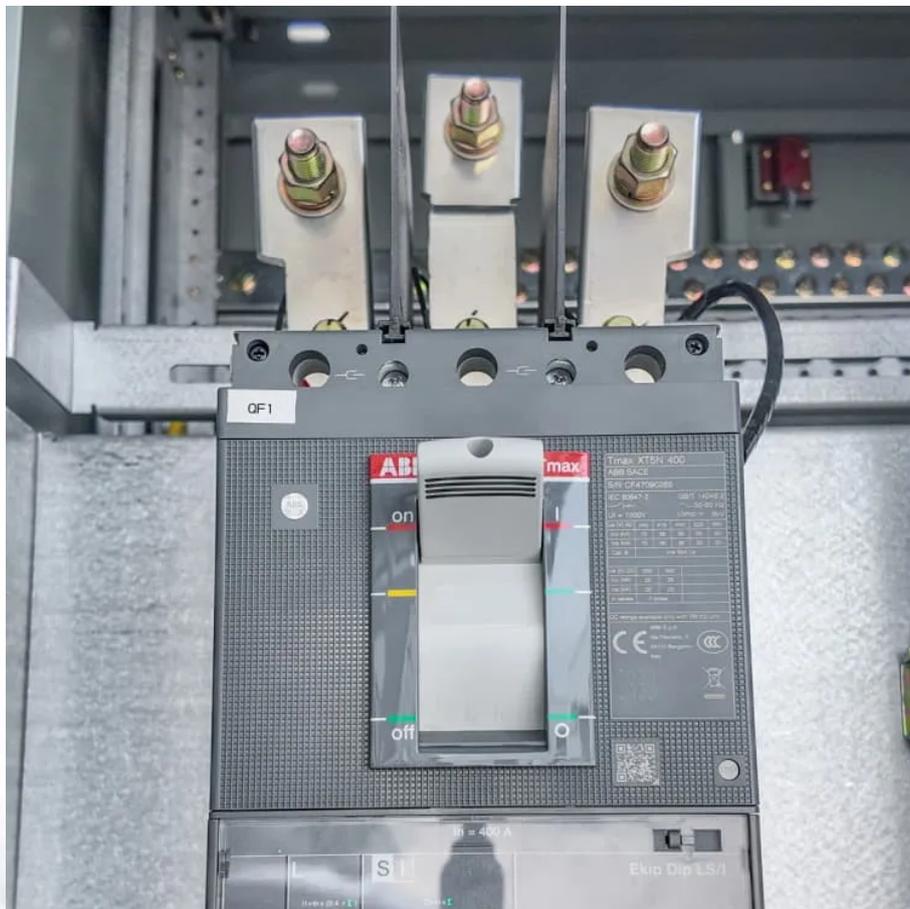


# When did liquid cooling for energy storage begin to be used





## Overview

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Liquid cooling technology has evolved significantly since its inception in the 20th century when data centers first adopted it for high-efficiency cooling. Are liquid cooled battery energy storage systems better than air cooled?

Liquid-cooled battery energy storage systems provide better protection against thermal runaway than air-cooled systems. “If you have a thermal runaway of a cell, you’ve got this massive heat sink for the energy be sucked away into. The liquid is an extra layer of protection,” Bradshaw says.

What is the difference between air cooled and liquid cooled energy storage?

The implications of technology choice are particularly stark when comparing traditional air-cooled energy storage systems and liquid-cooled alternatives, such as the PowerTitan series of products made by Sungrow Power Supply Company. Among the most immediately obvious differences between the two storage technologies is container size.

What is a liquid air energy storage system?

An alternative to those systems is represented by the liquid air energy storage (LAES) system that uses liquid air as the storage medium. LAES is based on the concept that air at ambient pressure can be liquefied at  $-196^{\circ}\text{C}$ , reducing thus its specific volume of around 700 times, and can be stored in unpressurized vessels.

When was liquid air first used as a storage medium?

The first concept, available in the literature on using liquid air as the storage medium, was proposed in 1977 by Smith . The core component of the system proposed was a regenerator used both to cool down and to heat up the air during the liquefaction process and the discharge phase, respectively.



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### LIQUID COOLING ENERGY STORAGE SYSTEM

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