gas. Among renewable energy sources, geothermal energy that is used for power production, space cooling and heating is the only source of energy that does not require energy storage due to its continuous heat flow regardless of ambient conditions [1–4]. However, solar energy as well wind energy and hydropower are the most widely used renewable energy sources which are not intermittent source of energy, hence they need energy storage systems [5]. This use of energy storage systems will make the system more expensive due to the high cost of energy storage systems [6].

This Special Issue aims to present the most recent technologies of energy storage systems integrated with renewable energy sources.

The first paper [7] of this Special Issue presented a global overview of renewable energy strategies of hybrid renewable energy systems (HRESs) and Integrated Renewable Energy Systems (IRESs) considering technical, economic and environmental limitations for obtaining the most suitable renewable energy systems in their present location. Voltage stability is one of the most important parameters in renewable energy systems that depend on weather conditions. Voltage stability was analyzed and assessed under continuous increase in load condition for IEEE 30 bus test network [8] where battery energy storage system was considered. The results of this work showed that the voltage stability could be controlled to remain above the acceptable limit in all lines. Photovoltaic cells (PV) uses only photon energy of solar spectrum near the solar cell band gap

energy to convert it to electricity, hence the rest of solar energy is converted into thermal energy which is not used by the solar cell. Such thermal energy can be used to drive a thermoelectric generator (TEG) for electricity production. The optimum configurations and performance of TEG was carried out using Matlab/Simulink [9] where it was shown that the symmetrical electrical configuration assured that the total output resistance of TEG modules is close to that of single TEG regardless of the quantity used. Hydropower is one of the most used renewable energy source worldwide. For instance, Ethiopia has a tremendous potential of hydroelectric source that meets Ethiopia energy demand [10]. In this paper, politics of hydropower from Grand Ethiopian Renaissance Dam (GERD) construction point of view has been discussed.

Another work about hydropower development in Uganda has been presented and discussed [11]. This study showed that there are major challenges regarding the development of hydropower in Uganda, which are namely technical, economic and environmental as well as social issues. The study also presented and discussed solutions to resolve these challenges that lacks the development of hydropower in Uganda.

Based on the above studies, there is a large space to improve and develop renewable energy systems worldwide taking into consideration the limitations and challenges that each country is facing in using renewable energy systems.

As the Guest Editors of this Special Issue "Analyzing energy storage systems for the applications of renewable energy production", we would like to thank the editorial team of AIMS Energy, authors and reviewers for making the completion of this project successful.

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