SODIUM SULFUR BATTERIES

CASES

FACT SHEET

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What are Sodium Sulfur Batteries?

Sodium sulfur (NaS) batteries describe a group of batteries that use sodium and sulfur as electrodes. In some variations, the electrolyte is a solid sodium-ceramic compound while in others molten sodium serves as the electrolyte.

Sodium and sulfur are both relatively inexpensive and abundant elements that can be found in most parts of the world. This makes them an attractive alternative to lithium-based batteries that rely on rare minerals, such as lithium and cobalt, which are concentrated fewer regions, including politically and environmentally fragile regions.

What Are Sodium Sulfur Batteries Used For?

NaS batteries are used in grid-scale and utility applications. One limitation of using the technology in a broader range of applications is its operating temperature of 300°C. This makes them unattractive for producers of consumer applications, like portable electronics and electric vehicles. As a result, it also hinders achieving the same widespread distribution and economies of scale as lithium-ion batteries despite sodium sulfur batteries being an older technology.

The market for sodium sulfur is dominated by a single Japanese business, NGK Insulators. They provide grid-connected NaS battery facilities in Japan and across the globe, including a 108 MW/648 MWh system in the United Arab Emirates that provides back up in the event of grid failure and reduces strain on the grid during peak demand.

Sodium Sulfur Batteries and Renewable Energy

There are several features of sodium sulfur batteries that make them an attractive option for energy storage systems and potentially for electric vehicles. They can provide an average of six hours of power compared to four hours from lithium-ion batteries. NaS batteries are also made of less expensive and more abundant materials, they are more durable so they can be fully charged and discharged more frequently—they can last more than double the number of charges of a lithium-ion battery. Their electrolytes and electrodes are non-toxic in contrast with lithium-ion. Sodium sulfur batteries also have the potential for higher energy density, which means that they could provide greater range for electric vehicles while using less space.

There are several prototypes of sodium sulfur that operate at lower temperatures and offer the potential for a safer, less expensive, and more durable alternative to lithium-ion batteries. These have not reached commercial viability but could become available within this decade.

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