MONTHLY CHINA ENERGY UPDATE

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Power installation and generation – January-March 2025

In the first quarter of 2025, 76.5GW of renewable power capacity was added, up 21% yoy. Solar power made up 70% of new added capacity, more than six times the share of thermal power, confirming the trend of China's solar-centric energy transition. Renewables accounted for 89% of new capacity. No new nuclear capacity was added in the first quarter - see Figure 1 below.

Wind power at 14.6GW added capacity, declined by 6% yoy. This appears to correspond with a prediction by China Energy Network that 2025 will see a slowing down of large-scale wind project development, as the industry turns its focus on reliability and safety in the face of "rising frequency of accidents and technology entering uncharted territory". It forecasted that "18MW onshore and 26MW offshore may be the limit of wind turbine installation and deployment in the next one to two years".

9.3GW of thermal power capacity was added, with its share of new additions at 11%, down 7 percentage points from the same period last year. The average utilisation of coal continues to decline as China builds more flexible coal-fired power plants to balance ever-more renewables.

Grid investment spending hit US$13 billion, up 25% yoy, indicating sustained infrastructure upgrades to support renewables growth.

Figure 1

New Capacity Installed in China in Jan-Mar 2025

		Jan-Mar 2025	% Share of new adds	% yoy change	Mar-25	% Share of new adds
Thermal Power	GW	9.3	11%	45%	5.6	18%
Hydropower	GW	2.1	2%	18%	0.8	2%
Nuclear Power	GW	0	0%	0%	0	0%
Wind Power	GW	14.6	17%	-6%	5.5	17%
Solar Power	GW	59.7	70%	31%	20.2	63%
Total capacity added	**GW**	**85.7**	**100%**	**23%**	**32**	**100%**
Renewable Energy adds	GW	76.5	89%	21%	26.4	82%
Zero Emissions Capacity Adds	GW	76.5	89%	21%	26.4	82%
YTD power grid investment	US$bn	13		25%		

Source: National Energy Administration

Total installed power capacity as at March 2025 reached 3,431GW, up 14% yoy. Wind and solar power capacity rose 60% yoy, dwarfing thermal's 4% growth. Solar continues to represent the highest rate of growth at 43% yoy - see Figure 2 below. Zero emissions power capacity now make up close to 60% of total capacity.

Figure 2

Total Installed Capacity in China as of March 2025

		As of Mar-2025	Share of Capacity	Change (yoy %)	As of Mar-2024
Thermal Power	GW	1,451	42%	4%	1,397
Hydro Power	GW	438	13%	3%	423
Nuclear Power	GW	61	2%	7%	57
Wind Power	GW	535	16%	17%	457
Solar Power	GW	946	28%	43%	660
Total Installed Capacity	**GW**	**3,431**	100%	14%	**2,994**
Renewable Energy Capacity	GW	1,919	56%	25%	1,540
Zero Emissions Capacity	GW	1,980	58%	24%	1,597

Source: National Energy Administration

Power generation continues greening trend

In the first quarter of 2025, solar and wind generation was up 27% yoy, significantly more than the total +3.4% growth in electricity consumption. For this reason, thermal generation was down 4% yoy in the first quarter. Zero emissions sources accounted for 39% of total power generation in the first quarter, surpassing the target of 33% by 2025 stated in China's 14th Five Year Plan for Renewable Energy (2021-2025) - see Figure 3 below.

According to NBS, in the first quarter, industrial hydropower, nuclear power, wind power, and solar power generation above the designated size of 100GWh increased yoy by 5.9%, 12.8%, 9.3%, and 19.5% respectively, while industrial thermal power decreased by 4.7% yoy.

Figure 3

China's Electricity Generation Mix in Jan-March 2025

		Jan-Mar 25	% Change yoy	Share of generation	Mar-25	% Change yoy
Thermal Power	TWh	1,494	-4%	61%	497	-1.7%
Coal	TWh	1,421	-4%	58%	473	-1.7%
Gas	TWh	69	-4%	3%	23	-1.7%
Other Thermal	TWh	4	-4%	0%	1	-1.4%
Bioenergy	TWh	47	-4%	2%	16	-1.8%
Hydropower	TWh	226	7%	9%	79	10.5%
Nuclear Power	TWh	117	13%	5%	43	23.0%
Wind Power	TWh	307	15%	13%	114	14.1%
Solar Power	TWh	254	45%	10%	93	31.1%
TOTAL POWER GENERATION	**TWh**	2,445	3%	100%	841	5.3%
Variable Renewable Generation	TWh	561	27%	23%	207	21.2%
Zero Emissions Power Generation	TWh	951	18%	39%	344	17.5%

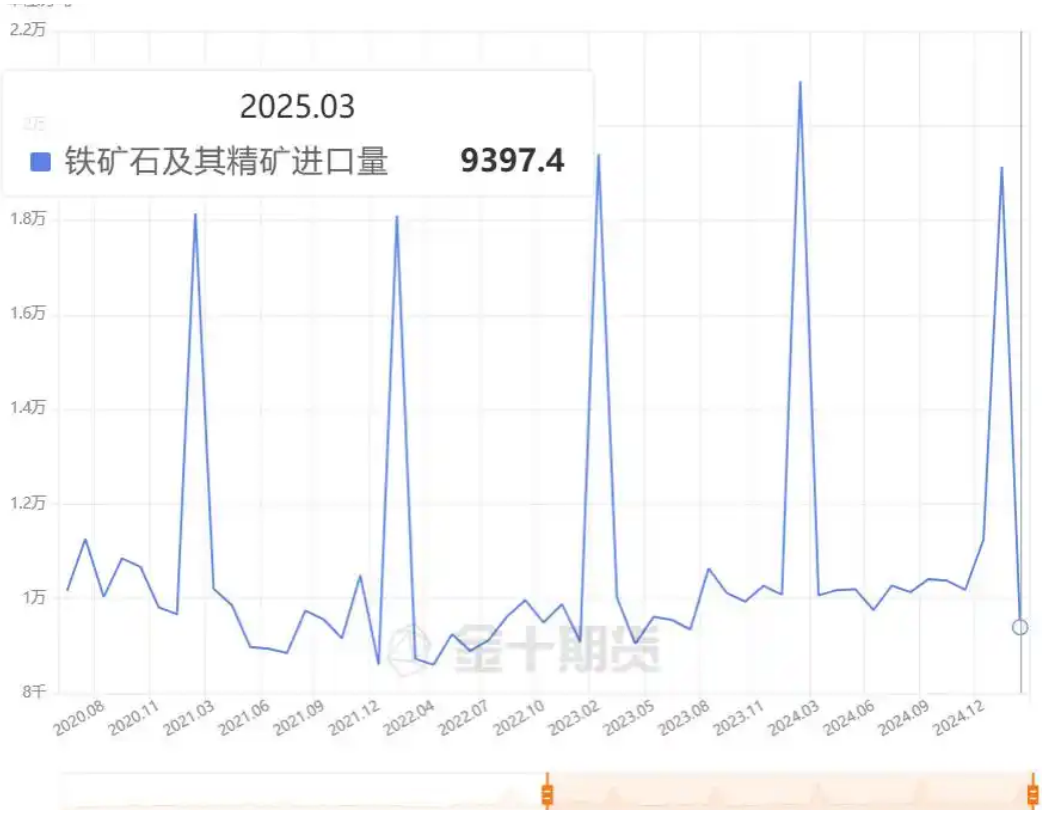
Source: National Bureau of Statistics, Ember, CEF Estimates

China's coal imports drop amid escalating trade uncertainties

The rising uncertainties from Trump's trade war and the continued fluctuation of exchange rates have impacted China's coal imports. China imported 38.7 million tonnes of coal in March, a yoy decrease of 6.4%, according to China Energy News. China's cumulative imports of coal in the first quarter declined for the first time since 2023. This was made up by increased domestic industrial coal output in this period, up 8.1% yoy, according to the NBS.

China's iron ore imports also fell to their lowest level in 20 months in March 2025, due to supply disruptions caused by Severe Tropical Cyclone Zelia off the Pilbara coast in Western Australia. In 1QCY2025, China's iron ore imports fell 7.8% yoy to 285.3 million tonnes - see Figure 4 below.

Figure 4 - China's iron ore import volumes - quarterly August 2020 to March 2025



Source: *General Administration of Customs: China's soybean and iron ore imports fell sharply month-on-month in March. How will the import situation change in the future?*

Policy and economic developments

China's GDP and exports show strong growth in first quarter of 2025

China's economy beat expectations with strong growth in the first quarter of the year, which recorded 5.4% GDP growth yoy, according to latest statistics released by the National Bureau of Statistics (NBS). This GDP appears slightly higher relative to total power generation growth at 3.4% yoy, which includes distributed energy resource generation (we note the NBS put 1QCY2025 electricity generation at -0.3% yoy, but this excludes 60% of all solar generation,

and some 10% of wind generation). In March, industrial output increased 7.7% yoy as production ramped up, while retail sales rose by 5.9% yoy.

China's export growth rate in 1QCY2025 has shown an upward trend despite Trump's tariffs, according to latest data released by the General Administration of Customs. Exports in this period exceeded US$823 billion, a 6.9% increase yoy.

Acknowledging that although China's exports are "facing a complex and severe external situation," Lu Daliang, director of the Statistics Department of the General Administration of Customs, said "the sky will not fall" (天塌不下来) – a phrase trending across Chinese media in response to Trump's tariffs – given China's economic resilience. As a continent-sized economy, it has a vast domestic market and has been "actively building a diversified market and deepening industrial and supply chain integration with all parties".

Chinese companies have been reducing their dependence on the US market in recent years. Exports to the US dropped from 19.2% in 2018 to 14.7% in 2024. In the same period, exports to ASEAN increased from 12.8% to 16.4%, while exports to countries participating in the Belt and Road Initiative (BRI) increased from 38.7% to 47.8%

Accelerating the Development of Virtual Power Plants

As part of implementing the Action Plan for Accelerating the Construction of a New Power System (2024-2027), the NEA and the National Development and Reform Commission (NDRC) released the Guiding Opinions on Accelerating the Development of Virtual Power Plants (VPPs). This is part of the Government's broader strategy to modernize the energy grid, integrate renewable energy, and enhance grid flexibility.

In recent years, various regions and enterprises have explored the construction of VPPs. For example, in January, China's first 1GW residential virtual power plant began construction in Jiangsu Province. By leveraging AI interaction, it will integrate high-power smart appliances in a large number of residents' homes into a cloud-based virtual energy pool, and carry out peak-shifting electricity consumption. The Opinions propose a VPP capacity target of 20GW by 2027, and 50GW by 2030.

200 million green certificates were traded nationwide in Q12025

In March 2025, the NEA issued 174 million green certificates, a 900% yoy increase, of which 82% were tradable, involving 70,700 renewable energy power generation projects. As of March

2025, a total of 5.6 billion green certificates have been issued nationwide, of which 3.8 billion were tradable.

In terms of green certificate trading, in Q12025, 200 million green certificates were traded nationwide, of which 118 million were traded in March. This comes after the NDRC and NEA released in early March their Opinions on promoting high-quality development of the renewable energy green electricity certificate market, as part of implementing China's Energy Law that came into effect in January 2025.

The Opinions seek to "vigorously cultivate the green certificate market" by establishing a green certificate consumption mechanism that combines mandatory and voluntary consumption. Notably, it will accelerate the increase in the proportion of green electricity consumption in industries such as steel, nonferrous metals, building materials, petrochemicals, and chemicals. Green electricity consumption requirements will be included in green product evaluation standards, and a government procurement policy to support green products will be explored and formulated.

Related to green certificates, CEF will be releasing soon a report examining the merits of introducing an Asian CBAM as China moves to extend and strengthen its national ETS.

New batch of 30 Vehicle-to-Grid charging projects announced

In April 2025, the NDRC and other government agencies announced an initial batch of 30 bi-directional EV charging pilot projects in 9 Chinese cities. The pilot comes as part of efforts to address increasing operating pressures on power grids as electrification rates soar in China.

China's Ministry of Public Security statistics shows that at the end of 2024, new energy vehicles (NEV) in China reached over 30 million. In 2024, 11 million NEVs were registered, accounting for over 40% of the number of newly registered vehicles. According to a Xinhua piece, "large-scale disorderly charging of new energy vehicles will bring huge pressure to the balance of supply and demand in the power system, and the necessity of large-scale promotion and application of vehicle-grid interaction is becoming increasingly prominent."

In fact, Chinese automakers have been exploring V2G applications for at least five years. As early as 2020, Dongfeng Motor and State Grid, the world's largest utility firm, partnered to integrate EV infrastructure into green power trading and to advance V2G adoption.

The 30 pilots will deploy smart charging technology that, along with EVs storing power and deploying energy back to the grid, will limit charging times for pilot EVs to off-peak hours when demand for electricity is low. Until now, V2G programs have been managed by local companies with limited financial backing. This boost of national government support aims to accelerate development of V2G technology.

Modelling by BNEF found that if 25% of EVs were able to send electricity back to the grid, their owners could earn more than US$1,100 a year. According to Bloomberg, "if Beijing can successfully make EVs an energy source — feeding power back into the grid at times of high demand — it will have major global implications for the standards of V2G".

Second batch of low-carbon tech demonstration projects released

In early April 2025, the NDRC issued its second batch of 101 green and low-carbon advanced technology demonstration projects, building on the first batch of 47 projects announced last year. David Fishman, Principal of The Lantau Group, provides detailed commentary on the most cutting-edge of these projects, including deep water offshore wind, zero-carbon steel, and VPPs.

These announcements follow the NDRC's release in March of the second batch of 27 national carbon peak pilot projects across 18 regions and cities, as part of implementing the Government's Action Plan for Reaching Carbon Peak Before 2030. These projects are intended as a "key means to speed up the comprehensive green transformation of economic and social development".

Battery production and exports surge in March

According to latest data from the China Automotive Power Battery Industry Innovation Alliance, in March, China exported 23GWh of power batteries, up 75.3% from the previous year. The total exports accounted for 20% of the sales volume that month. From January to March, China's cumulative exports of power and other batteries reached 61.5GWh, up 91.2% yoy.

International Cooperation

March and April 2025 saw a flurry of international engagements with at least 11 countries to strengthen economic, energy and climate cooperation, following Trump's announcement of sweeping tariffs.

7+ countries strengthen renewable energy cooperation with China

On 15-17 March, UK Secretary of State for Energy Security and Net Zero, Ed Miliband, met with Chinese counterparts in Beijing, resuming climate and energy discussions for the first time in nearly 8 years. Miliband stated in a press release, "it is simply an act of negligence to today's and future generations not to engage China on how it can play its part in taking action on climate."

At the 8th China-UK Energy Dialogue, the two sides discussed "clean energy technologies, pathways to the energy transition including phasing out coal, energy security and international energy governance". A key outcome of this meeting was the signing of the **China-UK Clean Energy Partnership Memorandum of Understanding**, which identified "power market reform and power grid, battery energy storage, offshore wind power, carbon capture, utilization and storage, clean low-carbon and renewable hydrogen as key areas of cooperation". A UK-China Electricity Market Seminar was also held, during which government officials and industry experts from China and the UK exchanged lessons, challenges and opportunities in the electricity market field under the decarbonization agenda.

The UK is expected to launch a formal Climate Dialogue with Chinese counterparts, inviting Chinese ministers to London later this year.

On 27 March, the French Ministry of Europe and Foreign Affairs released a China-France joint statement on climate change to mark the 10th anniversary of the Paris Agreement. The statement included that "the two sides will enhance cooperation on energy efficiency and decarbonization in the areas of energy, industry, transportation and buildings, including making continuous efforts to transition away from fossil fuels in energy systems, in a just, orderly and equitable manner, and actively pushing forward green and low-carbon socio-economic transformation."

On 31 March, Chile's Minister of Energy, Diego Pardow, met with Director of China's NEA, Wang Hongzhi, in Beijing to discuss bilateral cooperation on renewable energy, electricity and energy storage. Minister Pardow stated that "Chile aims to learn from China's experience in energy security and clean energy, in order to develop more effective national policies and attract greater investment from Chinese energy companies".

The meeting concluded with the signing of a **Chile-China Memorandum of Understanding on Energy Transformation Cooperation**.

Chile is one of the world's largest suppliers of copper and lithium—both critical minerals for the energy transition. China's CATL and BYD have been engaged to supply battery energy storage systems (BESS) for Chile's 2GW Solar + 11GWh BESS facility, which will likely be the world's largest operating BESS installation, at least until Saudi Arabia's proposed 5GW solar and 19GWh BESS hybrid project is built. It demonstrates Chile's prioritisation of BESS development to optimise its vast solar power resources and address rising curtailment due to transmission restrictions.

Other bilateral engagements with the NEA included:

- the signing of a China-Kuwait 🇰🇼🇨🇳 Framework Agreement on Technical Arrangements for Renewable Energy Projects; and
- a visit by the South African Minister of Energy and Electricity to deepen 🇿🇦🇨🇳cooperation in "power transmission and transformation, smart grids, and renewable energy development" and "leverage China's experience in energy infrastructure planning and technology deployment".

Foreign Ministers of China, Japan, and South Korea meet

On 22 March, the Foreign Ministers of Japan, China and South Korea 🇯🇵🇨🇳🇰🇷 held trilateral talks in Tokyo, the first such gathering since 2023, and Foreign Minister Wang Yi's first visit to Japan in over four years. The three Ministers agreed to "promote future-oriented cooperation" amid geopolitical and economic uncertainties arising from Trump's trade and security policies. They also agreed to expedite preparations for a trilateral leaders' summit later this year, and to continue talks on a free-trade agreement which were revived last year after a five year hiatus.

The Japanese and Chinese Foreign Ministers also led the Sixth Japan-China High-Level Economic Dialogue, the first in about six years. The two sides confirmed they would "promote mutually beneficial and practical cooperation in a wide range of fields, including the green economy and measures to deal with the declining birthrate and aging population".

Shi Jiangtao writes in the South China Morning Post that "the unexpected U-turn on China by Japanese Prime Minister Shigeru Ishiba, seen as a hardliner on security for his advocacy of an 'Asian NATO' to counter Beijing, has also offered China an opportunity to push for an Asian-centric order that is less dependent on Washington."

Spanish Prime Minister Sánchez meets with President Xi

On 11 April, Spanish Prime Minister Pedro Sánchez met with Chinese President Xi Jinping in Beijing, becoming the first European leader to visit China since the escalation of tariff tensions between the US and the rest of the world. This was PM Sánchez's third visit to China in two years.

According to the Spanish Ministry of Economy, Commerce and Business press release, Spain and China reached seven🇪🇸🇨🇳agreements during this visit, aimed at facilitating exports of various Spanish food, healthcare, and cosmetic products to China, as well as increasing collaboration in culture, science, and education.

PM Sánchez also met with representatives of a dozen major Chinese companies present in the Spanish market or considering investing there in the automotive, battery, and renewable energy sectors. These efforts build on closer "bilateral cooperation in the new energy industry" in recent years which have seen Spain emerge as a European hub for EV battery manufacturing, enabled by partnerships with Chinese companies, such as the Stellantis and CATL joint venture announced in December 2024 to build a US$4 billion battery plant in northern Spain, and the US$455m joint venture EV plant in Barcelona between China's Chery and Spain's Ebro-EV Motors.

Spain, the eurozone's fourth-largest economy and a leader in growth, has increasingly become a strategic destination for Chinese multinationals, which "see Spain as a gateway to the European Union, Africa, and Latin America".

In the face of criticism from US Treasury Secretary Scott Bessent who hit out at PM Sánchez's visit to China as "cutting their own throat", Spanish Agriculture Minister Luis Planas defended Spain's national interests, and affirmed that "expanding the trade relations that we have with other countries, including a partner as important as China, does not go against anyone".

President Xi's visit to Vietnam, Malaysia and Cambodia

On 14-18 April, President Xi visited Vietnam, Malaysia and Cambodia, his first foreign visits of the year, in the wake of President Trump's sweeping "reciprocal" tariffs, as China seeks to "strengthen strategic bonds with neighbouring nations".

China is seeking to position itself as a credible and stable partner for ASEAN, which is one of the hardest hit regions by Trump's universal tariffs, ranging from 24 to 49 per cent on goods.

Although these measures have been suspended for 90 days, they have seriously dampened the region's confidence in future trade with the US.

During President Xi's two-day visit to Vietnam, 🇻🇳🇨🇳agreements were signed to enhance supply chain linkages, rail connectivity and AI cooperation. In Malaysia – his first visit since 2013 – Xi oversaw the signing of 🇲🇾🇨🇳 31 bilateral agreements spanning a wide range of sectors, including expanded trade and services, digital innovation, artificial intelligence, satellite navigation, green technology, intellectual property, and manufacturing. With Cambodia, 🇰🇭🇨🇳cooperation agreements were signed on key BRI projects, AI, and Cambodia's "Industrial Development Corridor" planning.

Chart of the month - China's solar panel exports

China's solar panel exports rose by 10% in 2024, but with imports by Global South countries rising by 32% yoy more than offsetting the Global North falling by 6%, according to Ember. Exports to the Global South more than doubled from 60GW in 2022 to 126GW in 2024, surpassing those to the Global North, as shown on the chart below. For more information. refer to Carbon Brief's Anika Patel's latest China Briefing.