CLIMATE ENERGY FINANCE

MONTHLY CHINA ENERGY UPDATE |

China to Achieve its 2030 Installed Clean Energy Target in July 2024

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China will achieve its 1,200GW wind and solar installed capacity by 2030 target by end July 2024, six years ahead of schedule.

103.5GW of zero-emissions capacity was added during the first 5 months of CY2024, as thermal power additions declined by 45% y-o-y as the end of May CY2024 notwithstanding a still exceptionally strong +6.9% y-o-y YTD2024 increase in electricity demand.

NEWLY INSTALLED CAPACITY

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

		Jan-May 2024	Share of new adds (%)	Change (yoy %)	May-24	Share of new adds (%)
Thermal Power	GW	12.1	10%	-45%	2.9	11%
Hydropower	GW	3.4	3%	-21%	0.7	3%
Nuclear Power	GW	1.2	1%	0%	1.2	4%
Wind Power	GW	19.8	17%	21%	2.9	11%
Solar Power	GW	79.2	68%	29%	19.0	71%
Total capacity added	**GW**	**115.6**	**100%**	**10%**	**26.8**	**100%**
Renewable Energy adds	GW	102.4	89%	25%	22.7	85%
Zero Emissions Capacity Adds	GW	103.5	90%	25%	23.9	89%

Source: NBS, CEF Estimates

During the first 5 months of CY2024, China added a total of 103.5GW of zero-emissions capacity, representing 90% of the net newly installed capacity, representing a 25% y-oy increase. May 2024 alone saw China add 23.9GW of zero-emissions capacity.

Solar power remains its leading position in capacity additions, with 79.2 GW installed from January to May, making up 68% of the total new capacity. This represents a 29% year-on-year increase, maintaining a strong growth trajectory from prior years.

Wind power followed, a total of 19.8 GW of new capacity connected to the grid in the first 5 months of CY2024, accounting for 17% of the total new additions and a very strong 21% year-on-year increase building on the exceptional growth delivered in 2023.

3.4 GW of hydropower was added during this period, representing 3% of the total new capacity. However, this was a 21% year-on-year decrease.

Nuclear power saw the addition of 1.2 GW from January to May in CY2024, making up 1% of the new capacity, in line with the previous year.

Despite a 45% year-on-year decrease in thermal power additions, there was another 12.1GW of net new thermal power capacity added in the first 5 months of CY2024, which constitutes 10% of the total new capacity additions.

As China's zero-emissions capacity continues to climb, China needs more solid efforts in transitioning away from coal - and needs to cease net new thermal power addition as soon as possible, as we detailed in our April Powershift report.

INSTALLED CAPACITY

Figure 2. National Installed Capacity as of May 2024

		May-24	Share of Capacity	Change (yoy %)	May-23
Thermal Power	GW	1,401	46%	3.7%	1,351
Hydro Power	GW	426	14%	2.2%	417
Nuclear Power	GW	58	2%	2.3%	57
Wind Power	GW	461	15%	20.5%	383
Solar Power	GW	691	23%	52.2%	454
Total of Installed Capacity	**GW**	**3,037**	**100%**	**13.7%**	**2,672**
Renewable Energy Capacity	GW	1,578	52%	25.9%	1,254
Zero Emissions Capacity	GW	1,636	54%	23.8%	1,321

Source: NBS, CEF Estimates

By the end of May, China had a total installed zero-emissions capacity of 1,636GW, representing 54% of the total capacity. We note capacity is very different to generation, given different utilisation rates, although we also highlight the average Chinese coal fired power plant operates just 50% of the time in 2024, with China building in coal plant flexibility to help integrate ever more variable renewable energy capacity.

Solar is the dominant clean energy resource, with 691GW of solar capacity installed in May 2024, taking up 23% of the total installed capacity, a 52.2% y-o-y increase. This is a world leading position, more than three times the total 200GW of solar capacity installed to-date in the US.

Total installed wind capacity reached 461GW, 15% of the total installed capacity, representing a 20.5% y-o-y increase, also a world leading position.

Hydropower followed, with a total installed capacity of 426GW, accounting for 14% of the national installed capacity, a 2.2% y-o-y increase.

By the end of the 5th month, China had a total installed nuclear capacity of 58GW, representing just 2% of total installed capacity, a 2.3% y-o-y increase.

Thermal power still takes up 46% of the total installed capacity, reaching 1,401GW, representing a 3.7% y-o-y increase. Unfortunately for the climate crisis, China also by far leads the world in terms of installed coal power capacity.

Benchmark against CEF forecast

According to CEF's national electricity model, to deliver on its 'dual carbon' targets ahead of schedule — peaking carbon emissions by 2030 and achieving carbon neutrality by 2060 — 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 requires maintaining an installation rate of over 375GW of zero-emission energy additions for CY2024.

Based on figure 1, the run rate of solar, wind and nuclear power additions installation are behind the pace required. However, CEF notes that China tends to significantly speed up monthly zero-emissions additions at the end of the year.

As shown in figure 2 - the total installed wind and solar capacity reached 1,152GW, with current wind and solar power addition pace, CEF estimates that China can reach its 1,200GW wind and solar installed capacity by 2023 target this month in July CY2024.

ELECTRICITY GENERATION MIX

Figure 3. China's Electricity Generation Mix in Jan-May 2024[1]

		Jan-May 2024	Share of Generation Jan-May	Change (y-o-y %)	Jan-May 2024 Adjusted	Share of Generation Jan-May Adjusted	May-24	Change (y-o-y %)
Hydropower	TWh	409	11%	16.0%	409	11%	115	40.2%
Thermal Power	TWh	2,517	69%	4.0%	2,517	65%	454	-3.7%
Nuclear Power	TWh	176	5%	1.0%	176	5%	36	-2.4%
Wind Power	TWh	405	11%	10.5%	417	11%	77	3.8%
Solar Power	TWh	150	4%	38.8%	329	9%	36	49.1%
Total Power Generation	**TWh**	**3,657**	100%	**6.9%**	**3,849**	100%	**718**	**4.3%**
Variable Renewable Generation	TWh	554	15%	17.0%	746	19%	113	14.8%
Zero Emissions Power Gneration	TWh	1,140	31%	13.9%	1,331	35%	603	21.5%

Source: NBS, CEF Estimates

China's electricity demand continues to increase as a result of strong economic growth and the progressive electrification of everything, which is seeing electricity demand growth well ahead of China's growth in total energy use. CEF has upgraded our forecast for China's

[1] Noting that this monthly 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. CEF's adjusted number is based on the CEC's rate.

GDP growth from 4.8% in 2024 to 5.0% in light of the strong momentum evident year-to-date, including the strong Caixin manufacturing purchasing managers index in June 2024.

According to China's National Bureau of Statistics, China's electricity demand reached 3,657TWh from January to May in CY2024, a 6.9% y-o-y increase.

1,140TWh of above-scale electricity was generated from zero-emissions power, representing 31% of the total power generation, a 13.9% y-o-y increase. However, CEF estimates that China has overall 1,331TWh of electricity generated from zero-emissions resources, representing 35% of the total electricity generation.

Hydropower generated electricity of 409TWh, a 16% y-o-y increase. CEF estimates that the total hydropower generation accounts for 11% of total electricity generation.

Above-scale wind generation reached 405TWh, a 10.5% y-o-y increase. CEF estimates that a total of 417TWh of power was generated from wind, representing an 11% share of the total power generation.

Nuclear power generated 176TWh of electricity, a 1% y-o-y increase, representing a 5% share of total power generation.

Above-scale solar power generated 150TWh of power, a 38.8% y-o-y increase. CEF estimates that solar power (including distributed solar power) generated a total of 329TWh of electricity, a 9% share of the total power generation.

CEF estimates that 65% of China's power generation still comes from thermal power. According to NBS, above-scale thermal power plants generated 2,517TWh of electricity, a 4% y-o-y increase.

As highlighted in our April 2024 Powershift report, it is crucial for China to demonstrate more ambitious commitment to cease the construction of new coal-fired power plants and to strategically plan for the retirement of existing ones. The rapid expansion of zero-emissions installations, at the scale and speed we have projected, along with the accelerated development of transmission lines and utility-scale battery storage to address the intermittency of variable renewable energy (VRE), indicates that China can produce sufficient zero-emissions energy to meet its electricity demands while gradually reducing its dependency on thermal power. This will necessitate meticulous grid distribution planning, particularly the enhancement of transmission lines in southwestern China to link the southwest and northwest regions. Based on current progress, CEF believes it is entirely feasible for China to significantly slow the expansion of its thermal energy infrastructure and halt the construction of new coal power plants before 2030.

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Previous Monthly China Energy Updates here.

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