

Design of wind energy storage power station



Overview

This paper discusses about remote area power supply (RAPS) system for the conversion of power from wind into electrical energy along with supercapacitor and battery storage to supply main load and dum.

How a wind energy storage system works?

To meet the power demand, the wind generator operates to generate power. When the power demand can be met with the wind energy generation, energy storage system is not supplying power to the load . If the demand is more than the wind power generator, energy storage system is operated along with windmill.

How is wind energy power generation and storage implemented?

In this paper, standalone operation of wind energy power generation and storage is discussed. The storage is implemented using supercapacitor, battery, dump load and synchronous condenser. The system is simulated for different power generation and storage capacity. The system is regulated to provide required voltage.

What is a windmill power generation system with energy storage system?

The basic block diagram of the windmill power generation system with energy storage system is shown in Fig. 1. The block diagram shows that the windmill is used to convert the wind power to electrical power, and it is rectified using rectifier to convert ac into dc signal.

How energy storage devices improve the performance of the proposed system?

The energy storage devices improve the performance of the proposed system by supplying or absorbing the mismatch. The supercapacitor in the storage system makes the battery to be away from deep discharge regions. The balancing of power is done with maximum power extraction from wind.

What is the difference between energy storage system and wind power generator?

When the power demand can be met with the wind energy generation, energy storage system is not supplying power to the load . If the demand is more than the wind power generator, energy storage system is operated along with windmill. The demand can be met exactly with the operation of both windmill operation and battery storage system .

How a wind power generation system varies based on its operating modes?

The wind power generation varies based on its operating modes of the wind generator speed of rotation. To meet the power demand, the wind generator operates to generate power. When the power demand can be met with the wind energy generation, energy storage system is not supplying power to the load .

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