



CLIMATE ENERGY FINANCE

MONTHLY CHINA ENERGY UPDATE | New Solar Deployment Accelerates amid CO2 Emissions Slowdown

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During the first 4 months of CY2024, China added 79.7GW of zero-emissions new capacity, accounting for 90% of the net capacity additions. China added 76.9GW of wind and solar capacity from January to April, if this pace sustains or accelerates in the rest of the year, China will achieve its 1,200GW of installed wind and solar capacity by 2030 target this year, 6 years ahead of time.

In March, China saw its CO2 emissions fall for the first time in the past 14 months. China's thermal power generation increased 5.9% y-o-y during the first 4 months of CY2024, despite the massive expansion in renewable energy deployment.

Biden's 100% tariff on Chinese EVs might not be as effective as Chinese EV makers remain price-competitive even after the add-on tariffs, but Chinese EV leaders will renew their focus on other key markets like Brazil and Indonesia. The US's 50% tariff on solar products hurts American consumers and slows down its national renewable energy development.

NEWLY INSTALLED CAPACITY

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

		Jan-April 2024	Share of new adds (%)	Change (yoy %)	Apr-23	Share of new adds (%)
Thermal Power	GW	9.2	10%	-28%	2.8	14%
Hydropower	GW	2.7	3%	-24%	0.9	5%
Nuclear Power	GW	0.0	0%	-100%	0.0	0%
Wind Power	GW	16.8	19%	19%	1.3	7%
Solar Power	GW	60.1	68%	24%	14.4	74%
Total capacity added	GW	88.8	100%	11%	19.4	100%
Renewable Energy adds	GW	79.7	90%	21%	16.6	86%
Zero Emissions Capacity Adds	GW	79.7	90%	18%	16.6	86%

Source: NBS, CEF Estimates

During the first 4 months of CY2024, China added a total of 88.8GW of electricity capacity, a 11% y-o-y increase. Among which, 90% of the total new additions are zero emissions capacity, reaching 79.7GW, a 18% y-o-y increase.

Solar capacity addition leads the way, with a total of 60.1GW of solar installed from January to April this year, accounting for 68% of the total newly installed capacity, a 24% y-o-y increase, but we note the slowdown in the growth rate after the doubling in CY2023.

This is followed by wind power additions, a total of 16.8GW of new wind capacity was connected to the grid during the first 4 months of CY2024, taking up 19% of the total newly added capacity, and representing a 19% y-o-y increase.

2.7GW of new hydropower capacity was added during the same time period, accounting for 3% of the total newly added capacity, however, it shows a 24% y-o-y decrease.

Zero nuclear capacity was added to-date in CY2024.

9.2GW of net new thermal capacity was added from January to April in CY2024, taking up 10% of the total new capacity additions, representing a 28% y-o-y decrease.

Benchmark against CEF forecast

According to CEF's forecast [model](#), to meet 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 323 GW of solar, 80 GW of wind, 1 GW of hydropower, and 3 GW of nuclear capacity annually. This requires maintaining an installation rate of over 400 GW per year of zero-emission energy additions for the next decade and beyond.

Based on Figure 1, if the pace of first 4 months sustains, by the end of 2024 China will have increased solar capacity of 180 GW, added wind capacity of 50 GW, hydropower addition reaches 8 GW, 0 for nuclear power capacity addition, and 28 GW of thermal power added. This represents a total of 239 GW of zero-emissions capacity will be added this year.

China's zero-emissions energy expansion pace during the first 4 months is below the speed and scale required to meet its 'dual carbon' targets ahead of schedule, with some reports of grid integration issues undermining progress after the phenomenal step-up in rate seen in

2023. China needs to speed up and scale up its zero-emissions deployment in the next 8 months of the year to demonstrate its genuine determination in achieving its climate goals.

However, China is still on track to achieve its 1,200GW wind and solar installed capacity target by 2030 as early as this year, 6 years ahead of time.

INSTALLED CAPACITY

Figure 2. National Installed Capacity as of April 2024

		Apr-24	Share of Capacity	Change (yoy %)	Apr-23
Thermal Power	GW	1,398	46%	4.0%	1,345
Hydro Power	GW	425	14%	2.1%	416
Nuclear Power	GW	57	2%	0.3%	57
Wind Power	GW	458	15%	20.6%	380
Solar Power	GW	671	22%	52.4%	441
Total of Installed Capacity	GW	3,010	100%	13.6%	2,649
Renewable Energy Capacity	GW	1,555	52%	25.7%	1,236
Zero Emissions Capacity	GW	1,612	54%	23.6%	1,304

Source: NBS, CEF Estimates

By the end of April 2024, China had a total installed capacity of 3,010GW, a 13.6% y-o-y increase. Among which, zero-emissions capacity represents 54% of the total installed capacity nationwide, representing a 23.6% y-o-y increase.

The total installed solar capacity leads the overall installed capacity in zero-emissions power, also shows the most significant growth among all energy sources, reaching 671GW, taking up 22% of the total installed capacity, exhibiting a 52.4% y-o-y increase.

This is followed by wind power, 458GW of wind capacity was installed as the end of April, accounting for 15% of the total installed capacity, representing a 20.6% y-o-y increase.

As at April 2024, China has a total installed hydropower capacity of 425GW, representing 14% of total installed capacity, a 2.1% y-o-y increase.

China has not added any new nuclear capacity this year. At of April 2024, China has installed nuclear capacity of 57GW, accounting for 2% of the total installed capacity.

Noting that 46% of China's total installed capacity still comes from thermal power as of April 2024, reaching 1,398GW, a 4% y-o-y increase.

ELECTRICITY GENERATION MIX

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

		Jan-Apr 2024	Share of Generation	Change (y-o-y %)	Apr-24	Change (y-o-y %)
Hydropower	TWh	294	10%	8.4%	84	22.1%
Thermal Power	TWh	2,062	70%	5.9%	458	1.9%
Nuclear Power	TWh	141	5%	1.9%	37	6.0%
Wind Power	TWh	325	11%	11.7%	81	-2.6%
Solar Power	TWh	111	4%	31.7%	31	36.0%
Total Power Generation	TWh	2,933	100%	7.4%	690	4.8%
Variable Renewable Generation	TWh	437	15%	16.2%	112	5.8%
Zero Emissions Power Generation	TWh	871	30%	11.0%	607	11.1%

Source: NBS, CEF Estimates

During the first 4 months of CY2024, China saw continued growth of electricity demand, reaching 2,933TWh, representing a 7.4% y-o-y increase. Electricity demand in April alone also grew another 4.8% y-o-y, reaching 690TWh.

From January to April this year, 30% of China's electricity generation comes from zero-emissions power, reaching 871TWh, representing a 11% y-o-y increase.

Among which, wind power generated 325TWh of electricity during the first 4 months, a 11.7% y-o-y increase and accounting for 11% of the total electricity generation.

Hydropower generated 294TWh of electricity representing a 8.4% y-o-y increase, taking up 10% of the total power generation.

This is followed by nuclear power, generating 141TWh of electricity, accounting for 5% of China's total power generation, representing a 1.9% y-o-y increase.

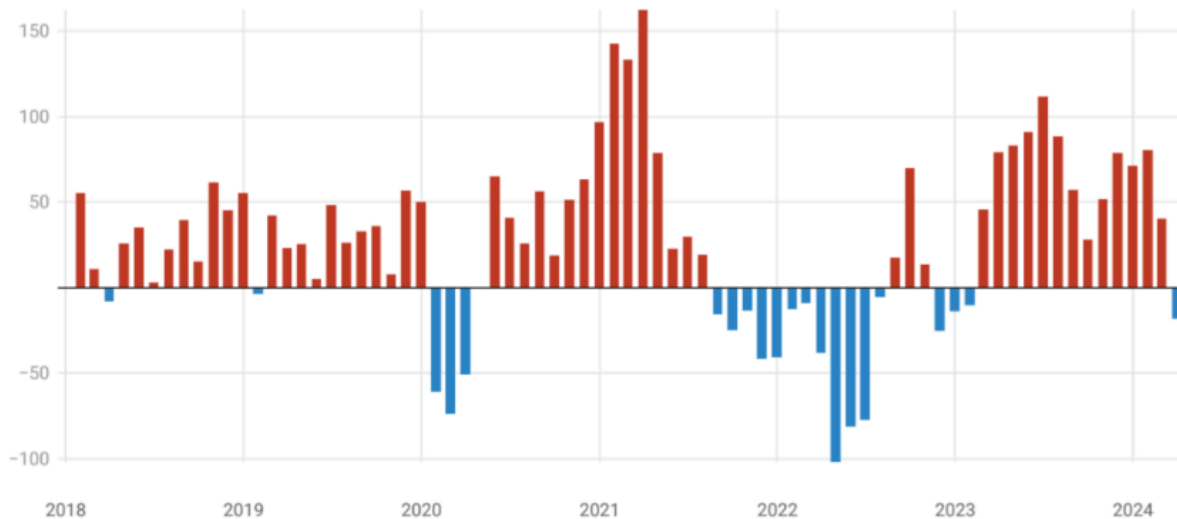
Large scale solar projects generated 111TWh of electricity, accounting for 4% of the total electricity generation, representing a 31.7% y-o-y increase, the fastest growing power generation source.

The Beginning of Peaking Emissions

According to the latest [analysis](#) by Carbon Brief, China's CO2 emissions fell by 3% in March for the first time in the past 14 months.

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, however they only report on a quarterly basis.

Figure 4: Year-on-year change in monthly emissions from fossil fuels and cement, MtCO₂



Source: Lauri Myllyvirta for Carbon Brief

CarbonBrief
LEADING THE CLIMATE

While the majority of China's emissions come from its power sector, March saw China's power sector emissions show a slowdown, whilst a decrease in steel production fell by 8%, and cement production fell by 22% y-o-y. These have paved the way for China's March emissions decrease. According to Carbon Brief, this trend is set to continue.

This progressive improvement in China's power sector mix is an outcome of China's rapid [expansion](#) in renewable energy.

As figure 2 shows, as of the end of April 2024, China has a total installed wind and solar capacity of 1,129GW. If the pace of renewable energy new addition during the first 4 months of CY2024 is sustained, by the end of CY2024 China will have a total installed wind and solar capacity of 1,280GW, which will set China to overachieve its 1,200GW of wind and solar installed capacity by 2030 target 6 years early.

However, as figure 3 suggested, China's thermal power generation still increased by 5.9% y-o-y. While the massive scaling up in wind and solar power is happening, it is becoming more pressing for China to speed new zero emissions capacity expansion even further to meet China's increasing electricity demand due to the nation's multi-decade-long electrification of everything [strategy](#).

Biden's 100% tariff on Chinese EVs

This month Biden's administration [announced](#) to raise tariffs on Chinese EVs to 100% this year, and double tariffs on imported solar cells to 50% this year.

Lilly Yejin Lee, a researcher at Columbia University's Center on Global Energy Policy, [suggests](#) that rising tariffs on solar products will discourage American local manufacturers to lower costs, which will likely lead to higher prices for American consumers.

Zhou Shijun from Arctech, a manufacturer of mounting systems for large-scale solar installations, [says](#) that Biden's protectionism on solar industry could slow down US's overall response to climate change, and the priority on protectionist measures over accessing the best technology would 'come back to haunt' the development of the renewable energy industry.

The question also remains: is Biden's 100% tariff on Chinese EVs effective?

Only 2% of US's imported EVs [come](#) from China, and for lower end Chinese EVs, the prices remain [competitive](#) even with a 100% tariff. To continue global growth and avoid the impact of US tariffs, Chinese EV makers are building factories outside of China to access developing major new markets. BYD is [building](#) a factory in Brazil with the expectation to start production in 2025. In the meantime, BYD also has major projects in countries such as Hungary and Indonesia.

The EU is probing into China's subsidies in their automotive industry, which could possibly protect EU-based EV makers. Compared to European carmakers, Chinese EV makers have been investing aggressively in R&D to improve the competitiveness of their offers. Chinese EV makers' core competitiveness now includes: lower prices, longer battery warranties, longer ranges, [fancy](#) car interiors and faster acceleration (makes it competitive compared to EU lux car brands), proprietary software and advanced battery and intelligent vehicle technologies, driving assistance system as well as a battery that charges in half an hour, early access to the latest battery technology for longer range, lighter and cheaper batteries.

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