Ultra-low energy consumption building energy storage equipment

What are ultra-low energy consumption buildings?
Among them, ultra-low energy consumption buildings (ULEBs) have become representative of efforts to balance the service demand and the need for energy self-sufficiency (Ohene et al., 2022). In 1976, the concept of zero-energy consumption buildings (ZEBs) was first proposed by Esbensen (Danish Technical University) (Wilberforce et al., 2021).

Can ultra-low energy consumption be implemented at different energy consumption levels?
To date,studies on the implementation of ultra-low energy consumption have been based mainly on the analysis of the effects of certain technologies,and few studieshave examined the regional implementation paths at different energy consumption levels.

Why is the operational state of energy-efficient ultra-low energy consumption buildings important?
The operational state of energy-efficient ultra-low energy consumption buildings is very important to achieve energy savings and emission reductions,which are currently necessary considerations for the development of the building industry.

Can ulebs be realized only by the application of existing energy-saving technologies?
The comprehensive application of existing energy-saving technologies indicates that the minimum EUI of conventional buildings in HSCW areas is 38.43 kWh/(m 2.a),while the energy consumption target value in these areas is 29.04 kWh/(m 2.a). This shows that ULEBs cannotbe realized only by the application of existing active technologies.

By using measured energy consumption and an energy model to simulate the energy performance of this space, this paper evaluates the potential energy savings based on different occupant behavior. This paper describes occupant behavior simulation methods and evaluates them using a robust dataset of 15 minute interval sub-metered energy consumption data.

This paper describes a two-year high-fidelity dataset for an ultra-low energy office building and living laboratory called HouseZero®. The building integrates multiple low-energy technologies ...

ULEBs are subject to stringent thermal design requirements. The thermal characteristics of these buildings have been qualitatively analyzed by various scholars, with particular focus on the key technologies necessary to achieve ultra-low energy consumption [2], [3], [16].For example, Yongming Ji et al. [17] analyzed the factors contributing to the high ...

The practice of passive and ultra-low energy consumption buildings in severe cold region, "Chenneng·Xishu garden"-the first demonstration project of passive and ultra-low-energy green building in severe cold regions of China ... [5,6], combing energy storage material like phase change

material with walls [7,8], employing systems with variable ...

The applicability and energy consumption of a parallel-loop ... To achieve the carbon neutrality goal, the power industry has been included in China national carbon trading market since 2017 [1].And the construction industry, an important sector consuming one third of the energy in the world, will soon be included in the carbon trading system [2].The ultra-low energy building ...

The building was designed as an ultra-low energy building according to the Chinese Technical Standard for Nearly Zero Energy Buildings ... The applicability and energy consumption of a ...

Although China is a developing country, its energy consumption has exceeded that of the USA and is now the highest in the world. The primary energy consumption in China reached 3.86 × 10 7 GWh in 2018, accounting for 22% of the world"s total primary energy consumption and being 1.42 times that of the USA (IEA, 2019). The energy consumption in ...

The building sector contributes immensely to the total energy consumption, particularly for its space conditioning and demotic hot. Evidence from a variety of research suggests that the built environment contributes substantially to global ...

To discuss how to set reasonable energy consumption target values for ULEBs based on different regions and performance, this paper takes conventional buildings and ...

and electric vehicles) and energy supply equipment (such as energy storage and cogeneration). Among them, due to the highest proportion of air conditioning systems in building energy consumption (about 30-40%) [2], so virtual energy storage (VES) technology based on flexible regulation of air conditioning systems has also become

Demonstration project of a 1,000MW coal-fired power plant with ultra-low ... Efficient energy storage. Building energy storage and conversion devices or systems through plasma processes is also a ...

Ultra-Low Energy Consumption. ... Second, the equipment used to run the house must be sized to match this demand while using the least amount of energy possible. ... Not everything about building an energy efficient house has to be difficult like constructing an intelligently detailed Passive House building envelope. A little extra research and ...

1 The US Department of Energy (2015a) has established a consensus definition of a zero-energy building: "an energy-efficient building, where, on a source energy basis, the actual annual delivered energy is less than or equal to the on-site renewable exported energy. Ultra-low energy buildings (also referred to as zero-energy ready) are energy ...

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Occupant behavior has an important impact on building energy consumption, and the accuracy of an occupant behavior model directly affects the reliability of energy consumption simulation results. Ultra-low energy buildings ...

Firstly, the evaluation index weight of passive ultra-low energy consumption building energy-saving effect is determined by multi scheme decision-making method, and the index evaluation system is established according to the index weight, and the fuzzy similarity of evaluation indexes is calculated and clustered by fuzzy grey clustering method ...

Based on an analysis of actual data obtained from energy consumption monitoring, verification of energy-saving renovations and green building evaluations in Chongqing, this paper suggests setting the target value for ultra-low energy consumption buildings in hot summers and cold winters areas at 29.04 kWh/(m 2.a), proposes a technology system ...

As buildings play a significant role in mitigating climate change (Li et al., 2018; Zhang et al., 2015), many studies have been conducted on mid-to-long term policy and technology impact on energy consumption and carbon emission trend.Yu et al. (2014) studied the impact of U-factor of buildings on energy consumptions, and found that the Chinese building ...

Thermal energy storage (TES) technologies can reduce or eliminate the peak electric power loads in buildings, and utilize benefits of waste heat recovery and renewable energy. This thesis work consists of TES literature review and ...

In this paper, a solar-driven heating and cooling system integrated with air source heat pump is designed and applied to the ultra-low energy building. The heat and electricity from the compound parabolic concentrated-photovoltaic thermal collector are fed to air source heat pump to increase the efficiency of the air source heat pump. Integrating energy, social, ...

Energy consumption in public and residential buildings worldwide accounts for approximately 20.1% of total energy consumption [1].According to 2017 data, the energy consumption of the building sector in the US accounts for about 39% of the total primary energy use [2] China, the building sector consumed approximately 20% of the primary energy and ...

Energy storage techniques need to respond to the needs of future (2030) buildings with very low energy and power requirements. This would include the use of natural energy from earth and ...

Medical Imaging Equipment Energy Efficiency. NREL | 2. Overview o Background o MRI technology & energy use ... causes a significant increase in building energy consumption. MIE Typical Energy Use [Knott et al. 2017] MRI: X-Ray ... (-263.8°C or -442.8 °F). These ultra-low temperatures drop the niobium-titanium (Nb-Ti) conductor resistance ...

boundaries of building energy efficiency. These developments have provided a great opportunity and powerful catalyst for realizing BCA"s aspirational of achieving Positive Energy, Zero Energy and Super Low Energy Buildings (known as Super Low Energy) that are 60-80% more energy efficient over 2005 levels.

Liquid air energy storage could be the lowest-cost solution for ensuring a reliable power supply on a future grid ... including high-demand growth plus high and low costs for renewable energy and for natural gas. Cetegen ...

-keywords: ultra-low energy consumption building; energy analysis::a:2095-2104(2012)1??,2008

completed ultra-low energy building (ULEB) retrofit projects demonstrates that deep energy savings are technically feasible. These projects show which approaches are being ...

The Advanced-Efficiency Approach or Ultra-Low-Energy Buildings (ULEB) is a further development of a Low-Energy Building, requiring up to 90 % less primary energy consumption than a conventional new building. The Ultra-Low-Energy Building maximizes a building"s energy efficiency potential. An Advanced-Efficiency Approach is needed to attain ...

Through the research of prefabricated passive experiment, this paper analyzes the problems and key points that should be paid attention to in the design and construction ...

Ultra-low temperature (ULT) freezers are typically designed to operate between -56°C and -86°C and they are usually operated at a set point of -70°C or -80°C (CBEA, 2012). When new, these freezers consume approximately 16 to 22 kilowatt hours (kWh) per day, which is about as much energy as an average family household.

Field Demonstration of High-Efficiency Ultra-Low-Temperature Laboratory Freezers. Energy Efficiency & Renewable Energy. R. Legett, 2014 Factors affecting the performance, energy consumption, and carbon footprint for ultra-low temperature freezers: case study at the National Institutes of Health. World Review of Science, Technology and Sust ...

The ever-expanding urban construction area has caused energy shortages and significant environmental pollution. Fig. 1 shows the total energy consumption and building carbon emissions in China from 2000 to 2016 (China Building Energy Report, 2018).As the figure shows, the total energy consumption of buildings in China increases each year, while their carbon ...

If such a building"s remaining energy consumption is supplied by clean, carbon-neutral renewable energy, it would be responsible for little or no greenhouse gas emissions. ... building control algorithms and performance ...

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