Mckinsey long duration energy storage

Mckinsey long duration energy storage

McKinsey"s Energy Storage Team can guide you through this transition with ...

As efforts to decarbonize the global energy system gain momentum, attention is turning increasingly to the role played by one of the most vital of goods: heat. Heating and cooling--mainly for industry and buildings--accounts for no less than 50 percent of global final energy consumption and about 45 percent of all energy emissions today (excluding power),1The baseline includes emissions from heating, industrial processes, transport, and other energy sector emissions. It excludes power generation emissions, which are discussed in the 2021 LDES Net-Zero Power report. so decarbonizing heat is central to the effort to achieve net-zero emissions (Exhibit 1).

Less well understood is often the role that managing and storing heat can play in addressing a crucial challenge facing the power sector: how to increase the share of inherently variable renewable sources, such as wind and solar in the energy mix while ensuring supply matches demand.

This article is based on research and analysis provided by McKinsey as a knowledge partner on the report "Net-zero heat" by the LDES Council. McKinsey experts included: Martin Linder, Jesse Noffsinger, Robert Riesebieter, Ken Somers, Humayun Tai, and Godart van Gendt, representing views from McKinsey"s Advanced Industries, Electric Power & Natural Gas, Sustainability Practices and the Battery Accelerator Team.

Thermal energy storage (TES) comprises a set of technologies that could both accelerate decarbonization of heat and help establish a stable, reliable electricity system predominantly powered by renewables. TES can be charged with renewable electricity or waste heat to discharge firm, clean heat to users such as industrial plants or buildings.

A new industry report with insights and analysis by McKinsey shows how TES, along with other forms of long-duration energy storage (LDES), can provide "clean" flexibility by storing excess energy (electrical or thermal) at times of peak supply and releasing it as heat when demand requires. It shows that when heat cannot be directly generated with renewable electricity, TES can be a more cost-efficient and low-carbon way of fulfilling heat demand than delivering a steady electricity supply with stored renewable power. TES can cover a wide range of heat applications, including reaching the very high temperatures required in some industrial processes.

The report is published together with the LDES Council, an executive-led organization formed to bring together the industry ecosystem and build a holistic fact base, thereby accelerating the cost reductions achievable through deployment of LDES solutions.

As discussed in the earlier net-zero power report by the LDES Council, the energy system will likely need to operate more flexibly as the renewables" share in the power mix grows. Right now, the necessary flexibility is provided mainly by dispatchable fossil-fuel generation, but that is not a long-term solution that achieve climate targets. The more sustainable alternative will likely be a mix of flexibility solutions, including LDES (and TES).

While direct electrification via renewables supports net-zero heat when the sun is shining and the wind is blowing, combining renewables with storage can help to complete the decarbonization of heating. Deploying TES can enable the provision of clean heat from renewables to industrial processes such as chemicals or food and beverage production.

All of these activities can help to match variable renewable electricity generation with demand and enable the system to operate at maximum efficiency, thus reducing the need to invest in infrastructure to cope with peaks and troughs. TES provides supply-side and demand-side storage and helps reduce the waste involved in curtailing renewable supplies at times of peak supply. It can improve overall grid utilization and reduce system stress, while in the process facilitating faster deployment of renewables.

TES can enable the cost-efficient electrification of most heat applications including steam and hot air, two of the most common forms of heat used in industrial processes. It covers a spectrum of technologies that can address a wide range of storage durations (from intraday to seasonal) and temperatures (from subzero to 2,400?C). According to the LDES benchmarking results, TES could facilitate cost-efficient clean heat provision. Exhibit 2 illustrates one example and compares the levelized cost of delivering medium-pressure steam using TES to other fossil and clean technologies.

Some TES technologies are already commercially available and can be easy to deploy and integrate with existing systems--for example, medium-pressure steam as applied in the chemicals and food and beverage industries. Innovative technologies that can help address higher-temperature needs well above 1,000?C are also on the way.

Contact us for free full report

Web: https://kary.com.pl/contact-us/
Email: energystorage2000@gmail.com
WhatsApp: 8613816583346