Why China is Still Building New Coal

Examining the rationale of China's long-term energy pathway

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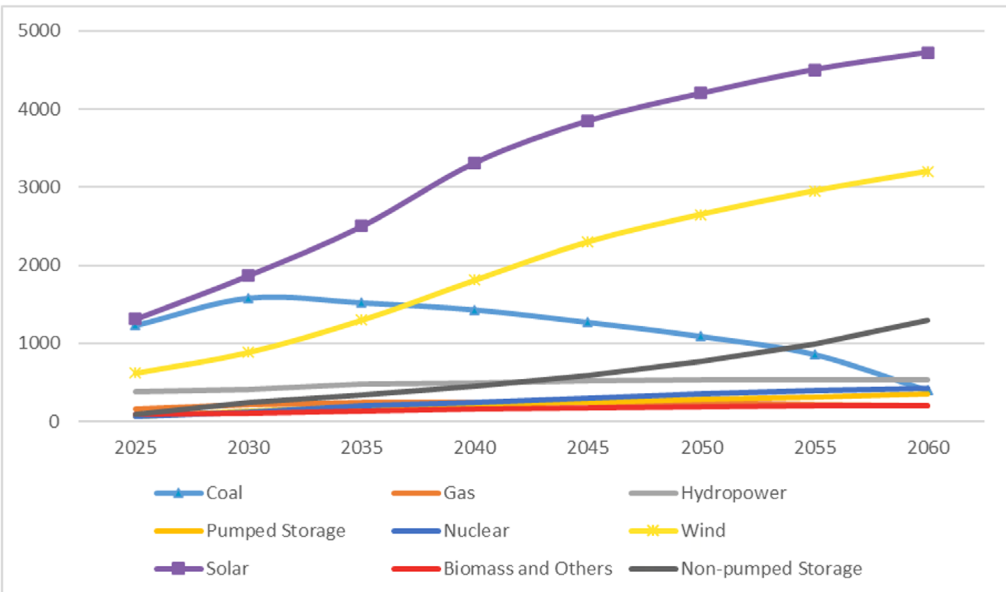
Executive Summary

- **Abundant coal reserves coupled with limited low-carbon flexibility resources make coal a critical component of China's energy transition, providing flexibility and stability to the grid as renewables scale up.**
- **New coal capacity built specifically for flexibility during the 14th Five-Year Plan accounted for 25% of total additions.**
- **Despite the ongoing coal buildout, coal power capacity is projected to peak by 2030 before declining to just 4.1% of total electricity mix by 2060.**
- **Solar and wind on an inexorable path to becoming the dominant sources of China's electricity generation.**
- **Current cost and development barriers to alternative flexibility resources make coal the only viable option until these technologies mature.**
- **Significant opportunities exist in renewables, storage, pumped hydro, CCUS, and grid integration solutions to support China's clean energy transition.**

China's status among the world's largest economies and the scale of its greenhouse gas emissions makes the country's energy transition pivotal to global climate action. Despite leading the world in renewable energy deployment, China continues to expand its coal power capacity, raising concerns about its commitment to achieving carbon neutrality by 2060.

This report examines the rationale behind China's continued coal buildout, its trajectory toward carbon neutrality, and investment opportunities along its dual-carbon pathways.

China's projected power generation by type through 2060.



China's energy-related activities account for nearly 80% of its total CO_2 emissions. The power-generation sector contributes more than half of that share. While total solar and wind capacity surpassed thermal power for the first time in 2023, coal remains a dominant source of electricity generation, driven by the need to ensure system security, meet rising electricity demand, and provide flexibility to support the integration of variable renewable energy sources.

The country's resource endowment, characterised by abundant coal reserves and limited oil and gas, has made coal a critical transitional resource in providing flexibility to cover the intermittency of wind and solar power, under China's deterministic approach to resource adequacy planning. In addition, low-carbon flexibility resources will struggle to keep up with increasing renewables integration by 2030.

Regional imbalances in power supply and demand, coupled with underdeveloped interprovincial transmission infrastructure, have led provinces to build new coal plants to address local electricity shortages.

However, our analysis suggests that even though new plants continue to be built, coal capacity is set to peak by 2030 and steadily decline thereafter. By 2060, we estimate the share of coal capacity within total power generation will decline to about 4.1% and all remaining plants will be retrofitted with carbon capture technologies. Already, new coal plants are increasingly being repurposed to support renewable integration, and approximately one-third of new capacity is aimed at enhancing system flexibility rather than extending fossil fuel reliance.

By 2060, our analysis indicates that wind power will account for 35% of power generation, and solar for 32%, supported by the deployment of about 1,660 gigawatts of storage technology and supplemented by a substantial increase in nuclear and hydropower.

While these changes unfold, China's economic growth and rising electricity demand will continue to reinforce the need for coal capacity in the short to medium term. Until low-carbon solutions are ready to be widely adopted, coal is the only feasible and reliable flexibility resource available to balance renewables and provide baseload power.

But the broader trajectory is clear. China's long-term energy strategy remains focused on achieving carbon neutrality, and the country's ongoing clean energy transition represents a once-in-a-generation opportunity to align economic development with decarbonisation. For technology providers and financial institutions, the coming decades will be critical.

By accelerating the deployment of low-carbon technologies, stakeholders can help China meet its carbon neutrality pledge while contributing meaningfully to a safer global climate future.

Introduction

As one of the world's largest economies, China's rapid economic development has been accompanied by rising emissions of carbon dioxide. CO_2 emissions reached 12.6 gigatonnes (Gt) in 2024,[1] accounting for about one-quarter of the global total (37.8 Gt).

The pace of China's emissions reductions has therefore become a critical factor in efforts to limit global warming. Since energy-related activities account for nearly 80% of the country's total CO_2 emissions – of which the power sector contributes more than half[2] – China's power sector has receive significant attention.

In September 2020, China's President Xi Jinping announced a "dual-carbon pledge" to reach peak CO_2 emissions before 2030 and carbon neutrality before 2060. Achieving these goals is critical to the fight against climate change, and China's approach to its energy transition is being closely watched worldwide as a result.

China has already made notable strides in expanding its renewable energy capacity, far outpacing the rest of the world in installing solar and wind capacity. From 2020 to 2024, installed solar capacity grew at an compound annual growth rate (CAGR) of 36.8%, while wind capacity increased by 16.6%.[3] Solar and wind capacity surpassed thermal power for the first time in 2023.[4]

Despite this, coal power capacity has continued to expand in parallel, rising from 1,080 gigawatts (GW) in 2021 to 1,119GW in 2024, a CAGR of 2.45%.[5] This ongoing expansion – particularly in the wake of China's dual-carbon pledge – has raised widespread concerns about the country's climate trajectory.

Critics view the ongoing coal buildout as a potential sign of insufficient commitment to the country's net-zero target. Uncertainty remains around China's emissions trajectory, particularly over when and at what level coal capacity will peak, and how rapidly it might decline thereafter.

This report seeks to assess those concerns, gauge when coal capacity may peak and the pace of its subsequent decline, explore why China's coal capacity continues to increase despite the country's carbon neutrality pledge, and examine potential investment opportunities along China's dual carbon pathways.

1. China's coal trajectory

Coal power has been China's dominant source of electricity for decades. As renewable energy deployment accelerates, the intermittency of weather-dependent resources such as wind and solar is creating new challenges: periods of insufficient supply and risks to system stability, which could possibly cause broader economic and social impacts.

To address these concerns, our modelling framework integrates assessments of electricity demand and real-time power balance, particularly under scenarios that feature higher shares of renewables. Building on this framework, we explore the feasibility of coal capacity peaking in China and the trajectory of its subsequent decline.

1.1 How We Configure Models

Electricity demand: Based on International Monetary Fund projections, China's GDP growth is expected to slow from 4.5% in 2026 to 3.4% by 2030.[6] Given an average electricity elasticity of 1.16 between 2018 and 2023, power demand through 2030 is projected to grow by 5.4% (2026), 5.0% (2027), 4.6% (2028), 4.3% (2029), and 4% (2030).[7]

By 2060, total electricity demand is expected to reach around 21,800 terawatt-hours (TWh),[8] driven by rapid advances in cloud computing, big data, 5G, and artificial intelligence, which are significantly increasing the capacity of data centres.

Real-time power balance: We adopt a peak load value of 2,010GW for 2030, based on projections from the China Electricity Council,[9] and we estimate the peak load for 2060 based on Equivalent Full-Load Hours (EFLH) calculated by State Grid[10] (*See Figure 1*).

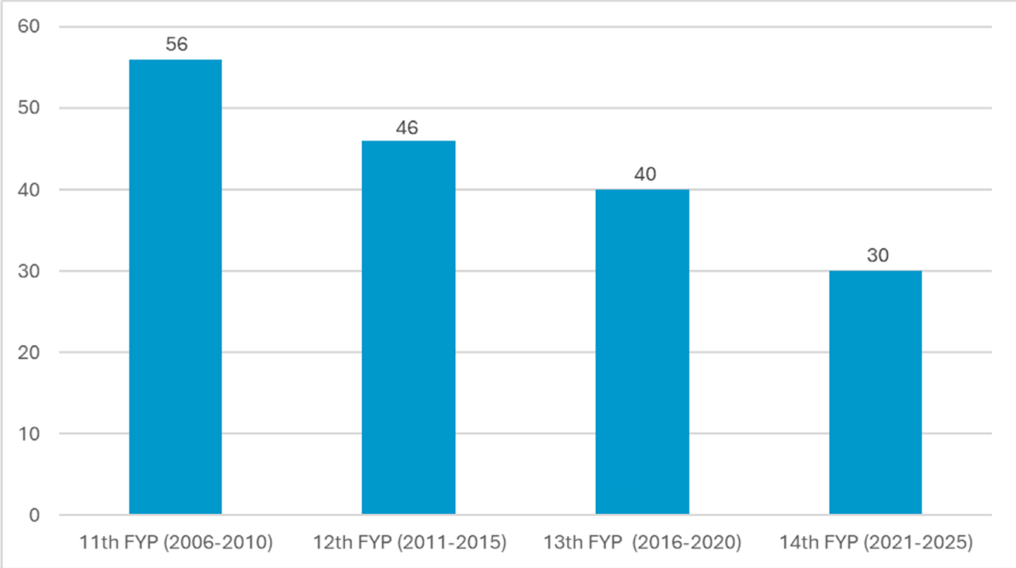
Figure 1: Estimated peak load from 2030 to 2060

Year	EFLH [11] (hours)	Electricity demand (TWh)	Peak load (GW)
2030	5960	13,113	2010
2035	6050	15,208	2514
2040	6100	17,212	2822
2045	6150	18,972	3085
2050	6200	20,451	3299
2055	6200	21,485	3465
2060	6200	21,800	3516

Note: Equivalent full-load hours (EFLH) indicate how many hours per year the power system would need to operate at peak load to generate the total annual electricity consumption.

For coal capacity: China's coal additions have shown progressively slower growth in each Five-Year Plan over the past two decades (*see Figure 2*).[12]

Figure 2: China's average newly installed coal capacity for each FYP (GW)



Source: NEA

Although the Blue Book on the Development of New-Type Power Systems lays out that coal power capacity and generation are expected to experience moderate growth before 2030, the 2021 electricity shortages experienced in China underscored the importance of system security.

The shortages prompted policymakers after the 20th Party Congress in 2022 to prioritise the establishment of a secure and reliable new energy system before gradually reducing reliance on traditional energy sources.[13]

As a result, we expect more coal capacity to be built during the 15th Five-Year Plan (2026 to 2030) to ensure system security, even as renewable energy continues to scale up. We estimate the 15th Five-Year Plan will also retire about 31.57GW of coal-fired capacity,[14] following the principle that units with capacities of around 200MW and an operating life of more than 30 years have reached obsolescence.

Our projection for future coal power thus reflects a combination of China's strategic policy guidance and the planned retirement of ageing coal units during this period.

Solar and wind capacity: Wind and solar are based on assessment of renewable potential, which is estimated at 45,600 to 58,900GW for solar and 10,950 to 20,100GW for wind.[15] Under the IEA's renewable energy integration framework, China is expected to advance to higher phases of renewable integration by 2030.[16]

Other power sources in the generation mix – such as hydropower, nuclear, biomass, pumped hydro, and battery storage – are all expected to complement coal and renewables in meeting electricity demand and ensuring real-time power balance.

1.2 China's Coal Trajectory to Carbon Neutrality

China's electricity demand is projected to rise significantly from 10,443TWh in 2025 to 13,113TWh in 2030 and 21,800TWh by 2060. Over the same period, China's coal power capacity is projected to rise from 1,230GW in 2025 to 1,580GW by 2030.

By then, China's coal power capacity is expected to peak. From 2030 onwards, projections show coal capacity begins to decline: to 1,520GW by 2035, 1,270GW by 2045, and just 400GW by 2060, a reduction of about 75% from the peak (*see Figure 3*). In that scenario, coal's capacity share of total power sources will shrink from 31.8% in 2025 to only 4.1% in 2060.[17]

Policy support for Carbon Capture, Utilisation, and Storage (CCUS) pilot projects should drive costs for those technologies down, while rising carbon prices under China's emissions trading system (ETS) should help make low-carbon technologies more competitive. By 2045, all remaining coal-fired units should be retrofitted with CCUS and unabated coal-fired generation should be approaching zero.[18]

So, although coal capacity will increase until 2030, its share of total power generation is on a steady downward trajectory, dropping from 49.2% (5,138TWh) in 2025 to 41.9% (5,492TWh) by 2030 and about 2% (420TWh) by 2060 (*see Figures 4 & 5*). Coal-plant capacity utilisation will also drop, from 53% in 2025 to 40% in 2030 and 12% in 2060. By 2060, coal-fired power's average utilisation hours are expected to fall to around 1,000 hours, which means it will mainly provide flexibility rather than baseload services.

Wind and solar, in particular, will see rapid growth, with installed capacities increasing from 620GW and 1310GW in 2025 to 890GW and 1,870GW by 2030, and further surging to 1300GW and 2500GW in 2035 and 3,198GW and 4,723GW by 2060, respectively. In total, wind and solar capacity are projected to grow from 1,940GW in 2025 to 7,921GW by 2060, a fourfold increase (*see Figure 3*).

Projected wind power generation increases from 1,241TWh in 2025 to 1,910TWh in 2030 and 7,675TWh in 2060, accounting for 12%, 15% and 35% of total generation, respectively (*see Figures 4 & 5*). Projected solar power grows from 1,388TWh in 2025 to 2,132TWh in 2030 and 7,084TWh in 2060, and its share in total electricity generation rises from 13% in 2025 to 32% in 2060 (*See Figures 4 & 5*).

Energy storage, which plays a key role in reducing renewable energy waste, is expected to see rapid growth. Deployment of storage will enable a higher share of variable renewable energy, enhancing system flexibility and reducing reliance on coal. New-type storage technologies – such as advanced lithium-ion batteries, flow batteries, compressed air energy storage, and mechanical energy storage – are projected to rise from just 91GW in 2025 to more than 1,300GW by 2060. Pumped hydro storage will grow from 70GW in 2025 to 360GW in 2060.

Nuclear energy and hydropower are also forecast to increase substantially. China's nuclear reactor fleet is expected to become the world's largest after 2030,[19] boosting capacity from 61GW in 2025 to 420GW by 2060. Hydropower capacity will grow from 383GW to 540GW, with development concentrated in China's central region and southern Yunnan province (*see Figure 3*). Nuclear power will account for 15% of total generation (3,271TWh) by 2060, up from 4%. Hydropower will grow from 1,200TWh to 2,110 TWh, and biomass generation from 430TWh to 940TWh (*see Figures 4 & 5*).

By 2060, combined renewable generation – from wind, solar, hydropower, and biomass — will reach 17,440TWh, meeting 80% of total supply, compared with 39% in 2025 (*see Figure 5*).

Figure 3: China's power generation capacity by type (GW)

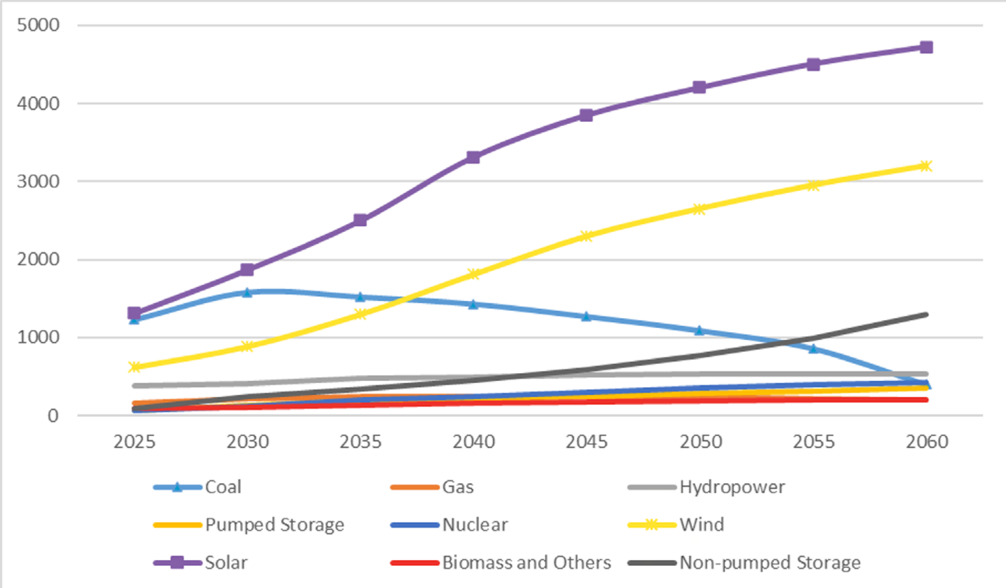


Figure 4: Electricity demand and generation by different power sources (TWh)

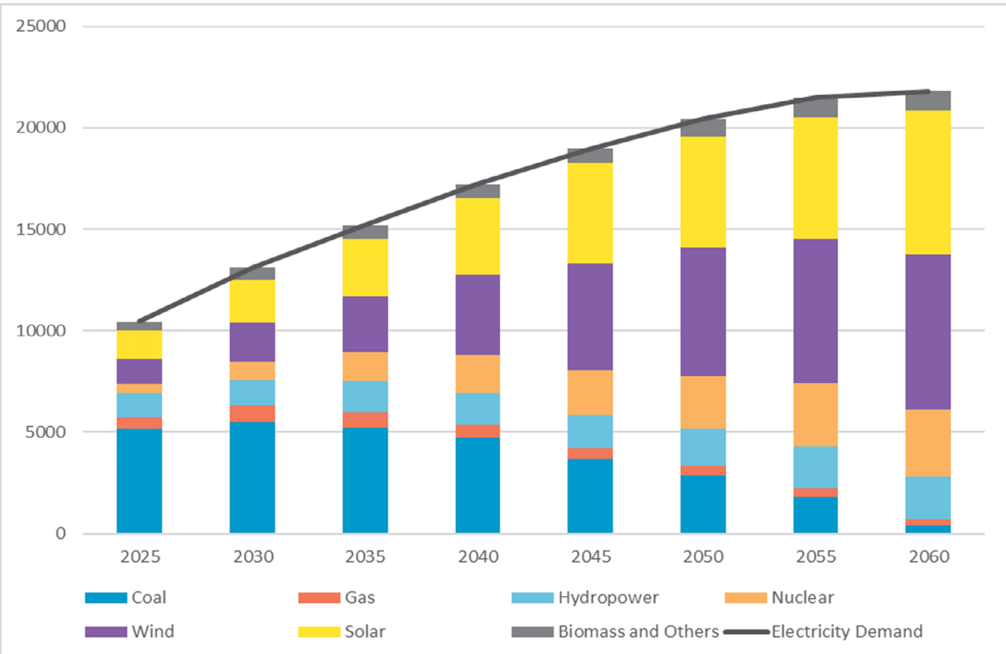
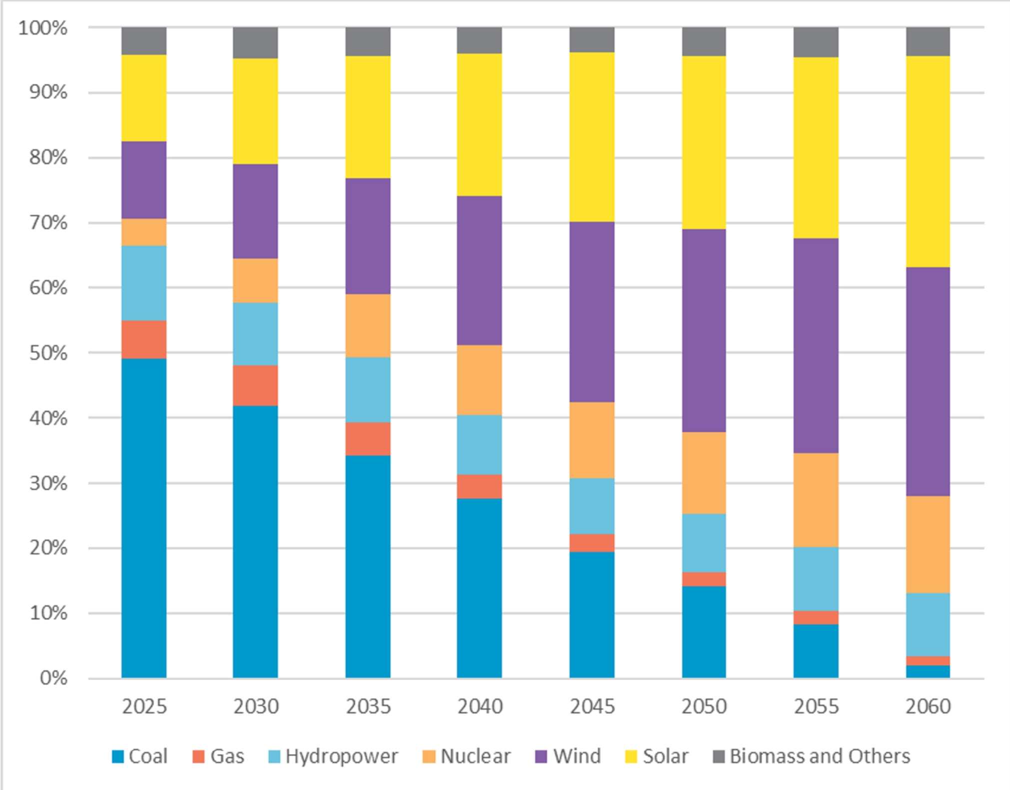


Figure 5: The share of generation by different power sources (%)



Note: For Figures 3, 4 & 5, data is calculated based on ARE analysis.

1.3 Flexibility essential for system security

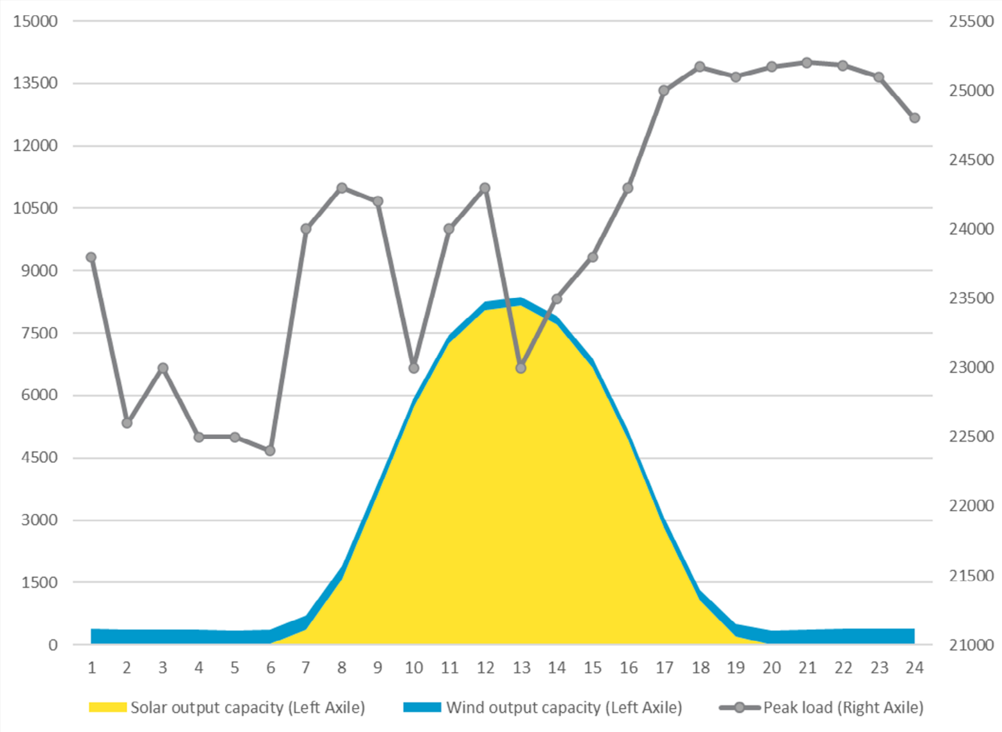
As variable renewable energy increases, flexibility becomes essential for system security. At the moment, it's primarily provided by coal power but this will progressively be replaced by low-carbon technologies.

Figure 6 (*next page*) illustrates the typical timing of peak loads in a Chinese city, showing significant fluctuations in wind and solar output, which makes it difficult for these sources to meet peak demand reliably.

China's power system uses a deterministic approach to resource adequacy planning. To ensure system adequacy is sufficient to cover peak load, a fixed reserve margin is applied (*see boxed text, p.11*). Unlike the probabilistic methods employed in the U.S. – such as the Loss of Load Expectation (LOLE) standard – this method aims to guarantee reliability under worst-case scenarios. It is straightforward and remains commonly used in countries where system security and supply stability are top priorities.

Under this power system planning approach, although wind and solar have large installed capacities, their firm capacities are significantly lower. Taking the projected 2030 figures as an example, there will be an estimated 1,870GW of solar capacity and 890GW of wind but dispatchable (firm) capacity during peak demand will only be 8GW for solar and 86GW for wind (*see Figure 7, p.13*). This underscores the

Figure 6: Comparison of load curve and solar PV output curve (MW)



Note: Figure 6 illustrates a typical working day in Anhui Province, China, showing solar and wind power output alongside the load curve. Peak load data are sourced from the NEA and NDRC[20], while solar and wind output data come from the Anhui Power Exchange Center.[21]

Approaches to resource adequacy planning

Deterministic approach

A deterministic approach ensures power system adequacy based on fixed assumptions about future conditions. The planning process ensures that the total available capacity is sufficient to meet the peak load under extreme but plausible conditions, such as unusually high electricity demand or low renewable energy output. It sets a required reserve margin to plan system adequacy based on the peak load.

China's reserve margin is typically composed of three parts, based on the Guide on Technology for Power System (GB/T38969)[22]:

- **Peak Load Reserve margin:** 2–5% of peak load, to account for unexpected electricity demand growth.
- **Contingency Reserve margin:** 10% of peak load, to handle sudden generator or transmission failures.
- **Maintenance Reserve margin:** 5% of peak load, to ensure supply during planned equipment maintenance.

Probabilistic approach

A probabilistic approach assesses power system adequacy using statistical methods. Instead of assuming fixed conditions, it models the likelihood of various scenarios — such as high demand, generator outages, or low renewable output — to estimate the probability of supply shortages.

One common metric is LOLE (Loss of Load Expectation), which expresses how often the system may fail to meet demand (e.g., 0.1 days/year). This method allows planners to balance reliability and cost by quantifying acceptable risk levels, and is widely used in countries such as the U.S. and UK.

critical role of flexibility resources in maintaining system security.

Figure 7 shows that the sources of flexibility in China's power system are expected to change radically between 2030 and 2060. Prior to 2030, flexibility resources are primarily provided by coal and hydropower. In 2030, thermal power (including coal, gas, and biomass) remains the dominant source for meeting peak demand, providing 1,718GW of effective capacity and accounting for 72.1% of total firm capacity.

Hydropower provides an additional 243GW, providing 10.2% of total firm capacity. Batteries and pumped hydro storage only contribute 96GW and 111GW of reliable capacity, accounting for 4% and 4.7% of total, respectively. In addition, we expect 30.2GW, about 2% of peak load capacity, will be provided by Demand Response measures (encouraging or obliging consumers to make short-term usage reductions during peak periods in response to a price signal, as shown in Figure 7).

Between 2030 and 2060, flexibility resources will mainly be provided by battery storage, nuclear, hydropower, and Demand Response. Battery storage is projected to provide 845GW of reliable capacity, along with 342GW from pumped hydro storage, accounting for 26.4% and 10.7% of total firm capacity. Dispatchable renewable sources such as hydropower will contribute 438GW, while Demand Response adds another 527GW.

Firm capacity from thermal sources will decline to 805GW by 2060, contributing to 25.1% of total firm capacity.

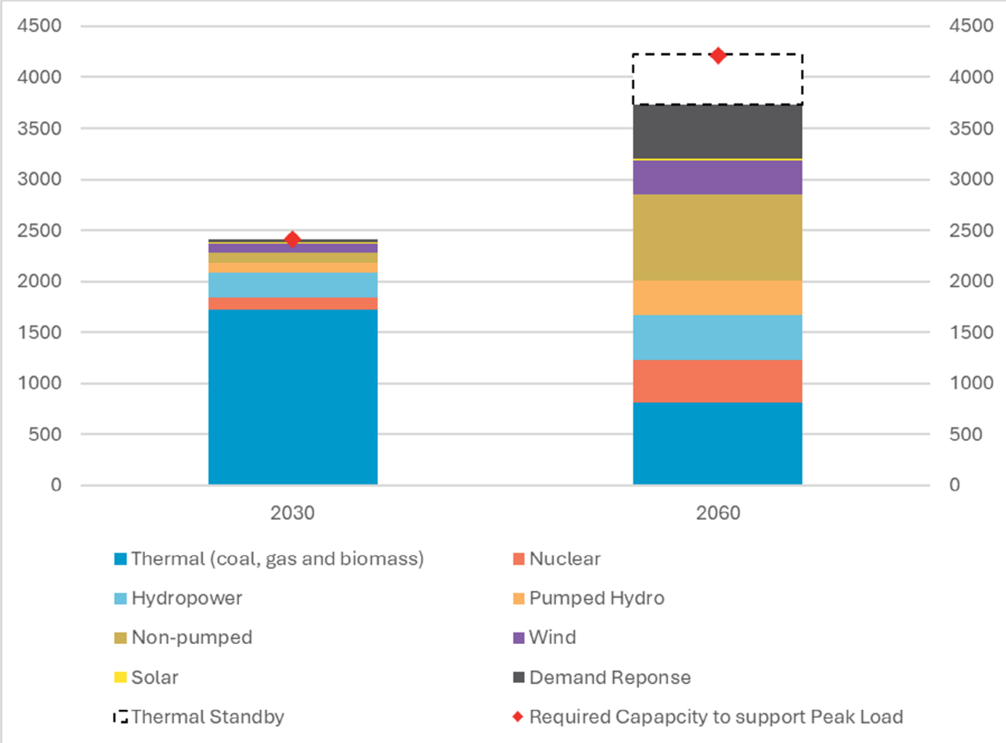
Total combined flexible capacity and demand response are expected to provide 3,733GW, compared with the total required adequacy of 4219GW in 2060. The shortfall of 487GW will be met by retired coal (420GW) and gas (70GW) plants, which will act as standby units dispatched only during periods of insufficient renewable output (*see Figure 8*).

Coal, therefore, will be progressively replaced as a baseload resource by diversified power sources and clean energy technologies, marking a fundamental structural transformation in China's power system.

Figure 7: Flexibility resources to meet system adequacy (GW)

	Criteria	2030	2060
1. Required System Adequacy	Peak load + Reserve margin	2412	4219
Peak Load		2010	3516
Reserve Margin	Sum of margins	402	703
Peak Load Reserve margin	5% of Peak load	101	176
Contingency Reserve margin（10%）	10% of peak load	201	352
Maintenance Reserve margin（5%）	5% of peak load	101	176
2. Installed Capacity of Power Mix	Sum of installed capacity of thermal, nuclear, hydro, storage, solar and wind	5582	11346
2.1 Thermal Power		1909	805
Coal		1580	400
Gas		220	200
Biomass		109	205
Firm Capacity	2030-2040: 90%; 2040 afterwards 100%	1718 (72.1%)	805 (25.1%)
2.2 Nuclear		120	420
Firm Capacity	100%	120 (5.0%)	420 (13.1%)
2.3 Hydro Power		405	540
Firm Capacity	60%-90% depends on the water inflow levels	243 (10.2%)	438 (13.7%)
Storage)	65%	96 (4.0%)	845 (26.4%)
Firm Capacity for Storage		207	1187
2.5 Solar and Wind		2760	7921
Wind		890	3198
Solar		1870	4723
Firm Capacity (Wind)	2030: 9.66%; 2060: 10.42%	86 (3.6%)	333.2 (10.4%)
Firm Capacity (Solar)	2030: 0.41%; 2060: 0.46%	8 (0.3%)	21.7 (0.7%)
Sum of Firm Capacity		2382	3205
2.6 Demand Response		30.2	527
3. Surplus	System Adequacy-(Capacity Credits + Demand Response)	0	-487
Standby Capacity		0	490
of which Coal		0	420
of which Gas		0	70

Figure 8: Electricity demand and generation by type (GW)



Source: NEA and ARE calculations

2. Why China builds new coal

In the five years between 2025 and the projected coal-power peak in 2030, China will continue to build new coal plants. While this expansion might seem to contradict China's carbon-neutrality pledge, a closer look at recent developments points to a redefined role for coal within the country's broader decarbonisation framework.

2.1 China's resource endowment has made coal a critical transitional resource in the country's energy transition

China has an abundance of coal but a relative scarcity of oil and natural gas. The country accounts for 53% of world coal production (on an exajoule basis), but only 5.5% of natural gas and 5.1% of crude oil.[23]

This resource endowment has set China's pattern of energy consumption. In 2023, China produced 93 exajoules (EJ) of coal and consumed 92EJ. Oil production was 9EJ and consumption 33EJ, while gas production was 8EJ and consumption 15EJ.[24] Imports cover the gaps (*see Figure 9*).

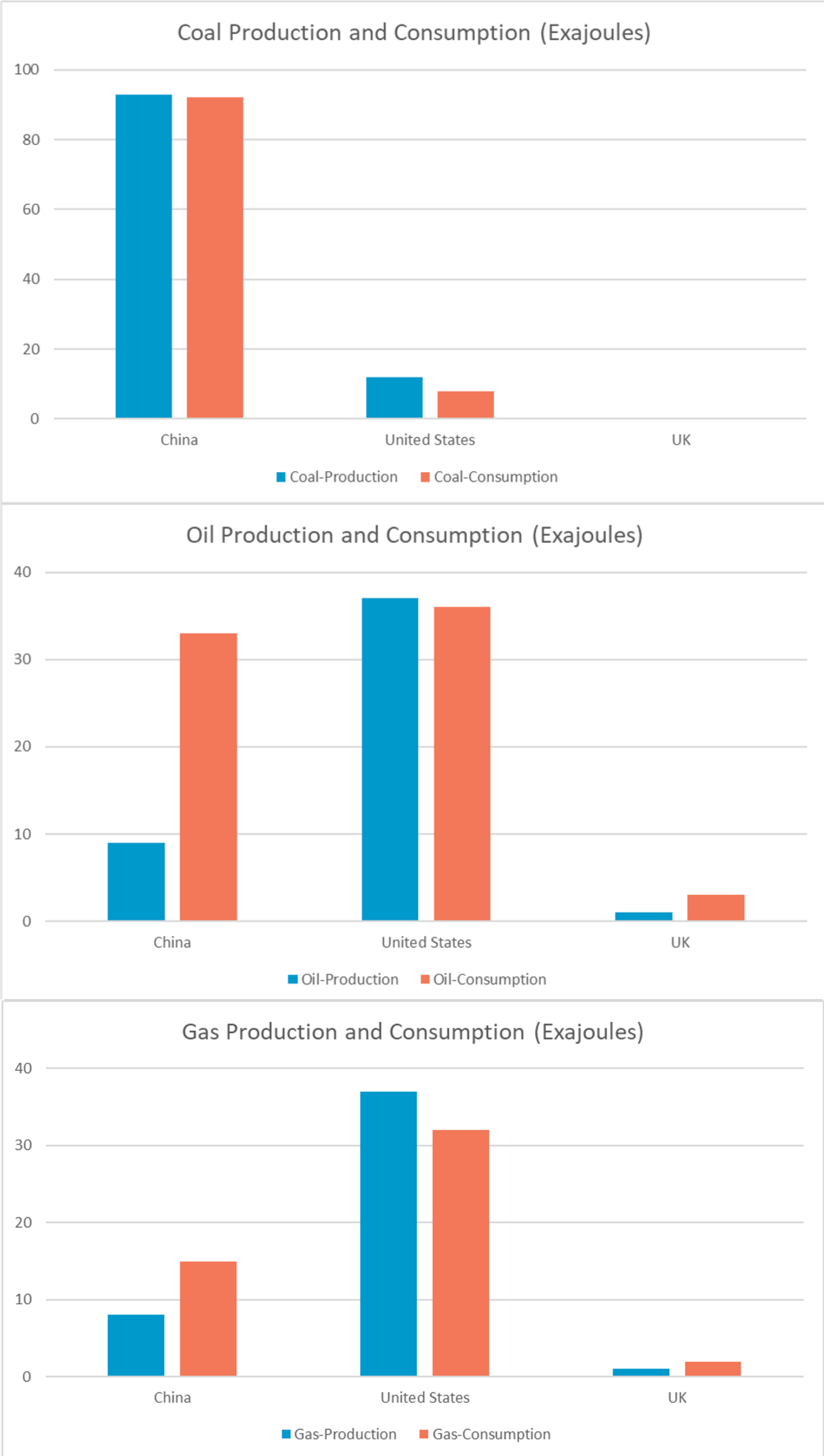
In contrast, U.S. production of natural gas, coal, and oil in 2023 exceeded domestic consumption (Gas: 37 vs 32EJ; Coal: 12 vs 8EJ; Oil: 37 vs 36EJ), making the country largely self-sufficient. In the UK, energy consumption consistently exceeds production in all three fuels, and the country is dependent on imports – of natural gas in particular – during its own energy transition (*see Figure 9*).

A clear pattern emerges from resource reserves, in that abundant domestic reserves become the backbone of a country's fuel mix. In China, coal accounted for about 61% of the country's total electricity generation in 2023 (5,752TWh out of 9,456TWh).[25] Similarly, in the U.S., which produces large amounts of natural gas and coal, the two fuels contribute the major share of electricity generation — gas nearly 40% (1,806TWh out of 4,254TWh), and coal nearly 16% (675TWh out of 4,254TWh) – (*see Figure 10*).[26]

In contrast, the UK has limited reserves of oil, gas, and coal and relies heavily on imports. Power generation is largely supported by abundant domestic wind resources and imported natural gas. In 2023, natural gas accounted for about 35% (102TWh out of 293TWh), while wind power contributed around 28% (82TWh out of 292TWh) of its electricity generation (*see Figure 10*).[27]

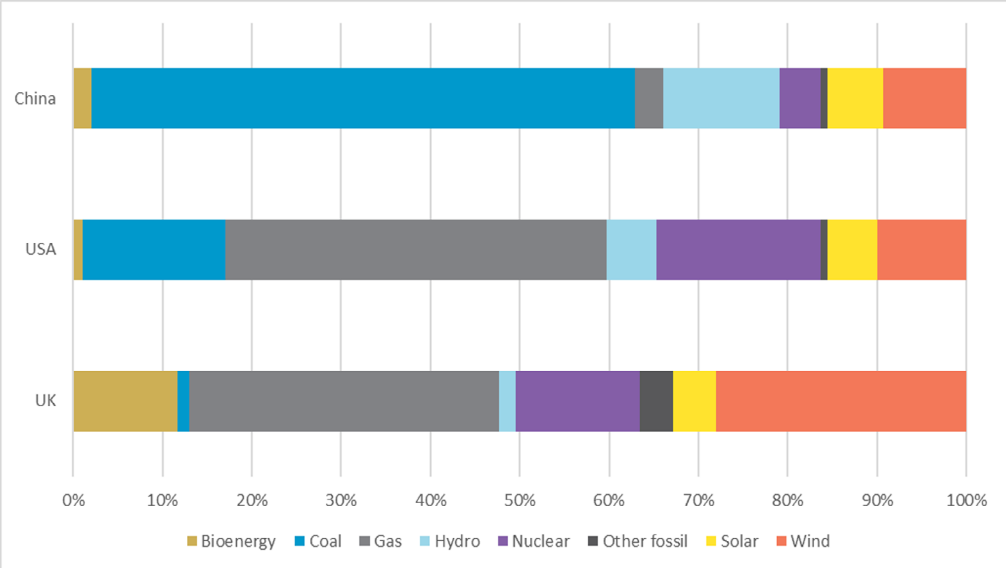
Unlike Western countries that can rely on natural gas as a transitional fuel, China's limited oil and gas reserves leave it with fewer options. This makes it more important to accelerate decarbonisation while leveraging existing coal power and transforming it into a flexible, cleaner backbone for the energy transition.

Figure 9: 2023 coal, oil and gas production and consumption



Notes: sourced from BP energy outlook 2024

Figure 10: Electricity generation by different power sources, 2023 (%)



Source: Ember and ARE calculation

2.2 New coal plants are being built to provide flexibility services to variable renewables

China's renewables buildout is focusing on large-scale wind and solar projects in the country's western regions, which are linked to major population centres through high-voltage transmission lines. These projects are often integrated with coal power to provide flexibility and ensure grid stability.

Since 2021, the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA) have jointly launched three batches of large-scale wind and solar base projects.[28] These were announced in the Notice on the Planning and Layout of Large-Scale Wind and Solar Power Bases Focused on Desert, Gobi, and Arid Regions in November 2021, February 2022 and April 2023 (*see Appendix*). Together, they brought total planned wind and solar capacity to 595.05GW.

As shown in the Appendix, China's large-scale renewable energy bases are typically configured as bundled development models known as "wind-solar-coal-battery", with a coal-to-renewables ratio of about 30%.

In many approved renewable bases — such as those in the Kubuqi, Ulan Buh, Tengger, and Badain Jaran deserts — installed wind and solar capacities often exceed 10GW, while accompanying coal power units are about 4GW. In this configuration, coal power acts as a flexibility resource, helping to stabilise the system during periods of low or intermittent renewable output with the ability to be ramped up and down in line with hourly, diurnal, weekly, and seasonal fluctuations in load.

About 147.05GW of large-scale wind and solar bases were expected to be constructed by the end of 2025.[29] Based on a typical 30% coal-to-renewables ratio, approximately 44GW of coal capacity will have been added to provide flexibility for bases built between 2021 and 2025, as shown in Figure 11.

Over the same period, China's net increase in coal capacity is projected to reach about 150GW. Once 30GW of retirements[30] is factored in, that means a total 180GW of new coal capacity has been built to serve both baseload demand and flexibility services. According to our calculations, this indicates that roughly 25% of the newly added coal capacity is intended to provide power system flexibility (*see Figure 11*).

Once we consider the remaining coal approved during the 14th Five-Year Plan but scheduled for construction beyond it, our calculations show that flexible-service coal capacity accounts for about 32% of total new coal constructed and approved (*see Figure 12*).

Looking at the coal power plans set out during the 14th Five-Year Plan, more than one-third of new capacity is aimed at enabling renewable integration by enhancing system flexibility, rather than extending fossil-fuel reliance. In our view, this is evidence that China's coal buildout is increasingly being repurposed to support a higher share of variable renewable generation rather than as baseload power.

In September 2025, China announced a more ambitious Nationally Determined Contribution (NDC) that will raise its installed wind and solar power capacity to 3,600GW by 2035,[31] which signals the share of new coal plants for flexibility services is likely to increase further.

Figure 11: The share of new-build coal for flexibility services during 14th FYP (2021-2025)[32]

Items	Details	Value (GW)
Approved Renewable Base Capacity during 14th FYP (2021-2025)	Batch 1 wind & solar bases[33]	97.05
	Batch 2 wind & solar bases[34]	455
	Batch 3 wind & solar bases[35]	43
	Total (Batch 1–3)	595.05
Constructed Renewable Base Capacity by 2025	Constructed RE base (batch 1) capacity by 2025[36]	97.05
	Constructed RE base (batch 2-3) capacity by 2025[37]	50
	Total constructed RE base (batch 1-3) capacity by 2025	147.05
Constructed Coal Capacity to support RE base	Required coal (30% of 147.05 GW renewables)	44.115
Coal net increase (2021-2025)	30 (2021) + 10 (2022) + 40 (2023) + 30 (2024) + 40 (2025 proposed) [38]	150
Retired coal (2021-2025)	200MW operating over 30 years[39]	30
Total constructed new coal capacity (2021–2025)	Net increase + retired coal	180
Share of constructed coal for flexibility services (2021-2025)	constructed coal for flexibility service/ total constructed new coal (44.115/180)	25%

Note: Please refer to References section for sources.

Figure 12: Share of completed and ongoing coal capacity from 14th FYP for flexibility service[40]

Items	Details	Value (GW)
Approved Renewable Base Capacity during (2021-2025)	Batch 1 wind & solar bases[41]	97.05
	Batch 2 wind & solar bases[42]	455
	Batch 3 wind & solar bases[43]	43
	Total (Batch 1–3)	595.05
Planned Coal Capacity to support RE base	30% of renewables capacity	178.52
Coal net increase (2021-2025)	30 (2021) + 10 (2022) + 40 (2023) + 30 (2024) + 40 (2025 proposed) [44]	150
Retired coal (2021-2025)	200MW operating over 30 years[45]	30
Total constructed new coal capacity (2021–2025)	Net increase + retired coal	180
Ongoing coal buildout from 14th FYP	Pre-permitted coal (by July 2025)	49.2
	Permitted coal	101.58
	Under construction	224.86
Total ongoing coal projects[46]	Pre-permitted + permitted + under construction	375.64
Total 14th FYP Coal Buildout: Completed and Ongoing beyond 2025	Completed new coal (180 GW) + ongoing projects (375.64 GW)	555.64
Share of completed and ongoing coal capacity for flexibility service[47]	New coal for RE base (178.52 GW)/completed and ongoing coal capacity (555.69 GW)	32%

Note: Please refer to References section for sources.

2.3 Flexibility Resources Struggle to Meet Increasing Renewables Integration by 2030

As the share of variable renewable energy sources continues to increase, current generating assets will need to be more flexible. In coal-dominated power systems, plants can adjust output to meet load fluctuations, whether hourly, daily, weekly, or seasonally. As China gradually retires coal plants in line with the country’s carbon neutrality targets, alternative sources of flexibility must be deployed to ensure the power system remains stable and responsive (*see Figure 13*).

Current constraints limit the role alternative resources can play in replacing coal’s flexibility services. In many European countries, natural gas often fills the role of a bridge to a low-carbon power system. Because of its heavy reliance on imports, China lacks gas-fired power plants,[49] which accounted for just 3.2% of total electricity output[50] (140GW) and 4.3% of total generating assets in 2024.[51] This is far below countries like the UK (36%) and Germany (14%).[52]

With the role of gas limited, pumped hydro storage is another option that’s widely deployed globally and is particularly effective in addressing two key power-system flexibility needs: peak capacity and inertia.

China’s abundant water resources are primarily concentrated in the southern and southwestern regions. However, China’s large-scale renewable bases are most concentrated in the northern and northwestern regions (*see Appendix*), which are significantly lacking

Figure 13: Electricity system flexibility requirements[48]

Flexibility services	Description	Dominant source of flexibility by 2060
Peak capacity (or adequacy)	Ensures that sufficient power capacity is available to meet the highest expected demand of the year. The share of variable renewables increases, affecting the availability of capacity across the day, month, and year.	▪ Batteries ▪ Pumped storage ▪ Demand Response
Ramping flexibility	The ability to change output quickly and at short notice (within hours to minutes) to keep supply and demand in balance.	▪ Demand Response ▪ Hydropower ▪ Storage
Stability	The ability to quickly reduce demand or increase supply when there is a large deviation in system frequency caused by a sudden loss of output or surge in demand.	▪ Storage (esp. battery) ▪ Hydropower ▪ Hydrogen
Inertia	The system's ability to ride-through momentary disturbances in supply or demand without causing cascading failures on the network.	▪ Nuclear power ▪ Bioenergy ▪ Hydropower ▪ Thermal power

Note: Summarised from IEA.

in water resources. This severely limits the feasibility of pumped hydro storage.

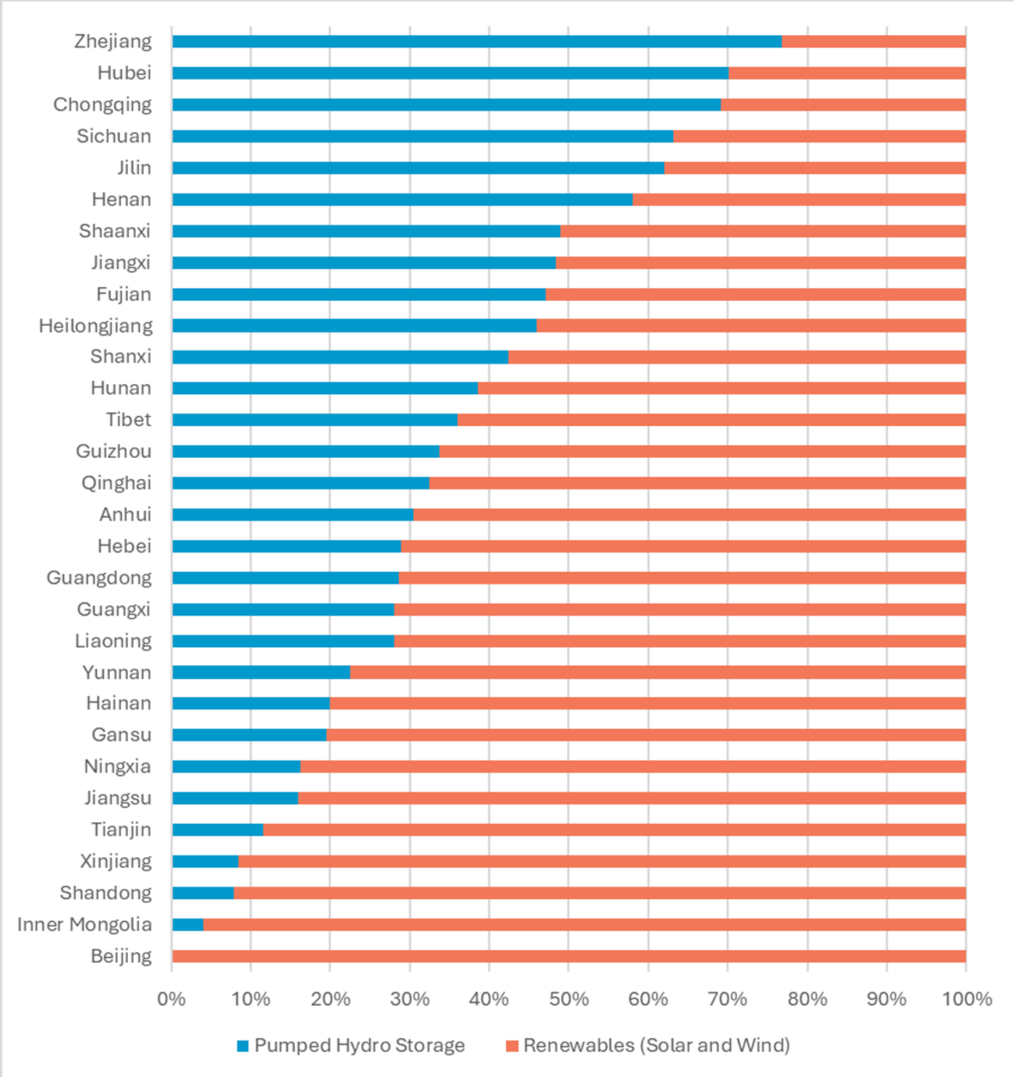
Northwestern provinces such as Inner Mongolia, Xinjiang, Ningxia, and Gansu host large-scale renewable energy bases and are experiencing rapid growth in wind and solar installations. However, pumped hydro storage development has lagged (*see Figure 14*). This is due to issues such as severe water scarcity and long construction timelines. A standard 1GW pumped hydro station typically requires seven to eight years to complete.[53]

As of April 2025, China had about 60GW of pumped storage in operation, with 163GW under construction, 198GW in pre-construction, and 90GW in the "announced" stage — totalling 451GW.[54] Much of this capacity is unlikely to be completed before 2030.

There are other promising storage solutions for power system flexibility, including battery storage (including lithium-ion, sodium-ion, and lead-acid batteries), compressed air energy storage (CAES), hydrogen storage, and thermal energy storage (TES).[56] Among these, lithium-ion batteries have grown rapidly, accounting for 90% of the storage market.

High costs remain a major barrier to battery storage growth. For example, lithium-ion storage is approximately RMB0.67 (USD0.09) per kilowatt-hour, more than twice the RMB0.31 (USD0.04) cost

Figure 14: Share of pumped hydro storage prospective (under construction, pre-construction, and approved) relative to wind and solar capacity, by province[55]



Source: Global energy monitor

of pumped hydro storage[57] (*see Figure 15*). In addition, batteries typically provide only two to four hours of storage.[58]

In contrast, technologies such as flow batteries and hydrogen storage are better suited for providing long-duration discharge, but they remain in the early stage of development.

Overall, the deployment of systems capable of cross-day regulation remains limited by cost and availability.

Until low-carbon solutions are ready to be widely adopted, coal is the only feasible and reliable flexibility resource available to balance renewables and provide baseload power.

Figure 15: Costs of long-duration storage technologies[59]

Category	Storage Technology	Energy Efficiency	Duration	Response Time	Cost (Yuan/kwh)
Mechanical energy storage	Pumped hydro storage	70-80%	8-10hrs	In minutes	0.31
	Compressed-air-energy storage (CAES)	50-70%	4-10hrs	In minutes	0.436
Electrochemical energy storage	lithium iron phosphate (LFP) batteries	85-98%	0.5-4hrs	In millisecond	0.67
	Vanadium redox flow battery (VRFB)	75-85%	4-24hrs	In millisecond	0.688
Chemical energy storage	Hydrogen[60]	55-75%	hours to weeks	In minutes	0.74
Thermal storage	Molten salt energy storage[61]	50%	>10hrs	-	0.886

Source: Beijing Energy Association[62]

3. New coal needs to serve as baseload generation until renewables can reliably meet electricity demand

China's power source capacity is designed from two perspectives, both of which are critical for grid stability:

Meeting electricity demand: ensuring total power generation capacity meets the country's growing electricity consumption in a given period of time.

Providing real-time power balance: The continuous process of matching an electrical grid's power supply with its demand at any given moment.

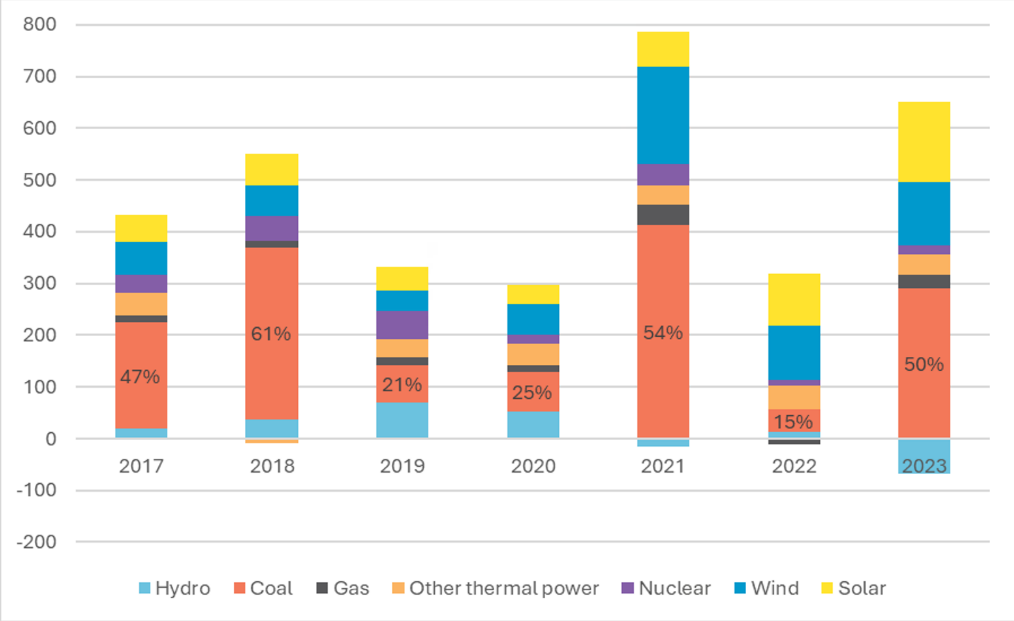
3.1. China's economic growth continues to drive rising electricity demand, necessitating an increase in coal capacity

China's economy has maintained rapid growth, which in turn has driven accelerating demand for electricity. As shown in Figure 16, between 2017 and 2023 annual incremental electricity generation reached 432, 542, 331, 299, 770, 310, and 584TWh, respectively, with coal power contributing approximately 47%, 61%, 21%, 25%, 54%, 15%, and 50% of these yearly increases [63]

Overall, coal's contribution has tended to rise in years with larger electricity demand increases, reflecting its role in filling the supply gap when other sources are unable to keep pace. While wind and solar have expanded rapidly in installed capacity, their actual generation remains dependent on weather conditions. Hydropower is also affected by rainfall variability, limiting its reliability as a stable source.

Meanwhile, as discussed in Section 2.3, other transitional energy or low-carbon options are constrained by resource availability, economics, and long construction timelines.

Figure 16: China's electricity demand (TWh) and GDP growth rate



Source: NBS database electricity balance sheet

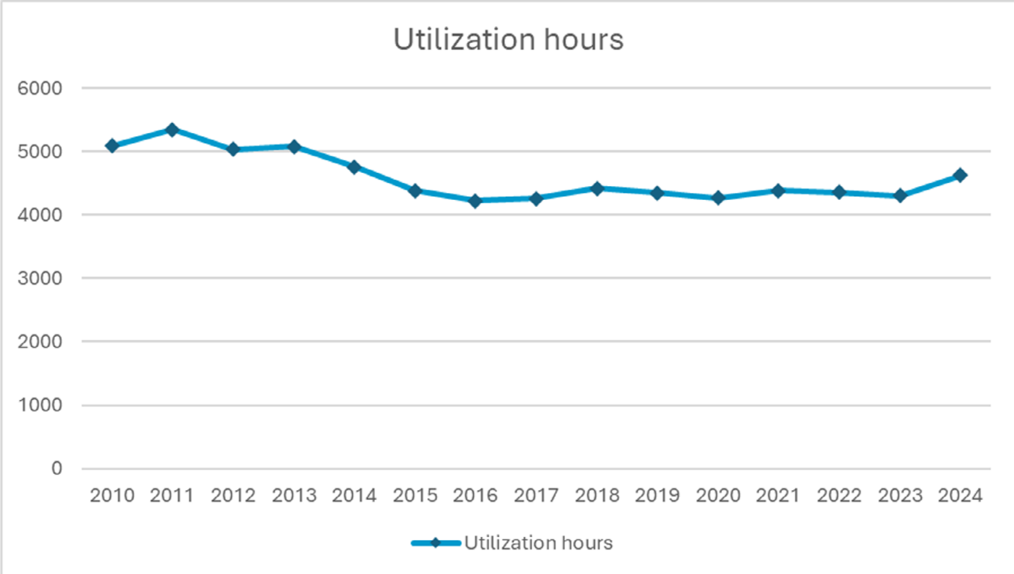
Mounting electricity demand cannot be met by simply increasing the utilisation hours of existing coal plants, for several reasons:

- Coal combined heat-and-power (CHP), or cogeneration, plants accounted for 41% to 52% of thermal power between 2021 and 2024.[64] These operate on a "heat-driven power" principle and cannot be easily adjusted to meet incremental electricity demand, since their operating hours and loads are determined by heating needs rather than electricity demand.
- Some power plants in the system are already functioning as baseload providers, with stable and high utilisation rates that leave little room for further increases in operational hours.
- Coal prices are market-driven, while electricity prices are heavily regulated. If coal prices rise significantly, coal-fired plants may reduce output to avoid financial losses, even if electricity demand is high. This price disparity makes it financially unfeasible for plants to operate.

Because of these constraints, when coal power is needed for baseload support during the transition period, China has adopted the principle of "adding capacity while controlling generation", which allows for moderate increases in coal power capacity to meet incremental demand while limiting coal plant utilisation to control total coal-fired generation.

Average coal-fired power plant utilisation has remained well below past highs in recent years. After peaking at 5,350 hours in 2011, average annual utilisation hours have generally ranged between 4,000 and 4,600 hours since 2015. So while coal capacity has continued to expand, utilisation hours have shown a steady decline over time.

Figure 17: Coal power utilisation hours over time



Source: NEA

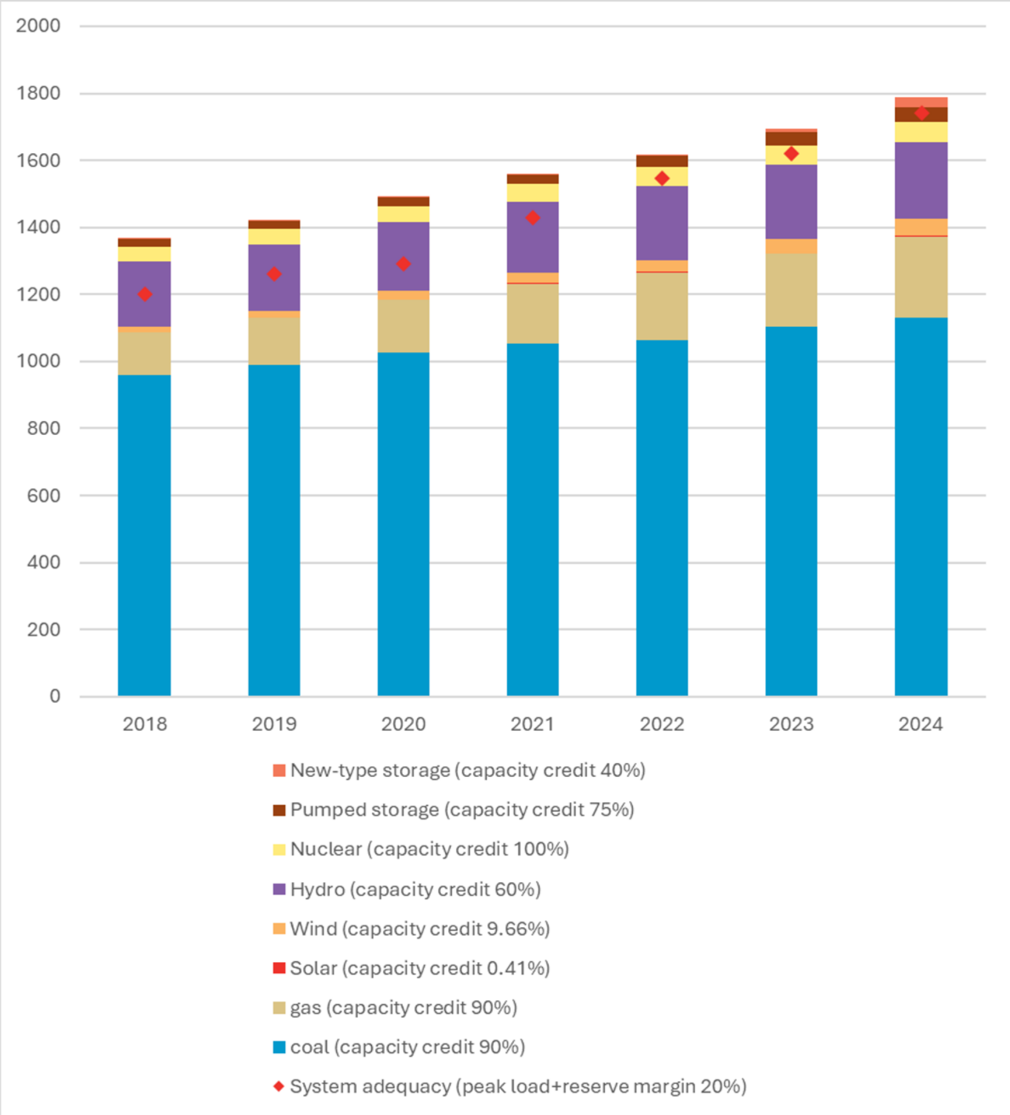
3.2 Peak Load Demand Reinforces Need for Coal Capacity

Real-time matching of power supply and demand is critical in maintaining grid stability – and is most challenging during periods of highest demand, when the system must be able to meet peak load. As discussed in section 1.3, China employs a deterministic approach to adequacy planning, and typically sets its required reserve margin at around 17% to 20% above peak load (*see boxed text, page 11*). Peak-hour availability varies widely between wind (9.66%), solar (0.41%), and coal (90%+).

During the 2024 summer peak period, for example, China's peak load reached 1,451GW, to which coal power contributed approximately 1,000GW of firm capacity.[65]

The dispatchable nature of coal power plays a critical role in ensuring system security, which is another reason for building new coal-fired capacity. Figure 18 illustrates the rapid growth of China's peak load, alongside the firm capacity provided by power sources during peak hours.

Figure 18: System adequacy and available capacity among different generation types



Note: Capacity contribution factor reflects the availability of different power sources during the system's peak load period

3.3 Insufficient Interprovincial Transmission Leads Provinces to Build Coal

Even though China has achieved an overall balance of power supply and demand at the national level, regional imbalances persist. The current operation of the grid, which schedules generators and balances by province instead of over wider regions, results in overbuilding of network assets in certain regions and sub-optimal utilisation of generating resources.

At the provincial level, some provincial demand centres continue to face varying degrees of power shortfall during peak summer and winter hours. Figure 19 (p. 27) shows that demand centres including Zhejiang, Sichuan, Shanghai, and Jiangsu purchase most of their shortfall electricity from the spot market. On the supply side, Hubei, Shaanxi, and several western provinces rich in coal and renewable energy are selling power.

Historically, China's power sector has been dominated by fixed prices, with more than 90% of traded electricity tied to medium- and long-term (MLT) contracts. These contracts lock in prices and volumes over extended periods, limiting flexibility to adjust to real-time system needs. For example, provinces like Shanxi have long-term supply agreements with Beijing and Jiangsu. Such contracts prioritise electricity delivery to designated provinces, making it difficult to redirect surplus power to regions with urgent need.

Power sector reforms are accelerating the deployment of a unified national power market to promote integration across provinces and regions (Document No. 118 issued by NDRC, 2022[66]). An interprovincial spot market was also officially launched in 2022.

Between 2022 and 2024, interprovincial traded volumes rose from 1,000 TWh[67] to 1,390 TWh[68], with the share of total transactions increasing from 19% to 22.5%. Though the scale of market transactions is still not sufficient, the market is expected to be fully established by 2030, enabling electricity to be allocated more flexibly and efficiently in line with real-time system needs.[69]

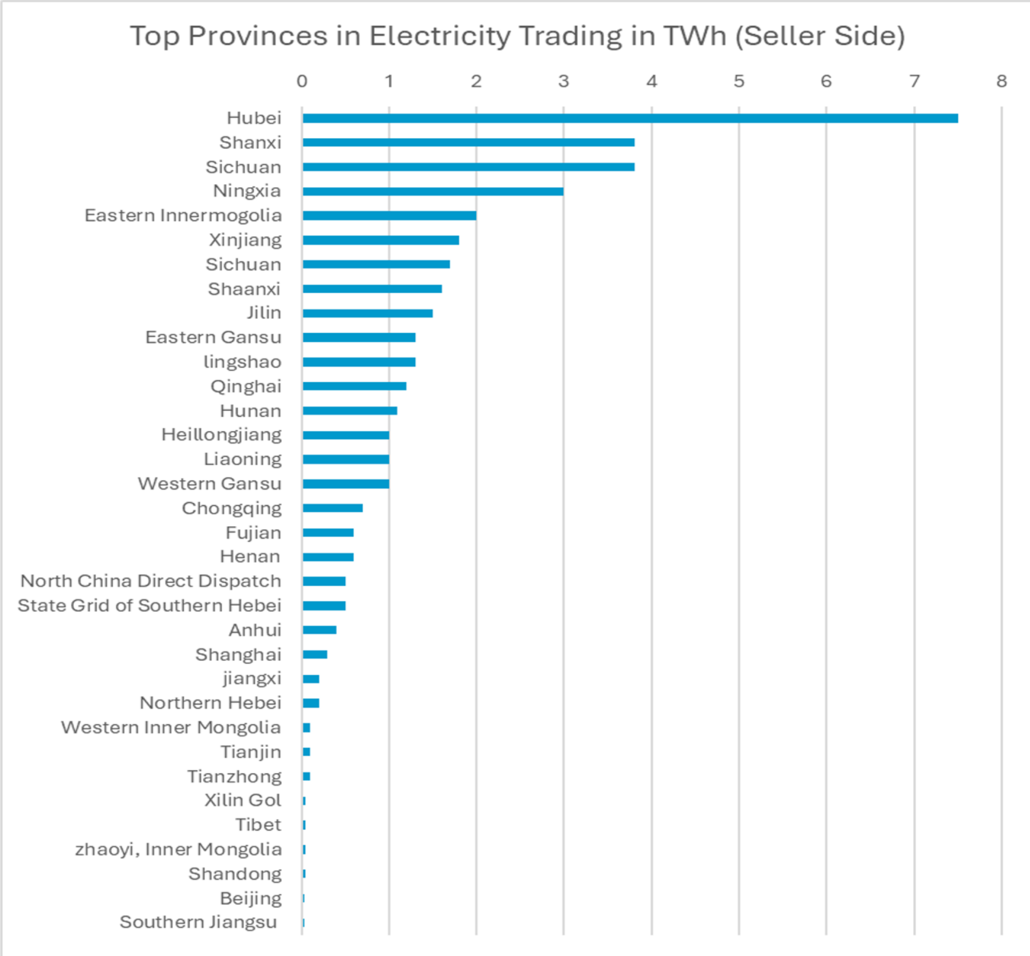
Long-term construction of transmission infrastructure also remains a challenge to provinces eager to fill the power shortage. Ultra-high-voltage (UHV) projects face lengthy construction timelines (typically two-to-three years for DC lines and one-to-two years for AC lines[70]). As a result, key regions such as North China, a major demand centre, and Southwest China, rich in renewable resources, remain insufficiently connected, limiting the efficient interprovincial transfer of electricity.[71]

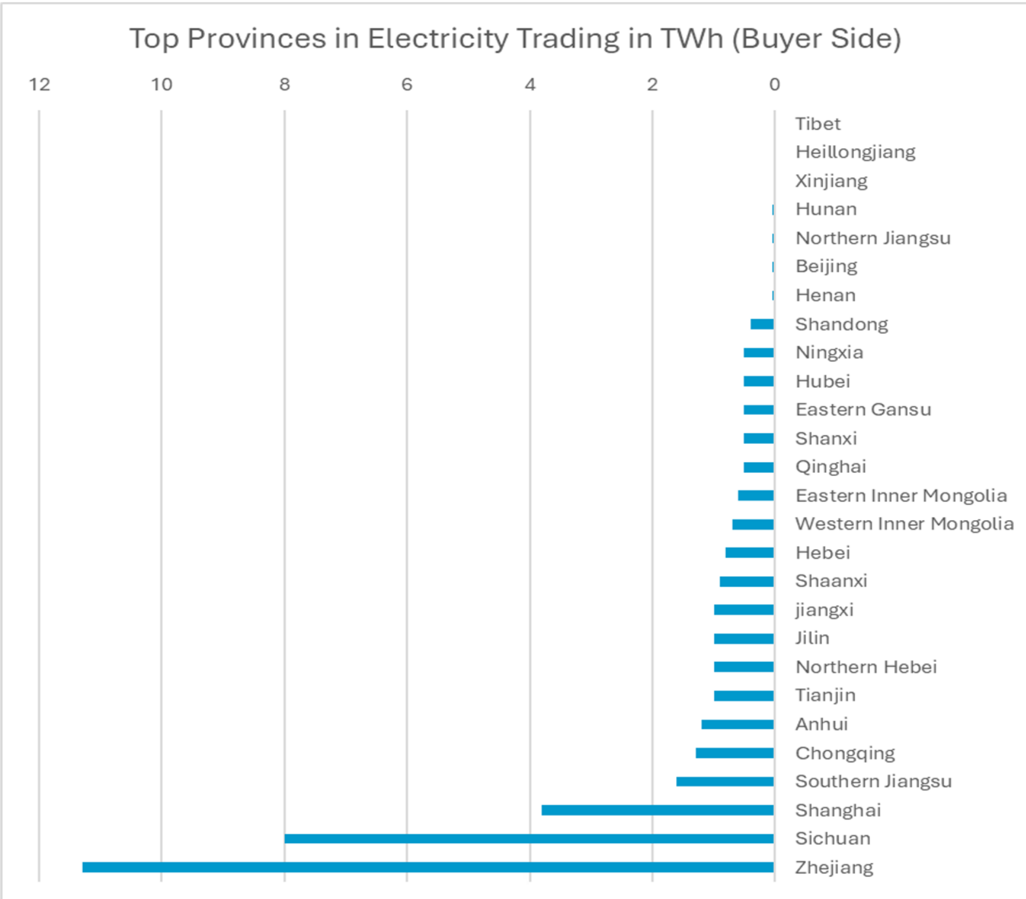
In addition, a 2013 State Council directive (Decision of the State Council on Canceling and Delegating a Batch of Administrative Approval Items) delegated the approval authority for coal-fired power projects of less than 600MW per unit to local governments.[72] This policy gave provinces greater autonomy to approve new coal projects based on local demand, without requiring central government approval.

The combination of underdeveloped cross-provincial transmission, immature market-based trading mechanisms, and the decentralisation of coal power project approvals has created incentives for provinces facing repeated power shortages to build new coal-fired power plants. For local governments, such projects are seen as a way to reduce the risk of outages and enhance local electricity system security.

Figure 19: Transaction volumes in the inter-provincial Electricity Spot Market (TWh)[73]

Source: NEA 2024 Electricity Market Report





3.4 Rising Heating Demand Drives New Coal Power

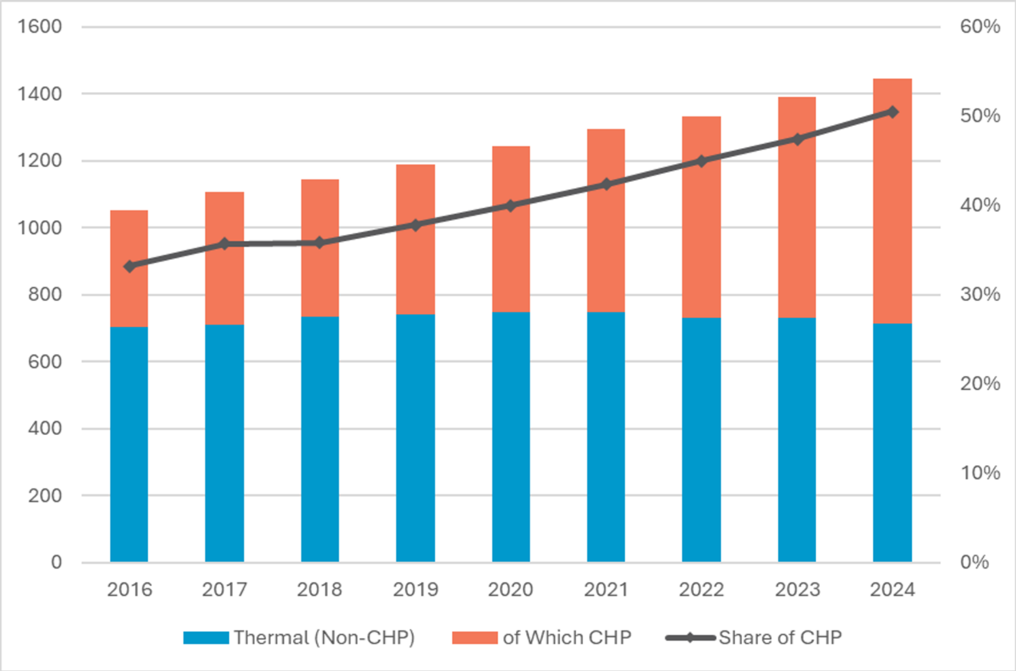
In China, the supply of electricity and heat is highly coupled. CHP (cogeneration) plants are the primary source of heating, supplying about 48% of demand in northern areas.

Unlike boilers that only produce thermal energy, leading to lower energy efficiency and higher pollution levels, CHP generates both electricity and heat simultaneously. Because of their large capacity, high chimneys, and high dust removal efficiency of the boilers that generate steam, CHP units are beneficial in furnace desulphurisation and denitrification.[74]

From 2016 to 2024, the CAGR of CHP capacity was an estimated 9.6%, with total capacity rising from 350GW[75] to 730GW.[76] Over the same period, the share of CHP plants accounting for total thermal power capacity increased from 33% to 51% (*see Figure 20*).[77]

At present, CHP demand in northern China is close to saturation, while demand for efficient heating solutions is expected to grow in southern China, where reliance on centralised heating has traditionally been lower but winters are becoming colder. This trend is likely to drive further CHP capacity expansion, and in turn additional coal power plant buildouts.

Figure 20: The capacity of combined heat and power (GW)



Note: 2016-2022 data sourced from IEA; 2023-2024 data sourced from CEC and NEA.

Overall, China's new coal power projects during the 14th Five-Year Plan period serve a dual purpose. On one hand, they provide flexibility to support the rapid expansion of renewables such as wind and solar; on the other, they remain essential to meeting incremental electricity demand while renewable capacity is still developing.

With the accelerated growth of renewable generation and supporting flexibility resources, the construction of new coal power plants is expected to peak around 2030 and decline thereafter. In the coming decades, the system will no longer rely heavily on fossil fuels as coal is gradually repurposed to accommodate a growing share of variable renewable generation.

3. Conclusion

The Opportunity in Carbon Neutrality

China's path to carbon neutrality will help define the global trajectory for climate action. As one of the world's largest economies, the country's choices — particularly around phasing down coal, deploying clean technologies, and transforming the power system — carry far-reaching consequences.

Despite the recent expansion of coal power capacity, this report illustrates that a long-term pivot is not only possible but already underway, supported by structural investments in renewables, storage, and carbon abatement technologies.

At the core of China's energy transition is the continued expansion of renewable energy, especially solar and wind, which has outpaced the rest of the world. As fossil fuel capacity declines, renewables are well on course to becoming the dominant source of electricity. This transition is driven by aggressive national targets and favourable policy signals.

Beyond utility-scale projects, investment opportunities also lie in distributed generation, grid integration technologies, and digital platforms that enhance forecasting and system efficiency. Upstream, the scale-up of renewables will demand robust supply chains, including solar PV modules, inverters, and wind turbine components — sectors where investors can contribute directly to China's low-carbon transition.

To support the growing share of variable renewables, battery storage is projected to play a central role. By 2060, battery systems are expected to reach 1,300GW, offering grid flexibility services. This scale of deployment will require significant growth in battery-material supply chains, advanced manufacturing, and energy management systems.

It also opens space for innovation in distributed storage models, particularly for industrial and commercial users. China's leadership in battery technology, including innovations in long-duration batteries, positions the country as a key player globally, offering investors exposure to both domestic demand and international markets.

In addition to batteries, pumped hydro storage will remain a cornerstone of long-duration flexibility. With an expected 360GW of capacity by 2060, pumped hydro will play a key role in storing excess renewable energy and providing stable output during periods of low wind or solar generation.

Investment opportunities in this sector include site development, environmental and geological assessments, engineering and construction services, and digital optimisation tools to enhance system efficiency. As China increasingly deploys hydro resources to serve flexibility needs, this technology offers investors a reliable, proven avenue for long-term infrastructure returns.

In parallel, while total coal capacity is expected to decline to 400GW, coal-fired power plants equipped with CCUS will continue to play a role system reliability. This presents a substantial opportunity in emissions reduction infrastructure, including CO_2 capture technologies, retrofit services, pipeline development, and geological storage. With stronger policy support and maturing carbon markets, such investments are increasingly becoming commercially viable.

Taken together, these developments illustrate that China's clean energy transition, though complex and non-linear, presents a once-in-a-generation opportunity to align economic development with decarbonisation.

For technology providers and financial institutions alike, the coming decades will be critical. By accelerating the deployment of low-carbon technologies and ensuring a just and orderly shift away from coal, stakeholders can help China meet its carbon neutrality pledge, while contributing meaningfully to a safer global climate future.

Appendix

1. First batch of large-scale wind and solar projects issued by NDRC and NEA

Renewable base	Province, city	Capacity	Transmission company
Western Inner Mongolia (Zhaoyi) 4 GW Wind-Solar HVDC Export Project	Alxa East County; Urat Rear Banner; and Hangjin Banner (all in Inner Mongolia)	4000MW	Inner Mongolia Grid, State Grid
Western Inner Mongolia (Tuoketuo) 2 GW Wind-Solar Export Project	Hohhot, Inner Mongolia	2000MW	Inner Mongolia Grid, State Grid
Western Inner Mongolia (Kubuqi) 2 GW Photovoltaic Desert-Control Project	Hangjin Banner, Inner Mongolia	2000MW	Inner Mongolia Grid, State Grid
Central Inner Mongolia (Ulanqab) 1.2 GW Wind Power Project	Ulanqab, Inner Mongolia	1200MW	Inner Mongolia Grid, State Grid
Central Inner Mongolia (Xilingol) UHV Export Phase II 4 GW Wind-Solar Project	Xilingol League, Inner Mongolia	4000MW	Inner Mongolia Grid, State Grid
Central Inner Mongolia (Xilingol-Shangdu) 2 GW Wind Power Export Project	Xilingol League, Inner Mongolia	2000MW	Inner Mongolia Grid, State Grid
Eastern Inner Mongolia (Lugu HVDC) 4 GW Wind Power Export Project	Hinggan League and Tongliao, Inner Mongolia	4000MW	Inner Mongolia Grid, State Grid
Eastern Inner Mongolia (Yimu HVDC-Lingdong) 1 GW Wind-Solar Export Project	Hulunbuir, Inner Mongolia	1000MW	Inner Mongolia Grid, State Grid
Qinghai–Henan HVDC Phase II (Hainan Prefecture) 3.4 GW Wind-Solar Project	Gonghe, Qinghai	3400MW	State Grid
Qinghai–Henan HVDC Phase II (Haixi Prefecture) 1.9 GW Wind-Solar Project	Golmud; Mangya; and Da Qaidam (All in Qinghai)	1900MW	State Grid
Hainan Prefecture (Qinghai) 3 GW Photovoltaic Project	Gonghe and Xinghai, Qinghai	3000MW	State Grid
Haixi Prefecture 1.6 GW PV & Solar-Thermal Project	Golmud and Delingha, Qinghai	1600MW	State Grid

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Haixi (Mangya) 1 GW Wind Power Project	Mangya, Qinghai	1000MW	State Grid
Hexi Corridor (Wuwei–Zhangye) 1.5 GW PV Desert-Control Project	Wuwei and Zhangye, Gansu	1500MW	State Grid
Hexi Corridor (Jiuquan) 2.85 GW Wind-Solar-Thermal Project	Jiuquan, Gansu	2850MW	State Grid
Hexi Corridor (Jiuquan–Jinta) 1 GW Photovoltaic Project	Jiuquan, Gansu	1000MW	State Grid
Hexi Corridor (Jiuquan Iron & Steel) 1.2 GW Wind-Solar Project	Jiuquan and Jiayuguan, Gansu	1200MW	State Grid
Eastern Gansu (Qingyang–Baiyin) 2 GW Wind-Solar Project	Qingyang and Baiyin, Gansu	2000MW	State Grid
Northern Shaanxi–Wuhan HVDC Phase I 6 GW Wind-Solar Export Project	Yulin and Yan'an, Shaanxi	6000MW	State Grid
Northern Shaanxi (Jingbian–Fugu) 3 GW Wind-Solar Export Project	Jingjie and Fugu, Shaanxi	3000MW	State Grid
Guanzhong (Weinan) 3.5 GW Wind-Solar Project	Weinan, Shaanxi	3500MW	State Grid
Ningxia (Yindong HVDC) 1 GW Photovoltaic Export Project	Yinchuan and Wuzhong, Ningxia	1000MW	State Grid
Ningxia (Lingshao HVDC) 2 GW Photovoltaic Export Project	Yinchuan and Wuzhong, Ningxia	2000MW	State Grid
Northern Xinjiang (Urumqi) 1 GW Wind-Solar Project	Urumqi, Xinjiang	1000MW	State Grid
Southern Xinjiang 1.4 GW PV-plus-Storage Project	Kashgar; Kizilsu; Bayingolin; Aksu; Hotan (all in Xinjiang)	1400MW	State Grid
XPCC Southern Xinjiang 2 GW Wind-Solar Project	XPCC 1st, 2nd, 3rd, and 14th Divisions, Xinjiang	2000MW	State Grid
XPCC Northern Xinjiang (Shihezi) 1 GW Photovoltaic Project	XPCC 8th Division, Xinjiang	1000MW	State Grid
Northwest Liaoning (Fuxin) 1.4 GW Wind-Solar Project	Zhangwu and Fumeng, Liaoning	1400MW	State Grid

Northwest Liaoning (Tieling) 1.5 GW Wind-Solar Project	Changtu; Xifeng; Qinghe, Liaoning	1500MW	State Grid
Northwest Liaoning (Chaoyang) 1.2 GW Wind-Solar Project	Chaoyang; Beipiao, Liaoning	1200MW	State Grid
Western Jilin–Lugu HVDC 3 GW Wind Power Export Project	Songyuan; Baicheng, Liaoning	3000MW	State Grid
Western Jilin–Lugu HVDC (Baicheng) 1.4 GW Solar-Thermal Project	Baicheng, Liaoning	1400MW	State Grid
Western Jilin 2.9 GW Local Wind-Solar Consumption Project	Siping and Baicheng, Liaoning	2900MW	State Grid
Zhangjiakou (Yu County) 1 GW Wind-Solar Export Project	Zhangjiakou, Hebei	1000MW	State Grid
Zhangjiakou (Zhangbei) 1 GW Wind Power Project	Zhangjiakou, Hebei	1000MW	State Grid
Chengde (Fengning) 1 GW Wind-Solar-Hydrogen-Storage Project	Fengning, Hebei	1000MW	State Grid
Shanxi (Yuncheng) 1 GW Wind-Solar Project	Yuncheng, Shanxi	1000MW	State Grid
Shanxi (Jinzhong) 1 GW Wind-Solar Project	Jinzhong, Shanxi	1000MW	State Grid
Northern Shandong (Lubei) 2 GW Photovoltaic Project	Dongying and Weifang, Shandong	2000MW	State Grid
Western Sichuan 1.4 GW Wind-Solar Project	Liangshan and Ganzi, Sichuan	1400MW	State Grid
Southern Fuyang (Anhui) 1.2 GW Wind-Solar Project	Fuyang, Anhui	1200MW	State Grid
Loudi (Hunan) Ecological-Restoration 1 GW Photovoltaic Project	Loudi, Hunan	1000MW	State Grid
Lower Jinsha River (Yunnan side) 2.7 GW Wind-Solar Project	Kunming; Zhaotong; Qujing; Chuxiong (All in Yunnan)	2700MW	China Southern Power Grid
Bijie (Guizhou) 1.5 GW Photovoltaic Project	Bijie, Guizhou	1500MW	China Southern Power Grid
Qiannan (Guizhou) 1.5 GW Photovoltaic Project	Qiannan, Guizhou	1500MW	China Southern Power Grid

Hongshui River (Guangxi) 1.4 GW Photovoltaic Project	Baise; Guigang; Laibin; Nanning (All in Guangxi)	1400MW	China Southern Power Grid
Nanning (Hengzhou, Guangxi) 2.6 GW Wind-Solar Project	Nanning, Guangxi	2600MW	China Southern Power Grid
Chongzuo (Guangxi) 2 GW Wind-Solar Project	Chongzuo, Guangxi	2000MW	China Southern Power Grid

2. Second batch of large-scale wind and solar projects issued by NDRC and NEA

Renewable energy base	Province	The energy resource (in MW)			Receiving markets	Transmission lines
			Flexibility resources			
		Renewables	Coal (new built)	Coal (retrofit)		
Central-Northern Ordos New Energy Project	Inner Mongolia	10000	4000		North China	New West Inner Mongolia→Beijing–Tianjin–Hebei export corridor
Ordos New Energy Project	Inner Mongolia	4000		6600	North China	Existing West Inner Mongolia→ Tianjin South export corridor
Southern Ordos New Energy Project	Inner Mongolia	10000	4000		Central & East China	New West Inner Mongolia export corridor
Central-Northern Ordos New Energy Project	Inner Mongolia	5000			Local consumption	New intra-provincial corridor
Central-Northern Ordos New Energy Project	Inner Mongolia	5000			Local consumption	New intra-provincial corridor
Southern Ordos New Energy Project	Inner Mongolia	5000			Local consumption	New intra-provincial corridor
Alxa New Energy Project	Inner Mongolia	10000	4000		North China	Western Inner Mongolia transmission corridor
Alxa New Energy Project	Inner Mongolia	5000			Local consumption	New intra-provincial corridor
Alxa New Energy Project	Inner Mongolia	5000		2000	Local consumption	New intra-provincial corridor

Western Jiuguan New Energy Project	Gansu	11000	4000		Central and east China	Jiuguan to central and east export corridor
Badain Jaran (Alxa) New Energy Project	Inner Mongolia	6000			Local consumption	New intra-provincial corridor
Hexi Corridor (Jiayuguan–Jiuguan) New Energy Project	Gansu	6000		2000	Local consumption	New intra-provincial corridor
Northeastern Tengger Desert Base New Energy Project	Inner Mongolia	11000	3320		Central China	New Ningxia–Hunan export corridor
Hexi Tengger Desert Base New Energy Project	Inner Mongolia	11000	4000		East region	New Hexi to Zhejiang export corridor
Southeastern Tengger Desert Base New Energy Project	Inner Mongolia	11000	4000		Central and east China	New Helanshan to central and east export corridor
Southeastern Tengger Desert Base New Energy Project	Inner Mongolia	6000	2000		Local consumption	New intra-provincial corridor
Hexi Tengger Desert Base New Energy Project	Inner Mongolia	6000		2000	Local consumption	New intra-provincial corridor
Northern Shaanxi Coal-Mining Subsidence Area New Energy Project	Shanxi	6000		4000	Central China	Existing Bozhou–Hubei export corridor
Ningxia Coal-Mining Subsidence Area New Energy Project	Ningxia	6000		3960	East China	Existing Ningxia–Zhejiang export corridor

Western Inner Mongolia (Ordos) Coal-Mining Subsidence Area New Energy Project	Inner Mongolia	4000		8000	North China	Existing Shanghaimiao–Shandong export corridor
Northern Shaanxi Coal-Mining Subsidence Area New Energy Project	Shaanxi	3000		6240	North China	Existing Fugu–Jingjie point-to-grid export corridor
Northern Shaanxi Coal-Mining Subsidence Area New Energy Project	Shaanxi	5000		2000	East China	New Shanbei–Anhui export corridor
Northern Shaanxi Coal-Mining Subsidence Area New Energy Project	Shaanxi	5000		2000	Central China	New Shaanxi–Henan export corridor
Northern Shanxi Coal-Mining Subsidence Area New Energy Project	Shanxi	8000	2000		North China	New Datong–Huailai–Tianjin North–Tianjin South export corridor

3. Third batch of large-scale wind and solar projects issued by NDRC and NEA

Project name	Wind (MW)	PV (MW)	CSP (MW)	Total scale (MW)	Location	Delivery method	Developer
Ulangab Dongda 1.5 GW Integrated Wind–Solar–Thermal–Storage Base Project	120	30	0	150	Fengzhen, Ulangab, Inner Mongolia	Export	Beijing Jingneng Power Co., Ltd.; Ulangab Energy Investment & Development Co., Ltd.
Xilingol League High-Voltage Export New Energy Phase III Project	400	100	0	500	Xilingol League, Inner Mongolia)	Export	Inner Mongolia Energy Group Co., Ltd.; China Huaneng Group Co., Ltd.; CSSC Haizhuang Windpower Co., Ltd.; CITIC Pacific New Energy Co., Ltd.; Beijing Jingneng Clean Energy Co., Limited; Wafangdian Wind Power Development Co., Ltd.; Jiangsu Jinling New Energy Group Co., Ltd.; SPIC Qiankun Co., Ltd.; SPIC Taishang Construction Co., Ltd.; China Datang Corporation
Inner Mongolia Chifeng 1 GW Desert Wind-Solar-Storage Base Project	85	15	0	100	Chifeng, Inner Mongolia	On-site consumption	Chifeng Yuanfeng New Energy Co., Ltd.
Inner Mongolia Energy Ar Horqin 1 GW Wind-Storage Base Project	100	0	0	100	Ar Horqin Banner, Inner Mongolia	On-site consumption	Inner Mongolia Energy Power Investment Group New Energy Co., Ltd.
Arong Banner–Chadong–Ewenki Banner East DC Export Phase II 1 GW Wind Power Project	100	0	0	100	Hulunbuir, Inner Mongolia	Export	Huaneng Inner Mongolia Eastern Energy Co., Ltd.
Horqin Right Middle Banner, Tongliao City 1.2 GW Wind Power Base Project	120	0	0	120	Tongliao, Inner Mongolia	On-site consumption	Tongliao New Energy Development Co., Ltd.

Bayan Nur Urat Front Banner Saobei 2 GW Photovoltaic Desert Base Project	0	200	0	200	Bayannur, Inner Mongolia	On-site consumption	China Huaneng Group Co., Ltd.
Datang Xisa Camp Urat 1 GW Wind-Solar-Storage Demonstration Base Project	80	20	0	100	Chifeng, Inner Mongolia	On-site consumption	China Datang Corporation
Ordos Etuoyan PV-Storage-Hydrogen Integrated Demonstration Base Project	100	200	0	300	Ordos, Inner Mongolia	On-site consumption	China National Petroleum Corporation (CNPC)
Western Inner Mongolia Tuoketuo Export Phase II 1.5 GW Photovoltaic Desert-Control Project	0	150	0	150	Ordos, Inner Mongolia	Export	China Datang Corporation
Niujie Ecological Restoration, Chifeng City 1 GW Wind Power Project	100	0	0	100	Chifeng, Inner Mongolia	On-site consumption	China General Nuclear Power Corporation (CGN); Chifeng State-owned Assets Operation (Group) Co., Ltd.
CHN Energy Eastern Inner Mongolia Banner Energy Base Project	60	0	0	60	Hulunbuir, Inner Mongolia	On-site consumption	China Energy Investment Corporation
Guodian Power 1 GW Xilinhot New Energy Base Project	50	50	0	100	Xilingol League, Inner Mongolia	On-site consumption	State Power Investment Corporation Limited (SPIC)
Chifeng City 2 GW Self-Peaking Wind-Solar-Storage Integrated Demonstration Base Project	150	50	0	200	Chifeng, Inner Mongolia	On-site consumption	Huaneng Inner Mongolia Eastern Energy Co., Ltd.
Huadian–CITIC Guoan Dachaidan 1 GW Generation-Grid-Load-Storage Project	0	100	0	100	Haixi, Qinghai	—	China Huadian Corporation Ltd.; CITIC Guoan Group Co., Ltd.
CHN Energy–Canadian Solar Guide 1 GW Generation-Grid-Load-Storage Project	20	80	0	100	Hainan, Qinghai	—	China Energy Investment Corporation; Canadian Solar Inc.
Qinghai Integrated Energy Guinan 1 GW PV-Storage Integrated Project	0	100	0	100	Hainan, Qinghai	—	State Grid Integrated Energy Service Group Co., Ltd.
Trina–CNNC Hueneng Guide 1 GW Generation-Grid-Load-Storage Project	20	80	0	100	Hainan, Qinghai	—	China National Nuclear Corporation (CNNC); Trina Solar Co., Ltd.
Qinghai Salt Lake Chuangrong–Huanghe Hydropower Qarhan Industrial Park 530 MW Project	0	53	0	53	Haixi, Qinghai	—	State Power Investment Corporation; Qinghai Salt Lake Industry Co., Ltd.

CNPC Qinghai Oilfield Golmud 1 GW Wind-Solar-Gas-Hydrogen Project	50	50	0	100	Haixi, Qinghai	—	China National Petroleum Corporation (CNPC)
CNNC Gansu Mining Area Clean Energy Base Support Project	60	40	0	100	Jiuquan Mining Area, Gansu	—	China National Nuclear Corporation (CNNC)
CNNC Hueneng Jinta County 1.6 GW Clean Energy Support Project	90	70	0	160	Jinta County, Jiuquan, Gansu	—	China National Nuclear Corporation (CNNC)
CGN Gansu Yumen 700 MW PV-Solar-Thermal-Wind-to-Hydrogen Demonstration Project	40	20	0	70	Yumen City, Jiuquan, Gansu	—	China General Nuclear Power Corporation (CGN)
Zhangye Carbon Neutrality Base Phase I	100	100	0	200	Zhangye, Gansu	—	China Energy Investment Corporation
Wuwei Minqin County Desert Source New Energy Comprehensive Governance Project	20	80	0	100	Minqin County, Wuwei, Gansu	—	State Power Investment Corporation Limited (SPIC)
Gansu Energy & Chemical Investment Group 1.9 GW Photovoltaic Power Base Project	0	190	0	190	Gansu Province	—	Gansu Energy & Chemical Investment Group Co., Ltd.
CGN Gansu Jiuquan Suzhou District 1 GW Generation-Grid-Load-Storage Integrated Project	0	100	0	100	Suzhou District, Jiuquan, Gansu	—	China General Nuclear Power Corporation (CGN)
Gansu Provincial Transport Investment Management Co. 1 GW Wind-Solar-Power Integrated Base	60	40	0	100	Gansu Province	—	Gansu Provincial Transportation Investment Management Co., Ltd.
Gansu Provincial Water Resources & Hydropower Survey and Design Institute 500 MW Photovoltaic Power Base	0	50	0	50	Gansu Province	—	Gansu Provincial Water Resources & Hydropower Survey and Design Inst. Co., Ltd.
ELION Group 500 MW PV-Solar-Thermal Sand-Fixation Project	0	50	0	50	Gansu Province	—	Elion Resources Group
Gansu Provincial Electric Power Investment Group 1 GW Wind-Solar-Power Integrated Base	50	50	0	100	Gansu Province	—	Gansu Electric Power Investment Group Co., Ltd.
Lanzhou LS Group 500 MW Photovoltaic Power Base Project	0	50	0	50	Lanzhou, Gansu	—	Lanzhou LS Group Co., Ltd.
Gansu Construction & Investment Group 1 GW Wind-Solar-Power Integrated Base Project	60	40	0	100	Gansu Province	—	Gansu Construction Investment (Holding) Group Co., Ltd.

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