



ENERGY FOUNDATION  
能源基金会

# COAL TRANSITION QUARTERLY

NEWSLETTER OF ENERGY FOUNDATION  
CHINA'S COAL TRANSITION TASK FORCE

ISSUE 9

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## Foreword by Cynthia Yu

Director, Coal Transition

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### China introduced capacity fee mechanism for coal power generation

On November 8th, China National Development and Reform Commission (NDRC) introduced a capacity fee mechanism for coal power generation for the first time. Effective on January 1st, 2024, China's coal power generators will be paid via a dual price system, the total power generated (based on RMB/KWh), plus the fixed payment (RMB/KW) based on the dispatchable capacity.

EFC believes the introduction of capacity fee is an important step towards a market mechanism via supporting more flexibility functions in the power system. It is a supportive policy for the coal power's role in power system. However, it is not enough to trigger strong investment preference in the coal power sector due to various uncertainties. The coal power sector will receive a capacity-based fixed income under the mechanism. However, generation-based unit price (RMB/KWh) under annual contracts may be decreased in 2024. The capacity fee will not increase the overall cost of China's power system significantly.

Key information as below:

- The capacity fee is priced at RMB 100/KW for most provinces for 2024/25, against 30% of the national average fixed cost (including depreciation, financial cost, O&M and employment expenditure), and is to increase to RMB 165/KW nationwide in 2026. For Henan, Hunan, Chongqing, Sichuan Qinghai, Yunnan and Guangxi where more thorough coal power flexibility retrofits have been implemented, capacity fees are paid at RMB 165/KW for 2024/25, and can increase to RMB 230/KW in 2026.
- Industrial and commercial end-users are to bear the extra cost and pay for the capacity fee.
- Coal power's performances are evaluated in terms of compliance with grid dispatch requests, and a penalty is imposed for failed response.

The policy is an important step for defining coal power's position to provide system flexibility in China's new power system before non-fossil solutions are fully commercialized. China is transforming coal power from baseload to supporting generation. All the newly built/approved coal power generators are required to have flexibility functions that can operate with much fewer utilization hours. However, the current income mechanism based on total power generation do not reflect the function as back-up/flexible capacity to balance the renewable output.

The capacity fee is to guarantee the reliability of the power system. China's coal power has undertaken a flexible balance function. Take Shandong in early May as an example. When Shandong experienced negative spot power price triggered by low demand and high wind power generation, Shandong's coal power provided systematic inertia without generating any power. When hydro power output decreased by 20% in the summer of 2022, stand-by coal power capacity worked to fill the power supply gap.



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The capacity fee will not increase the overall cost for China's power system. The coal power sector experienced RMB 100 billion loss in 2023 by far. It is estimated that the capacity fee is to increase the cost for China's power system by approximately RMB 120 billion in 2024-2025. China's industrial and commercial sector is estimated to pay RMB 0.015/KWh extra for consuming 7580 TWh of power, approximately 85% of the total power demand. On the other hand, it is widely agreed that long-term electricity prices for annual contracts between power generations and customers will be lowered in 2024 compared with prices in 2023. Guangdong province, which enjoys the highest coal power price in China, proposed to lower the coal power benchmark from RMB 0.463/KWh to RMB 0.442/KWh to offset the capacity fee. Meanwhile, at spot market, the bidding price from coal power generation will also be lowered. As coal power in China sets the marginal power prices, power prices for other technologies may be impacted by lowered coal prices. Overall, we don't expect to see an overall increase in end-user cost.

Even with capacity fee, the newly built coal power projects are still driven by State Owned Enterprises' (SOEs) social responsibility rather than commercial gains. We believe the policy can convince China's SOEs to build approved coal power, as the coal power's income structure has certain fixed payment. However, different from the pumped hydro sector where capacity fee triggered investors' strong preference, we don't think the capacity fee for coal power can fundamentally change investors' attitude.

Coal power still faces various uncertainties. The volatile fuel prices put pressure on coal power operation. The capacity fee is not enough to fully cover the annual fixed cost where depreciation and financial cost are significant components for new coal power plants. The risks are high for coal power to further lower its utilization not only because of a large amount of wind and solar, but also the competition from other existing coal/gas power flexibility, energy storage, pumped hydro and demand side response.

The capacity fee for coal power is just one step. To deepen power market reform, a systematic approach is needed. China has no interest in increasing electricity prices in the industrial sector, particularly in the face of current economic challenge. Price signals that lead consumers to use more power when wind/solar generations are high will increase overall system efficiency and lower bill payment. A more flexible end-user price mechanism will allow better coordination between the supply and demand side. Coal power shall gain competitiveness in power market when low marginal cost renewables is not enough for demand and power price can cover the variable costs (fuel and carbon costs).



## Note from HAN Wei

Director of Projects, President's Office

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As of 2023, the global energy landscape is marked by a pivotal transition towards renewable energy, amidst persistent reliance on fossil fuels and growing challenges in balancing climate change with energy security and economic growth.

Despite broader geopolitical and economic tensions, the recent Sunnylands Statement on Enhancing Cooperation to address the Climate Crisis between China and the United States, the world's two largest emitters of greenhouse gases, marks a significant step in collaborative efforts to address global climate challenges. Both China and the US have agreed to support tripling global renewable energy capacity by 2030 and to "accelerate the substitution for coal, oil, and gas generation".

Developing countries are playing an increasingly important role in accelerating energy transition momentum in the world. However, we see, balancing economic growth with emission reduction efforts is a significant challenge for many developing countries. Furthermore, to support them in building a more sustainable energy system, there is a huge gap of USD 29 billion between the annual investment needs before 2030 and the actual funding they could acquire.

EFC International Cooperation Taskforce is fully aware of the importance, potential and challenges that we have in this unprecedented transition process and collaborative climate actions. We have conducted in-depth joint researches and organized Track II dialogues on the key issues including clean energy, coal just transition, green trade and supply chain, and low-carbon investment, and delivered the policy recommendations to key policy stakeholders.

Highlights of our recent work include:

- **CCICED:** We have addressed the energy transition issues and submitted policy briefings to policymakers through the channel of China Council for International Cooperation on Environment and Development through the work of Special Policy Study.
- **China-US Coal Just Transition Collaboration:** We have supported Jackson Hole Center of Global Affairs to organize a series of Track II dialogues on the topic of national policies and local experiences in coal just transition, and potential cooperation opportunities of coal transition between the two nations.
- **China-Europe Coal Just Transition Collaboration:** We have supported Agora, Shanxi Coshare Institute and Energy Forum to conduct a joint research on coal just transition in China and Poland, to provide decision-makers and stakeholders with policy recommendations on employment issues and economic diversification.
- **Supporting ASEAN Countries on Coal Phase-out:** Through cooperating with UNESCAP, we have supported the country studies to identify strategies and approaches for coal phase-out and renewable scale-up, concerning just transition, investment de-risking and multi-goal synergy. A Policy Dialogue on Phasing Down the Use of Coal in the Asia-Pacific Region was held in Bangkok in October during the 3rd Asia and Pacific Energy Forum to highlight the results of studies and provide guidance for the development of policy for the phasing down of coal in the region.



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- **China-ASEAN Countries Low-carbon Investment:** We have supported ASEAN Center for Energy (ACE) to conduct research on ASEAN energy investment 2023-2024, following the achievements made from 2022's research of Measure and Investments for Clean Energy and Power Sector Resilience in ASEAN. We also co-organized the China-ASEAN Low-carbon Investment Workshop with Center of Belt and Road Initiative of NDRC, and ACE in Indonesia in August, bringing government officials, state-owned enterprises, private sectors and industry associations to tap the potential of cooperation between China and ASEAN countries on energy transition.
  - **China-SEA Cooperation in Energy Transition:** Together with Asia Society Policy institute (ASPI), in 2023, we organized three convenings of policymakers and domain experts of China and ASEAN countries to discuss how to catalyze clean energy investment for sustainable development in Southeast Asia.

If you are interested in obtaining more info about our clean power work, please reach out to [HAN Wei hanwei@efchina.org](mailto:HAN Wei hanwei@efchina.org).

# Coal Data Updates

## Summary of economic and energy trends during Jan-Sep, 2023

China's economy grew by 4.9% YoY in the Q3 of 2023, and 1.3% on a QoQ basis. Despite a slowdown from Q2's 6.3% YoY growth, China's GDP still increased by 5.2% YoY by the end of September, stably moving forward to the annual growth target of 5%. Meanwhile, retail sales and industrial added value respectively increased by 6.8% and 4% YoY, bolstering the economic fundamentals.

Along with the economic recovery, both national energy demand and power consumption accelerated from H1, reaching 5.4% and 5.6% YoY by the end of September 2023.

In the first nine months of 2023, hydropower output saw 10.1% YoY shrinkage, in contrast to wind and solar power generation expansion, respectively reaching 13.4% and 11.3% YoY growth.

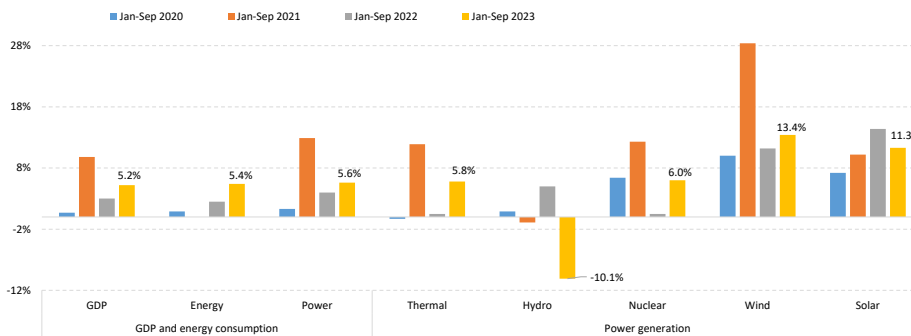


Figure 1. YoY changes of China's key economic and energy indicators, 2020-2023

Source: National Bureau of Statistics (NBS).

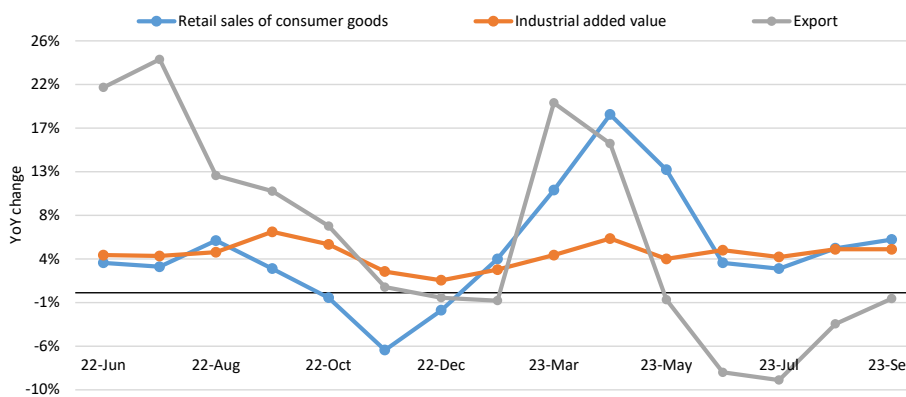


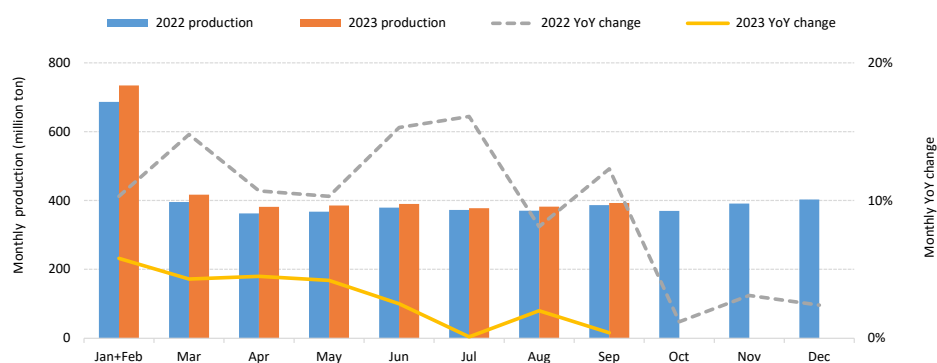
Figure 2. YoY changes of China's key economic performance indicators

Source: NBS.



## Coal production

Following a 4.4% YoY growth in H1 2023, China's coal production rose by 3% YoY by the end of September, reaching 3440 Million tons (Mt). Despite a modest rebound of growth rate in August, the expansion of coal production evidently sped down from the 2022 level under the tightened safety measures at the major mining hubs to constrain production.



**Figure 3. YoY changes of China's monthly coal production: 2022 vs. 2023**

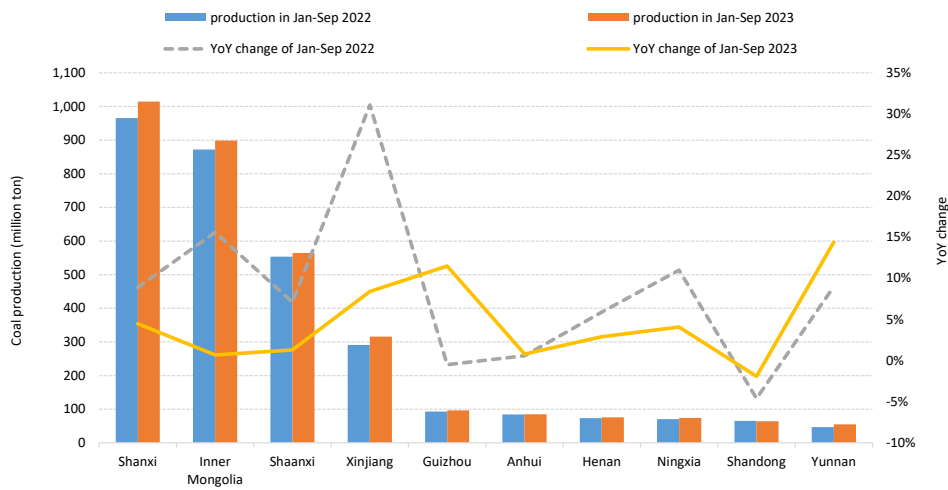
Source: NBS.

National coal production is highly concentrated in the top-producing regions. Specifically, the top ten and top four provinces stand for 94% and 81% of national coal production, respectively. Compared with the same period in 2022, the production growth rate of Xinjiang slowed down significantly.

Province	Coal production	YoY change	Production share
Shanxi	1,014.397	4.5%	29.5%
Inner Mongolia	898.310	0.7%	26.1%
Shaanxi	564.391	1.3%	16.4%
Xinjiang	316.002	8.4%	9.2%
Guizhou	96.802	11.5%	2.8%
Anhui	84.914	0.8%	2.5%
Henan	76.041	2.9%	2.2%
Ningxia	73.867	4.1%	2.1%
Shandong	64.217	-1.9%	1.9%
Yunnan	54.853	14.4%	1.6%

**Table 1. China's top 10 coal-producing provinces during Jan-Sep, 2023 (Unit: Mt)**

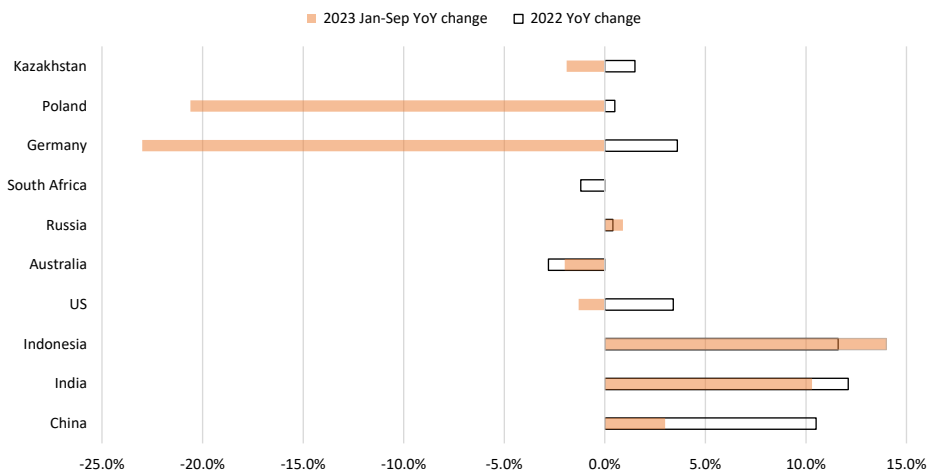
Source: NBS.



**Figure 4. China's top 10 coal-producing provinces: 2022 vs. 2023**

Source: NBS.

From global perspective, among the top 10 coal producing countries, only Indonesia and Russia achieved higher YoY growth compared with 2022. China and India also contribute to the world coal supply increase, offsetting the drop of coal production from the United States and Europe. Driven by more affordable international supplies, the coal market has gradually loosened up.



**Figure 5. YoY change of coal production in top 10 coal producing countries during Jan-Sep 2023**

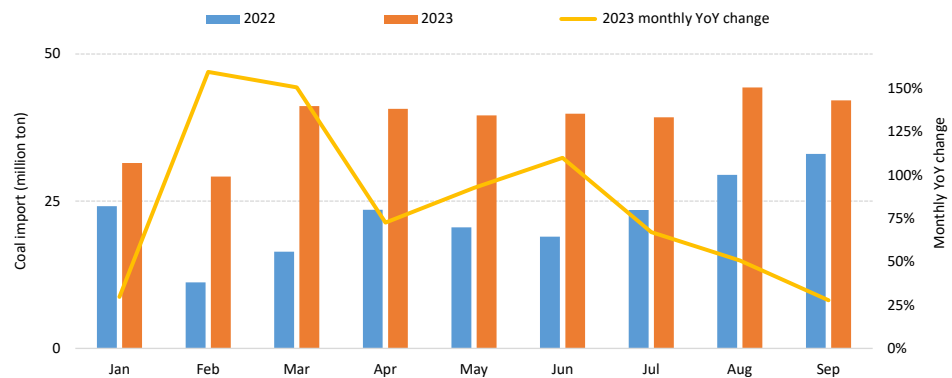
Source: [China Coal Economic Research Association](#).

Note: Australia is based on H1 2023 data; 2023 data for South Africa is unavailable now.

## Coal imports

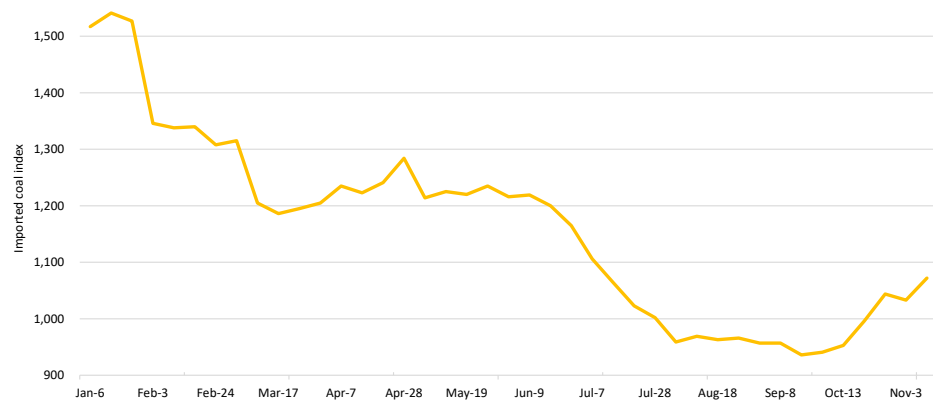
By the end of September 2023, China's coal import reached 350 Mt, witnessing a 73.1% YoY increase in volume and a 39.1% YoY increase in value of RMB.

Meanwhile, according to China's imported coal index compiled by China Electricity Council (CEC), the import price of coal has slid since the beginning of 2023, until it rebounded in late September. In October, the conflict in the Middle East, overlapping with previous oil production cuts, led to the surging global oil and gas prices, driving up international coal prices and thus suppressing domestic import demand.



**Figure 6. China's monthly coal imports: 2022 vs. 2023**

Source: [China Customs](#).



**Figure 7. China's imported coal index**

Source: CEC.

## Coal consumption

Globally, as coal prices have fallen from the highs of 2022, 2023 may see a new record of coal consumption. According to the estimation of IEA, among the main coal consumers, China and India are likely to continue the coal consumption growth compared with 2022, while the EU and the US may see a decline in domestic use. However, during the first eight months of 2023, United States thermal coal exports hit their highest levels since 2018 due to the strong demand from key consumers, including China, India and South Korea.

In China, the national coal consumption is mainly for thermal power generation (56%~)



and industrial production of steel (16%~), cement (13%~) and chemical products (7%~).

Despite the strong performance of the “new three” exports, including solar cells, lithium-ion batteries and electric vehicles, the cement and crude steel outputs are still weak, thus lowering the coal demand to some extent. Meanwhile, the thermal power generation growth turned positive in September, mainly due to the recovering industrial and commercial activities.

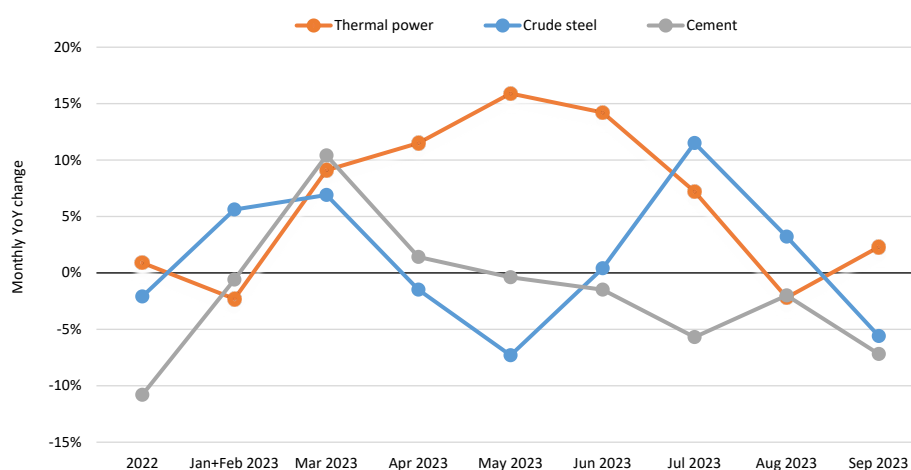
According to the China Coal Industry Association, by the end of October, the coal inventory in the thermal power plants nationwide had reached a new historical high - around 202 Mt (available for about 34 days), 28 Mt higher compared with the same period last year. Moreover, coal inventory at Bohai Port has also been climbing since September, preparing for the coming heating season.

During Jan-Sep 2023, coal-related key sectors’ production data as:

	Thermal power (TWh)	Crude steel (Mt)	Cement (Mt)
Output in Jan-Sep 2023	4639.69	795.07	1495.2
YoY growth rate during Jan-Sep 2023	5.8%	1.7%	-0.7%
YoY growth rate in 2022	0.9%	-2.1%	-10.8%

**Table 2. Coal-related key sectors’ production in Jan-Sep 2023**

Source: NBS.

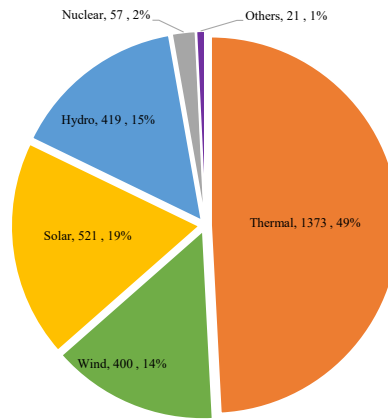


**Figure 8. Monthly YoY change of production in main coal-related sectors in 2023**

Source: NBS.

## Coal-fired power plants

In the first nine months of 2023, China’s total power capacity advanced 12.3% YoY, reaching 2790 GW, with the breakdown as the following figure. Thereinto, renewable power capacity grew by 20% YoY, hitting 1384 GW, roughly accounting for 49.6% of total power capacity.



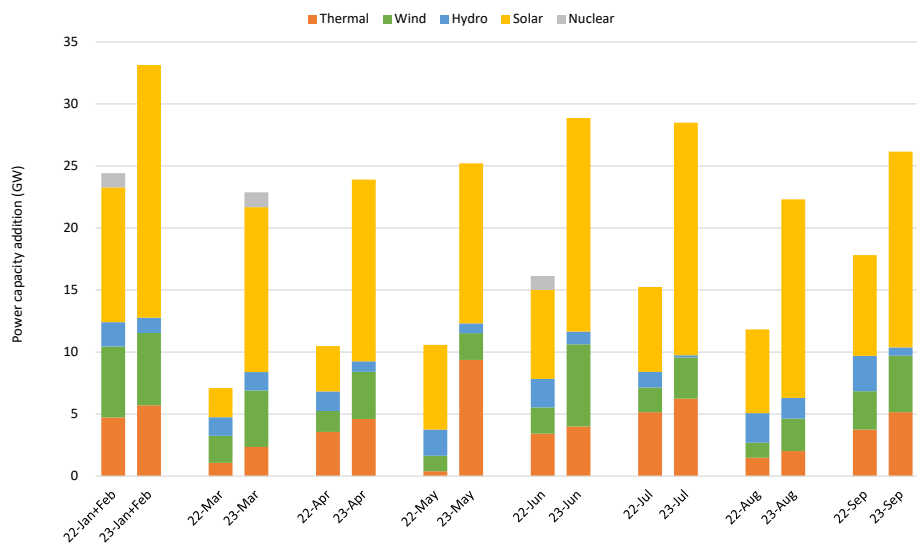
**Figure 9. Power capacity mix by the end of September 2023 (Unit: GW)**

Source: National Energy Administration (NEA).

Jan-Sep 2023	Total	Hydro	Thermal	Nuclear	Wind	Solar
Incremental capacity	226.33	7.88	39.44	1.19	33.48	128.94
YoY growth rate	12.3%	3.4%	4.3%	2.2%	15.1%	45.3%

**Table 3. Incremental power capacity by technology during Jan-Sep 2023 (Unit: GW)**

Source: CEC.



**Figure 10. Power capacity additions by technology: 2022 vs 2023**

Source: NEA.

During Jan-Sep 2023, China's power generation by technology is presented as the following table.

Jan-Sep 2023	Total	Thermal	Hydro	Nuclear	Wind	Solar
Power generation	6621.92	4639.69	858.39	322.79	583.68	217.29
YoY growth rate	3.8%	7.5%	-22.9%	6.5%	16%	7.4%

**Table 4. Power generation by technology during Jan-Sep 2023 (Unit: TWh)**

Source: NBS.

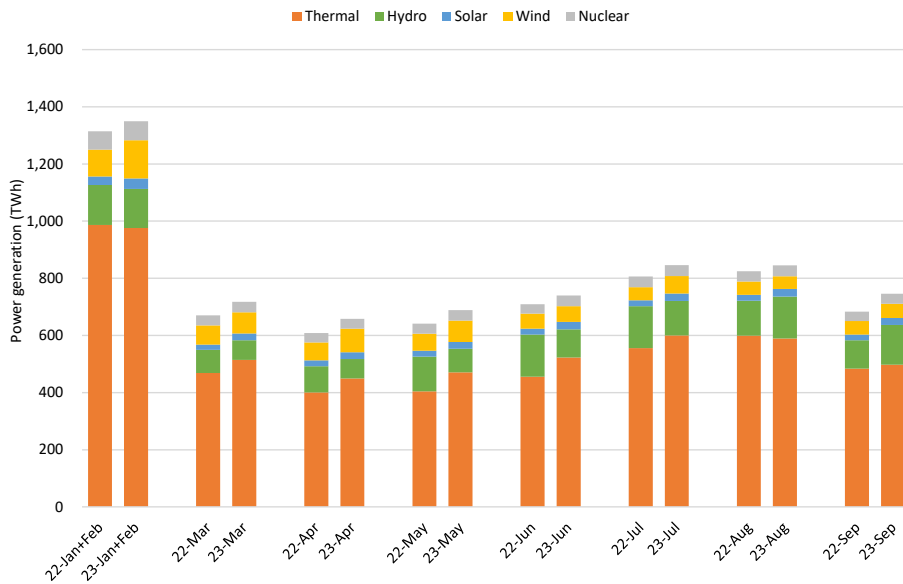


Figure 11. Power generation mix by technology: 2022 vs 2023

Source: NBS.

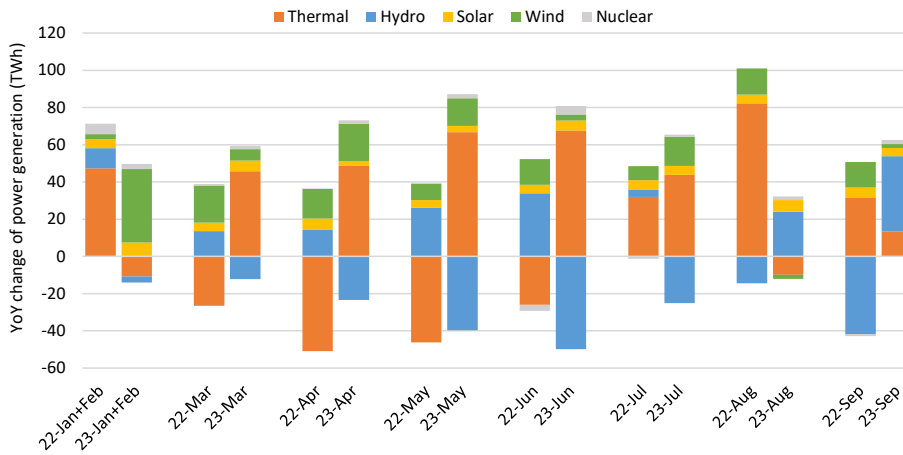


Figure 12. Power generation addition by technology: 2022 vs 2023

Source: NBS.

During Jan-Sep 2023, the total power investment increased by 41.1%, reaching RMB 553.8 billion. Thereinto, investment in solar power is evidently advancing at 67.8% YoY growth, followed by 46% in nuclear and 33.4% in wind power.

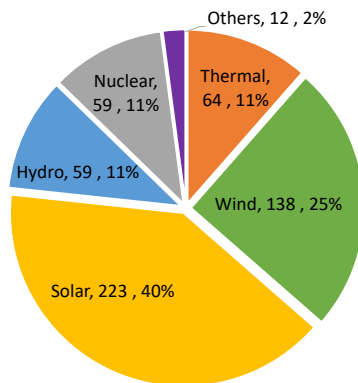


Figure 13. Power investment by technology by the end of September (unit: billion RMB)

Source: NEA.



# Key Developments in China



## NDRC issued the Notice on Establishing Coal Power Capacity Fee Mechanism

On November 10th, 2023, the [NDRC](#) issued the Notice on Establishing Coal Power Capacity Fee Mechanism. In order to accelerate the construction of a new type of power system, adapt to the new situation of coal power transforming into basic guarantee and system regulating power sources, and better ensure the safe and stable supply of electricity, the relevant matters regarding the establishment of a coal power capacity tariff mechanism are hereby notified as follows.

- The mechanism is applicable to compliant public coal power units in operation, excluding self-owned power plants and coal-fired power units that do not comply with national planning, to meet national requirements for energy consumption, environmental protection and flexibility regulation capabilities.
- The capacity fee is determined based on the fixed cost of recovering a certain proportion of coal power units. The fixed cost follows a unified national standard of RMB 330 per kilowatt per year. During 2024 to 2025, the recovering proportion of fixed costs is around 30% in most places and appropriately higher at around 50% in areas with rapid transformation of coal power functions. Starting from 2026, the recovering proportion will be increased to no less than 50%.
- The capacity fee that coal power units can obtain is determined based on the local coal power capacity fee and the maximum output declared by the unit. The new coal power units will implement the capacity fee mechanism starting from the following month of operation. The coal power capacity charges will be included in the system operation costs, which are shared by industrial and commercial users based on the proportion of electricity consumption in each month.
- Under normal operating conditions, if the coal power unit is unable to provide the declared maximum output following the dispatch instructions twice within the month, 10% of the monthly capacity fee will be deducted, 50% will be deducted three times, and 100% will be deducted four or more times.

## NDRC issued the Notice on National Carbon Peak Pilot Construction Plan

On October 20th, 2023, the [NDRC](#) issued the Notice on National Carbon Peak Pilot Construction Plan. It aims to select 100 typical representative cities and parks nationwide to carry out carbon peak pilot construction, explore carbon peak paths for cities and parks with different resource endowments and development foundations, and provide operable, replicable and promotable experience for the whole country. The plan focuses on energy, industry, energy conservation, building construction, transportation, and other key areas. By 2030, significant progress will be made in the comprehensive green transition of the economic and social development in the pilot cities and parks.

## The State Council issued the Opinions on Further Strengthening Mine Safety Production Work

On September 6th, the [State Council](#) issued the Opinions on Further Strengthening Mine Safety Production Work. The opinions emphasize that

- Strengthen the safety access for coal mines with severe disasters, and stop the construction of coal mines with a production capacity below 0.9 Mt/year.
- Promote the transformation and upgrading of mines, and dispose mines that do not meet safety production conditions categorically.
- Prevent and resolve major security risks by improving the mine safety management system and clarifying the main responsibility of related enterprises, etc.

# Progresses of EFC's Coal Transition Task Force

## Seminar on Power System Reform and Coal Power Transformation Towards "Dual Carbon" Goals

On August 25th, EFC hosted a closed-door Seminar on Power System Reform and Coal Power Transformation towards "Dual Carbon" Goals to discuss power system reform and coal power transformation. The experts were from top universities such as Tsinghua University and Peking University, as well as key stakeholders in the power industry, such as State Grid Energy Academy and China Datang Group, and also including iNGO partners such as RMI. During the discussion, the experts exchanged ideas on the directions and priorities of power system reform in the near and mid-term, especially how to implement the reform at the local level.

## Promoting Coal Consumption Control and Coal Power Transformation in Inner Mongolia

On September 5th, supported by EFC, the grantee Shanghai Jiaotong University Inner Mongolia Research Institute finalized two projects on the promotion scheme and pilot project of upgrading coal-fired power units in Inner Mongolia and the research on the topic of coal consumption control in Inner Mongolia. The two projects helped the region better achieve the high-quality transformation of development and the realization of the vision of carbon peaking and neutrality. During the research period, the grantee also submitted a policy note on energy storage to participate in the electricity market to NEA and Ministry of Education.

## Energy Transition Narrative Building

On September 13th, EFC organized a seminar to share energy transition narrative building, convening with research partners including iGDP and Greenpeace and key media outlets such as Caijing 11 and 21st Century. The participants discussed the evolution of energy transition narrative building in recent months

due to internal and external tensions, and also tried to seek potential opportunities for better communication.

## Flexibility Retrofits and System Optimization of Coal-fired Power Plants

On September 19th, our grantee China Electric Council, a national power sector industrial association joined by massive experts from research and industrial fields, kicked off the research on coal power flexibility retrofit. By comprehensively analyzing the current situation and challenges of coal power flexibility retrofits, this project will propose suggestions on improvement and functional optimization of coal power flexibility retrofits, and put forward the evaluation methods of carbon reduction from flexibility retrofits of coal-fired power plants.

## A Win-Win Study on Securing National Energy Security and Local Green Development in Ordos

On September 22nd, Inner Mongolia Beichen Think Tank kicked off a local study for Ordos' industry transition. This project takes the transformation of Ordos from a high-carbon city to a low-carbon green city as the entry point, by achieving the transformation of energy supply security, industrial structure and economic development mode. It is expected that the effective implementation of this project can fulfill the national and autonomous region's requirements for energy conservation and carbon reduction in Ordos City, and finally achieve the targets of carbon peaking before 2030.

## Final Meeting on Policies and Measures for Promoting Smart Heating

On October 18th, funded by EFC, our grantee finished the study on policies and measures for promoting intelligent heating to achieve carbon peaking and carbon neutrality. This project analyzed the current situation, development trends, and existing problems of smart heating in the context of "carbon peak and carbon neutrality". According to the research, it is forecasted that the energy consumption rate will decrease to 4 kgce/m<sup>2</sup> by 2060 under the condition of smart heating. The relevant report was submitted to NDRC's Division for Environmental Resources. The policy note was published in Issue 573 and 574 of Energy Decision Reference. China Clean Heating Industry Development Report cited part of the project outputs.

## Building a Climate-resilient Power System

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On October 26th, EFC published one opinion piece about climate-resilient power system in Neng APP. According to our research, climate change directly affects every segment of the electricity system, altering generation potential and efficiency, testing the physical resilience of transmission and distribution networks, and changing demand patterns. Therefore, it is necessary to take effective policy measures and coordinated action among key actors to build a climate-resilient power system. The power sector needs to design top-down planning and strategies, form bottom-up mechanisms and technologies, and improve the closed-loop system of "pre-warning, in-process response, and post-event review".

## Build Energy Security With Green and Growth Roundtable

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On November 2nd, EFC held the 3rd Coal Transition Roundtable in 2023 to discuss "security, prosperity and green". In the roundtable, we collected feedbacks from experts on the next year project topics, including developing new employment opportunities via green transition, developing clean heating solutions via adopting measures to local conditions, conducting case studies on successful transition stories, supporting security and development, and so on. EFC has built a reputation through our Coal Transition Roundtables and received good feedback from industrial players, policymakers and experts. Through

the roundtable discussions, we have helped form a consensus on energy transition, especially on coal transition.

## EFC Initiated Energy Security Alert and Media Response

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EFC developed a draft briefing on China's potential energy security alert and public media response action plan. The main information includes power supply and demand, oil and gas price, and media response. We also analyzed the key indicators for energy fluctuation: weather, geopolitics and macro-economy. In the next step, we plan to cooperate with CEC and National Climate Centre to establish a routine mechanism for early warning.

## Promote Low Carbon Transition Pathway of Coal in China

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Cynthia YU, Director of EFC's Coal Transition Task Force, spoke at various events to promote alternative energy security. At the Taiyuan International Energy Forum, together with some global Fortune 500 enterprises, she advised on Shanxi's energy transition roadmap by learning from inter-national experience and analyzing Shanxi's own situation. In the Future Energy Conference, she indicated the importance of new ideas for the new power system to solve the old power shortage problem.







# Highlights of Knowledge from the Field

## World Energy Outlook 2023 ([IEA](#), October 2023)

The new World Energy Outlook explores some key uncertainties to prospects for energy security and rapid, affordable energy transitions: the implications of any deterioration in geopolitical tensions, the pace of China's economic growth, the possibilities for more rapid solar PV deployment opened by a massive planned expansion in manufacturing capacity (led by China), and the implications of a huge increase in the capacity to export liquefied natural gas starting in the middle of this decade, led by the United States and Qatar. Accelerated scale-up of the clean energy transition means there is very little runway left for growth in fossil fuels: for the first time, demand for oil, natural gas and coal each peak in the three World Energy Outlook-2023 scenarios before 2030. The share of fossil fuels in primary energy demand declines from 80% over the last two decades to 73% in the STEPS by 2030, 69% in the APS and 62% in the NZE Scenario.

## International Energy Outlook 2023 ([EIA](#), October 2023)

The International Energy Outlook 2023 (IEO2023) explores long term energy trends across the world through 2050. The new outlook places emphasis on the current trajectory of the global energy system from perspectives of new energy policies, the transition to zero-carbon technologies, energy security concerns, and economic and population growth. IEO2023 identifies three key findings:

- Increasing population and income offset the effects of declining energy and carbon intensity on emissions;
- The shift to renewables to meet growing electricity demand is driven by regional resources, technology costs, and policy;
- Energy security concerns hasten a transition from fossil fuels in some countries, although they drive increased fossil fuel consumption in others.

## Scraping by 2023: Global Coal Miners and the Urgency of a Just Transition ([GEM](#), October 2023)

Coal miners face the harsh prospect of job layoffs due to scheduled mine closures and a market shift toward cheaper wind and solar power generation, whether or not their home country has a coal phase-out policy in place. To estimate potential job losses, the current report summarizes key points as below:

- Nearly half a million workers (414,200) operate mines that may reach their end of operation before 2035, affecting an average 100 workers per day.
- By 2050, nearly 1 million coal mine jobs (990,200) will no longer exist at operating mines given the coal industry's foreseeable closures, potentially laying off over one-third (37%) of the existing workforce – even without climate pledges or policies to phase out coal.
- China and India will likely be hardest hit: China's Shanxi province would shed the most jobs globally — nearly a quarter of a million (241,900) by 2050 — while Coal India is the producer facing the largest potential jobs cuts of 73,800 by mid-century.

## Energy Security Sentinel - An Interactive Study of Geopolitical Risk and Energy Prices ([S&P Global](#), August 2023)

Under the background of current geopolitical risks, this analysis shows how diversity of supply, higher levels of global spare capacity and expansion of strategic fuel reserves have helped insulate markets from the risk of supply disruptions due to war, sanctions, climate change and unrest. Geopolitics is leading the bullish sentiment across all commodity markets. In the first half of 2023, Russia's war in Ukraine continued to dominate the Energy Security Sentinel. Meanwhile, the first half of 2023 has also seen an uptick in reported tanker attacks and seizures in the Middle East – a signifier of simmering tensions between the West and Iran. Data presented in the S&P Global Energy Security Sentinel shows that the spread of incidents in the Middle East has shifted from Iraq in late 2022 to the waters in and around the region during 2023. Prior to the re-emergence of threats to oil shipping, the geographical range of security events in the Middle East was seen spreading across the Arabian Peninsula to the Strait of Hormuz and the eastern coast of the UAE.



