



Autonomous power supply and system enclosure based on hybrid renewable energy sources with wireless communications

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A system solution (Thermobox) for autonomous power supply protection from elements and built-in telemetry was developed for installation of an automatic weather station (AWS) in a remote location with no grid power and housing available. The given system provides the following functions: collects, conserves and distributes low voltage electrical power, protects equipment from low temperatures with a regulated heating option, houses electronic devices and solar batteries, and functions with wireless communications through the 3G network. Thermobox has the following system elements: solar panel (24 V, 270 W), wind turbine (24 V, 200 W), wooden enclosure, two rechargeable solar batteries (each 12 V, 100 Ah), hybrid charge controller (solar and wind), wireless router, 3G modem, controlled low voltage power distribution using direct current (DC-DC), heater, inside and outside temperature sensors, and a control module. The system was successfully tested in field conditions. The Thermobox design can be applied as an all-in-one solution to provide electrical power from renewable sources with protection from weather conditions while allowing wireless communication.

