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Foreword by Cynthia Yu

Director, Coal Transition

Energy and power supply security concerns significantly shape China's coal sector in 2022. To avoid power shortage and cope with skyrocketed commodity prices, China prioritized on increase in coal production to ensure sufficient coal for power generations. Policies on pricing mechanisms were also issued to stabilize the domestic coal price at wellhead levels.

On the other hand, the long-term pessimistic expectation on coal power sector significantly limits the investment to coal and coal power sectors. About 70% of the listed coal-power generation sector reported negative profits in 2022. Coal power assets are traded at a discount of the book value. State-owned Assets Supervision and Administration Commission of the State Council (SASAC) and China's power generation companies prioritize asset value and risk control and are reluctant to increase investment in new coal power capacity. The National Development and Reform Committee (NDRC), National Energy Agency (NEA), and provincial governments emphasize the importance of using coal to secure power supply. The different targets by different stakeholders are conflicted in most provinces.

Some of China's policies issued in 2022 did not reach its targets. By November, in total 62 million tons of coal mine capacity was approved by NEA, instead of 300 million tons of incremental coal mine capacity planned in April 2022. In 2022, a total of RMB 81.1 billion of clean coal usage re-lending facility was issued out of the planned RMB 300 billion. The production increase is mainly via stretching existing coal mine capacity, leading to a decrease in coal quality. Following coal mine accidents, concerns are raised on coal as a sustainable solution for energy security.

The strong production growth in 2022 does not all go to the consumption side. Due to the weak economy triggered by the COVID pandemic, China's key coal consumption sector (power, steel, cement, etc.) experienced modest or negative output growth, leading to coal inventory built in key sectors. Coal power plants have built high inventory (~25 days) in May, and from September to December. During the record-breaking drought and heatwave in summer, coal power offset the hydropower shortfall and significantly increased the output. Throughout the power crisis, we realize distributed energy systems and flexibility release from grid networks are important for providing power supply security.

Moving forward to 2023, China prioritizes economic development. Large scales of investment are being proposed by Beijing and provincial governments that will support both power demand and commodity prices. In Xi's 20th Congress report, the word "Green" has been mentioned thirteen times. For China, green development can serve not only to fulfill the climate agenda but also as strategic new economic drives. China spent USD 546 billion in 2022 on solar and wind energy, electric vehicles, and batteries, accounting for half of the global investment. Meanwhile, the tendency to continue investing in high energy intensity and high emission sectors still exists.

For EFC, it is important to parallelly work on "building the new" and "discarding the old." We plan to continue the efforts to promote renewables, non-fossil fuel storages, grid networks, and green power consumption while accelerating existing coal power capacity flexibility retrofits and orderly phasing out coal capacity. We believe it is important to promote green technologies and explore new models for sustainable climate and investment perspectives.



Note from JING Hui

Senior Program Director, Strategic Communications

Building narratives of the energy transition is an integral part of EFC's strategy to drive decarbonized growth.

In 2022, deadly heat and the deepening energy crisis facing many countries packed a double punch, forcing some of the world's largest economies into a desperate scramble to secure electricity for their citizens. In China, while many low-carbon policies kept rolling out to honor the country's climate commitments, economic pressure and power shortages have put "energy security" high up in the policy and public discourse.

To better understand how the energy narrative has been influenced by these events and shed light on future narrative-building efforts by the field, EFC Strategic Communications Program conducted two rounds of media discourse research and shared with the field. Key findings include: China's overall commitment to the dual carbon goals remains unchanged; energy security is described as a precondition for development, and coal is being depicted as the bedrock for security; green and low carbon energy discussions are not gone but embedded in the "Don't discard the old before the new is built" rhetoric; and stories about global energy crisis have been constantly picked up to keep Chinese readers abreast with global trends.

Informed by the findings and matching policy windows, we organized a few communications events in 2022. Highlights include:

- In July, we held a high-level forum to discuss the modern energy system as a fundamental solution to energy security. The forum, in collaboration with a highly influential news wire Chinese News Service, generated good coverage on renewable's role in the new power system to maintain energy security, and reached over 1 million live streaming viewership.
- In December, in partnership with Caixin, a prestigious financial media outlet, we organized an online dialogue ruminating on the global energy crisis and its impact on China. Discussions on disinformation of the European coal rebound, European renewable energy policies, and China's opportunities attracted in-depth media reporting and extensive online viewership.

It's never been a more necessary time to build the low-carbon energy transition narrative in China. We are resolute in our efforts to inspire more informed discussions and construct a shared clean energy vision through strategic communications.

If you are interested in obtaining a copy of the media discourse research, please reach out to JING Hui (jinghui@efchina.org).

Coal Data Updates

Summary of economic and energy trends in 2022

China's GDP achieved 2.9% YoY growth in Q4 2022 and 3% in the whole 2022, evidently lower than the 2021 level at 4.3% and 8.1%, respectively. Correspondingly, the national energy demand and power consumption were respectively up by 2.9% and 3.6% YoY in 2022, a significant slowdown when compared with the last year.

In 2022, wind and solar power generation led the growth among all technologies, with 12.3% and 14.3% increase YoY, respectively. The hydropower generation turned from -2.5% in 2021 to 1.0% growth YoY, but was still below 2020 power output. As China's power dispatch prioritizes on renewable generation, thermal power increases by 0.9% only, which contradicts the 3.6% of the total power consumption growth.

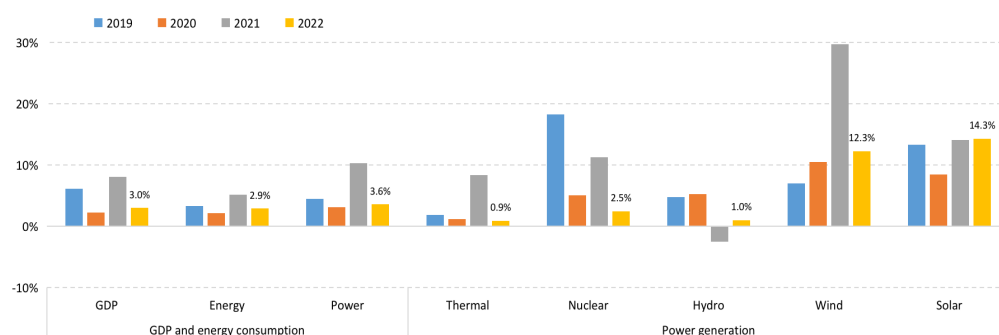


Figure 1. YoY changes of China's key economic and energy indicators, 2019-2022

Source: National Bureau of Statistics (NBS) and China Electricity Council (CEC).

Coal production

As the elevated priority of coal in energy security, China's coal production reached 4,496 million tons in 2022, with 9% YoY growth. China started to boost coal production since Q4 2021 in order to cope with the nationwide power shortage. Based on our interview, close to the 10% of coal production increase has reached the production up-limit. The monthly YoY growth rate gradually sped down in Q4 2022, as coal power inventory at power plants stabilized at 175 million tons, based on media reports.

In terms of capacity, according to the disclosure of the national energy work conference, 22 coal mine projects have been approved in 2022, equivalent to 80 million tons per annum coal capacity.

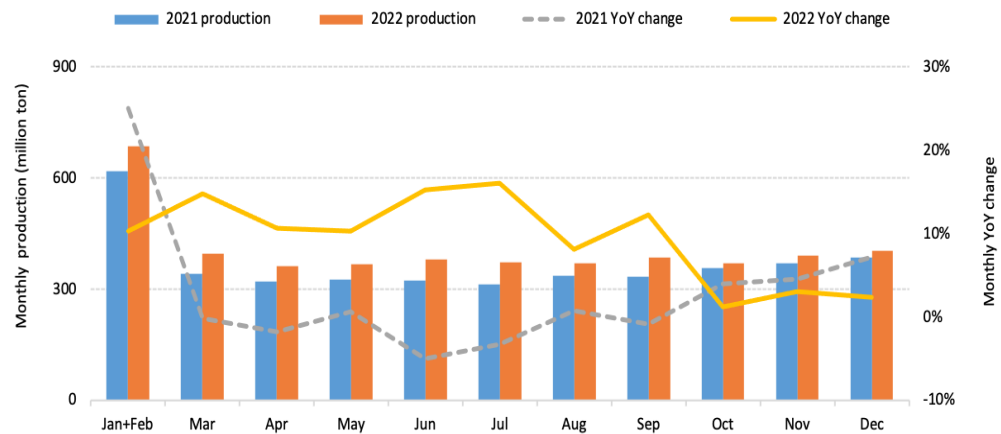


Figure 2. YoY change of China's monthly coal production: 2021 vs. 2022

Source: NBS.

The national coal production is highly concentrated in the top-producing regions. Specifically, the top ten and top four provinces respectively stand for 94% and 81% of the national coal production. Shanxi, China's largest coal producer, produced over 1,300 million tons of coal in 2022, accounting for 29% of China's national output. Meanwhile, Inner Mongolia, Shaanxi, and Xinjiang represent 26%, 17%, and 9%, respectively.

Compared with 2021, seven of the top ten producing provinces experienced positive YoY growth in 2022. Xinjiang is gaining a stronger position in the national coal market, with the highest YoY growth rate, while the output from Guizhou, Anhui, and Shandong are through a shrinkage from 2021.

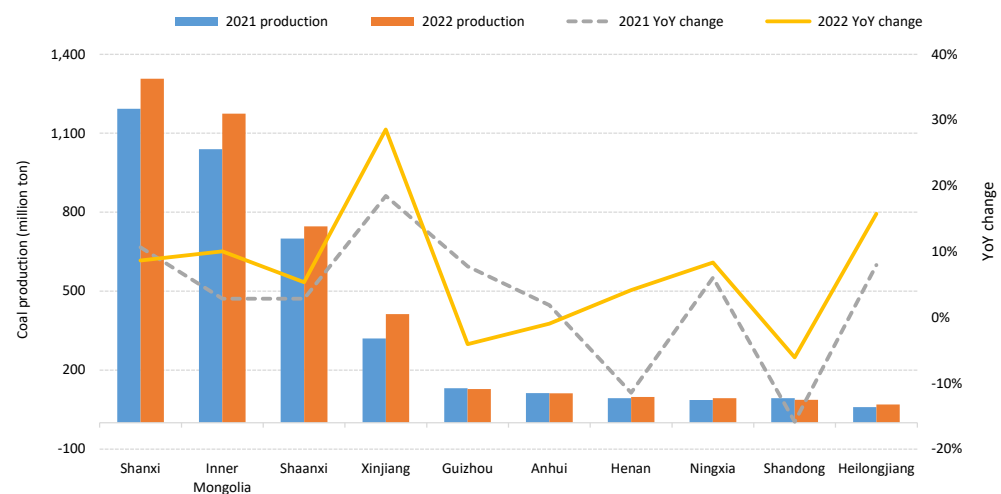


Figure 3. China's top ten coal-producing provinces: 2021 vs. 2022

Source: NBS.

From a global perspective, the Ukraine war brought energy security a top priority, reflecting in the surging coal production around the main coal producers worldwide. Eight out of the top ten coal-producing countries witnessed positive growth of national coal production in 2022, while South Africa and Australia experienced a shrinkage. Thereinto, the YoY growth rate of India and Indonesia exceeded 10%, followed by China at 9% YoY.

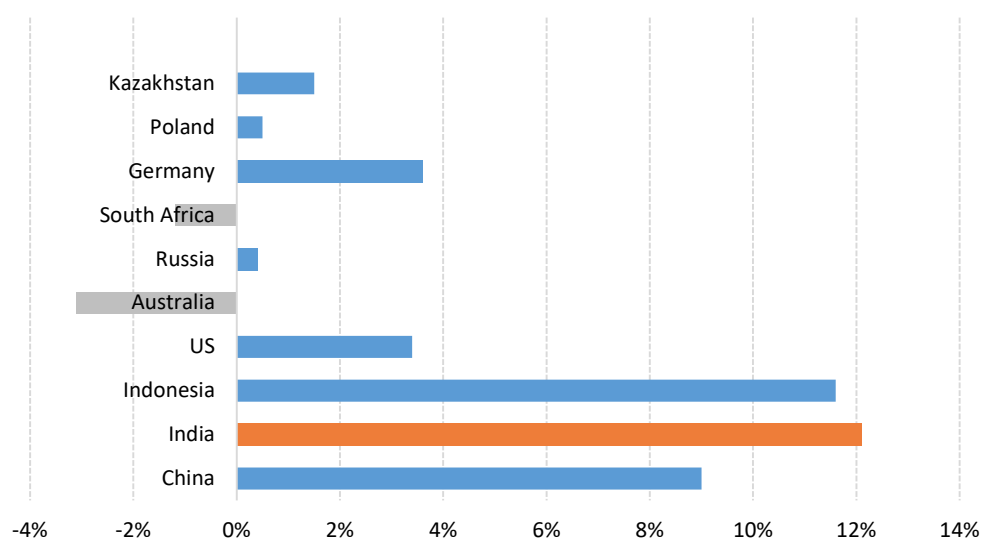


Figure 4. YoY change of coal production in world's top ten coal-producing countries in 2022

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

Note: Australia is based on data of the first nine months of 2022.

Coal imports

In 2022, China's coal import reached 293 million tons, witnessing a 9.2% YoY decrease in volume but a 22.2% increase in value. Due to the domestic production release and high international coal prices, China's coal import experienced the first YoY shrinkage since 2016. From the perspective of import source, China's coal import from Indonesia, the largest coal import source for China, declined 14.1% ending by November 2022. According to the imported coal index of China compiled by CEC, the import price of coal kept increasing momentum as entering Q4 2022, staying above RMB 1,300/ton.

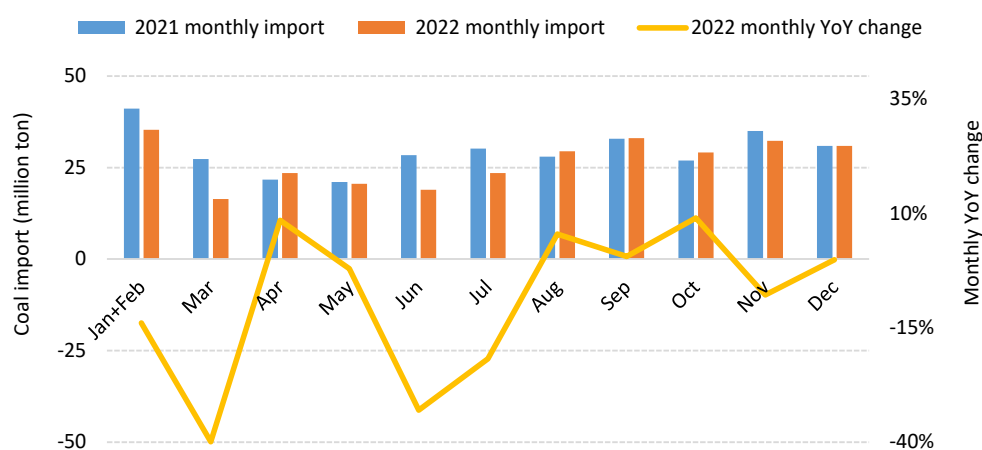


Figure 5. YoY change of China's monthly coal imports: 2021 vs. 2022

Source: [China Customs](#).



Figure 6. China's imported coal index in 2022

Source: CEC.

Coal consumption

Globally, 2022 saw a hiking coal demand due to the curtailed gas supplies and the extreme drought weather. The estimation of the International Energy Agency (IEA) indicates that global coal consumption may surpass 8 billion tons in 2022 for the first time and stands a good chance of maintaining the same level until 2025. In China, the national coal consumption is mainly for thermal power generation (~56%) as well as industrial production of steel, cement, and chemical products (~36%).

In Q4 2022, the ongoing COVID-Zero policy and the high infection rate in December, as well as the downward real estate development, weakened both power and coal consumption. The growth rate for steel production started to turn positive in August and fell to the negative in December again, and the cumulative production is still lower than the output in 2021. Cement production suffered from significant shrinkage due to the weakening demand from the property sector. After the summer peak period, the growth rate of thermal power gradually slowed down in Q4 2022.

Throughout 2022, the production data of coal-related key sectors is as the following:

- Thermal power generation: 5,853 TWh, increased by 0.9% YoY (while total power generation increased by 2.2% YoY); an 8.4% increase in 2021 compared to 2020;
- Crude steel output: 1,013 million tons, decreased by 2.1% YoY; a 3.0% decrease in 2021 compared to 2020;
- Cement output: 2,118 million tons, decreased by 10.8% YoY; an 1.2% decrease in 2021 compared to 2020.

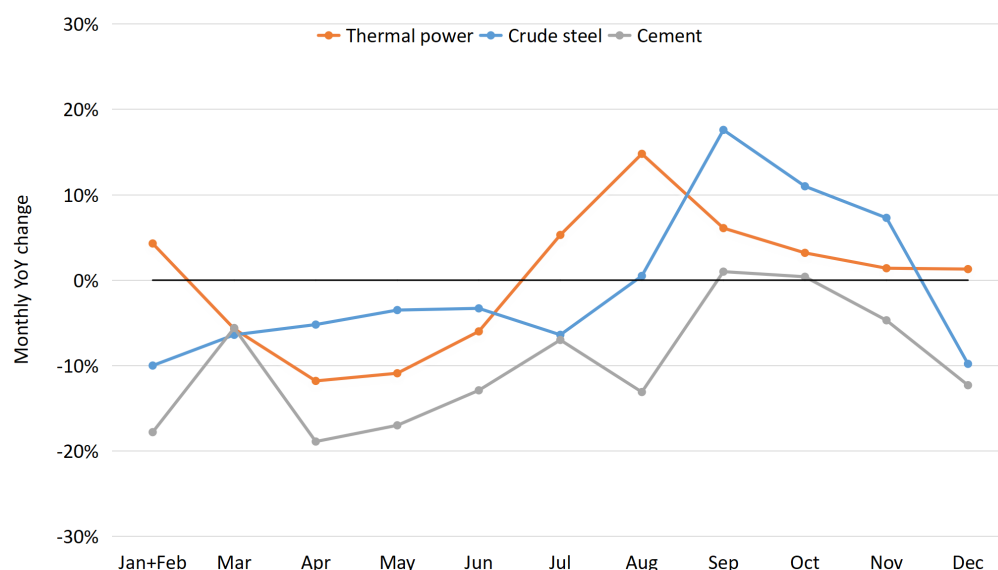


Figure 7. Monthly YoY change of production in main coal-related sectors in 2022

Source: NBS.

Coal-fired power plants

According to the CEC, China's total power capacity stands at 2,560 GW by the end of 2022, with the breakdown as the following figure. Thereinto, the coal power capacity accounts for 43.8% of the national total capacity, approximately 1,120 GW, increasing by around 1% YoY. By comparison, the aggregate non-fossil capacity accounts for 49.6% of the national total capacity, with a 13.8% YoY growth.

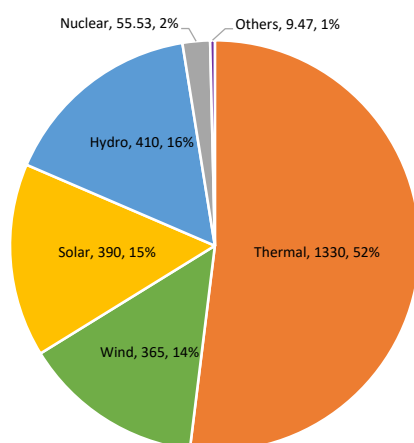


Figure 8. Power capacity mix by the end of 2022 (Unit: GW)

Source: CEC.

China added 200 GW power capacity in 2022, of which 160 GW capacity comes from renewables, both hitting a historical level. According to the NEA, the power capacity addition in 2022 was mixed by hydro 23.87 GW, wind 37.63 GW, thermal 44.71 GW, and solar 87.41 GW, representing 11.9%, 18.8%, 22.4%, and 43.7% of national total incremental capacity, respectively. Compared with 2021, 2022 incremental hydro and solar power capacity experienced a 1.6% and a 60.3% YoY increase, while incremental thermal and wind power capacity declined by 9.5% and 21% YoY, respectively. The slowdown of wind power installation is mainly due to the end of subsidies for offshore wind power projects from the central government starting in 2022.

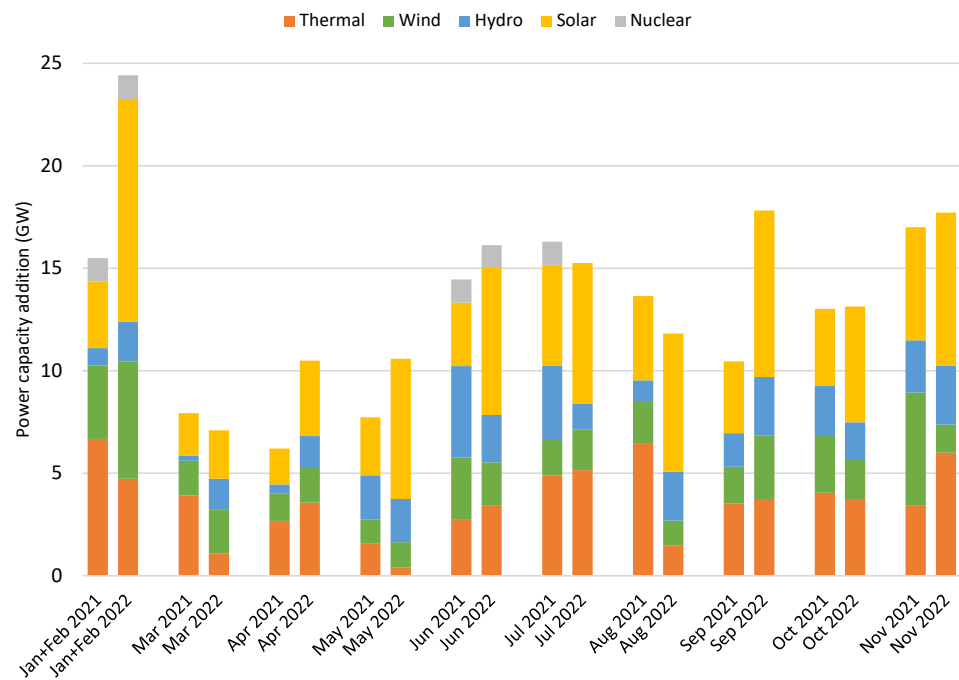


Figure 9. Power capacity addition by technology: 2021 vs. 2022

Source: CEC.

By the end of 2022, China's thermal power generation increased by 0.9% YoY, compared with 3.6% increase in power consumption. China's power consumption decreased significantly during the strict COVID-Zero policy implementation in H1 2022 but increased sharply from summer to November to cope with the lower hydropower output. To avoid coal-related power shortage happening, China has been building coal inventory at power plants. Coal inventory at power plants is stabilized at around 170-175 million tons from September to December 2022, effectively ensuring the coal demand for the heating season. Mid- and long-term contractual agreements between coal-power plants and coal producers are encouraged and estimated to reach 2 billion tons in 2022.

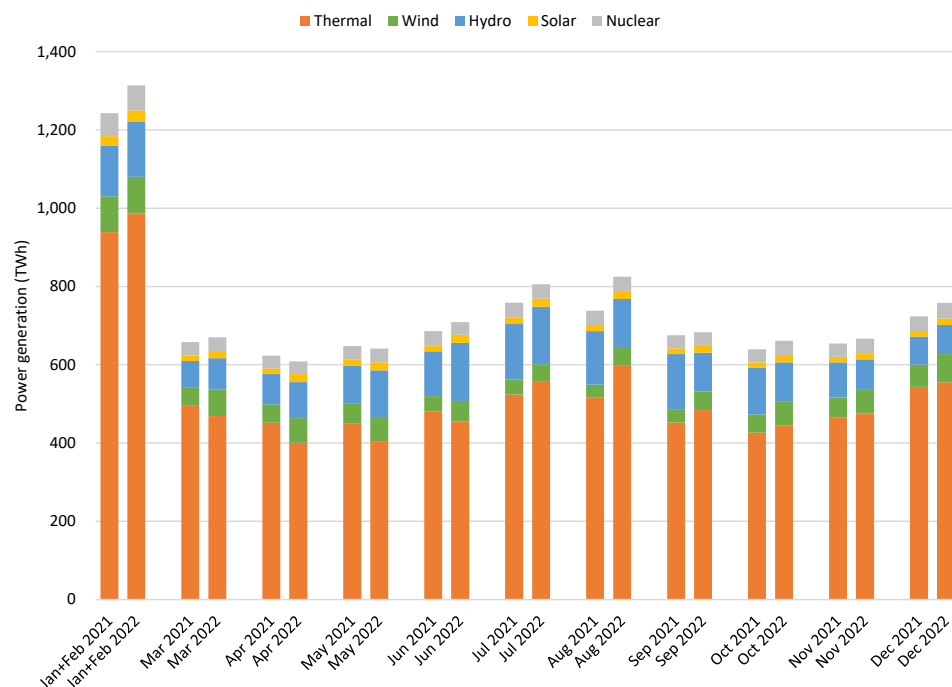


Figure 10. Power generation mix by technology: 2021 vs. 2022

Source: NBS.

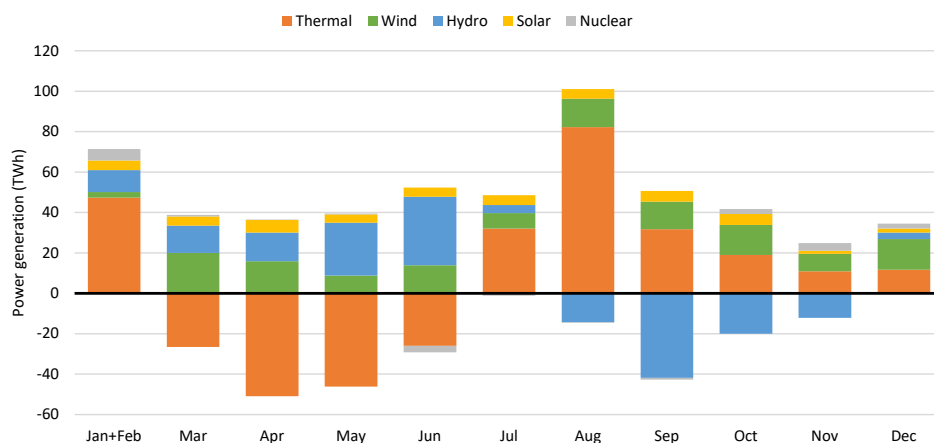


Figure 11. Power generation addition by technology: 2021 vs. 2022

Source: NBS.

From January to November 2022, the investment in power generation reached RMB 552.5 billion, 28% higher than the level in the same period of 2021. The thermal power investment expanded by 38% YoY, accounting for 13% of the total investment. Investments in clean power, focusing on hydro, nuclear, wind, solar, and biomass, accounted for 86.6% of the total investment. The investment in wind and hydropower respectively decreased by 23.7% and 15.3% YoY while the soaring investment is mainly concentrated in the mounting solar power expansion.

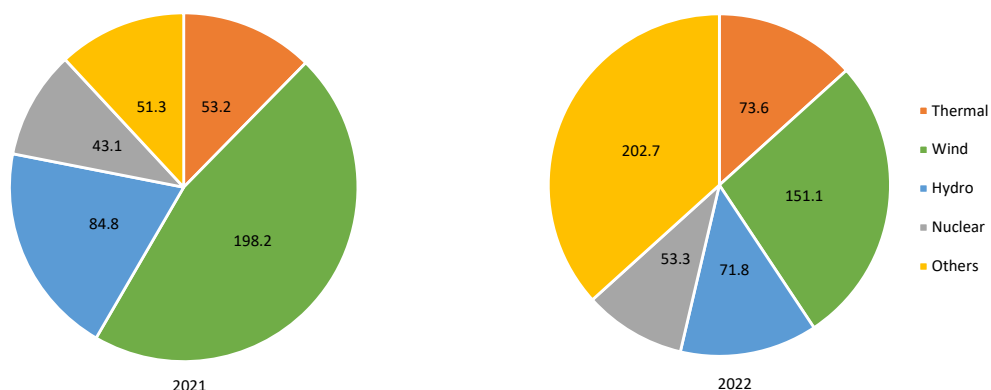


Figure 12. Power investment by technology (Unit: billion RMB)

Source: CEC.

Key Developments in China



PBoC continued to implement three structural monetary policy tools, including carbon emission reduction supporting tools

In January 2023, the People's Bank of China (PBoC) issued a notice to continue the implementation of three monetary policy tools, including carbon emission reduction supporting tools. The carbon emission reduction supporting tool and the special re-lending to support the clean and efficient use of coal will continue in 2023, so as to support the economic transformation to green and low-carbon while ensuring the security of energy supply, and help achieve the goal of carbon peak and carbon neutrality in a scientific and orderly manner. ([PBoC](#))

China pushes efforts for new power system

On January 4, 2023, the NEA started soliciting public opinions on the development of the country's new-type power system. In the blue book, the following three development milestones for the new-type power system were designed, aligning with China's dual carbon goals:

- From now to 2030, new energy will become the main source of additional power generation, while coal power will still be the anchor for energy security; it is also mentioned that coal power capacity and generation will increase before 2030.
- From 2030 to 2045, new energy will become the main body of power capacity while coal power will speed up the clean and low-carbon transition.
- From 2045 to 2060, new energy will become the main body of power generation while traditional power sources such as coal power, gas power, and conventional hydropower will be transformed into system-regulated power sources. ([The State Council](#))

NDRC and NEA require a high proportion of the coal and power supply to be subject to mid- and long-term contracts in 2023

On December 2, 2022, NDRC and NEA published the notice on the signing and performance of mid- and long-term electricity contracts in 2023. The notice requires a high proportion (80%) of market entities signing contracts, especially for coal power, to prevent high price fluctuation and to ensure reasonable profit for the coal mine and coal power sectors. Such measures will help to ensure the smooth operation of China's power system, with electricity mid- and long-term contracts as policy anchors. At the same time, the notice points out that it is necessary to improve the green electricity price formation mechanism, encourage power users to sign annual and above green electricity trading contracts with new energy enterprises, and lock in a long-term and stable price for new energy enterprises. ([NDRC](#))

Energy and electricity state-owned enterprises (SOEs) will form cooperatives

On December 30, 2022, SASAC required SOEs to form a cooperative between coal and coal power as well as between coal power and renewable power fields. One case is the cooperative between China Coal Group and the State Power Investment Corporation. The former purchased two coal power plants from the latter at 75% of the net asset value of the coal power plants. By September 2022, the 4.76 GW trading coal power plant assets reported a net loss of RMB 867 million in the first three quarters. Another case is the cooperative between Huadian and Huaneng with the National Energy Group, which is under discussion. ([Caixin](#))

NDRC and NEA promote the development of green electricity certificate trading

In December 2022, NDRC and NEA jointly issued the Notice on Promoting Green Electricity Certificate Trading by Power Trading Institutions, proposing that green electricity certificates are the only proof of the environmental value of green electricity. China's green electricity certificate system has been implemented since 2017 and now formed a complete issuance and trading system. Following the statement on November 16, 2022 which clarified the green electricity certificate as the basic certificate for renewable electricity consumption identification, the notice will further promote the improvement of China's green electricity certificate market and green electricity enterprises are expected to fully benefit. ([BJX](#))



Key Developments: International Perspective

December 15 Vietnam seals USD 15.5 billion deal with rich nations to exit coal

Vietnam has landed a USD 15.5 billion partnership with funders led by the European Union and the UK to help finance its transition away from coal. The Southeast Asian nation will receive half of the allotted package of grants and loans from country donors, with the other 50% coming from a group of investors known as Glasgow Financial Alliance for Net Zero. The funding will help bring Vietnam's peak emission date forward by five years to 2030 and will see the power sector's emissions top out at 170 million metric tons, a drop of around 70 million tons from the country's previous forecasts. Headline generation capacity in coal will go no higher than 30.2 GW, a drop of almost 7 GW compared to what was planned. ([Bloomberg](#))

November 15 U.S., Japan, and partners mobilize USD 20 billion to move Indonesia away from coal

A coalition of countries will mobilize USD 20 billion of public and private finance to help Indonesia shut coal power plants and bring forward the sector's peak emissions date by seven years to 2030. The United States and Japan are co-leading the effort with Indonesia on behalf of the other G7 democracies Britain, Canada, France, Germany, and Italy, as well as partners Norway, Denmark, and the European Union. Indonesia has also set a goal to reach net zero emissions in its power sector by 2050, a decade before its current target in its national climate plan, and to double the pace of renewable energy deployment so that it accounts for at least 34% of all power generation by 2030. ([Reuters](#))

November 2 Germany's cabinet approves accelerated coal exit by 2030 in the western state

Germany's cabinet approved a draft law to phase out coal-fired power plants in the western state of North Rhine-Westphalia by 2030 instead of a previous date of 2038, part of Berlin's efforts to speed up the cutting of greenhouse emissions. Meanwhile, the cabinet approved extending the lifespan of two coal-fired plants in the same state for the country's energy security. RWE, Germany's largest power producer, said it was bringing forward its own coal phase-out by eight years and was ready to end lignite-based electricity generation in 2030. Under the plan, the Neurath D and E lignite-fired plants, run by RWE, with a combined output of 1.2 GWh, which were supposed to go offline by the end of 2022, can run until March 2024 and a decision to extend their lifespan by another year should be made in September 2023. ([Reuters](#))

October 27

South Africa and Indonesia get USD 1 billion to close coal plants from the CIF

As the world's 13th- and 10th-biggest emitter of greenhouse gasses, South Africa and Indonesia will receive a combined USD 1 billion from the Accelerating Coal Transition investment program of the Climate Investment Funds (CIF) to replace some of their coal-fired power plants with renewable energy facilities. In South Africa, the money will be used to close coal-fired electricity stations and replace them with renewable energy plants and battery storage systems. In Indonesia, CIF will work with state power provider PT Perusahaan Listrik Negara and private companies to accelerate the closure of 2,000 MW of coal-fired generation in five to ten years and explore how that capacity can be replaced. South Africa is also negotiating USD 8.5 billion in climate finance as part of an agreement with the US, UK, Germany, France, and the European Union known as the Just Energy Transition Partnership. ([Bloomberg](#))

October 18

Indonesia's electric company in talks with investors over early retirement of coal plants

Indonesia's state utility Perusahaan Listrik Negara (PLN) is in negotiations with U.S. and European investors to help finance an acceleration scheme for its coal power plant retirement. To reach net zero carbon emission by 2060, PLN is planning the early retirement of coal plants with a collective capacity of 10 GW. According to the Chief Executive, the company could expedite the phasing out of coal capacity by a decade with affordable financing at a 2.5% to 3% rate. Although PLN vowed it would not commission new coal power plants, a number of coal projects currently under construction would still enter the system until 2026, amounting to 13 GW of output. Besides, state coal miner PT Bukit Asam signed a principal framework agreement with PLN to take over a coal-fired power plant in West Java, which could reduce the lifetime of the power plant by nine years. ([Reuters](#))



Progresses of EFC's Coal Transition Task Force

Research on CCS in coal power sector

On November 17, 2022, the project “The suitability evaluation of CO₂ storage in saline aquifers matching with China’s coal-fired power plants” was kicked off. By now, the detailed information on geology and coal power plants were collected, and the preliminary screening of the target coal power plant (more than 300 MW capacity, remaining lifetime > ten years, unit load rate > 60%) was finished, and the source-sink matching was roughly analyzed. In the next step, the grantee will optimize the CO₂ storage evaluation and estimate the cost. Experts in various fields, such as geology, energy, power, and environment, will be invited to participate in project discussions and output distribution. In specific, as planned, the participants to upcoming discussions will come from a wide range of organizations, including the China Energy Construction Group, the Geological and Environmental Monitoring Institute, the Ministry of Natural Resources, the Climate Department of NDRC, and top universities in China.

Study on Hohhot’s low-carbon heating development plan and recommendations

Hohhot is the provincial capital of Inner Mongolia. In recent years, Hohhot continues to promote clean heating while coal-fired boiler heating still accounts for a large proportion. This is the main reason for the high coal consumption and carbon emissions of heating power. To propose a development path and policy mechanism for low-carbon clean heat supply suitable for Hohhot, EFC supported Tsinghua University to carry out research on this topic, and the project was kicked off on November 21, 2022. The project aims to investigate the current situation of low-carbon heating resources, analyze the economic and policy obstacles, and formulate the low-carbon heating development plan for Hohhot, with providing relevant policy suggestions.

Spot markets in China’s unified power market framework

On December 6, 2022, EFC and IEA jointly held a seminar on the power spot markets in China. The topics include the expected market design model, relevant transformation path recommendations, the role of various stakeholders, and the impact of the market on all parties. Around 60 experts from Chinese power enterprises, research institutes, and universities joined the discussion. The keynote speech was the China spot

market target model, given by CEC and commented by IEA. During the roundtable discussion session, the transitional steps toward a full-mature power market were discussed.

A county-level just transition case study in Shanxi

On December 26, 2022, EFC carried out the mid-term review meeting with the local grantee in Shanxi on the county-level just transition case study. Until now, the grantee finished the scoping and framework jobs, analyzed the employment conditions in Shanxi, and conducted the investigation for basic information collection at the county level. In the next step, the grantee will continue the social community investigation, carry out comparative studies of county-level cases, and propose just transition policy notes on existing impacts mitigation and future risks prevention. Based on the policy effect evaluation, the strengths and gaps of relevant policy, the needs of different groups in the coal industry during the transition, policy suggestions will be proposed for just transition of coal industries.

Green finance role on coal transition in Inner Mongolia

On January 11, 2023, EFC held the final review meeting for the project of exploration of the green finance’s role in coal industry transition for China’s coal dependent cities—a case study on two Inner Mongolian cities—Erdos and Hologol. Based on the current policy and financial market environment of “dual carbon,” the project designed the coal transition pathway in Ordos and Hologol. Besides, the grantee studied the financial investment needs of coal transition in Inner Mongolia, as well as the potential obstacles of green finance and transition finance support. Furthermore, the grantee proposed specific policy suggestions for financial support on coal transition, referring to the successful experience of typical coal-dependent areas in the world.

Coal transition master plan and pilot in Zhejiang province and Jiaxing city

On January 16, 2023, EFC held the final review meeting for the project of the master plan on coal phase-out in the 14th Five-Year Plan (FYP) period and medium/long term for Zhejiang-take Jiaxing District as the pilot. This project developed a methodology for coal reduction, including policy databases, technology databases, questionnaires for economic evaluation, and risk assessment. Besides, the project focused on industry and park two dimensions for coal transition problem analysis and solution proposal. The project facilitated the Implementation Opinions on Accelerating the Green and Low-carbon Development in Huangwang Jianshan Industrial Park in 2023, where it was required to strictly control coal consumption and improve zero-carbon energy development.



Highlights of Knowledge from the Field

Key Themes for the Global Energy Economy in 2023 ([OIES](#), January 2023)

The latest edition of the key themes series examines a number of topics that will be highly relevant to the global energy economy in 2023, including a huge re-prioritization of energy policy away from environmental issues and towards energy security and affordability, the availability of Liquefied Natural Gas (LNG) to meet European demand, the energy implications of China's re-opening, India's new G20 presidency, Africa's hydrocarbon strategy, and the US's Inflation Reduction Act.

Coal 2022: analysis and forecast to 2025 ([IEA](#), December 2022)

Coal sits in the center of climate and energy discussions because it is the largest energy source globally for electricity generation and for the production of iron and steel and of cement, as well as the largest single source of carbon dioxide emissions. The current energy crisis has forced some countries to increase their reliance on coal in spite of climate and energy targets. Coal 2022 offers a thorough analysis of recent trends in coal demand, supply, trade, costs, and prices against a backdrop of rising concern about energy security and geopolitical tensions. It also provides forecasts to 2025 for demand, supply, and trade by region and by coal grade. The report contains a deep analysis of China, whose influence on the coal market is unparalleled by any other country and in any other fuel.

Alternative Pathway to Phase Down Coal Power and Achieve Negative Emission in China ([ACS Publications](#), November 2022)

Coal "phase down" has long been argued for its side effects on energy security and social development. Retrofitting coal power units with biomass and coal co-firing with a carbon capture and storage approach provides a solution. However, the emission reduction potential is still unknown. Thus, the article focused on helping China's 4,536 coal power units make differentiated retrofit choices based on unit-level heterogeneity information and resource spatial matching results. The research concluded that China's coal power units have the potential to achieve 0.4 gigaton of negative CO₂ emission in 2025, and the cumulative negative CO₂ emission would reach 10.32 gigatons by 2060.

Methane Reduction in Coal Mines in China: Observations and Prospects ([iGDP](#), November 2022)

Coal mines account for the highest share of methane emissions in China, and ultra-low concentration coal mine gas dominates in coal mine methane emissions. The report identified key challenges to the methane reduction in coal mines, especially lacking emission limitation standards, cost-effective technologies, and policy attention to address methane emissions from abandoned coal mines. Based on the status quo and challenges, several policy suggestions have been put forward from the perspective of U.S.-China cooperation, statistics management, emission standards, methane Monitoring Reporting and Verification (MRV) system, investment and financing mechanism, etc.

China Country Climate and Development Report ([World Bank](#), October 2022)

According to the report, climate risks will become a growing constraint to China's long-term growth and prosperity without adequate mitigation and adaptation efforts. Model-based simulations, consistent with China's dual carbon goals and the Nationally Determined Contribution (NDC), show that the pace of emissions reduction will vary across sectors, with important implications for sequencing. The low-carbon transition of the power sector—the largest source of emissions—would need to come first to achieve a rapid decline in emissions over the next two decades. This report also established a comprehensive policy framework, within which specific policy options were structured around six interconnected policy packages to ease the inevitable trade-offs and maximize the potential synergies between China's climate and development objectives.

