



MONTHLY CHINA ENERGY UPDATE |

China's Power Market Half Year 2024 Review

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NEWLY INSTALLED CAPACITY

Figure 1. New Capacity Installed in China in Jan-June 2024

		Jan-June 2024	Share of new adds (%)	Change (yoy %)	Jun-24	Share of new adds (%)
Thermal Power	GW	18.3	12%	-30%	6.2	17%
Hydropower	GW	5.0	3%	-7%	1.6	4%
Nuclear Power	GW	1.2	1%	0%	0.0	0%
Wind Power	GW	25.8	17%	12%	6.1	16%
Solar Power	GW	102.5	67%	31%	23.3	63%
Total capacity added	GW	152.8	100%	14%	37.1	100%
Renewable Energy adds	GW	133.3	87%	25%	31.0	83%
Zero Emissions Capacity Adds	GW	134.5	88%	25%	31.0	83%
Investment in Completed Power Grid Project	1 billion yuan	254.0		24%	83.7	

Source: NBS, CEF Estimates

During the first 6 months of CY2024, China installed a total of 152.8GW of new capacity additions, a 14% y-o-y increase. 134.5GW or 88% were zero emissions capacity, a 25% y-o-y increase.

Solar power continues to lead the way. From January to June, 102.5GW of solar power capacity was newly added to the grid, representing 67% of the total new installs, an excellent +31% y-o-y.

According to China's [National Energy Administration](#) (NEA), 49.6GW of new solar installations are centralised solar power stations, and 52.9GW are distributed solar. In June alone, 23.3GW of solar capacity was newly installed, 63% of the total.

Solar is followed by wind power capacity additions, with 25.8GW newly added to the grid, representing 17% of the total newly installed capacity, 12% y-o-y increase. June saw China add 6.1GW of wind power capacity, 16% y-o-y increase.

During the first 6 months, 5GW of hydropower was newly added to the grid, representing 3% of the total new adds, a 7% y-o-y decrease.

1.2GW of nuclear capacity was added from January to June, 1% of the total new capacity added, a 0% y-o-y increase.

During the same January to June period, China added another 18.3GW of thermal power capacity, accounting for 12% of the total new capacity additions. Pleasingly this was a 30% y-o-y decrease.

However, June alone saw China add 6.2GW of new thermal capacity, one third of the total new thermal power capacity additions for the entire 1HCY2024, +17% y-o-y.

Although China’s thermal new additions during the first 6 months of CY2024 show a decline, CEF believes for China to reach its ‘dual carbon’ targets – peaking carbon emissions by 2030 and achieving carbon neutrality by 2060 – it needs to cease new thermal expansion as early as possible, even noting its orientation to new low utilisation, flexible coal plants.

INSTALLED CAPACITY

Figure 2. National Installed Capacity as of June 2024

		Jun-24	Share of Capacity	Change (yoy %)	Jun-23
Thermal Power	GW	1,405	46%	3.5%	1,357
Hydro Power	GW	427	14%	2.2%	418
Nuclear Power	GW	58	2%	2.3%	57
Wind Power	GW	467	15%	19.9%	389
Solar Power	GW	714	23%	51.6%	471
Total of Installed Capacity	GW	3,071	100%	13.4%	2,708
Renewable Energy Capacity	GW	1,607	52%	25.8%	1,278
Zero Emissions Capacity	GW	1,665	54%	23.3%	1,351

Source: NBS, CEF Estimates

By the end of June 2024, China had a total installed capacity of 3,071GW, a 13.4% y-o-y increase. Notably, 54% of the total installed capacity comes from zero-emissions energy sources, reaching 1,665GW, a 23.3 % y-o-y increase.

Of this, solar power has a total installed capacity of 714GW, accounting for 23% of the total installed capacity, a 51.6% y-o-y increase.

Wind power was 467GW of capacity, 15% of total installed capacity, a 19.9% y-o-y increase.

Hydropower totalled 427GW, 14% of total installed capacity, showing a 2.2% y-o-y increase.

Nuclear capacity was 58GW at the end of June, only 2% of total installed capacity, a 2.3% y-o-y increase.

Thermal power still comprises 46% of the total installed capacity as at the end of June, reaching 1,405GW, a 3.5% y-o-y increase.

Benchmark against CEF forecast

According to [CEF's national electricity model](#), to deliver on its 'dual carbon' targets ahead of schedule China needs to install the equivalent of 260GW of solar, 80GW of wind, 4.5GW of hydropower, and 3GW of nuclear capacity in CY2024.

This is a total of over 345GW of zero-emission energy additions for CY2024. Based on figure 1, the run rate of solar, wind and nuclear power new capacity additions is currently behind schedule, while hydropower is on track to reach its yearly target required.

Accordingly, a slight lift on the 1HCY2024 run-rate is required, consistent with the normal end of year rush / uplift.

As shown in figure 2, by the end of June 2024, China had a total installed solar and wind power capacity of 1,181GW, only 19GW away from its 1,200GW wind and solar installed capacity by 2030 target.

Based on figure 1, at least 19GW of new wind and solar power capacity additions will be highly feasible to achieve in July 2024, meaning China will reach its 2030 solar and wind target [six years ahead of schedule](#) as we have projected.

ELECTRICITY GENERATION MIX

Figure 3. China's Electricity Generation Mix in Jan-May 2024¹

		Jan-June 2024	Share of Generation Jan-June	Change (y-o-y %)	Jan-June 2024 Adjusted	Share of Generation Jan-June Adjusted	Jun-24	Change (y-o-y %)
Hydropower	TWh	553	12%	22.7%	553	12%	145	46.0%
Thermal Power	TWh	3,005	68%	2.0%	3,005	64%	446	-6.1%
Nuclear Power	TWh	212	5%	0.1%	212	5%	36	-4.0%
Wind Power	TWh	476	11%	12.0%	531	11%	75	21.1%
Solar Power	TWh	190	4%	40.4%	394	8%	73	33.9%
Total Power Generation	TWh	4,435	100%	6.4%	4,695	100%	788	3.1%
Variable Renewable Generation	TWh	665	15%	18.8%	925	20%	148	27.1%
Zero Emissions Power Generation	TWh	1,430	32%	17.0%	1,690	36%	342	35.1%

Source: NBS and Ember, CEF Estimates

China's electricity demand continued to grow during 1HCY2024, showing a 6.4% y-o-y increase, well above China's 5% GDP growth target for 2024.

During the first half of CY2024, China generated 4,695TWh of electricity. In June alone, A total of 788TWh of electricity was generated in June alone, a 3.1% y-o-y increase.

Significantly, 36% of power generation was from zero-emissions energy sources.

For now, hydropower is back as the pillar of China's zero emissions power generator after it was hit by the droughts last year. A total of 553TWh of electricity was generated from

¹ Noting that this January-June CY2024 data comes from China's National Bureau of Statistics, which only reports generation from above a certain threshold for revenue, and therefore this data underestimates China's overall power generation. The more comprehensive data for China's power generation comes from China Electricity Council (CEC), however they only report on a quarterly basis. Ember reports data based on CEC's numbers, June CY2024 data comes from Ember, and CEF's adjusted number is based on the Ember's rate.

hydropower during the first 6 months of CY2024, 12% of total power generation. June saw hydropower generate 145TWh of electricity, a 46% y-o-y increase.

That is followed by wind power generation, reaching 531TWh during 1HCY2024, 11% of total power generation. In June, wind power generated 75TWh of electricity, a 21.1% y-o-y increase.

During the first half of CY2024, solar power generated a total of 394TWh of electricity, 8% of total power generated. In June alone, 73TWh of solar was generated, a material 33.9% y-o-y increase. After a long period of lower solar utilisation rate due to a lack of grid connectivity and battery energy storage system (BESS) deployment, China has been actively addressing these issues in the grid, now reflected in rising solar power generation.

Nuclear power generated electricity of 212TWh, a 5% of the total power generation. In June, nuclear power generated 36TWh of power, a 4% y-o-y decrease.

During 1HCY2024, 64% of power generation came from thermal power, reaching 3,005TWh. June saw 446TWh of thermal power generation, a 6.1% y-o-y decrease. China's investment in grid transmission and distribution is +24% yoy to Rmb254bn in 1HCY2024 (an annualised US\$70bn investment), which is key to continued integration of renewable energy.

Implications of China's electricity sector transition

China is rapidly approaching a pivotal moment in climate history, with the power sector very close to what CEF expects could well be a permanent peak in carbon emissions in 2QCY2024.

Overall, given the significance of the sustained property sector new construction slowdown and pivot in China's economy towards zero emissions industries of the future (e.g. solar, batteries and EVs), we could well look back on either 2023 or 2024 as the peak in China's national emissions, more than six years ahead of the country's Nationally Determined Commitment of 2030 under its contribution to the global goals of the Paris Agreement.

And if China emissions peak, then potentially the world's emissions peak, particularly as China builds its outbound investment and trade with developing countries worldwide to build their capacity to embrace this technology disruption to align with climate science, even as these countries build energy independence and domestic energy security.

Australia's National Electricity Market (NEM)

According to Australian Energy Market Operator (AEMO)'s latest quarterly [report](#), NEM's electricity demand is showing an 1.5% y-o-y increase during 2QCY2024, reaching 23,964MW, a 359MW increase compared to 2QCY2023.

Wind output decreased to a quarterly average of 2,657MW, a drop of 657 MW (-20%) from last year. Hydro-generation averaged 1,607MW over the second quarter, showing an 18% decrease from last year and the lowest Q2 output since 2017.

In the meantime, average operational demand slightly increased to 21,913 MW, up 0.9% from last year.

As a result, gas-fired generation rose to an average of 1,702 MW, a 16% y-o-y increase. Black coal-fired generation averaged 10,857MW, 7.3% higher than 2QCY2023, despite the gaming of the market via unplanned and planned outages during grid transmission outages.

It is becoming more crucial to deploy more distributed energy resources and a lot more batteries to enhance grid flexibility and reliability and to optimise existing grid T&D and the integration of VRE while we wait for the new interstate and REZ transmission lines to be built.

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