

Proportion of Renewable Energy Development Scenarios and Pathways" (China Energy Development Strategy), the proportion of renewable energy power generation will reach 85% by 2050, and the proportion of wind power and photovoltaics will achieve 63%, which means that while currently a supplementary energy, renewable energy is gradually changing

REopt is a techno-economic decision support model used to optimize energy systems for buildings, campuses, communities, and microgrids. REopt recommends an optimal mix of renewable energy, conventional generation, and energy storage technologies to meet cost savings and energy performance goals.

Bakhtavar et al. (2020) considered four objectives to optimize the energy system for a net zero energy consumption community: minimization of the total life cycle cost, minimization of the negative environmental impact of the energy system, maximization of the renewable energy proportion in the energy supply, and minimization of the energy ...

Economic development and population growth pose enormous challenges to ensuring adequate water, energy and food globally. By 2030, the global demand for food is expected to have increased by 50% [1], the energy demand by 40% [2], and the water demand by 30% [3]. Water, energy and food security have become key global issues that need to be ...

Renewable energy transition is the initiative of the global energy sector to move away from fossil fuels (such as natural gas, oil, and coal) towards renewable energy sources (Hassan et al., 2024). The environmental Kuznets curve (EKC) illuminates the intricate association between environmental decline and economic growth (Wang et al., 2024b) and it is considered ...

Inter-regional power grid planning up to 2030 in China considering renewable energy development and regional pollutant control: A multi-region bottom-up optimization model. ...

Regional energy planning plays a vital role in its sustainable development, in which integrating renewable energy sources with fossil fuels can efficiently reduce fuel consumption and mitigate environmental pollution. However, the plan involves multi-dimensional uncertain factors and requires comprehensive optimization methods.

Unified multi-objective optimization for regional power systems with unequal distribution of renewable energy generation and load. Long Zhao, Xiangfei Meng, Lichao ...

At the Copenhagen climate conference, the Chinese government promised that renewable energy

An optimization model for regional renewable energy development

consumption would account for 15% of primary energy consumption in China by 2020 [1] reality, the development of renewable energy has attracted unprecedented attention not only in China but all over the world [2]. On the one hand, since the oil crisis in the 1970s, ...

Renewable energy is playing an increasingly important role in energy security and environmental protection. As China has a huge demand for renewable energy and also has abundant wind resources, it is vital that government, investors and operators work together to ensure the sustainable development of the wind energy industry. Even though China is ...

Golden, CO: National Renewable Energy Laboratory. NREL/TP-TP-6A20-74110. Cole, Wesley J., and Nina M. Vincent. 2019. Historical Comparison of Capacity Build Decisions from the Regional Energy Deployment System (ReEDS) Model. Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-71916. Frazier, A.

Multi-objective optimization model for regional renewable biomass supported electricity generation in rural regions ... The findings revealed that coal and biomass mixing is a viable option for sustainable development. Byon et al. (Byun et al., 2022) proposed a hybrid model combining process simulation, life cycle assessment and supply chain ...

Optimizing the industrial structure is an important way to address resource constraints, achieve sustainable development. In this study, a planning method that combines the superstructure modeling concept and the mathematical method of mixed integer programming is proposed to investigate the optimized results of the coal industry under given constrained ...

In order to adapt to the future energy transformation situation, the development of renewable energy has become an important part of national energy strategies. By 2018, the global installed capacity of renewable energy power generation totaled 2391 GW, accounting for one-third of the total installed capacity of power generation in the world.

In this paper, a strategic decision making model for the sustainable development of marine renewable energy is proposed, and a specific application to the United Kingdom (UK) is...

Renewable Sustainable Energy 1 July 2024; 16 (4): 045301. ... the operation optimization model of integrated energy system is established with three objectives of total cost minimization, carbon emission minimization, and energy curtailment rate minimization. ... Operation optimization of regional integrated energy system based on the modeling ...

Multi-objective model is a standard optimization model in energy planning. ... Then, the optimal multi-regional rural renewable energy development map and optimal RHRES coupling scheme are obtained. Secondly, according to the optimal RHRES coupling scheme in each region, the RHRES physical model is

established. Based on the min costs and the ...

Using Renewable Energy (RE) is growing day by day. We need to locate RE in the best place to maximize energy production and supplier profit. As a result, we propose a novel method for RE location (REL). This model suggests a Data-Driven Robust Optimization (DDRO) for multi-objective REL by considering Risk (DDROMORELR). We consider risk by adding min ...

Driven by clean and low-carbon targets, the efficient utilization of renewable energy sources, such as wind and solar power, is becoming the mainstream trend in future energy development [1]. The integrated energy system (IES) leverages the conversion and complementary properties of various energy sources, ensuring organic coordination and optimization across all stages of ...

Purpose of Review: Optimization-based methods for the food-energy-water nexus can assist decision-making on critical infrastructure but are limited in scope and applicability. We provide an overview of optimization-based systems modeling techniques for operations researchers and systems modelers for the nexus. Recent Findings: We find that the literature ...

The development of renewable energy has become an important means for the world to cope with climate change, ensure energy security, and protect the ecological environment. Using the panel data of 30 provinces in China from 2013 to 2021, this study used the mediating effect model and the spatial Durbin model (SDM) to explore the mechanism and ...

China's regional energy development model is still dominated by fossil fuel energy, and the proportion of renewable energy driving economic growth is relatively low. ... Research on comprehensive evaluation and structural optimization of China's renewable energy development. J. Res. Sci. 33, 431-440. Google Scholar. Liu, J., Zhang, D ...

As early as 2010, Yang [] published a monograph that systematically illustrated the advantages and disadvantages of distributed energy systems and analyzed the components, development status, problems, and future trends of distributed energy systems from technology, economic, and social aspects 2011, Manfren et al. [] presented some available models for ...

Development of a multi-regional factorial optimization model for supporting electric power system's low-carbon transition - A case study of Canada. ... Emodi et al. (2019) highlighted the roles of renewable energy development and carbon taxes in GHG emission mitigation in Australia's electricity systems using the LEAP-OSeMOSYS.

Energy challenge and environmental pollution are serious threats to the sustainable development of society and economy [1]. The heavy reliance on fuel oil for traditional vehicles contributes to about 15 % of global greenhouse gas emissions in the transport sector [2]. While electric vehicles (EVs) help mitigate environmental

pollution, their rapid growth creates substantial charging ...

Optimized model for coordinated development of regional sustainable agriculture based on water-energy-land-carbon nexus system: A case study of Sichuan Province. ... (AEM) for producing hydrogen. An optimization model of the renewable energy system and a mathematical model of the electrolyzer are developed to achieve this objective. The ...

But regional sustainable development requires sustainable energy planning, which includes multi-factors such as energy sources, energy systems, and spatial layouts. Integrated energy system (IES) uses multi-energy, such as natural gas and renewable energy, to produce power, heat, and cold energies for the regional demands (Berjawi et al., 2021).

The results show that the proposed multi-objective model can combine different optimization demands together, maximize the economic characteristics of clean energy while ...

At present, there are many solutions proposed for the problem of renewable energy consumption, such as increasing energy storage devices [5], expanding cross-regional transmission capacity, optimizing the dispatching strategy of generating units [6], etc. Among them, power grid partitioning [7] and load-side management [8] are two solutions with high ...

This optimization energy model has been deployed together with a Delphi questionnaire to assess energy costs, resource constraints, and reliability of electricity supply based on renewable resources in the long term [216]. ... DEP models usually apply to regional power development. The RIEP (Regional Integrated Energy Plan) is software-aided ...

Inter-regional power grid planning up to 2030 in China considering renewable energy development and regional pollutant control: A multi-region bottom-up optimization model. Author links ... An inexact bi-level simulation-optimization model for conjunctive regional renewable energy planning and air pollution control for electric power ...

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