

What is the economic potential of energy storage type?

Economic potential of energy storage type varies with the built context. Li-ion batteries are economically viable solution for self-sufficiency improvement. Reversible fuel cells are suitable as a long-term storage solution.

Can energy storage technologies improve urban energy performance?

Summary of findings and limitations The case study's results, summarized in Table 7, demonstrated that the scope and economic potential of different energy storage technologies and configurations (single and hybrid) for improving the energy performance of an urban energy community depends on (and varies with) its built context (form and function).

Does urban context influence energy storage prospects?

Case study The case study intends to demonstrate the merits of the analytical framework and exhibit the influence of urban context on energy storage prospects. It evaluates and compares the techno-economic potential of ESSs (of single and hybrid types) for improving the performance of energy communities of different urban built types.

What is community energy storage?

In urban areas, community energy storage serves various purposes including increasing self-consumption, enabling the seamless integration of intermittent renewables, and providing economic incentives (Barabino et al., 2023; Koirala et al., 2018; Zhang et al., 2023).

How can a public awareness campaign reduce energy waste?

Behavioural guidelines and economic benefits increase intentions to save energy. The current enormous levels of energy waste are among the main culprits for climate change. Research in the field of energy has suggested the need for more effective public awareness advertising campaigns to modify consumer behaviour and reduce waste.

Does community energy storage meet performance objectives?

Previous studies on community energy storage have largely focused on system design and operations to meet certain performance objectives such as maximum self-sufficiency (Dorahaki et al., 2023; Fan et al., 2022; Guo et al., 2021; Kang, et al., 2023, 2023; Tostado-Véliz et al., 2022).

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As can be seen from Figure 2, the integrated energy agent is a combination of different energy agents to build a multi-agent of integrated energy. 1-8, respectively, represent the charging and discharging power of electric energy storage, photovoltaic output, input power of electric boilers, procurement and sales of electricity from external ...

between storage filling level and stored energy value (which is 0 when storage is empty). 4.2.3 DQL Agent with Increased Action Space Exploring the addition of a fourth action allowing agents to sell stored energy aimed to boost savings in scenarios with full storage, high export prices, and low energy

energy storage simultaneously until the energy storage is fully charged; and if that is so the exceeding power will be sold to the grid. o Full-Match-Load mode. In this mode the solar power will never be sold to the grid, it will supply only to the house load first, and to charge the energy storage when the power exceeds the load.

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Energy storage is gaining more attention since it enables higher penetration of renewables, achieving energy arbitrage and enhancing the power systems resilience [1], [2]. However, the high installation and maintenance costs of energy storage systems hinder their application [3]. In contrast, installing a shared energy storage system (SESS) for

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According to the report of the United States Department of Energy (USDOE), from 2010 to 2018, SS capacity accounted for 24 %. consists of energy storage devices serve a variety of applications in the power grid, including power time transfers, providing capacity, frequency and voltage support, and managing power bills [[52], [53], [54]].

The energy-saving effects ranged from 0.4% to 33%, and the energy cost savings ranging from 9% to 47%. ... For renewable energy power generation devices, energy storage devices, and the prediction of the overall grid load, a MACS can be employed for control and adjustment. ... When equipped with energy storage devices, the agents can adjust the ...

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In the Optimal II scenario (which enforces 100 % self-consumption), the optimal ESS comprises Li-ion battery technology only (an average of 16 MWh). However, self-sufficiency remained almost the same as in the case without storage. The average energy cost-saving was reduced to 4.5 % (from 6.5 %).

4.1 Influential factors. The first step to achieve energy waste reduction is to understand where it originates from. According to Ashouri et al. (), there are four major influential factors of this phenomenon: Building characteristics Construction materials and insulation levels are obvious factors that increase energy waste in all types of buildings. van den Brom et al. ...

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Studies on energy storage as an enabler of renewable energy communities have largely ignored the influence of urban built context on its performance improvement potential. This paper thus presents a systematic approach that incorporates features of built form and function, using an agent-based model of urban energy demand and supply, in the performance analysis of urban ...

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