Commentary

China's 15th Five-Year Plan

A Deeper Phase of the Energy Transition

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Key Points

- The 15th Five-Year Plan (2026-2030) will be pivotal in delivering China's CO_2 peaking goal before 2030 and setting the foundation for an absolute decline in emissions toward 2035.
- Power and energy market integration will accelerate, with reforms aimed at establishing a unified national electricity market by 2030 through expanded cross-regional trading, harmonized market rules, and stronger grid interconnections.
- Non-fossil energy will drive incremental supply growth, as large-scale wind and solar expansion enables clean sources to meet most new energy and electricity demand.
- Coal and oil will continue to underpin energy security, with coal transitioning from baseload generation to a flexibility and capacity-support role, and with oil supported by strategic reserves and enhanced domestic production.
- System flexibility technologies will scale up, including "new-type" energy storage, EV-based flexibility, and hydrogen as strategic solutions, to meet needs across multiple time horizons and sectors.

Abstract

As China enters its 15th Five-Year Plan (2026-2030), it faces the challenge of sustaining rapid clean energy expansion while managing rising power demand, system constraints, and structural economic transition. This paper examines the energy priorities of the 15th Five-Year Plan and analyzes how China aims to build a “new-type” energy system aligned with its climate commitments. Although detailed targets will be finalized in 2026, recent policy signals point to three central objectives: to peak CO_2 emissions before 2030 and initiate an absolute decline toward 2035; to increase the share of non-fossil energy; and to reach peak coal and oil consumption during the 15th Five-Year Plan period. This paper highlights five structural shifts shaping the “new-type” energy system: (i) the transformation of coal from a baseload supplier to a source of flexibility and backup capacity; (ii) rapid scaling of “new-type” energy storage and a shift toward market-based deployment; (iii) integration of electric vehicles and vehicle-to-grid technologies as distributed flexibility assets; (iv) continued power market reform to establish a unified national electricity market by 2030; and (v) the emergence of hydrogen as a strategic pillar for deep decarbonization and long-duration storage, supported by national pilot programs and integrated wind-solar-hydrogen projects.

Keywords: China, 15th Five-Year Plan, Energy Transition

Introduction

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China has made significant advancements in the clean energy landscape. Over the past decade, it has become the world's largest developer of wind and solar power, the leading manufacturer of clean energy technologies, and the fastest-growing electric vehicle (EV) market. By scaling up manufacturing and fostering large domestic markets, China has sharply reduced global costs for solar panels, batteries, and EVs.

However, challenges for clean energy remain. Fossil fuels still underpin energy security, while electricity demand – driven by EV charging, data centers, advanced manufacturing, and heavy industry – continues to exceed expectations. Grid congestion, regional mismatches between resource bases and demand centers, and limited system flexibility reveal the limits of capacity-led expansion. Decarbonizing heavy industries such as steel, cement, and chemicals remains constrained by technological barriers and high costs.

Meanwhile, geopolitical fragmentation, economic restructuring, and intensifying technological competition are reshaping China's development environment. The 15th Five-Year Plan (FYP) (2026-2030), released in March 2026, marks a critical midpoint toward the 2035 modernization goals. It defines how China advances energy transition while navigating structural transformation in a more uncertain global economy.

Drawing on analysis of recent policy documents, official statistics, and industry plans, this paper assesses the energy priorities and structural shifts to China's 15th FYP. It focuses on two central questions: What are the key targets for energy transition, and how will China build a "new-type" (新型) energy system to achieve them?

The Key Targets for the Energy Transition

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The full outline of the 15th FYP was approved and released on March 13, 2026, at the National People's Congress (NPC). Key binding targets include a 17% reduction in carbon intensity relative to GDP and a rise in the share of non-fossil energy to around 25% of total energy consumption by 2030 (Xinhua 2026a). The 15th FYP also sets a cap on total energy consumption while expanding domestic energy production capacity to roughly 5.8 billion tons of coal equivalent, reflecting continued emphasis on energy self-sufficiency.

In addition, the plan emphasizes grid modernization and interprovincial transmission to support the integration of variable renewable energy. It also highlights the electrification of end-use sectors, industrial decarbonization, and the expansion of carbon markets. Overall, the 15th FYP signals a pragmatic transition pathway that balances climate ambition with energy security and economic resilience.

2.1 Reaching a Peak of CO_2 Emissions Before 2030 and Carbon Neutrality Before 2060

In its first Nationally Determined Contribution (NDC) in 2015, China pledged to peak CO_2 emissions around 2030 and to reduce CO_2 emissions per unit of GDP (carbon intensity) by 60%-65% from 2005 levels by 2030 (GOC 2015), and these goals were strengthened in the updated NDC of 2021 (GOC 2021). In addition to the long-term commitment to achieve carbon neutrality by 2060, the peaking timeline was advanced to "before 2030," and the carbon intensity reduction target was raised to "more than 65% from 2005 levels" (GOC 2021).

China has also taken measures to control non-CO_2 greenhouse gases (GHGs). For example, the Methane Emissions Control Action Plan, issued and implemented in 2023, includes the establishment of a methane monitoring, reporting, and verification system, as well as targeted actions in key sectors. However, the 2030 peaking target applies specifically to CO_2 emissions and does not cover other GHGs.

The 17% reduction in carbon intensity under the 15th FYP is critical for achieving China's updated NDC target of reducing carbon intensity by more than 65% from 2005 levels by 2030. In 2023, China updated its 2005 GHG baseline, revising CO_2 emissions (excluding land use, land-use change, and forestry) to 6.4 $GtCO_2$ (MEE 2023). GDP in 2005 was approximately CN¥18.3 trillion (NBS 2006), implying a carbon intensity of around 3.49 tCO_2 per CN¥10,000 (at 2005 prices).

After decades of sustained efforts, China's carbon intensity is estimated to have declined to 1.69 tCO_2 per CN¥10,000 (at 2005 prices) by 2024. This estimate is based on publicly available data: CO_2 emissions from energy and industrial processes reached 13.1 $GtCO_2$ (JRC and IEA 2025), GDP totaled CN¥134 trillion (GOC 2025a), and 2024 GDP was deflated to 2005 prices

using World Bank (2025) data. This represents a 51.5% reduction relative to 2005, still falling short of the 65% reduction target for 2030.

In its new NDC released in 2025, China explicitly commits to a post-peak decline, aiming to reduce economy-wide GHG emissions by 7%-10% by 2035 relative to the peak level reached before 2030 (GOC 2025b). This signals not only a shift from an intensity-based approach to absolute emissions reduction – a more stringent commitment – but also an expansion in scope from CO_2 alone to all GHGs.

The absence of a clearly specified peak year leaves room for short-term emissions growth. The potential incentive to increase emissions prior to peaking could, however, be constrained by the introduction of the "dual control" system for carbon intensity and total carbon emissions during 15th FYP. If emissions peak at a higher-than-expected level before 2030, this could pose additional challenges to achieving the 2035 target. Therefore, China's approach to meeting its 2030 target during 15th FYP will be crucial to fulfilling its mid- and long-term commitments.

2.2 Increasing the Share of Non-Fossil Energy

China aims to raise the share of non-fossil energy in primary energy consumption to around 25% by 2030, 30% by 2035, and 80% by 2060 (GOC 2021). Between 2005 and 2025, China increased the share of non-fossil energy from 7.4% to 21.5%. During the 15th FYP period, incremental growth in both energy and electricity demand is expected to be met primarily by non-fossil sources (NEA 2025a).

Unlike previous plans, the government did not set more ambitious targets for renewable energy installation in the 15th FYP, and instead aimed for renewables to account for only 50% of total installed power capacity by 2030. By the end of 2025, China had installed 2,340 GW of renewable energy capacity, already representing nearly 60% of the country's total installed power capacity (NEA 2026a). Of this, 1,840 GW came from wind and solar. Given the strong momentum in the domestic market, China could readily add around 200 GW of renewable capacity annually, reaching approximately 3,600 GW by 2035, which is the new NDC target.

The 15th FYP indicates a transition that moves from capacity-driven growth to system integration. China aims to increase the share of wind and solar power in total electricity generation to 30% by 2030 (NDRC and NEA 2025a). This share has already risen significantly, from just 1% in 2010 to 21% in 2025, but thermal power generation remains the dominant source of electricity production (Figure 1).

As wind and solar reach a higher proportion of the power system, exposure to weather-driven variability and forecast uncertainty intensifies, thereby raising the technical and operational requirements for system flexibility. In practice, higher variable renewable energy (VRE) penetration has already exposed structural integration challenges, including rising curtailment risks in resource-rich northern and western regions of the country, as well as persistent transmission bottlenecks between renewable bases and major load centers in the east. At the same time, the displacement of thermal generation reduces system inertia and complicates frequency control, increasing reliance on fast-response flexibility resources, grid-forming inverters, and more sophisticated ancillary service markets.

It is therefore critical for China to undertake a structural transformation of its energy system to accommodate a substantially higher share of VRE while maintaining flexibility, stability, and overall system security.

2.3 Peaking Coal and Oil Consumption

China aims to reach peak consumption of coal and oil during the 15th FYP. Domestic gasoline and diesel consumption already peaked in 2023, according to CNPC ETRI (2026) (Figure 2), reflecting rapid vehicle electrification, the adoption of liquified natural gas in heavy-duty transport, and a modal shift from road to rail. As demand for transport fuels weakens, growth in petrochemical products, including plastics and other intermediates, has become the primary driver of oil consumption and is expected to account for an increasing share of any future increases in China's oil demand.

Projections of the timing and level of the peak of China's overall oil demand vary across institutions. Domestic research institutes estimate a peak of around 15.4 million barrels per day (mb/d) during 2025-2026 (CNPC ETRI 2025; Sinopec EDRI 2025), while the IEA (2025a) projects a higher peak of 16.95 mb/d in 2027. In contrast, OPEC (2025) adopts a more bullish outlook, forecasting demand to rise to 18.3 mb/d by 2030 and further to 18.9 mb/d by 2035.

Coal consumption is projected to peak around 2027 and then enter a plateau phase (Xinhua 2026b). Coal use in the chemical

Figure 1. China's annual installed power capacity and electricity production (2005-2025).

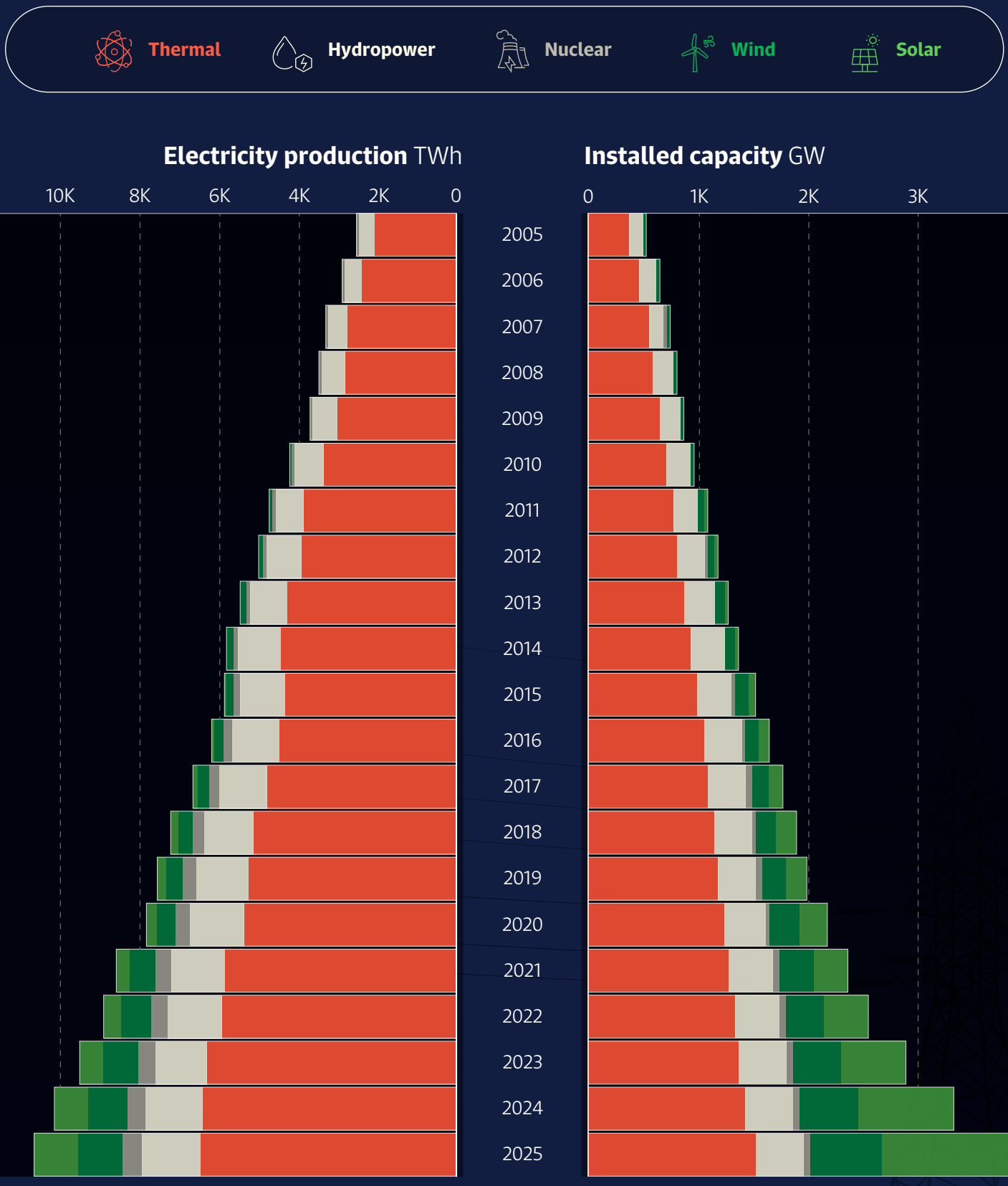
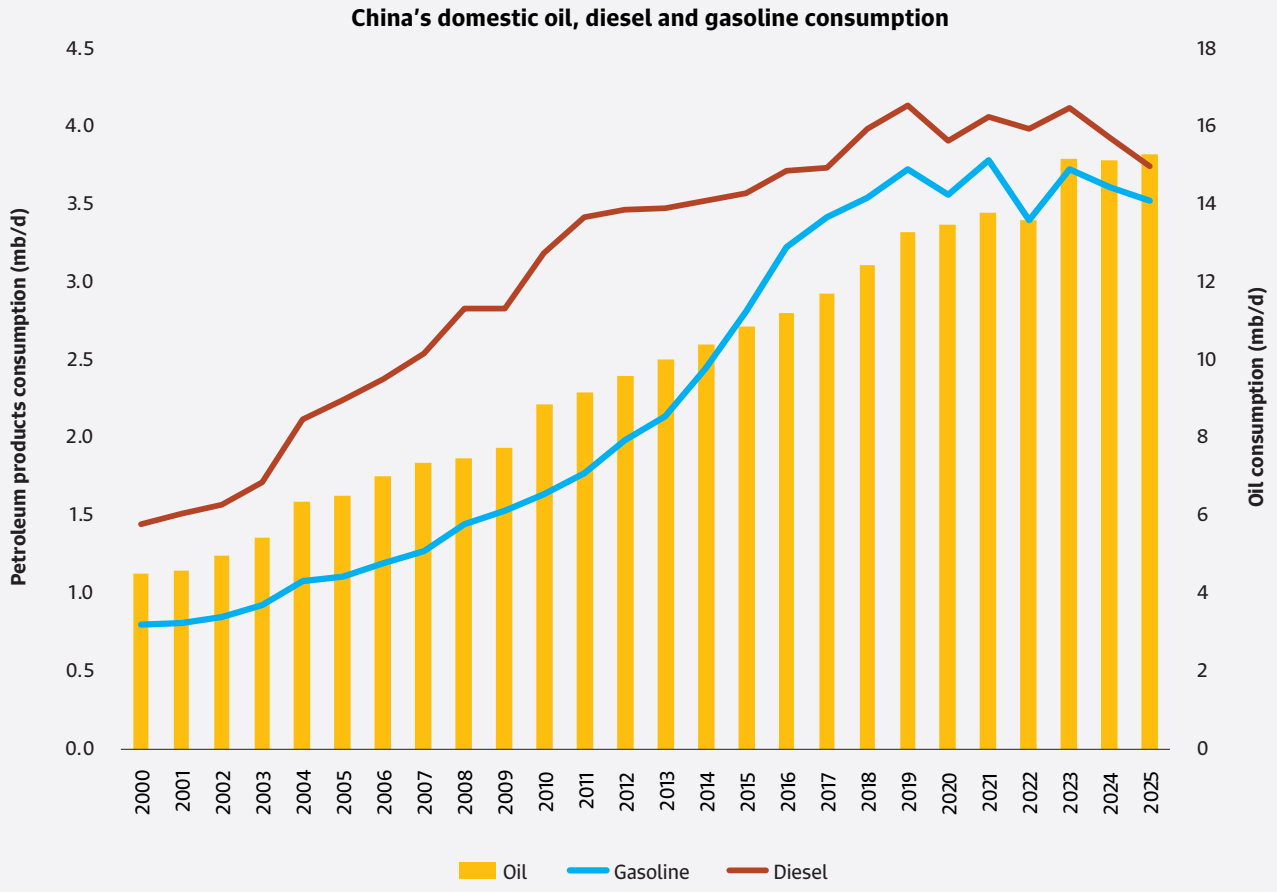


Figure 2. China's oil, diesel, and gasoline consumption (2000-2025).



Source of data: CNPC ETRI, Energy Statistical Review (2026)

sectors is expected to continue growing, while consumption in steel, building materials, and residential sectors is likely to decline gradually. Coal remains central to China's energy system, although its share of primary energy consumption has declined markedly – from over 72% in 2005 to around 52% in 2025 (CNPC ETRI 2026). The outlook for coal demand will increasingly be determined by the pace of renewable energy expansion, growth in electricity demand, and the need for greater grid flexibility. During the 15th FYP period, installed coal capacity may remain high, but average utilization will trend lower, with coal increasingly serving a backup role.

However, China continues to place strong emphasis on energy security, with maintaining adequate stockpiles of coal, oil, and gas serving as a key strategy to buffer short-term disruptions caused by market volatility, extreme weather, or geopolitical tensions. This approach reflects a dual hedge: on the one hand, against geopolitical risks (including instability in major supply regions, such as the Gulf), and on the other, against transition-related uncertainties as the energy system undergoes structural transformation. The government will further strengthen oil and gas exploration and development to expand reserves, maintain crude oil output at around 200 million tons, and sustain growth in natural gas production (NEA 2025b). In addition, China plans to establish a preliminary coal production capacity reserve system by 2027 and to build around 300 million tons per year of dispatchable reserve capacity by 2030 (NDRC 2024).

This strategy underscores the strategic tension between peaking fossil fuel consumption and reinforcing domestic supply capacity: while long-term policy signals point toward declining fossil fuel use, near- to medium-term priorities continue to emphasize resilience, import diversification, and supply reliability during a period of heightened geopolitical and transition risk.

How to Build a New-Type Energy System

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In the 15th FYP, China also outlines a vision for a new-type energy system in which conventional energy continues to play a foundational role, while emerging technologies, innovative applications, and new market mechanisms are encouraged to scale up and assume a greater share in meeting the flexibility and stability requirements.

China's flexibility resources have traditionally been concentrated on the supply side, with heavy reliance on thermal power plants and hydropower. These assets can continue to provide substantial flexibility support, as reflected in the NEA's preliminary plans for the 15th FYP, which emphasize the construction of Yarlung Zangbo hydropower project and integrated hydro-wind-solar bases in the southwest, as well as the continued retrofitting of coal-fired power plants (NEA 2026b). At the same time, emerging technologies – such as energy storage, EV charging infrastructure, demand response, and virtual power plants (VPPs), and water electrolyzers – are expected to play an increasingly important role.

3.1 A Shift in Coal Use

Coal's role in China's power system is shifting from that of a primary energy supplier to one focused increasingly on providing system flexibility and ensuring adequacy. Newly-built coal plants are expected to serve mainly peak shaving and balancing functions in large-scale clean energy bases in the desert, Gobi, and other arid regions, where hydropower resources are limited. Next-generation coal units are designed to operate stably at minimum loads of below 20% of rated capacity.

Retrofitting the existing coal fleet to improve efficiency and operational flexibility is also critical. Since 2021, more than 300 GW of coal capacity has been upgraded for flexible operation, with an additional 200-400 GW scheduled for retrofitting by 2027 (NDRC and NEA 2025b). These upgrades typically allow units to operate safely at around 25%-40% of rated capacity. In addition to meeting flexibility requirements, China also aims to reduce the carbon emissions per kWh of retrofitted coal units by approximately 50% by 2027 compared with 2023 levels (NDRC and NEA 2024). In effect, these upgraded coal units are expected to reach carbon intensity levels generally comparable to those of natural gas-fired power plants by 2027.

To offset declining utilization rates and electricity sales revenues, the government introduced a two-part tariff mechanism for coal-fired power in 2024, comprising an energy price and a capacity tariff. During 2024-2025, roughly 30% of fixed costs[1] could be recovered through capacity payments in most regions, rising to around 50% in areas where coal plants primarily provide grid flexibility (NDRC 2023). From 2026 onward, the recovery ratio increases to no less than 50% nationwide (NDRC and NEA 2026), strengthening revenue certainty for dispatchable capacity in a system with growing

1 In 2024, the reference fixed cost for coal-fired power units was set at CN¥330/kW per year, equivalent to roughly US$46/kW at an exchange rate of CN¥7.2 per U.S. dollar.

renewable penetration. In 2024 alone, coal-fired power units received around US$13 billion in capacity payments, equivalent to around US$2.88/MWh (CEC 2025b). By comparison, mid- and long-term contract electricity prices for coal-fired power ranged between US$30-72/MWh in 2024 (NEA 2025c).

3.2 Rapid Scaling-Up of Energy Storage

Policy attention has steadily intensified since the start of the 14th FYP, with national authorities positioning storage as a key enabler for renewable integration, peak shaving, frequency regulation, and system security. By the end of 2025, China had 136 GW / 351 GWh[2] of new-type storage (excluding pumped hydro) in operation (NEA 2026c), far exceeding the 14th FYP target of 30 GW. Compared with 2021 levels, the deployment of new-type energy storage has expanded more than 40-fold (Figure 3).

Much of the expansion during the 14th FYP period was driven by province-level mandates since 2017, which required new solar PV or wind projects to be paired with storage capacity ranging from 5% to 30% of installed power, depending on local regulations. While these mandates rapidly increased installed capacity, they did not create sufficient economic incentives to ensure efficient utilization. Limited peak-valley price differentials constrained arbitrage opportunities, reducing the commercial rationale for frequent cycling. Meanwhile, ancillary service markets remained underdeveloped, limiting storage participation in frequency regulation, capacity remuneration, and other balancing services. Together, these structural and market constraints suppressed operational performance, resulting in average utilization rates of only 17%-31% for co-located storage systems.

A policy shift occurred in 2025, when the NDRC and NEA issued a notice on deepening market-oriented reform of new energy on-grid tariffs (NDRC and NEA 2025c). This explicitly stipulates that storage deployment must not be used as a prerequisite for project approval, grid connection, or market entry of new renewable projects, signaling a clear shift from co-location with renewables towards independent storage project and multi-scenario applications. Under this new framework, the economics of energy storage systems have improved markedly. Storage operators can now derive revenue from capacity leasing, participation in electricity spot markets, ancillary services, and capacity compensation.

China plans to expand its installed capacity of new-type energy storage to 180 GW by 2027 (NDRC 2025a), representing an increase of more than 32% from the 2025 level of 136 GW. The target then rises to 240 GW by 2030, and 300 GW by 2035 (MIIT 2025). During the 15th FYP period, lithium-ion battery storage is expected to remain the dominant technology. However, flow batteries and sodium-based batteries are likely to achieve large-scale deployment in long-duration storage applications.

3.3 The Rise of EV Charging

China is both the world's largest EV market by volume and one of the fastest growing in terms of market share. EV sales exceeded 16 million units in 2025, accounting for more than 50% of new car sales (Xinhua 2026c). Total EV stock surpassed 43 million by the end of 2025 (SINA 2026) and is projected to reach around 120 million by 2030 under the IEA's Announced Pledges Scenario (IEA 2025b).

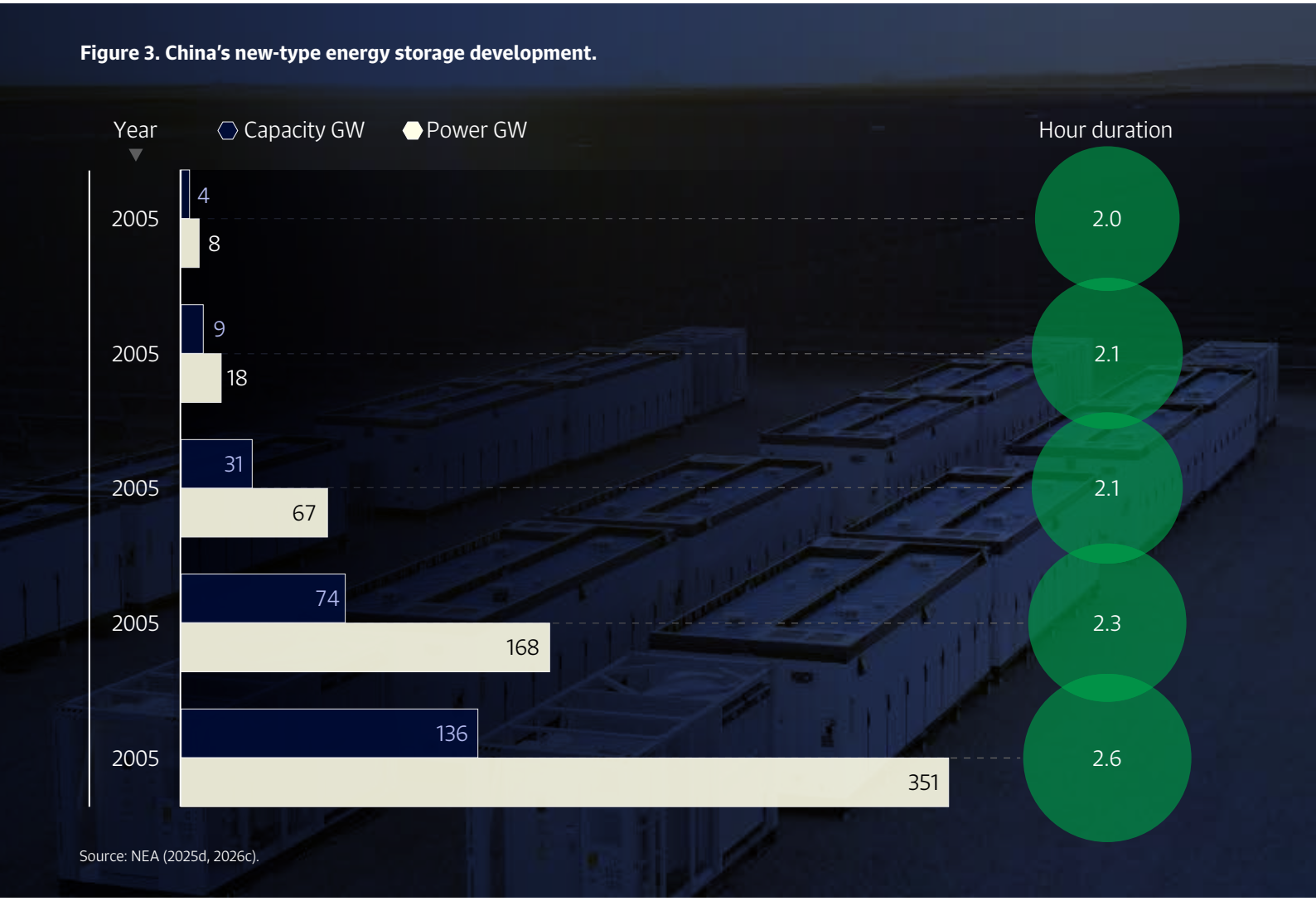
At the same time, the government is accelerating the expansion of charging infrastructure to keep pace with rapid EV adoption. Efforts are focused on expanding charging facilities in residential communities, enterprise parking areas, industrial parks, and government buildings. The NDRC has issued a three-year action plan targeting a total of more than 28 million charging units by 2027, which will be sufficient to serve over 80 million EVs (NDRC 2025c). By 2025, the number of charging units had already reached approximately 20 million (NEA 2026d).

Rapid growth in EV ownership and the continued expansion of charging infrastructure are creating opportunities to deploy technologies that transform EVs into valuable sources of grid flexibility. Through vehicle-to-grid (V2G) technology, EVs can operate as mobile storage units, charging and discharging in response to the needs of the broader power system.

In 2025, China announced the first batch of large-scale V2G pilot projects, covering nine cities and 30 individual demonstration projects (NDRC 2025b). Key functionalities under testing include bidirectional charging, intelligent charging and grid

2 Energy storage capacity is typically reported using two indicators – power capacity (GW) and energy capacity (GWh). Power capacity refers to the maximum instantaneous output the system can deliver, while energy capacity reflects the total amount of electricity that can be stored and discharged over time.

Figure 3. China's new-type energy storage development.



Source: NEA (2025d, 2026c).

coordination, and aggregated participation in VPPs. These pilots play a critical role in establishing technical standards, grid interconnection rules, and market incentives (such as differentiated peak-valley pricing) to encourage orderly charging and discharging behavior. By 2027, large-scale V2G pilot applications are expected to expand substantially, with more than 5,000 newly-installed bidirectional charging facilities and cumulative reverse power discharge exceeding 20 million kilowatt-hours (NDRC 2025c).

3.4 Continued Power Market Reform

China's power sector reform has progressed for more than a decade through two major phases: initial liberalization beginning in 2002 and a deeper market-oriented reform launched in 2015 to move from administrative pricing and planned dispatch toward competitive markets with price discovery. Between 2020 and 2022, provincial transmission and distribution tariffs were fully approved and implemented, laying the foundation for more cost-reflective pricing.

Over time, China has established a wholesale market system centered on the electricity energy market, supported by ancillary services and capacity compensation mechanisms. The market now operates under a dual structure: spot markets provide price discovery, while medium- and long-term markets offer price stability and hedging. Ancillary services have shifted from mandatory provision with ex-post compensation to competitive bidding, covering peak shaving, frequency regulation, and reserve services. Capacity compensation mechanisms have been piloted in several provinces to ensure reliability through capacity payments or capacity-based tariffs.

Market integration has also accelerated. Cross-province trading and spot market linkages continue to expand, and a basic framework for a unified national market is emerging. By 2025, market-based electricity trading reached 6,600 TWh – seven times the 2015 level – with its share of total electricity consumption rising from less than 15% to 64% (NEA 2025c;

CINIC 2026). Cross-provincial and cross-regional trading grew from under 100 TWh in 2015 to about 1,600 TWh in 2025 (CINIC 2026).

In February 2026, the State Council issued a top-level reform blueprint for the coming decade. It targets a largely unified national electricity market by 2030, with market-based transactions accounting for around 70% of total consumption and all generation and non-protected users participating directly. The reform promotes a shift from separate provincial bidding to unified and coordinated trading, better alignment across spot, contract, ancillary, and capacity markets, and further development of capacity mechanisms to support flexible resources such as coal, pumped hydro, and new-type energy storage.

3.5 Hydrogen for Deep Decarbonization and Energy System Flexibility

Hydrogen is central to China's energy transition, industrial upgrading, and long-term economic development. In its 2021-2035 hydrogen development plan, China emphasizes hydrogen's role in large-capacity, long-duration energy storage, enabling cross-regional and seasonal balancing of renewable resources (NDRC 2022). The plan supports demonstrations of hydrogen storage for renewable integration and grid peak shaving, while promoting integrated models such as "wind/solar + hydrogen storage" (NRDC 2022).

It also seeks to expand hydrogen fuel cell applications across transport, distributed combined heat and power, and backup power systems, while promoting the substitution of clean hydrogen in energy-intensive and chemical industries, including ammonia, methanol, refining, coal-to-liquids, and hydrogen-based steelmaking.

To advance these goals, China's National Energy Administration launched the National Hydrogen Pilot Program in 2025, setting clear priorities to scale up low-carbon hydrogen production, infrastructure, and end-use deployment. The program combines technology-focused project pilots with regional pilots that foster full value-chain integration and industrial clustering (NEA 2025e).

Supported by these policies, China is accelerating wind-solar-hydrogen-ammonia-methanol integration. By the end of 2025, around 900 projects had been planned, with 290,000 tons per year of installed capacity – the largest globally (SINA 2025).

Unlike the policies in 14th FYP period, which focused on pilot projects and localized breakthroughs, the 15th FYP highlights a more systematic, forward-looking, and strategic approach to hydrogen deployment. Some provinces have explicitly placed the hydrogen industry alongside frontier technologies such as AI and advanced communications, recognizing its role in driving high-end manufacturing, new materials, and new energy.

Conclusion

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China's 15th FYP represents a pivotal stage in its energy transition, shifting the focus from rapid capacity expansion to system integration, flexibility, and market reform. Compared with the 14th FYP – characterized primarily by record-breaking additions of wind, solar, and storage capacity – the 15th FYP marks a qualitative deepening of reform.

Rather than simply scaling supply, it prioritizes resolving structural bottlenecks in grid integration, pricing mechanisms, and cross-regional coordination. In this sense, it can be seen less as a break in direction and more as an inflection point in implementation – the transition moves from expansion-led growth to system-led optimization.

While non-fossil energy will continue to scale at record speed, ensuring reliability, affordability, and energy security remains central. The evolving role of coal, the rapid deployment of storage and EV-based flexibility, deeper power market integration, and the strategic development of hydrogen collectively signal a shift toward institutional and operational restructuring. Whether this becomes a genuine structural turning point will depend on the extent to which market reforms, carbon constraints, and flexibility investments are effectively aligned with China's peaking and post-peak climate commitments.

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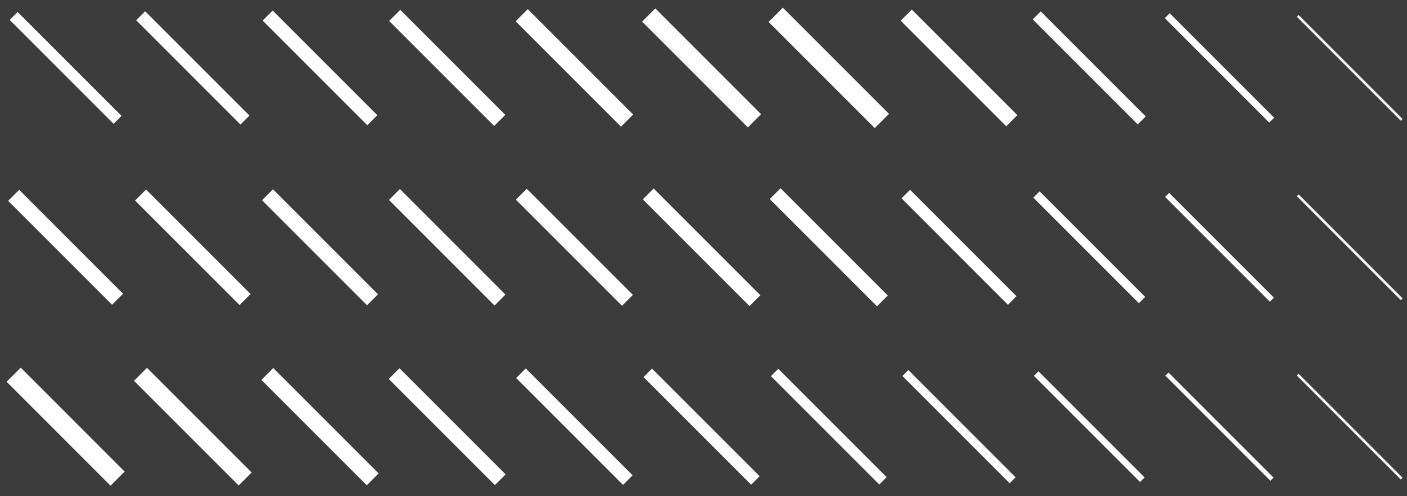
About the Project

This study was conducted under the project “How China’s Industrial Structural Change Could Reshape Its Oil Demand.” The project seeks to deepen understanding of the evolving drivers of China’s industrial restructuring and their implications for oil consumption, using input-output modeling. It also tracks industrial relocation from China and assesses its impact on the country’s oil demand.



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