

MONTHLY CHINA ENERGY UPDATE |

China Continues to Massively Scale Up Renewables while adding Thermal Power

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Previous monthly updates [here](#).

Energy Trends as of July 2023

Not only was it another near record month of 22GW of wind and solar added for July 2023, but it was also another month of 6.3GW of new coal power plants in China. National electricity demand grew 5.0% y-o-y, and hydropower generation continued to decline. Even with strong wind and solar growth, coal power generation continues to grow at above market growth rates of +7.9% y-o-y in July.

Figure 1. New Capacity Installed in China in Jan-July 2023

		Jan-July 2023	Share of new adds (%)	Change (yoy %)	Jul-23	Share of new adds (%)
Thermal Power	GW	32	19%	76%	6.3	20%
Hydropower	GW	6	3%	-48%	0.2	1%
Nuclear Power	GW	1	1%	-48%	0.0	0%
Wind Power	GW	26	15%	76%	3.3	11%
Solar Power	GW	97	56%	158%	18.7	60%
Other (Biomass, W2E)	GW	10	6%		2.7	9%
Total capacity added	GW	172	100%	104%	31.2	100%
Variable Renewable adds	GW	133	77%	117%	24.8	79%
Zero Emissions Capacity Adds	GW	140	81%	112%	25.0	80%

Source: NBS, CEF Estimates

Renewable energy expansion continues in China. 81% of the total net newly installed capacity from zero emissions energy sources from January to July, reaching 140GW, a 112% y-o-y increase.

Solar and wind power remains leading the new installed capacity. From January to July, China added 97GW solar power, a 158% increase from last year. July saw China adding 18.7GW solar power. 26GW wind power was added in the first 7 months of this year, a 75% y-o-y increase. 3.3GW of the newly installed wind power was added in July.

Notably, only 6GW hydropower was added to the grid from January to July this year, a 48% y-o-y decrease. 0.2GW of hydropower was added in July, taking up merely 1% of the total share of the newly installed capacity in July.

China continues to add more coal power to meet increasing electricity demand. China has added 32GW of thermal power from January to July in 2023, a 76% y-o-y increase, and July alone saw China add 6.3GW of thermal power, showing with continued strong domestic economic growth comes the need for more of all new energy sources, renewables adds are still insufficient to supply new electricity demand growth whilst the economy continues to grow strongly, and absent a structural shift away from heavy industry and construction towards significantly lower energy intensity demand sectors like services.

The momentum of newly added coal power shows a slightly accelerated trend, as in July a 20% share of the total newly added capacity was thermal power, higher than the 19% of the total share of newly installed thermal power capacity from January to July, with this trend entirely at odds with the growing need for China to pivot fully away from its current reliance on even more fossil fuel powered energy supply.

Figure 2. National Installed Capacity as of July 2023

		Jul-23	Share of Capacity	Change (yoy %)	Jul-22
Thermal Power	GW	1,364	49.8%	4.1%	1,309
Hydro Power	GW	418	15.3%	4.1%	402
Nuclear Power	GW	57	2.1%	2.2%	56
Wind Power	GW	393	14.3%	14.3%	344
Solar Power	GW	491	17.9%	42.9%	344
Total of Installed Capacity	GW	2,740		11.6%	2,455
Variable Renewables Capacity	GW	884	32.3%	28.6%	687
Zero Emissions Capacity	GW	1,376	50.2%	20.1%	1,146

Source: NBS, CEF Estimates

Installed capacity

50.2% of China's total national installed capacity is from zero emissions energy sources, reaching 1,376GW, a 20.1% y-o-y increase. The shift to zero emissions sources continues but is still of insufficient scale for China to reach peak coal use as yet. But with this scaling up of wind and solar, peak coal is still on track to be reached well before 2030.

Solar power was the major clean energy source with 17.9% of the total installed capacity, reaching 491GW, with a 42.9% y-o-y increase.

This is followed by hydropower, having slipped to third position behind solar to represent a 15.3% share of national installed capacity at 418GW, a 4.1% y-o-y increase. But as a reflection of how large the Chinese electricity system is, China’s hydro capacity is 4 times the size of the Brazilian installed base of 109GW (#2 globally) and the US at 102GW (#3).

Wind power reached 393GW of installed capacity, accounting for 14.3% of the total installed capacity as of July 2023, with capacity up 14.3% y-o-y.

National installed capacity for nuclear power was 57GW, only 2.1% of the total installed capacity, a 2.2% y-o-y increase.

As of the end of this July, 49.8% of the country’s installed capacity was from thermal power, reaching 1,364GW, a 4.1% y-o-y increase.

Electricity generation mix

Figure 3. China’s Electricity Generation Mix in Jan-July 2023

		Jan-July 2023	Share of Generation	Change (y-o-y %)	Jul-23	Change (y-o-y %)
Hydropower	TWh	572	11%	-21.6%	121	-17.2%
Thermal Power	TWh	3,547	71%	8.0%	600	7.9%
Nuclear Power	TWh	250	5%	5.9%	38	2.9%
Wind Power	TWh	484	10%	23.8%	61	34.5%
Solar Power	TWh	160	3%	21.6%	26	22.8%
Total Power Generation	TWh	5,013	100%	5.0%	846	5.0%
Variable Renewable Generation	TWh	644	13%	23.3%	522	30.8%
Zero Emissions Power Generation	TWh	1,466	29%	-1.4%	725	-1.4%

Source: NBS, CEF Estimates

China’s energy demand continues to climb. China’s total power generation from January to July was 5,013TWh, a 5.0% y-o-y increase.

Thermal power still dominates China’s electricity generation mix, with 71% of the total share, or 3,547TWh in the first 7 months of 2023, a 8% y-o-y increase. July saw thermal power generation reaching 600TWh, representing a 7.9% y-o-y increase.

Hydropower generation declined significantly, showing a 21.6% y-o-y decrease to 572TWh. In July, 121TWh hydropower was generated, a decline of 17.2% y-o-y, showing the drought is still ongoing. Hydropower is still the leading zero emissions energy source in power generation, representing 11% of China’s total power generation.

Wind power generation reached 484TWh from January to July this year, accounting for 10% of the total power generation, a 23.8% y-o-y increase. In July power generated from wind reached 61TWh, a 34.5% y-o-y increase.

During the first 7 months of 2023, solar power generation reached 160TWh, a 21.6% y-o-y increase. July saw solar power generation reaching 26TWh, a 22.8% y-o-y increase.

New Coal-Fired Power Plants Need to be Restricted in China

To achieve its 'dual-carbon' [targets](#) – to peak emissions before 2030, and achieve carbon neutrality before 2060 – China still has a [long way to go](#) to deliver on its total energy system transition.

Despite China's consistent efforts to rapidly expand its world leading solar manufacturing and deployments [since](#) 2009, there is still a substantial gap between its current decarbonisation rates and what is required to achieve these targets.

The urgency of deploying even more renewables, curbing coal expansion, and improving current energy storage systems has never been more obvious.

Economist Zhang Shuwei has [suggested](#) that reduced coal prices in China, as low as early 2020 levels, could bring back a return of coal power plant profitability. The record high coal prices have eroded the profitability of coal power over the last two years, and this has accelerated the flow of capital into renewable energy as renewables.

However, with 60-70% decline in international coal prices to-date in 2023, accompanied by a large number of [newly](#) permitted coal-power plants, CEF sees a concerning trend: the increasing number of [new](#) coal power plants being approved and built in China are placing China's and global efforts on carbon neutrality in jeopardy.

We believe that now is the crucial time for the Chinese government to impose more strict regulations on building new coal-fired power plants, tighten China's national emissions trading scheme to increase the internalised cost of carbon emissions and further accelerate China's energy transition to place it on a trajectory to meeting its dual carbon targets while meeting the country's still strongly growing energy demands.

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