INDUSTRIAL PARK ENERGY STORAGE OVERTIME INTENSITY

The optimization of energy storage capacity is an effective measure to reduce the construction cost for the zero-carbon big data park powered by renewable energy. This study first analyzes the characteristics of the power source and grid network of the zero-carbon big data park. Then Comprehensively considering the investment cost, operation, and maintenance cost, carbon a?|

The energy infrastructure in an industrial park is defined as shareable utilities that are located within the park and provide energy for the park, e.g., heat and electricity 31. Climate change

Experiments verify that the microgrid energy load curve and the peak and valley electricity price are considered to participate in the demand side response. The output of each piece of a?|

Achieving the win-win goal of economic development and carbon intensity reduction, especially through industrial restructuring, is a challenge involving uncertainty and complexity. Determining which industry is green and whether it should be encouraged or limited at different stages of economic development are key issues. The relationship between industrial a?|

The building sector accounts for approximately 36% of global energy consumption and 38% of carbon emissions [1] China, buildings consumed 1.02 billion tons of coal equivalent (TCE) for operations in 2019, representing approximately 21% of the country's total energy consumption and 22% of carbon emissions [2] 2020, building construction and a?|

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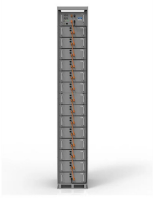
The energy utilization indexes of the power supply system in the industrial park with different optimal allocation methods are also examined, which are listed in Table 4. It is shown that the indexes of energy directly supplied by RES, energy shifting by BESS, energy from utility grid, RER and REDR for the method with the improved DARTP-DR


The optimization model of the power grid, wind power, photovoltaic, and battery hybrid power supply system is of great significance to improve the utilization efficiency of renewable energy, promote the consumption of renewable energy, and achieve the goal of reducing carbon emissions [1,2,3].The academic research of Wang Hao and others is focused a?|

Meanwhile, industrial energy productivity (industrial value added per unit of energy input) has risen in most regions since 2000, mainly thanks to the deployment of state-of-the-art technologies, use of more efficient equipment, and structural shifts that result in a larger role for high value-added light industry (e.g. electronics).


Given that the sustainable economic development in China is severely restrained by a rapid increase in energy consumption, an industrial structure adjustment can act as an effective and feasible measure to reduce China's energy intensity.This study empirically analysed the linear and nonlinear relationships between industrial structure adjustment and energy a?|


Source: U.S. Energy Information Administration, Office of Energy Consumption and Efficiency Statistics, Form EIA-871A and E of the 2012 Commercial Buildings Energy Consumption Survey. About EIA Open Data

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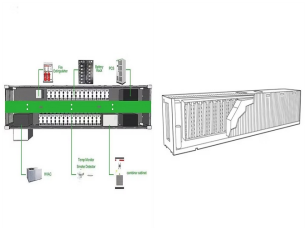
Table 2: Examples of available technologies for the energy-intensive industries 35 Table 3: Estimated share of energy costs (excluding feedstocks) in 2017 in the EU27 38 Table 4: Overview of existing funding mechanisms for energy-intensive industries 42 Table 5: Technology roadmap for each sector, based on sector roadmaps and expert judgment.

Existing literature in the field of energy economics has investigated and highlighted some factors contributing to energy intensity, such as per capita income (Agovino et al., 2019; Jimenez and Mercado, 2014), technological innovation (Wurlod and Noailly, 2018), urbanization (Farajzadeh and Nematollahi, 2018), trade openness (Pan et al., 2019; Rafiq et a?|



Industry represents 30% of U.S. primary energy-related carbon dioxide (CO 2) emissions, or 1360 million metric tonnes of CO 2 (2020). The Industrial Decarbonization Roadmap focuses on five of the highest CO 2-emitting industries where industrial decarbonization technologies can have the greatest impact across the nation: petroleum refining, chemicals, iron and steel, cement, and a?|

An industrial park containing distributed generations (DGs) can be seen as a microgrid. Due to the uncertainty and intermittency of the output of DGs, it is necessary to add battery energy a?|

Energy storage is one of the most important elements of PED and also for EIP. The storage of heat and electricity must be quality and long lasting as it is possible. Fang et al. (2021) analyzed hybrid energy storage system in an industrial park based on variational mode decomposition and Wigner a?? Ville distribution. IP has energy management

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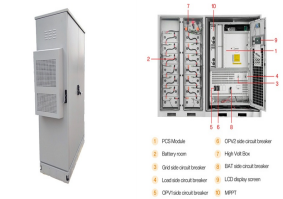
Onsite production of gigawatt-scale wind- and solar-sourced hydrogen (H2) at industrial locations depends on the ability to store and deliver otherwise-curtailed H2 during times of power shortages.



The Industrial Development Report 2018 of the United Nations Industrial Development Organization [6] reaffirms that industries should create a "virtuous circle of sustainable consumption is a system in which fossil fuel inputs are gradually replaced with renewable energy, materials and energy are used more efficiently, and final goods are reused a?|

Energy intensitya??calculated as total energy consumption divided by real gross domestic product (GDP)a??is a common energy indicator and efficiency measure. In 2020, U.S. energy intensity reached a low of 5.05 thousand British thermal units (Btu) per chained 2012 dollar, down 4% from the previous year and less than half as energy intensive as

The research on demand response and energy management of parks with integrated energy systems abounds. In Ref. [3], the energy time-shift characteristics of the energy storage system are fully considered and adjusted as a demand-side flexibility resource Ref. [4], the flexible load and the convertible load are fully considered, wind and light uncertainty a?|

China's industrial energy consumption accounted for approximately 70% of national energy demand in the past four decades. Regarding energy demand and environmental pollution, success in controlling energy demand and reducing energy intensity for industrial sectors in China would play a crucial role for the country's sustainable growth problems. To a?|

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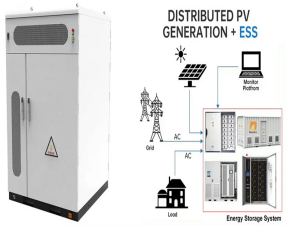
The literature has discussed measures that can control or even reduce energy intensity; these mainly include technological progress [4, 5], structural changes involving energy mix [6, 7], and industrial structural adjustment [8, 9].Among these measures, there have been systematic studies on the role of technological progress in reducing energy intensity [5, 10, 11].

The industrial park is assumed to connect to Bus 10 in the IEEE 30-bus system to import electricity, and the MEF of Bus 10 is used to estimate emissions. With every five minutes, the aggregate power of the industrial park is added to Bus 10 in the IEEE 30-bus system. To obtain MEF of bus i at time t (MEF i, t) (Eq.



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In 2016, the Ministry of Industry and Information Technology (MIIT) proposed the industrial green development plan to emphasize the promotion of the establishment of green IPs (MIIT, 2016) 2021, the China State Council issued a notice on the action plan for carbon peak before 2030 to deploy the work of the IPs in several places, including focusing on energy a?|

Energy is a key element of human social, economic development and the lifeblood of industrial production. For centuries, traditional fossil energies such as oil, coal, and natural gas have become increasingly exhausted, and the energy problems for human survival in the future have become increasingly severe, which leads to an imbalance in energy supply a?|

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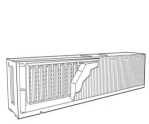
The EERE energy intensity index is designed to be a more accurate measure of underlying energy efficiency change because it excludes a variety of factors unrelated to energy efficiency. The (EERE) economywide energy intensity index is based upon an energy-weighted average for four major end-use sectors. The weights are based on shares of source


Establishing an industrial park-integrated energy system (IN-IES) is an effective way to reduce carbon emission, reduce energy supply cost and improve system flexibility. However, the modeling of hydrogen storage in traditional IN-IES is relatively rough. The seasonal energy storage analysis approach of [[16], [17]

The installations of Photovoltaic (PV) systems and Battery Energy Storage Systems (BESS) within industrial parks holds promise for CO 2 emission reduction. This study aims to comprehensively evaluate the economic and environmental benefits of PV and BESS a?|




The multi-vector energy solutions such as combined heat and power (CHP) units and heat pumps (HPs) can fulfil the energy utilization requirements of modern industrial parks. The energy a?|


This research primarily focuses on three types of energy storage equipment: heating energy storage (HES), and cooling energy storage (CES) and electrical energy storage (EES). The mathematical model formula for energy storage equipment s is as follows: (10) E ES (t) = (1 a?? r) E E S (t a?? 1) + I. E S c h P E S c h (t) I? t a?? P E S d