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New energy battery cabinet has large temperature difference

Overview

What is the temperature distribution of a battery cabinet?

The results show a great difference in temperature at various heights of the battery cabinet. The batteries of the lower height level have a temperature about 25°C; the batteries of the higher height level have a temperature near 55°C. There are also differences in the temperature distribution for various battery cabinets.

What is the average temperature of a battery?

The results reveal that the average temperature of each cabinet is about 39°C; the standard deviation of the battery temperatures is about 15°C, and the maximum difference in battery temperature is about 40°C.

How much heat does a battery storage system generate?

A battery-storage system has a maximum heat generation about one tenth that of a fully loaded data center. Also, a BESS is on its maximum power for a brief interval to satisfy the demand of a rapid fluctuation of the grid; the data center must sustain a high load under an extended period , , .

How does temperature change affect battery performance?

After modification, the maximum temperature difference of the battery cells drops from 31.2°C to 3.5°C, the average temperature decreases from 30.5°C to 24.7°C, and the coefficient of performance (COP) increases four-fold. The modification shows an improvement in temperature uniformity, overall temperature and COP.

What is a single battery temperature?

The single battery temperature is defined by the area-weighted averaged surface temperature of the battery. To analyze the temperature uniformity, we applied the standard deviation (STDEV) and the maximum difference (dTmax) to measure the variance.

Can a divergence theorem convert battery heat generation to uniform heat flux?

The divergence theorem was used to convert the battery heat generation to a form of uniform heat flux for the boundary conditions in the CFD. A similar method was implemented in a previous study to investigate the flow pattern of an outdoor battery-storage cabinet .

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