Coal is losing ground, but not letting go:

Structural inertia and the struggle to shift coal's role in China's power system

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New coal power projects in China in 2025

CREA
Centre for Research on Energy and Clean Air

Global Energy Monitor

Coal is losing ground but not letting go: Structural inertia and the struggle to shift coal's role in China's power system

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Authors

Qi Qin, CREA; Christine Shearer, GEM

Contributors

Belinda Schaepe, CREA; Xing Zhang, GEM; Mingxin Zhang, GEM

Data scientists

Danny Hartono, CREA; Lauri Myllyvirta, CREA

Designer

Wendi Wu

About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, and health impacts, as well as the solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the keys to successful policies, investment decisions, and advocacy efforts. CREA was founded in Helsinki and has staff in several Asian and European countries.

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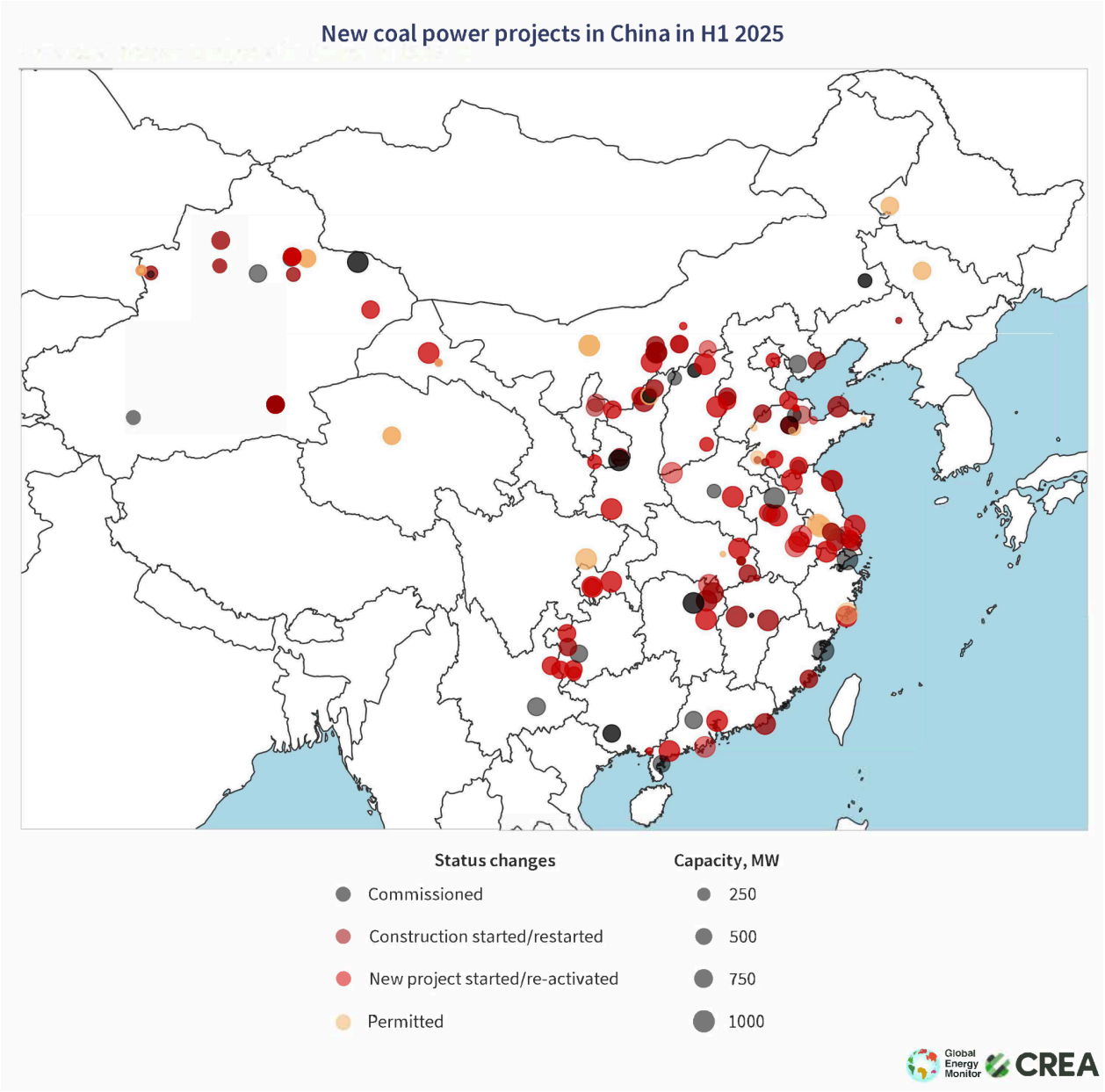

Introduction

For years, Chinese policymakers and official media have consistently described coal power as the 'ballast' of the power system—an essential foundation for ensuring energy security. Since late 2023, as clean energy has gained growing economic significance[1], the tone has begun to shift: more attention is being placed on the role of renewables in energy security, and on coal power's future as a flexible, supporting resource rather than a primary generator. Yet despite this discursive shift and the rapid expansion of clean energy, coal remains deeply embedded in the power system, with little public discussion of its phase-down or eventual exit.

The core tension of 2025 is increasingly evident: coal's share in power generation has fallen to record lows, yet new coal power capacity additions are on track to reach decade highs. Clean energy is growing at an unprecedented speed and is now capable of meeting nearly all incremental demand, but coal power continues to expand in absolute capacity terms and remains structurally protected.

But while the generation mix is shifting, the underlying rules of the system remain largely unchanged. Instead of adapting to a cleaner, more flexible power structure, current institutions continue to lock in coal's position. Broad capacity payments, inflexible dispatch practices, long-term contracting, and the absence of a national retirement pathway all serve to keep coal power in place, regardless of whether it's still needed.

This report examines how institutional inertia is slowing the transition away from coal. Without stronger corrective policies, there is a real risk that rapid clean energy growth will continue to be offset by slow structural reform, leaving emissions on a high plateau and coal locked into the system for years to come.

Key findings:

- **Coal power construction and commissioned projects remain high, with no clear signs of slowing.** 21 gigawatts (GW) was commissioned in H1 2025, the highest first-half total since 2015. And full-year additions are expected to exceed 80 GW, according to association projections. Construction starts and restarts reached

[1] Carbon Brief (25 January 2024) 'Clean energy was top driver of China's economic growth in 2023' https://www.carbonbrief.org/analysis-clean-energy-was-top-driver-of-chinas-economic-growth-in-2023/ Analysis. Accessed 10 August 2025.

46GW, equivalent to the entire coal power capacity of South Korea and sustaining the high pace set in 2022.

- **New project approvals remain strong, with signs of pre-carbon peak acceleration.** 25 GW was permitted in H1 2025, slightly down from previous years. However, new and revived proposals totalled 75 GW, the highest H1 figure in a decade, reflecting a continued push to advance coal projects before the 2030 carbon peaking deadline.

- The commissioning boom of 2025 reflects a delayed response to the permitting surge of 2022–2023, when more than 100 GW of coal power was approved each year. **Unless policy action is taken, these previously approved projects will continue to drive high levels of commissioning in 2026–2027.**

- **Clean energy is expanding at unprecedented speed, reshaping China's power mix, while coal's role in generation continues to decline.** Wind and solar additions are expected to exceed 500 GW in 2025, which is more than enough to meet total electricity demand growth. Coal's share in power generation dropped to a historic low of 51% in June 2025. At the same time, renewables account for 60% of total installed capacity, compared to about 34% for coal. Yet coal capacity continues to rise, highlighting a widening disconnect between capacity growth and actual power generation.

- **Coal power is not fulfilling its intended role as a flexible backup for renewables.** Current dispatch practices predominantly rely on coal power plants for ramping up power generation when needed, with minimal incentives or explicit requirements to flexibly scale down power generation.

- **China still lacks a coherent coal exit strategy, and power plant retirements are far behind official targets.** Only 1 GW of coal power was retired in H1 2025, with just 16 GW retired since 2021. To meet the 14th Five-Year Plan goal of 30 GW by the end of 2025, 13 GW would need to be retired in H2, which appears to be an increasingly unlikely prospect.

- **The upcoming Nationally Determined Contributions (NDCs) and 15th Five-Year Plan offer a crucial opportunity to establish a clear, coordinated roadmap for managing coal power's decline.** While China's energy policy direction is aligned with long-term climate goals, the absence of binding targets and institutional

reform has allowed legacy incentives for coal power to persist. Without stronger national guidance, clean energy progress may be offset by continued coal expansion, delaying energy transition and stalling emission reductions.

Coal power construction and project activity remain strong

Despite a rapidly changing capacity and generation mix, coal power construction in China shows no sign of easing. In the first half of 2025, 21 GW of new capacity were brought online—the highest first-half total since 2015. Full-year commissioning is expected to exceed 80 GW, according to projections by the China Electricity Council (CEC), which would make 2025 the biggest year for new coal power capacity additions in a decade[2]. Many of the projects entering operation this year were approved during the permitting surge of 2022[3] and 2023[4], in which each year saw in excess of 100 GW of new coal capacity cleared. Unless policy measures are introduced to restrict project execution, similar commissioning peaks can be expected in 2026 and 2027 as those projects reach completion.

[2] China Electric Power News (30 July 2025) 中电联发布《2025年上半年全国电力供需形势分析预测报告》 https://mp.weixin.qq.com/s/u2HWG-_DFj5EysbPQm8MiQ Analysis. Accessed 10 August 2025.

[3] GEM and CREA (27 February 2023) 'China permits two new coal power plants per week in 2022' https://energyandcleanair.org/wp/wp-content/uploads/2023/02/CREA_GEM_China-permits-two-new-coal-power-plants-per-week-in-2022.pdf Analysis. Accessed 10 August 2025.

[4] GEM and CREA (22 February 2024) China risks missing multiple climate commitments as coal power approvals continue https://energyandcleanair.org/wp/wp-content/uploads/2024/02/CREA_GEM_2023H2-coal-power-briefing_China-missing-climate-commitments.pdf Analysis. Accessed 10 August 2025.

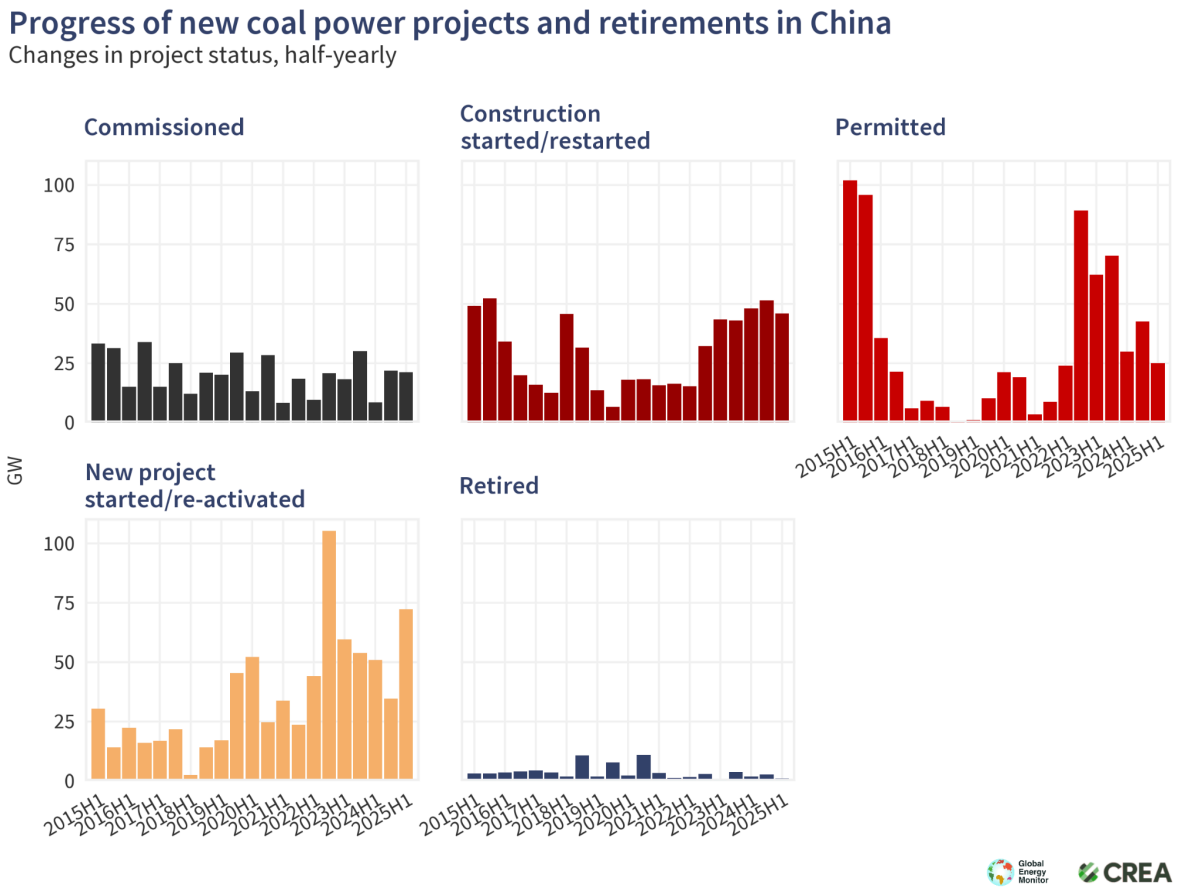

Figure 1 – Progress of new coal power projects and retirements in China H1 2015– H1 2025

Construction starts also remained elevated. A total of 44 GW of capacity either broke ground or resumed construction in H1 2025. This continues the high pace seen since 2022, pointing to sustained momentum in project delivery. See Figure 1. Despite falling use of coal power, growing clean energy penetration, and moderate demand growth, many projects continue to move forward, often backed by local governments citing economic development or energy security needs.

Early-stage project activity paints a more complex picture. In the first half of 2025, 25 GW of coal power received formal approval, a decline of around 38% compared to the H1 average of 2022 and 2023. However, newly proposed and revived projects alone amounted to 53 GW, the highest first-half total for such early-stage activity in over a decade. This surge suggests that developers still see the years leading up to 2030, China's national carbon peaking deadline, as a critical window for advancing coal projects.

While the 2022–2023 surge in coal permitting was largely a response to immediate power shortages and government mandates, the more recent wave of proposals in 2024–2025 appears to reflect strategic positioning by developers and interest groups, who are moving to secure approvals while policy space remains open. In this context, investment appetite may reflect not pure market enthusiasm, but a distorted market interest shaped by the incentives to maintain high domestic coal demand in the name of supporting official targets for power reliability and economic growth.

As clean energy rises, coal retreats in power generation

China's clean energy rollout has reached an unprecedented scale in 2025. Wind and solar installations are expected to exceed 500 GW this year, according to State Grid Research Institute[5] —more than India's entire installed power capacity across all sources. China's rapid renewable energy expansion is driven by a rush to complete projects under the 14th Five-Year Plan and policy-driven urgency[6]. Building on already high additions in 2023 and 2024, this acceleration is placing clean energy at the centre of the country's power system, and increasingly, at the centre of its economic strategy[7].

Power generation data from the first half of 2025 shows just how far the mix has shifted. According to China Electricity Council (CEC), while total electricity demand rose by 3.7% year-on-year, solar and wind generation increased by 20% and 10.6%, respectively. These gains not only met the full growth in demand but also offset the drop in hydropower and contributed to a decline in thermal generation, which fell by 2.9% and 2.4%, respectively. As a result, coal power generation declined in absolute terms even as new plants continued to come online. Over the same period, the share of wind and solar in total generation rose by 4.4 percentage points, reaching 26%, a clear sign that clean energy is

[5] China Electricity (4 July 2025) 预计2025年"风光"新增装机或超5亿千瓦 https://mp.weixin.qq.com/s/nENo5gH7BK4zxGqMj5F79Q News. Accessed 10 August 2025.

[6] PV Magazine (12 June 2025) 'China's new pricing policy' https://www.pv-magazine.com/2025/06/12/chinas-new-pricing-policy/ Analysis. Accessed 10 August 2025.

[7] CREA (19 June 2025) 'Clean energy industry can double in value by 2035 and deliver one fifth of China's economic modernisation goal' https://energyandcleanair.org/publication/china-clean-energy-industry-can-double-in-value-by-2035/ Analysis. Accessed 10 August 2025.

no longer supplementary, but central to meeting new electricity demand, making the continued expansion of coal power increasingly difficult to justify.

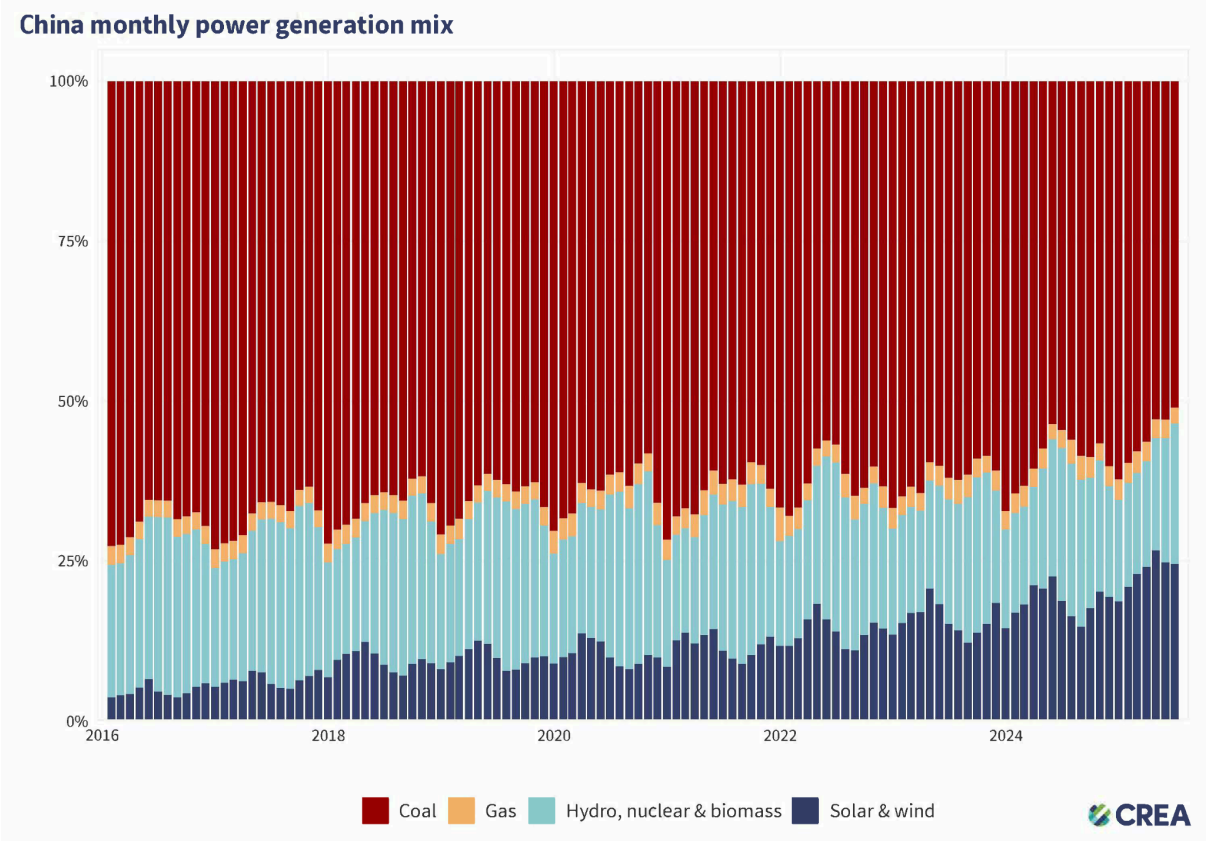

Figure 2 – China monthly power generation mix 2016-H1 2025

The simultaneous expansion of coal capacity and contraction of its generation share signals a growing structural imbalance in China's power system. In June 2025, coal accounted for 51% of electricity generation, a historic low, down from around 73% in 2016. See Figure 2. Coal's presence in the system remains large, but its actual contribution to power supply is structurally diminishing. This disconnect is contributing to falling utilisation rates and a growing stock of underused capacity. Without clear limits on new investment or stronger signals to rationalise existing assets, China risks entrenching a mismatch between capacity and actual system needs, and locking in coal capacity that delivers diminishing returns: financially, operationally and environmentally.

Coal power fails to deliver system flexibility

In official rhetoric from 2022, coal power is expected to gradually take on a more flexible, supporting role: serving as a backup to variable renewables when needed[8]. This language has also been widely adopted in project approvals: in the first half of 2025, more than 60% of newly permitted capacity was described as providing "regulation" or "support" to the power system. But in practice, most coal power plants continue to operate in a fixed, baseload mode. While they are called upon to ramp up during clean energy shortfalls, they are rarely scaled back when renewables are abundant[9]. System dispatch rules and long-term contract structures[10] continue to guarantee output for many coal units, including through direct administrative dispatch and non-market generation quotas. As a result, what is described as "flexibility" often amounts to little more than upward responsiveness, rather than meaningful adjustment around renewable generation patterns.

The institutional focus on ramping up rather than ramping down is reflected in the rules securing coal power plants' capacity payments[11]. In 2024, China's National Energy Administration introduced penalties for plants that fail to meet their declared maximum output when instructed: a unit that underperforms twice in a month loses 10% of its capacity payments; three failures result in a 50% cut, and four or more mean forfeiting the full amount. Yet there are no equivalent requirements or incentives for plants to reduce output in response to high renewable supply, and capacity payment is allocated regardless of actual flexibility delivered.

Dispatch practices further reinforce this rigidity. In a 2025 grid operation guideline from a

[8] People's Daily (26 April 2022) 我国实现超低排放的煤电机组超十亿千瓦 煤电将转向支撑性和调节性电源 https://www.gov.cn/xinwen/2022-04/26/content_5687191.htm Report.

[9] Dialogue Earth (24 July 2025) 'China's overuse of coal is causing negative power prices' https://dialogue.earth/en/energy/chinas-overuse-of-coal-is-causing-negative-power-prices/ Analysis. Accessed 10 August 2025.

[10] CREA and GEM (13 February 2025) 'When coal won't step aside: The challenge of scaling clean energy in China' https://energyandcleanair.org/publication/when-coal-wont-step-aside-the-challenge-of-scaling-clean-energy-in-china/ Analysis. Accessed 10 August 2025.

[11] NDRC and NEA (10 November 2023) 关于建立煤电容量电价机制的通知 https://www.ndrc.gov.cn/xxgk/zcfb/tz/202311/t20231110_1361897.html Policy.

northeastern province[12], dispatch optimisation is explicitly required to account for long term contract fulfilment, with generation plans adjusted to reflect contract progress. When balancing against forecasted renewable output, the rule prioritises meeting thermal plants' minimum operating levels and scheduling maintenance around contract volumes. Where renewable generation cannot be fully accommodated under these constraints, it is the clean energy plan, not coal output, that is subject to adjustment. This codifies a system logic in which coal power generation is structurally protected, while renewables must adapt around it.

Taken together, these mechanisms allow coal power to maintain its role in the system without having to adapt. Long-term contracts help ensure that coal power plants still receive stable dispatch volumes, while broad capacity payments[13] cushion the financial impact of running fewer hours. These protections distort market signals and discourage operational flexibility. More fundamentally, they reduce the economic pressure for change. Developers and operators still see value in building or holding onto coal power plants not to provide backup or flexibility, but to run steadily as a baseload. This happens even as coal's share of power generation continues its structural decline.

[12] CESE (9 January 2025) 黑龙江电网调度日前火电发电计划管理实施细则 https://mp.weixin.qq.com/s/3GmwWmvkZ33QBq354jxEDQ Regulation.

[13] Carbon Brief (12 June 2025) 'China's 'capacity payments' boosted coal-plants revenue by up to 8%' https://www.carbonbrief.org/guest-post-chinas-capacity-payments-boosted-coal-plant-revenue-by-up-to-8/ Analysis. Accessed 10 August 2025.

Coal power expansion follows familiar tracks

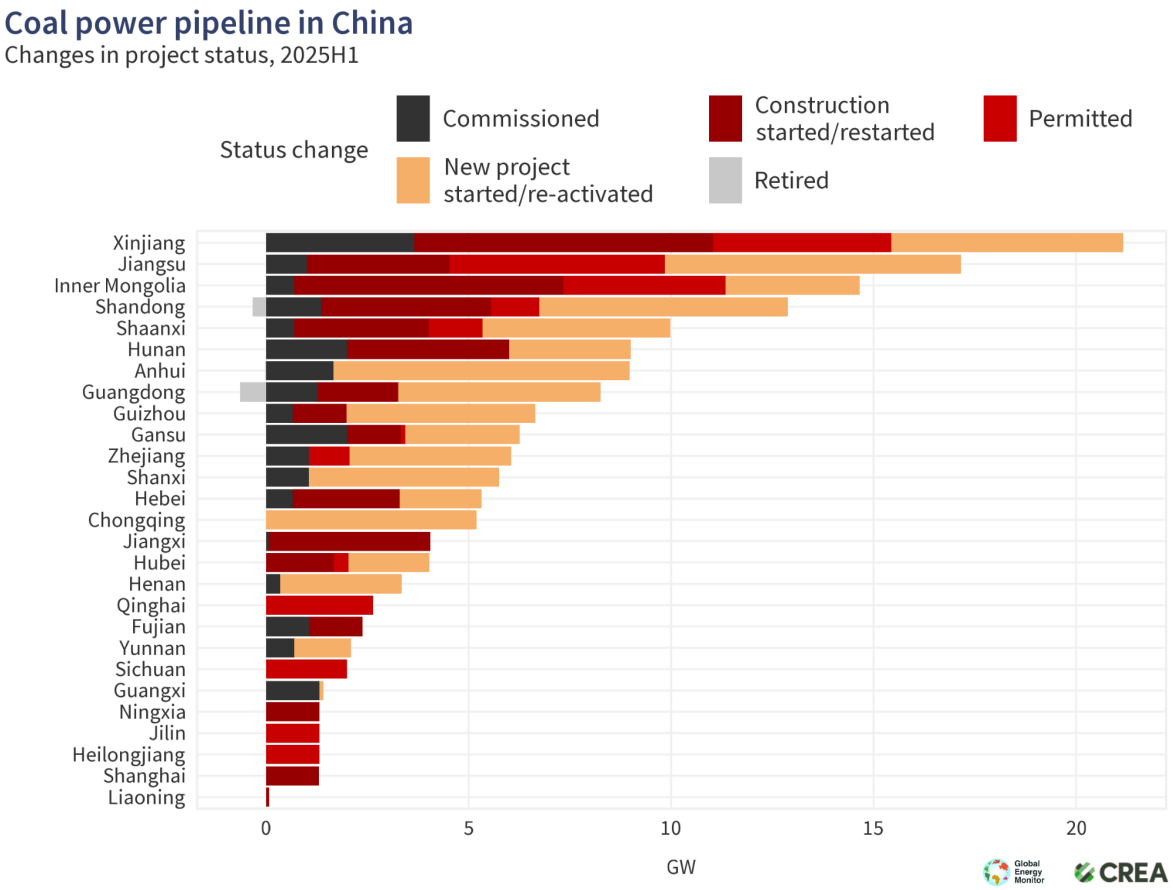

Figure 3 – Coal power pipeline in China H1 2025

China's coal power pipeline remains full. The provinces leading coal power construction in 2025, such as Xinjiang, Inner Mongolia, and Shaanxi, are among those with the highest coal-mining production capacity in China, each exceeding 50 million tonnes per year. Coal power development has become routine in these regions, backed by established permitting pathways, strong local power companies, and a reliable flow of investment. Adding Jiangsu and Shandong, these provinces are largely the same ones that commissioned the most new coal power capacity between 2021 and 2024. See Figure 3. Many of them also carry regional supply responsibilities: either as energy bases tasked with delivering power output, or as industrial centres prioritising local security of supply.

These same provinces have also made notable progress in scaling up wind and solar. Faced with constraints in grid flexibility and market mechanisms, local authorities have

largely defaulted to coal power as the fastest and most controllable way to secure dispatchable capacity. Building new plants offers a straightforward solution to the twin demands of energy security and clean energy growth, at least in the short term. Over time, however, this approach leaves behind a deeper structural challenge: how and when will these coal power plants exit the system?

What's missing is national clarity

Coal retirements in China remain far behind target. Only 1 GW of coal capacity was retired in H1 2025, bringing the total since the start of the 14th Five-Year Plan to just 16 GW. To meet the government's stated goal[14] of retiring 30 GW of coal during the 2021–2025 period, an additional 13 GW will need to be retired in the second half of 2025. Meanwhile, public discussions are already shifting to how to manage a looming wave of ageing coal assets. Nearly 100 GW of coal power capacity is expected to reach the end of its design lifetime during the 15th Five-Year Plan period. Rather than planning for their replacement with clean resources or retirement, current efforts appear focused on life extension and retrofitting, potentially locking in another cycle of long-term coal dependence[15]. There is still little public or academic debate over how China will phase out coal power in a managed way. The absence of a national retirement strategy leaves coal exits politically marginal and institutionally unsupported.

At the same time, new developments are raising further concerns about the direction of the power sector. In July 2025, China Power—a listed subsidiary of State Power Investment Corporation, the company with the most clean power capacity of China's five major power groups, announced plans[16] to accelerate "incremental development and large-scale coal power construction" in the second half of the year. Meanwhile, the implementation of policy document No. 136[17] removed guaranteed offtake for new wind and solar projects,

[14] NEA (29 January 2022) "十四五" 现代能源体系规划 https://www.nea.gov.cn/1310524241_16479412513081n.pdf Policy.

[15] China Electricity (25 July 2025) "十五五"近亿千瓦煤机"到期"，老旧机组如何"焕新" https://mp.weixin.qq.com/s/5oTJASgIhX6q6XaK1pcAxQ Intervieiw.

[16] Flush Network (31 July 2025) 中国电力：高质量推进增量发展和大火电建设 https://news.10jqka.com.cn/20250731/c670036111.shtml News.

[17] Energy Trend (6 February 2025) 'Two Weeks After Document No. 136: The Shockwave in the New Energy Industry' https://www.energytrend.com/news/20250226-49084.html News. Accessed 10 August 2025.

shifting them to market-based pricing. While coal power remains institutionally accommodated, recent developments have introduced uncertainty for renewable investors, making short-term prospects less predictable despite strong long-term momentum.

If the central government continues to prioritise clean energy development and integration, the system-level reforms needed to support a coal power transition—such as more flexible dispatch arrangements, conditional capacity payments, and a rethinking of long-term contract guarantees—are likely to follow. These changes may not happen all at once, but they will become harder to avoid as clean energy meets a growing share of demand and coal's inflexibility increasingly conflicts with system needs.

However, in the absence of a clear national direction, these transitions may be slow, fragmented and inefficient. While some provinces have begun to explore more concrete approaches, their efforts are still limited in scope and lack broader coordination. At the national level, President Xi Jinping has indicated that coal consumption should gradually decline during the 15th Five-Year Plan period—a statement of long-term intent. Yet this vision has not been matched by a concrete roadmap for managing the coal fleet. There are still no binding targets for capacity reduction, no defined retirement pathways, and no clear limits on new project approvals.

What remains missing is not capability or technology, but clarity. Without a structured national roadmap for phasing out coal, the system risks defaulting to inertia and continuing along paths shaped by legacy incentives rather than long-term goals. In recent years, the central government has repeatedly emphasised the need for macro policy consistency[18]. Yet, in practice, the simultaneous push for both coal power and clean energy reflects a lack of coordination and clear prioritisation. Research[19] has shown that China's energy policy system remains highly centralised but thematically narrow, with limited involvement from a broader set of agencies. Thematic blind spots, such as the absence of restrictions on coal power expansion, can persist even as clean energy receives policy

[18] Xinhua News (8 October 2024) 'Chinese premier stresses enhancing consistency of macro policy' orientation https://english.news.cn/20241008/77934fb6169d4cb79647e9c50dfbc87a/c.html News. Accessed 10 August 2025.

[19] Liu, Y. Bridging research and policy in China's energy sector: A semantic and reinforcement learning framework. *Energy Strategy Reviews* 59, 101770 (2025). https://doi.org/10.1016/j.esr.2025.101770

support. This structural disconnect helps explain why, without a roadmap for phasing out coal power, provincial and sectoral actors may continue following legacy incentives. A clear national strategy for managing coal power's decline is essential not only to align provincial decisions with national priorities, but also to prevent short-term fixes from creating long-term structural barriers. The upcoming Nationally Determined Contributions and 15th Five-Year Plan present a critical opportunity to guide investment decisions, market reforms and institutional arrangements.

Policy recommendations

To align China's power system with its dual carbon goals and avoid locking in unnecessary coal power capacity, we recommend the following actions:

- Develop a national roadmap for coal power phase-down. Establish clear national targets and timelines for peaking and reducing coal power capacity, generation and associated emissions, to be incorporated into the upcoming 15th Five-Year Plan. Require provinces to publish their own coal power transition roadmaps, including retirement schedules, to align local actions with national priorities.

- Tighten permitting standards and cancel non-essential coal power projects. Clearly state that no new conventional coal power plants should be approved in principle during the 15th Five-Year Plan period, with narrowly defined exceptions. Conduct a review of the 2022–2025 permit wave to identify projects that should be cancelled or deferred based on updated system needs.

- Align provincial actions with national goals. Include coal power reduction progress in performance evaluations of local governments. Promote best practices from early movers and encourage other provinces to follow with peak and phase-down plans.

- Reform capacity payments to reward flexibility, including for technologies beyond coal plants, like batteries and pumped hydro. Link capacity payments to actual system service delivered, especially ramping down during periods of high renewable generation. Gradually phase out capacity compensation for inflexible or underperforming coal power units.

- Revise long-term contract structures to reflect system needs. Reduce the share of

coal power covered by long-term power purchase agreements. Accelerate the shift from administrative contract guarantees to market-based contracting frameworks.

- Reform dispatch rules to prioritise renewable integration. Eliminate dispatch practices that give fixed priority to coal output over renewables.
- Accelerate retirement of inefficient and ageing coal power plants. Create a retirement incentive mechanism, including financial compensation, land reuse support, and workforce transition planning.

About the data

The changes in coal power project status analysed for this briefing are based on the July 2025 update of Global Energy Monitor's Global Coal Plant Tracker (GCPT) and the historical 2014–2024 information available upon request. The GCPT is an online database that identifies and maps every known coal-fired generating unit and every new unit proposed since 1 January 2010 (30 MW and larger). The tracker uses footnoted wiki pages to document each plant and is updated biannually, with partial quarterly supplements.