

## Energy storage systems chad

where  $P_{pv-out}$  represents the power output of the PV,  $P_{pv-rated}$ ; the PV rated power at reference test condition,  $G$ ; the solar radiation ( $W/m^2$ ),  $G_{ref}$ ; the solar radiation at standard temperature condition ( $G_{ref} = 1000 W/m^2$ ),  $T_{ref}$ ; the cell temperature at reference conditions ( $T_{ref} = 25 ^\circ C$ ),  $K_T$ ; the temperature coefficient of the PV module.

Where,  $P_{WECS}$  is the Output power of WECS;  $\rho$  is the air density;  $A$  is the area swept by rotor blades;  $V_s$  is the velocity of wind;  $C_p$  is the performance coefficient of wind turbine;  $\lambda$  is the tip-speed ratio of blade;  $\beta$  is the blade pitch angle;  $\eta_t$  and  $\eta_g$  are respectively the wind turbine and generator efficiency.

where  $P_{G-rated}$  represents the nominal power of the diesel generator,  $P_{G-out}$ ; the output power, while  $A_G$  and  $B_G$  represent the coefficients of the fuel consumption curve defined by the user (Liter/kWh).

where  $EL$  represents the daily average load,  $AD$ ; the number of autonomy days,  $\eta_{inv}$  and  $\eta_{batt}$  are respectively the battery and the inverter efficiency, and  $DOD$  is the battery's depth of discharge.

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