



Taking The Pulse

Insights on Climate Developments in China

July 2024

Welcome to Taking the Pulse!

Taking the Pulse (TTP) provides the global climate community with access to the latest thinking inside China on the low-carbon transition.

In July, the Third Plenary Session of the Central Committee made a series of important arrangements to improve China's green development mechanism, highlighting the need to accelerate the country's new energy transition.

In this issue, TTP focuses on the power market transition and its role in ensuring the security and stability of the power system, which remains a tough task as extreme weather events and the instability of renewable power continue to pose a challenge.

IN FOCUS: ACCELERATING MARKET-BASED POWER REFORM UNDER EXTREME WEATHER CHALLENGES

- **Extreme Heat Strains the Power System**

As the world set another record for the highest temperature on July 22, China is also facing a dual challenge of intense heat and heavy rainfall. The newly published [Blue Book on Climate Change in China 2024](#) highlights that, as a region highly vulnerable to climate change, China is experiencing significant shifts in its climatic patterns. These shifts include more frequent and intense episodes of extreme high temperatures and precipitation.

Amid these anomalous weather conditions, the challenge of maintaining the stability and safety of the power system has become more complex. [Zhang Xing](#), Deputy Director-General of the Comprehensive Department of National Energy Administration, noted in a recent press conference that since the onset of summer, several regions in China have faced persistent high temperatures, causing power demand to surge and repeatedly set new records. On July 24, the national power load peaked at 1.451 billion kilowatts, surpassing last year's record by over 100 million kilowatts. By late July, [many provinces](#) had reached all-time highs in power demand, with Guangdong surpassing 150 million kilowatts for the first time this year.

Beyond the seasonal spike in demand due to summer heat, the rapid expansion of renewable energy capacity has also introduced new challenges for power system stability

and energy integration. According to [data](#) published by China's Electricity Power Development Research Institute, by the end of June, the combined capacity of grid-connected wind and solar power reached 1.18 billion kilowatts nationwide, overtaking coal-fired power capacity (1.17 billion) for the first time. While this milestone is a positive step toward the goal of 1.2 billion kilowatts of wind and solar capacity by 2030, renewable energy generation is more susceptible to weather fluctuations, making the power it supplies less predictable amid frequent extreme weather events.

- **Demand-Side Solutions for Managing Power Supply Volatility**

An energy column in the [Economic Daily](#) argues that relying solely on building new power plants to meet the short-term volatility in electricity demand during the summer peak is neither cost-effective nor sustainable. A more efficient approach is to adjust power consumption patterns on the demand side.

[Li Yutong](#), Deputy Director of Laboratory at the Shenzhen Institute of Building Research Co., Ltd., notes that while market-driven demand-side responses are more complex due to the need to coordinate with multiple stakeholders, they offer significant cost advantages. For instance, reducing peak load in Shenzhen through demand-side management costs less than 2% of what it would take to build conventional power generation facilities, such as coal or gas plants. However, enthusiasm for investing in these demand-side solutions has not peaked.

Cooling demand, particularly from air conditioning, is a key driver of increased electricity usage during the summer. By focusing on smart management of air conditioning loads, it's possible to achieve sustainable demand-side management with minimal expense, argues Chen Jingying, a researcher at the Regulatory Assistance Project. In this [article](#), she notes that air conditioning offers substantial potential as a demand response resource in scorching summer months, especially with a seasonal capacity compensation mechanism.

In case you missed it: [Cool Communities: Raising Awareness about Green Cooling in China](#)

- **Strengthening the Role of Virtual Power Plants in Grid Regulation**

As an advanced energy management approach that integrates generation, grid, load, and storage resources, virtual power plants (VPPs) can do more than just manage adjustable loads like air conditioners and EV charging stations. During peak demand periods, VPPs can also coordinate distributed solar power systems and user-side energy storage to stabilize the grid.

Since the launch of the [second power system reform](#) in 2015, which aimed to “regulate the middle (grids) and open up the two ends (generation and consumption sides)”, China has seen numerous large-scale virtual power plant pilot projects emerge across various provinces during the 13th Five-Year Plan period (2016-2020). Recently, China's first [all-](#)

[green electricity-powered VPP](#) began operation in Ningbo, Zhejiang, marking a significant milestone in renewable energy integration and load balancing.

The [Electricity Market Supervision Measures](#), effective from June 1, formally recognize VPPs as participants in power trading. [Zhang Chong](#), Senior Engineer of Innovative Investment at the State Power Investment Corporation, noted that this opens the door for flexible resources such as controllable loads, new energy storage, and distributed renewables to enter the market, thereby enhancing user-side flexibility and driving market diversity and efficiency.

Nevertheless, VPPs still face significant challenges in participating in the electricity spot market and achieving sustainable commercial operation. An analysis published by [China Energy News](#) identified three key issues: first, there is a lack of comprehensive, long-term policy planning, leading to imbalances between rapid development and quality outcomes; second, the technical standards and management frameworks for VPPs are still underdeveloped; and third, the power market mechanisms are in their infancy, with gaps in entry criteria, trading options, and profitability, which threaten the long-term sustainability of the VPP industry.

- **Advancing Market-Driven Reforms in the Power Sector**

The [resolution](#) of the Third Plenary Session, released on July 18, underlined the importance of deepening energy management reforms, establishing a unified national power market, and pushing forward price reforms in the energy sector. It emphasized that market and pricing reforms are central to the broader energy system reform.

An article in [Caixin](#) has pointed out that nine years after the second round of power sector reform, many experts now believe the focus should shift towards fostering high-quality growth in renewable energy. A key point is refining price mechanisms to better support the integration of renewables and the increase of capacity. [Zhang Lin](#), Director of the Planning and Development Department at the China Electricity Council, noted that the market-based power reforms should facilitate the orderly market entry of renewables, enhance the renewable energy consumption responsibility framework, and explore the possibility of assigning consumption responsibilities to end-users.

[An article](#) in China Strategic Emerging Industry Magazine emphasized that the electricity sector continues to operate under a "semi-planned, semi-market" dual-track system. The slow evolution of pricing mechanisms has hindered electricity prices from accurately reflecting market dynamics and cost changes, which has undermined market efficiency and fairness. [Zhou Xiaochuan](#), Vice Chairman of the Boao Forum for Asia, posited that optimizing the power system hinges on incentive and guided price mechanisms. He proposed incorporating carbon emissions into power pricing, making coal power more expensive and renewables like wind and solar more affordable, thereby providing appropriate incentives across the power system and passing these price differences on to consumers.

Sources of the Expert Views Cited in This Newsletter:

National Energy Administration: [National Energy Administration's Press Conference for the First Half of 2024](#)

Economic Daily: [What Changes Will Turning up the AC by 1°C in the Summer Bring?](#)

Southern Weekly: [In the Face of Extreme Weather, This Small Action Has Great Impact](#)

China Electricity Council: [Seasonal Capacity Mechanisms Mobilize Demand-Side Resource Development](#)

Economic Daily: [Virtual Power Plants Will be the New Engine of the Electricity Market](#)

China Energy News: [Virtual Power Plants as a Bridge to Demand-Side Participation in Power System Operations and Market Transactions](#)

Caixin Weekly: [Next Steps in the Power System Reform](#)

National Business Daily: [Explore the Implementation of Weighting Renewable Energy Consumption Responsibility to End-Users](#)

China Strategic Emerging Industry Magazine: [How the Power System Reform Breaks the Challenges in the New Energy Era](#)

Caixin Weekly: [Market-Based Power Reform Under Climate Change](#)

Other Topics You May Also Be Interested In:

- **Energy Transition** | [As China seeks to advance its electricity reform, it is crucial to shift focus to the user side](#)
- **Extreme Weather** | [Highly sensitive to climate change, China is facing significant shifts in its climate system](#)
- **Green Finance** | [It is essential to refine the structure of green financing to solve the investment overheating in the PV and wind power sectors](#)

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<https://www.igdp.cn/taking-the-pulse-library/>

Thank you for reading!

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