

Kongres Container

Virtual Power Plant Energy Storage Power Station Project



Overview

The virtual power plant project is led by the New Energy Research Institute of the State Energy Group, and is jointly implemented by first-class domestic research and development institutions such as the China Electric Power Research Institute and the North China Electric Power University to provide engineering planning and design, key technology research and development, full-process technical support and full life cycle operation services for the project.

What is a virtual power plant?

The proposed virtual power plant integrates photovoltaic (PV) and wind turbine (WT) systems into a microgrid topology, facilitating efficient energy management across generation, storage, distribution, and consumption components. Communication systems enable real-time monitoring and control for optimal system operation.

What challenges do virtual power plants face?

The transition to renewable energy sources and distributed energy generation (DG) has spurred the global evolution of energy production methods. However, virtual power plants (VPPs) face challenges due to fluctuations in renewable energy sources (RES) production, such as those from photovoltaics and wind turbines.

Can virtual power plants improve grid stability and reliability?

Virtual power plants (VPPs), integrating multiple distributed energy resources, offer a promising solution for enhancing grid stability and reliability. However, challenges persist in effectively managing the variability of renewable energy generation and ensuring grid stability. Existing research highlights several critical shortcomings:

What is a virtual power plant (VPP)?

The “virtual” nature of VPPs comes from its lack of a central physical facility, like a traditional coal or gas plant. By generating electricity and balancing the energy load, the aggregated batteries and solar panels provide many of the

functions of conventional power plants. They also have unique advantages.

Can virtual power plants be used as a primary user-side resource?

The rapid deployment of renewable energy and the surpassing of expectations in the penetration rate of EVs in China present opportunities for the significant growth of virtual power plants (VPPs) and vehicle-to-grid (V2G) interactions. The enormous potential and advantages of V2G as a primary user-side resource are further revealed.

What are the design considerations for a virtual power plant?

Design considerations for the virtual power plant focus on technical feasibility, economic viability, and regulatory compliance, ensuring a balanced and reliable power supply through the integration of production, storage, and distribution components.

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