

# Energy storage transformation of office buildings

Can residential transformation reduce energy consumption in old office buildings?

Evaluating the feasibility of residential transformation of old office buildings in terms of energy consumption and economic costs. It is feasible to achieve net zero energy consumption in old office buildings through residential transformation. Combining measures can each reduce energy consumption and life cycle costs by over 20 %.

Can office buildings be made energy-efficient?

Shiyu Wan et al. proposed a framework for sustainable energy-efficient retrofits of office buildings. They found that improvements in lighting and air-conditioning systems can reduce energy consumption by around 8-13% in a large office building.

Does converting office spaces to residential spaces affect energy consumption?

Especially, renovating HVAC systems when converting office spaces to residential ones involves changes in thermal zones, which significantly affect energy consumption. Thirdly, the study did not account for potential increases in electrical equipment usage and related energy consumption and operating costs due to home office setups.

Can smart building technologies improve energy performance of existing office buildings?

The research investigates the impact of applying smart building technologies on energy performance of existing office buildings in Egypt. Smart building technologies can improve energy performance and are retrofit-friendly, with wireless capabilities that decrease installation costs compared with wired technologies.

What is one way to save energy in an office building retrofit?

Maatouk Khokhi et al. selected an office building in UAE as a case study of the retrofitting of an existing office building to achieve lower energy consumption. They concluded that the upgrading in HVAC system and the use of variable air volume (VAV) can save energy by 8.49%.

Is it possible to achieve net zero energy consumption in old office buildings?

It is feasible to achieve net zero energy consumption in old office buildings through residential transformation. Combining measures can each reduce energy consumption and life cycle costs by over 20 %. Prioritizing the residential transformation of low-energy, large-area, low-height buildings in old office structures.

The paper developed by Sørensen et al. [1] analyzes energy flexibility in buildings, focusing on electric vehicles (EVs) in Norwegian apartment buildings along with photovoltaic generation. Results indicate significant flexibility potential through shared energy management systems, with EV charging time shifts leading to increased electricity use and power ...

c, The PVT system mounted on the south elevation of the Active Office facade. d, The energy

dashboard displayed in the foyer of the Active Office, showing visitors the building's energy ...

The total electricity consumption from commercial sector was about 9% during 2013-14 in India. Load research survey was carried out to study the usage patterns for all types of electric appliances used in commercial establishments at income, appliance and end-use levels in Gujarat state of India - one of the most progressive states.

The energy storage capacity of the water storage tank is 60 m<sup>3</sup> and full automatic control system is designed for the system ... wind energy, etc." For those office buildings with high building density and occupant density in the large city, wind energy is not suitable. ... Importance of policy for energy system transformation: diffusion of ...

Established in November 2022, Stor4Build is a multilaboratory consortium working to accelerate the development, optimization, and equitable deployment of cost-effective ...

The results from a case study show that, first, the model of office + multi-courtyards has positive impact on climatic adaptation, in terms of ventilation, air temperature, thermal ...

select article Charging performance of latent thermal energy storage system with microencapsulated phase-change material for domestic hot water ... A case of study of an office building in different weather conditions. ... select article Developing a generic System Dynamics model for building stock transformation towards energy efficiency and ...

heat pump model, and the thermal energy storage model, an integrated numerical simulation model for office building heating is established. The model is used to investigate the ...

The results show that renewable energy has a notable effect of energy savings in existing office building, as it could be integrated in the building with minimum intervention. At the end, it can be deduced that the investment ...

Domestic hot water (DHW) is the second-largest use of BEC for residential buildings, lighting is the second-largest use of building energy in office buildings. Compared with residential buildings, office buildings have high requirements for lighting, indoor ventilation and space cooling [107].

This paper describes a novel office building attached photovoltaic (OBAPV) system consisting of the photovoltaic (PV) array, office building, electric vehicle and power grid. ...

Inline to the ice thermal energy storage system simulation, MacPhee and Dincer [137] performed a detailed investigation on the energetic and exergetic efficiencies of four different ice thermal energy storage systems suitable for air conditioning applications. They analyzed the charging, storage and discharge cycle efficiencies

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for the ice ...

Transformation of Buildings and Urban Spaces to Adapt for Future Mobility: A Systematic Literature Review ... where an education office building management system was developed for operation and management ... In ...

Battery electricity storage is a key technology in the world's transition to a sustainable energy system. Battery systems can support a wide range of services needed for the transition, from providing frequency response, reserve capacity, black-start capability and other grid services, to storing power in electric vehicles, upgrading mini-grids and supporting "self-consumption" of ...

The main aim of this study is to propose a retrofitting design approach to transform existing office buildings into life-cycle net-zero energy and carbon, The flow chart in Fig. 8 demonstrates how to use the proposed LCNZE and LCNZC retrofitting design approach in practical implications. ... Furthermore, energy storage technologies effectively ...

They found that incorporating energy storage systems into building energy systems can enhance system reliability and reduce dependency on the electricity grid. Wang ...

The Ministry of Housing and Urban-Rural Development of the PRC issued the Technical Guideline for Establishing an Energy Conservation Supervision System for Buildings in Colleges and Universities (AC 2009, No. 163) jointly with the Ministry of Education in 2009 [5].The guideline divides school buildings into 7 categories and 13 types, including teaching buildings, ...

Energy in China's New Era The State Council Information Office of the People's Republic of China December 2020 Contents Preamble I. Developing High-Quality Energy in the New Era II. Historic Achievements in ...

To address office vacancy and housing shortages, adaptive transformations of office buildings into residential spaces are proposed. While renovating old office buildings is prioritized, energy and ...

In the same way that societies transform, times change, and cities evolve, industrial architecture modernizes and technifies, sometimes reaching a state of abandonment or ruin. Understanding its ...

The construction of buildings and their operation contribute to a large proportion of total energy end-use worldwide [1], [2], [3] the building sector, most energy is consumed by existing buildings while the replacement rate of existing buildings by the new-build is only around 1.0-3.0% per annum [4], [5], [6], [7].Therefore, rapid enhancement of energy efficiency in ...

Thermal energy storage (TES) is one of several approaches to support the electrification and decarbonization

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of buildings. To electrify buildings efficiently, electrically ...

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The world is undergoing a rapid energy transformation dominated by growing capacities of renewable energy sources, such as wind and solar power. ... increasing by up to 50% the space available for residential or office space in the building. ... This paper concludes that Lift Energy Storage Technology could be a viable alternative to long-term ...

Some progress has been achieved for the flexible energy management of HVAC systems and EV charging loads in buildings. In Ref. [6], the HVAC systems of buildings were utilized to accommodate the on-site renewable energy within users' temperature comfort, which can increase the penetration of renewable energy Ref. [7], an energy scheduling method of ...

„??,15000?7000,???

In 1976, the concept of zero-energy consumption buildings (ZEBs) was first proposed by Esbensen (Danish Technical University) (Wilberforce et al., 2021) untries around the world responded quickly, and Germany promoted the development of passive houses (Schnieders et al., 2015) the United States, the federal government issued the Federal ...

Concerning the double carbon national strategy, the energy-saving renovation of old buildings has become one of the most important tasks of energy conservation and emission reduction in construction in China. There ...

An inter-office energy storage project in collaboration with the Department of Energy's Vehicle Technologies Office, Building Technologies Office, and Solar Energy ...

The study suggests prioritizing renovation for small to medium-sized old office buildings with energy consumption below 348.3 kWh/m<sup>2</sup> &#183;yr, footprint area over 2000 square meters, and height under 26 m. This study highlights the benefits of functional transformation over energy-saving transformations in reducing operational energy and costs ...

The global clean energy transformation has begun The world's energy systems are changing. Driven by strong demand for clean energy and mounting impacts from climate-driven extreme weather, entities around the world are setting ambitious goals to reduce emissions from the fossil fuels that have powered economic growth for over a century.

Directive 2010/31/EU promotes the refurbishment of existing buildings to change them into nearly

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zero-energy buildings (nZEBs). Within this framework, it is of crucial importance to guarantee the best trade-off between ...

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