

Review of power sector development in the first half of 2023

In the first half of 2023, due to the impact of high temperatures and other factors, the challenge of ensuring power supply has been increasing, and coal power has continued to play an essential supporting role. At the same time, China continued to accelerate the green energy transition, renewable energy maintained a sound development momentum, the proportion of installed renewable power generation capacity has historically exceeded that of coal power, and the construction of new-type energy storage facilities has been accelerating. Wind and solar PV power generation have increased rapidly, and the renewable power curtailment rate has remained within a reasonable range.

The challenge of ensuring the power supply has increased

In the first half of 2023, the electricity consumption of the whole society increased by 5% year-on-year, 2.1 percentage points higher than that of 2022 H1. Affected by the improvement of the agricultural economy and the recovery from the epidemic, the electricity consumption of the primary and tertiary industries rose significantly, with year-on-year growth rates of 12.1% and 9.9%, respectively. In summer, China has been experiencing continuous high temperatures, and the national daily dispatched power generation (30 TWh/+5.3% y-o-y) and the peak power load (1340 GW/+3.8% y-o-y) hit a record high.

Affected by less precipitation, hydropower generation in the year's first half fell by 22.9% year-on-year. To further ensure power supply security, coal and natural gas production and import continued to increase. The proportion of coal power generation remained at nearly 60%, and it was still the most important source of power supply, giving full play to the role of "ballast stone".

According to the forecast of the China Electricity Council (CEC), the growth rate of electricity consumption in the whole society in the second half of 2023 can reach 6%~7%. The government requires continuous strengthening of fuel supply, urges all types of power sources to be fully generated, and simultaneously strengthens inter-provincial power mutual aid to improve power security and supply capabilities.¹¹

References

¹¹ "2023年上半年全国电力供需形势分析预测报告," China Electricity Council, 31 July 2023, accessed at <https://cec.org.cn/detail/index.html?3-323217>; "国家能源局2023年三季度网上新闻发布会文字实录," National Energy Administration, 31 July 2023, accessed at http://www.nea.gov.cn/2023-07/31/c_1310734825.htm.

¹² "国家能源局发布2023年上半年光伏发电建设运行情况," National Energy Administration, 27 July 2023, accessed at <https://www.cnpower.com.cn/news/71798.html>.

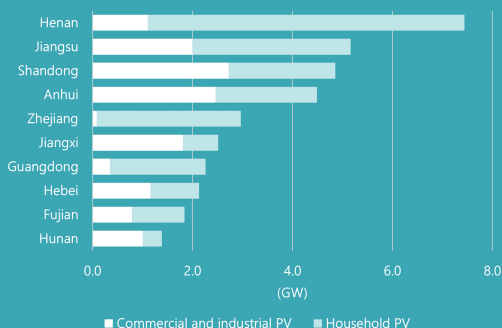
¹³ "2023年上半年全国电力供需形势分析预测报告," China Electricity Council, 31 July 2023, accessed at <https://cec.org.cn/detail/index.html?3-323217>; "国家能源局2023年三季度网上新闻发布会文字实录," National Energy Administration, 31 July 2023, accessed at http://www.nea.gov.cn/2023-07/31/c_1310734825.htm.

Solar PV leads the newly installed capacity

In the first half of 2023, China's newly installed power generation capacity was 140 GW, and power source investment increased by 53.8% year-on-year. The newly installed renewable power capacity was 109 GW, a year-on-year increase of 98.3%, accounting for 77% of the total newly installed capacity. By June 2023, China's total installed power generation capacity reached 2,707 GW, of which 48.8% was renewable power, surpassing coal power (42.1%) in history. The total installed capacity of wind power and solar PV reached 859 GW, which is expected to reach 960 GW by the end of the year, accounting for one-third of the total installed capacity.

- **The growth of wind power capacity nearly doubled.** The newly installed wind power capacity was 23 GW in 2023 H1, more than 10 GW compared to 2022 H1. Onshore wind power is absolutely dominant, and the "Three Norths" region accounting for 70.6%.
- **Utility-scale and distributed solar PV both experienced rapid growth.** The newly installed capacity of solar PV power generation was 78 GW, accounting for 55.6% of the total newly installed capacity. The newly added capacity of utility-scale PV and distributed solar PV increased by 234% and 108%, respectively, year-on-year. The cumulative installed capacity of distributed solar PV reached 41 GW, of which 21 GW were household solar PVs, and central and eastern provinces such as Henan, Jiangsu, Shandong, Anhui and Zhejiang saw the largest increase.¹²
- **New-type energy storage continued to expand quickly,** with a growth of 8.6 GW, equivalent to the total installed capacity over the years, and the lithium-ion battery played the absolute dominant role. North, northwest and central regions together accounted for 80% of China's total, of which the newly installed capacity in Shandong reached nearly 3 GW, and that of Hunan and Ningxia reached 2.6 GW and 2 GW, respectively.¹³

Top 10 provinces of newly installed distributed solar PV capacity in the first half of 2023



Source: PV-perspective, July 2023

Newly installed power generation capacity and total installed capacity in the first half of 2023 by fuel type

	Newly installed capacity	Total* installed capacity	Total* electricity generation
Total	141 GW (+72 GW y-o-y)	2702 GW (+10.8% y-o-y)	4168 TWh (+3.8% y-o-y)
Thermal power	26 GW	1357 GW (+3.8% y-o-y)	2946 TWh (+7.5% y-o-y)
Nuclear power	1.2 GW	57 GW (+2.2% y-o-y)	212 TWh (+6.5% y-o-y)
Hydropower	5.4 GW	419 GW (+4.5% y-o-y)	450 TWh (-22.9% y-o-y)
- General hydropower	2.1 GW	370 GW	
- Pumped storage	3.3 GW	49 GW	
Wind power	23 GW	389 GW (+13.7% y-o-y)	463 TWh (+20% y-o-y)
- Onshore wind power	22 GW	358 GW	
- Offshore wind power	1.1 GW	31 GW	
Solar PV	78 GW	470 GW (+39.8% y-o-y)	266 TWh (+30% y-o-y)
- Utility-scale solar PV	37 GW	272 GW	
- Distributed solar PV	41 GW	198 GW	
Biomass power	1.8 GW	43 GW (+9.2% y-o-y)	98 TWh (+10% y-o-y)
New-type energy storage	8.6GW/17.8 GWh	17 GW/36 GWh	
Share of non-fossil energy	77.6%	50.9%	35.7%
Share of renewable energy	76.7%	48.8%	30.6%

Note: *Total refers to power plants above designated scale, which is less than the sum of the capacity/generation by technology below; it does not include new-type energy storage. Source: National Energy Administration (NEA) and China Electricity Council (CEC), July 2023

References

- ¹⁴ "2023年上半年全国电力供需形势分析预测报告," China Electricity Council, 31 July 2023, accessed at <https://cec.org.cn/detail/index.html?3-323217>; "国家能源局2023年三季度网上新闻发布会文字实录," National Energy Administration, 31 July 2023, accessed at http://www.nea.gov.cn/2023-07/31/c_1310734825.htm.
- ¹⁵ "2023年6月全国新能源并网消纳情况发布," National New Energy Consumption Monitoring and Early Warning Center, 1 August 2023, accessed at https://www.sohu.com/a/708105602_703050.

Wind power and solar PV power generation are growing rapidly

The total power generation of power plants above the designated scale nationwide was 4,168 TWh, a year-on-year increase of 3.8%. Among them, thermal power and nuclear power generation increased by 7.5% and 6.5%, respectively. Renewable power generation was 1,277 TWh, accounting for round 30% of total power generation. Wind power, solar PV and biomass power generation increased by 20%, 30% and 10% respectively year-on-year.

The average utilisation hours of units above 6 MW was 1,733 hours, a year-on-year decrease of 44 hours, mainly affected by the insufficient output of hydropower (1239hr/-452hr y-o-y). The utilisation hours of coal and nuclear power increased, reaching 2,244 hours and 3,770 hours, respectively. The utilisation hour of wind power was 1,237 hours, an increase of 83 hours year-on-year; solar power generation was 658 hours, a year-on-year decrease of 32 hours.¹⁴

From January to June 2023, the national average wind curtailment rate was 3.3%, of which Hebei, Gansu and Mongolia were higher than 5%; the national average solar curtailment rate was 1.8%, Qinghai and Tibet were higher than 5%.¹⁵