

Small Scale Solar-Photovoltaic and Wind Pump-Storage Hydroelectric System for Remote Residential Applications

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Abstract : The use of hydroelectric pump-storage system at large scale, MW-size systems, is already widespread around the world. Designed for large scale applications, pump-storage station can be scaled-down for small, remote residential applications. Given the cost and complexity associated with installing a substation further than 100 miles from the main transmission lines, a remote, independent and self-sufficient system is by far the most feasible solution. This article is aiming at the design of wind and solar power generating system, by means of pumped-storage to replace the wind and/or solar power systems with a battery bank energy storage. Wind and solar pumped-storage power generating system can reduce the cost of power generation system, according to the user's electricity load and resource condition and also can ensure system reliability of power supply. Wind and solar pumped-storage power generation system is well suited for remote residential applications with intermittent wind and/or solar energy. This type of power systems, installed in these locations, could be a very good alternative, with economic benefits and positive social effects. The advantage of pumped storage power system, where wind power regulation is calculated, shows that a significant smoothing of the produced power is obtained, resulting in a power-on-demand system's capability, concomitant to extra economic benefits.

Keywords : battery bank, photo-voltaic, pump-storage, wind energy

Conference Title : ICSREE 2015 : International Conference on Sustainable and Renewable Energy Engineering

Conference Location : Montreal, Canada

Conference Dates : May 11-12, 2015