

COAL INFORMATION UPDATES

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Data of Coal Market in 2020

Coal production

The national raw coal production above designated size was 3.84 billion tons in 2020, up 0.9% year on year. The growth rate was 3.3% lower than that of the previous year (4.2%). The average monthly coal production was 320 million tons. The production of raw coal in December was 350 million tons, up 3.2% year on year. Shanxi became the second province after Inner Mongolia in history, with an annual coal production of more than 1 billion tons in 2020. Meanwhile, Shanxi's coal production surpassed Inner Mongolia, becoming the largest coal-producing province again. Average monthly coal production in Shanxi was 92.45 million tons in 2020, up 11.75% over the same period last year. In contrast, the average monthly coal production in Inner Mongolia was 85.45 million tons in 2020, 2.15% lower than that in 2019.

1. Continuous increase in the proportion of production in major coal-producing provinces

The total coal production of Shanxi was 1,063 million tons, up 8.2% year on year, and that of Inner Mongolia was 1,001 million tons, down 7.8% year on year. The production in these 2 provinces accounted for 53.7% of the total amount in China. Of the 9 provinces with an average monthly production of more than 5 million tons, 6 saw an increase while the other 3 were the other way around. Among the major coal-producing provinces, Shanxi, Inner Mongolia, and Shaanxi witnessed an average monthly production of over 50 million tons. The total production of the 3 provinces accounted for 73.1% of the national average monthly raw coal production, 0.7% higher than that in last year.

2. Continuous decrease in the scale of production in small coal-producing provinces

Of the 15 provinces with an average monthly production of less than 5 million tons, 5 saw an increase, while the other 10 were the other way around. The 15 provinces registered a total average monthly production of 26.58 million tons, accounting for 8.3% of the national average monthly coal production, with a 0.5% lower than that in last year. Among the 24 domestic coal-producing provinces, 3 provinces that featured the most monthly average production decline were Jiangxi, Guangxi, and Sichuan. Their collective average monthly coal production was 32% less than that in last year.

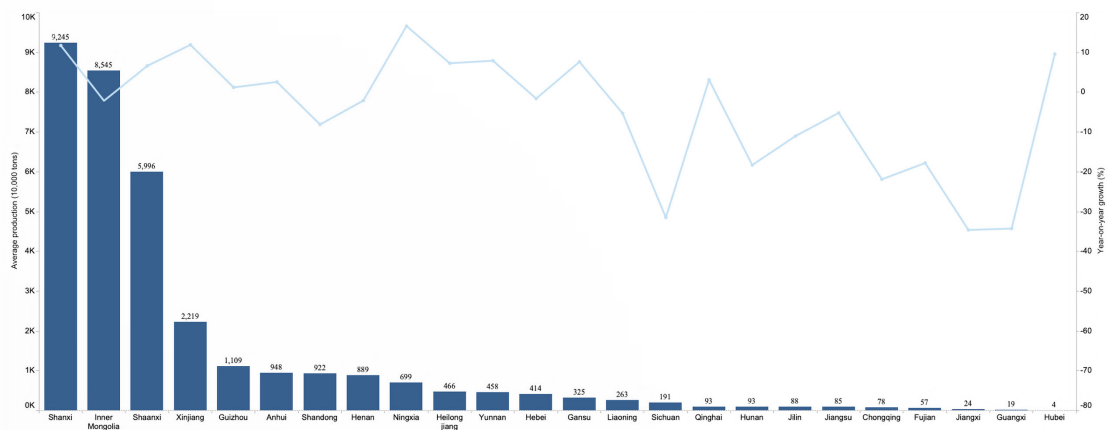


Figure 1. Average monthly production of raw coal in 2020

Source: National Bureau of Statistics

3. Contribution of coal industry to economic development of major coal-producing provinces

China's GDP of 2020 increased by 2.3% over the previous year. Shanxi's added value of the coal industry increased by 8.4%; while its GDP grew by 3.6% year on year, 1.3% higher than the average of the whole country. Shaanxi's added value of the coal industry increased by 5.4%; while its GDP grew by 2.2% year on year, 0.1% lower than the average. Inner Mongolia's added value of the coal industry declined sharply by 6.8%; while its GDP grew by 0.2% year on year, 2.1% lower than the average of the whole country. The coal industry played an inconsistent role in driving the economic growth of major coal-producing provinces. The growth rate of the coal industry added value in Shanxi and Shaanxi was much larger than that of the local GDP, indicating that the coal industry was one of the main contributing industries to GDP growth. However, the growth rate of the coal industry added value in Inner Mongolia was much lower than that of the local GDP, showing that the coal industry made no positive contribution to GDP growth. But according to the official employment statistics in 2019, the coal industry offered a large number of jobs and was an important support to local economic and social development. The average number of workers in the coal industry and its rate in provincial employment were 831,000 and 4.37% in Shanxi, 169,000 and 0.82% in Shaanxi, and 180,900 and 1.36% in Inner Mongolia.

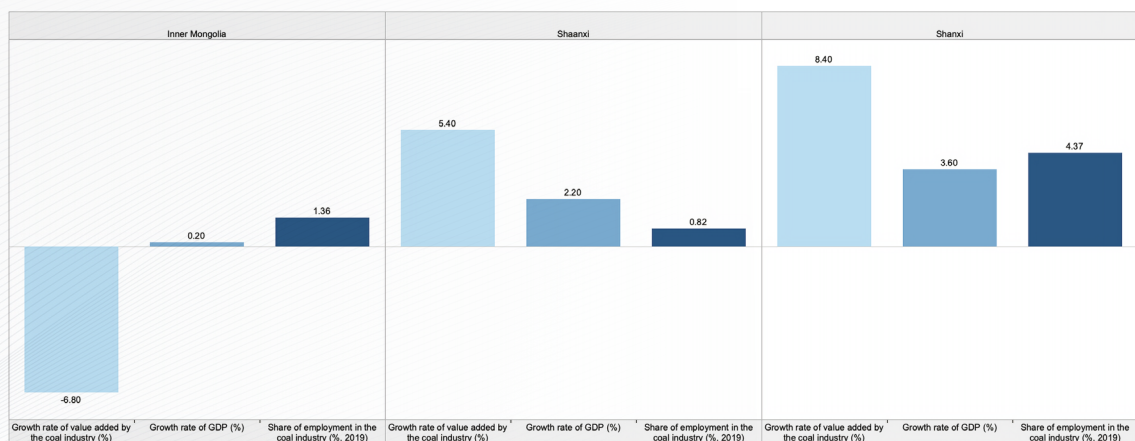


Figure 2. Value added and employment in the coal industry in Inner Mongolia, Shaanxi, and Shanxi

Source: Shanxi Provincial Bureau of Statistics, People's Government of Inner Mongolia Autonomous Region and People's Government of Shaanxi Province

4. Remarkable trend towards scale expansion and modernization transformation

There were 668 coal mines in Shanxi, with a total annual capacity of 1045.6 million tons in 2020. Among them, 324 mines that have an annual capacity of 1.2 million tons or above add up to a total annual capacity of 773.6 million tons, accounting for 74% of the total annual capacity. 340 mines that have an annual capacity of 900,000 tons or below add up to a total capacity of 265.9 million tons, accounting for only 25% of the total annual capacity. The total annual capacity in Lüliang, Shuozhou, and Changzhi cities was 467.05 million tons, accounting for 44% of the total capacity in Shanxi. Those 3 cities featured 148 coal mines. The overall annual capacity of those 148 mines that have an annual capacity of over 1.2 million tons was 387.55 million tons, accounting for 58% of the total annual capacity of these 3 cities.

Shaanxi featured 475 coal mines, with a total annual capacity of 737 million tons in 2020. Among them, 137 mines that have an annual capacity of over 1.2 million tons add up to a total annual capacity of 582.45 million tons, accounting for 79% of the total annual capacity. 334 mines, with an annual capacity of less than 900,000 tons, accounting for only 21% of the total annual capacity.

As of March 2021, Inner Mongolia had a total annual capacity of 935.95 million tons. 193 coal mines that have a capacity of over 1.2 million tons add up to a total annual capacity of 849.7 million tons, accounting for 91% of the total annual capacity. 133 coal mines had a capacity of less than 900,000 tons, accounting for only 9% of the total annual capacity.

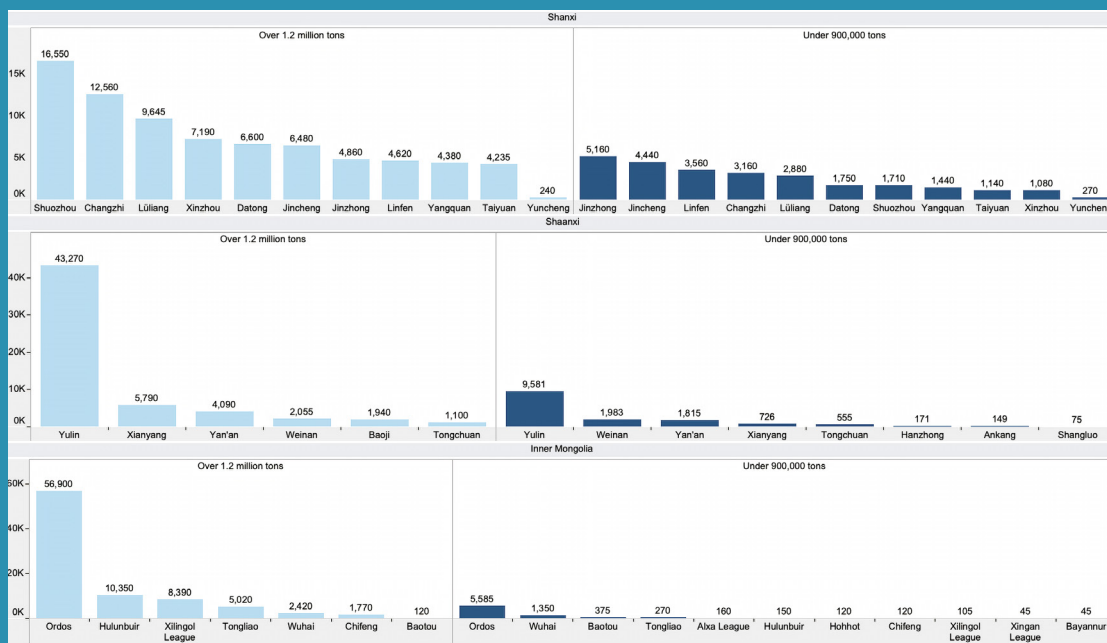


Figure 3. Capacity of coal mines in Inner Mongolia, Shaanxi, and Shanxi

Source: Shanxi Provincial Bureau of Statistics, People's Government of Inner Mongolia Autonomous Region and People's Government of Shaanxi Province

5. Initial success in eliminating backward production capacity

Since the national proposal of de-capacity plan in 2016, under the leadership and promotion of relevant state departments and local governments of major coal-producing provinces and regions, continuous efforts have been made to reduce overcapacity, eliminate backward production capacity and develop advanced production capacity. The coal supply quality was improved remarkably nationwide. By the end of 2020, about 5,500 domestic coal mines were closed, and over 1 billion tons of backward coal capacity was eliminated annually. The coal industry outperformed the de-capacity goal set in the *Opinions of the State Council of the People's Republic of China on Reducing Overcapacity in the Coal Industry to Achieve Development by Solving the Difficulties* (GF (2016) No.7). In 2020, more efforts were made to reduce excessive capacity. Totally 600 domestic backward coal mines in 22 coal-producing regions were closed, increasing by 3.4% over the previous year. Over 150 million tons of backward production capacity was eliminated. In the major coal-producing provinces, Shanxi closed 32 backward coal mines, of which 27 mines (84%) had a capacity of less than 900,000 tons. The closed mines were located mainly in Datong, Linfen, and Jincheng cities. Shaanxi closed 57 coal mines, whose annual capacity was less than 900,000 tons. 16.93 million tons of backward production capacity was eliminated. Yulin was the city with the most mines closed in Shaanxi in 2020. A total of 20 coal mines with a capacity of 7.71 million tons were closed, accounting for 35% of the total closed mines. Inner Mongolia closed 10 coal mines, including 3 under construction and 7 in production. Among those mines, 9 coal mines had an annual capacity of 900,000 tons. A total capacity of 4.95 million tons was eliminated. For Ordos alone, 3.3 million tons of backward production capacity was eliminated.

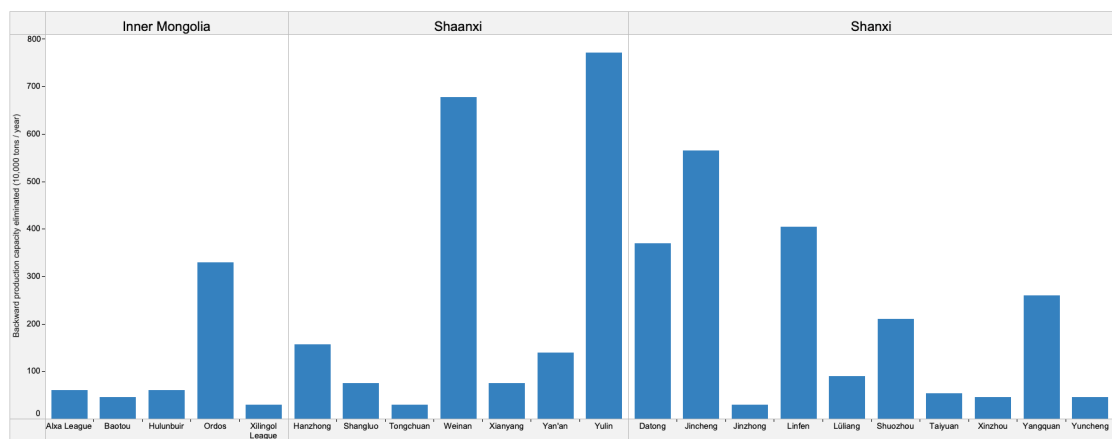


Figure 4. Elimination of backward production capacity of coal mines in Inner Mongolia, Shaanxi, and Shanxi

Source: www.coalchina.org.cn, People's Government of Shaanxi Province and People's Government of Inner Mongolia Autonomous Region

Coal consumption

In 2020, China's total energy consumption was 4.98 billion tons of standard coal equivalent, up 2.2% over the previous year. Coal consumption increased by 0.6%, and coal consumption accounted for 56.8% of total energy consumption, down 0.9% from the previous year.

1. Continuous decline of proportion of coal consumption

From 2018 to 2020, the proportion of domestic coal consumption to primary energy consumption continued to decline from 59% to 56.8%. Coal consumption showed a sustained rebound, but did not surpass the peak of total coal consumption in 2013 (see Figure 5).

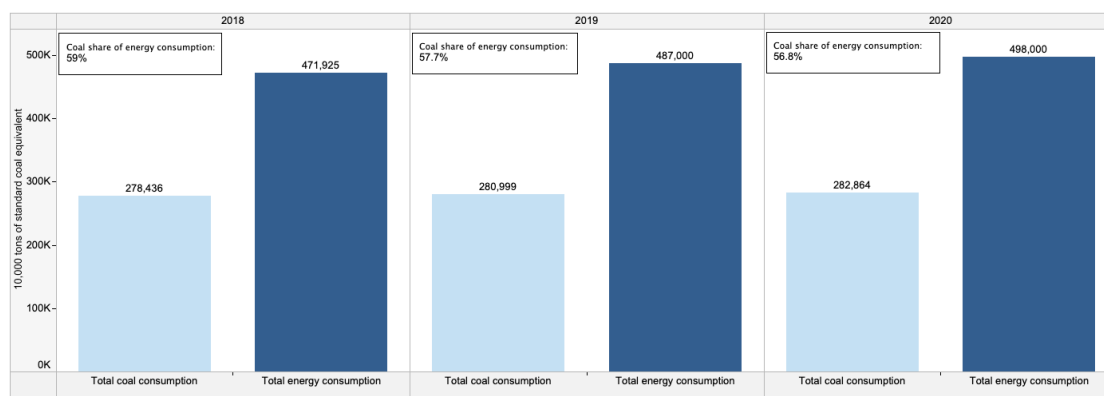


Figure 5. Coal share of energy consumption

Data source: National Bureau of Statistics

2. Stable coal import

China imported about 304 million tons of coal in 2020. The regulation over imported coal was strengthened due to the impact of COVID-19. As a result, the import volume increased slightly by 1.5% year on year, and the growth rate decreased by 4.8% compared with that in 2019. According to the statistics since 2018, the amount of coal imported by China has been stable at about 300 million tons, accounting for only 7% of the domestic raw coal supply, which has a limited impact on the overall supply. Demand for imported coal was low due to China's strict epidemic control and overseas epidemic spread. The price of imported coal was very favorable. As of December 2020, data shows that, CCI 5500 Import (tax included) thermal coal price index was nearly CNY 300 / ton lower than CCI 5500 Domestic (tax included) thermal coal price index. It is predicted that the price of imported coal will be less competitive with the recovery of the global economy. Under the backdrop of import intervention policies, coal imports will remain stable.

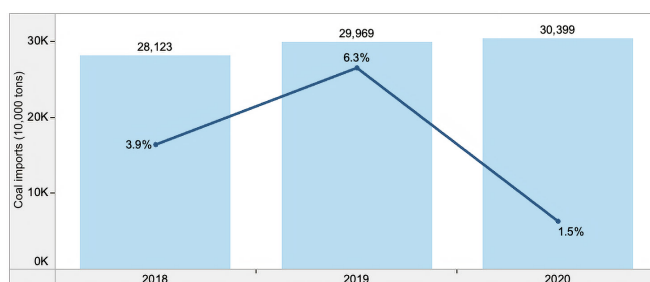


Figure 6. China coal imports, 2018-2020

Source: Coal Industry Research Report 2020 and Qianzhan Database (d.qianzhan.com)

3. Increase in the proportion of coal consumption in major industries

National coal consumption in 2020 was mainly in the industries of power, iron and steel, building materials, and chemical, with year-on-year growths of 0.8%, 3.3%, 0.2%, and 1.3% respectively, compared with those of 2019. Overall coal consumption in other industries decreased by 4.6%, compared with that of the previous year. Coal consumption in power and heat supply industry amounted to nearly 60% of total domestic coal consumption.

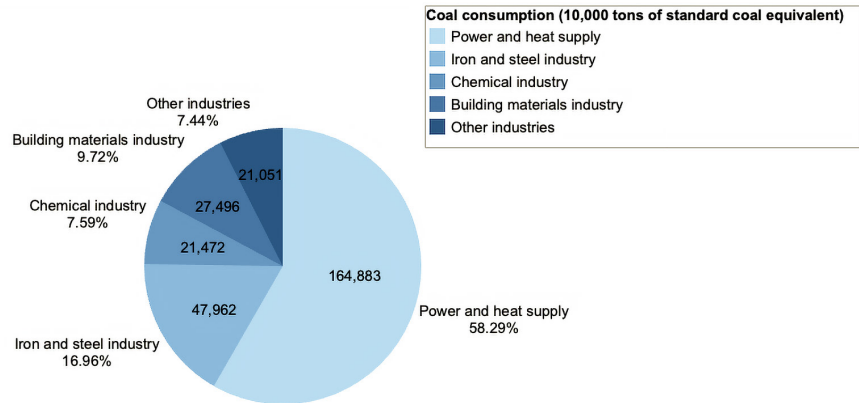


Figure 7. Coal consumption by sectors, 2019

Source: Coal Industry Research Report 2020 and China Energy Big Data Report (2020) - Coal

Coal-fired power generator

In 2020, with the impact of COVID-19, the installed capacity nationwide increased from 1.5 billion kW at the end of 2015 to 2.2 billion kW at the end of 2020, with an average annual growth of 7.6%. The results were more than the 2020 target of "national installed capacity of 2 billion kW with an average annual growth of 5.5%". By the end of 2020, domestic installed capacity of hydropower generators was 370 million kW, nuclear power generators 49.89 million kW, grid-connected wind power generators 280 million kW, grid-connected solar power generators 250 million kW, and thermal power generators 1.25 billion kW. The installed capacity of full-caliber coal-fired power generators reached 1.08 billion kW, accounting for 84.6% of the total installed capacity of thermal power generators (China Electricity Council, 2021).

1. Decreased proportion of installed capacity of coal-fired power generators to lower than 50%

The domestic installed capacity of coal-fired power generators has grown from 755 million kW in 2012 to about 1.08 billion kW in 2020, with an average annual growth of about 3.7%. Meanwhile, the domestic installed capacity of clean energy power generators has grown from 389 million kW in 2012 to about 1.106 billion kW in 2020, with an average annual growth of 13%. In 2020, the installed capacity of coal-fired power generators in China accounted for 49.1% of the total installed capacity, a record low of below 50% for the first time.

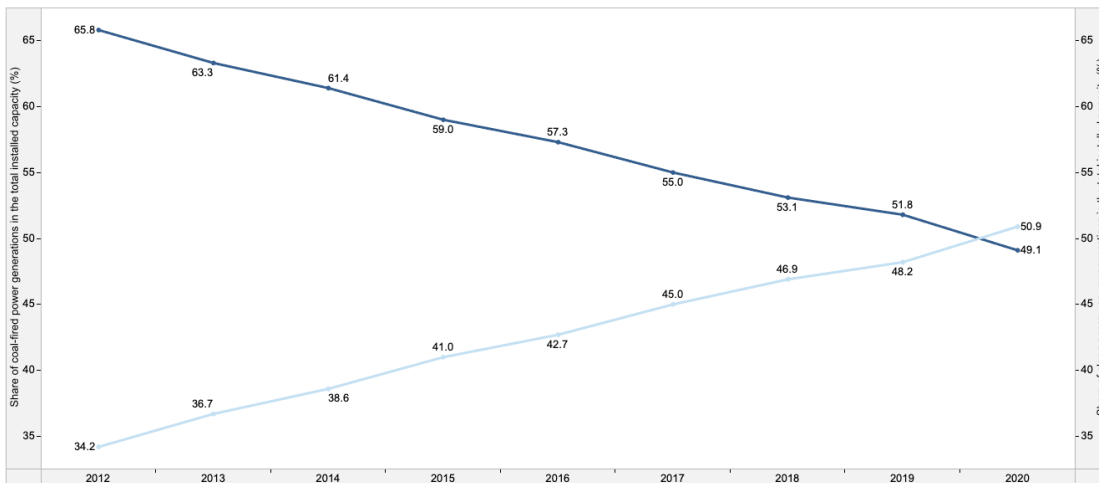


Figure 8. Share of coal-fired power generations and clean energy power generations in the total installed capacity

Source: China Electricity Council

2. Substantial increase of installed capacity of new coal-fired power generation projects

According to the data of Programme of Energy and Climate Economics at Renmin University of China (PECE), after COVID-19, 72 projects with an installed capacity of more than 86 GW are under planning, licensing, or licensing preparation due to the ease of risk warning in the planning and construction of coal-fired power generation projects, among which the installed capacity in projects related to UHV transmission is about 31.2 GW. In 2020, local Development and Reform Commissions approved coal-fired power generation projects with a total installed capacity of 46.1 GW, 3 times of the total approved amount in 2019. In terms of investment entities, the investors of new coal-fired power generation projects in 2020 focused mainly on local power companies. The new record of installed capacity of coal-fired power generation projects in 2020 was mainly driven by the ease of risk warning in the planning and construction of coal-fired power generation projects and economic recovery policies. Since the delegation of approval for coal-fired power generation projects in 2015, local companies have been enthusiastic about new coal-fired power generation projects. For local governments, they promote these projects for more tax revenue, realization of local resources, and power supply for the development of local high energy-consuming industries. Every year since 2016, the National Energy Administration has released the 3-year planning and construction risk warning regarding coal-fired power generation projects. It has eased the coal-fired power generation risk warning mechanism since the late period of the 13th Five-Year Plan. In its *Risk Warning on 2023 Coal-fired Power Generation Planning and Construction* released in February 2020, only Shanxi, Gansu and Ningxia were marked as high risk under the warning index for installed capacity abundance of coal-fired power generators. At the same time, to mitigate the impact of COVID-19 on the national economy, the central and local governments have taken a number of measures to promote economic recovery. From the macro perspective, economic recovery policies have also promised to reduce interest rates for long-term loans and support for key projects, thus promoting the economic efficiency of new coal-fired power generation projects.

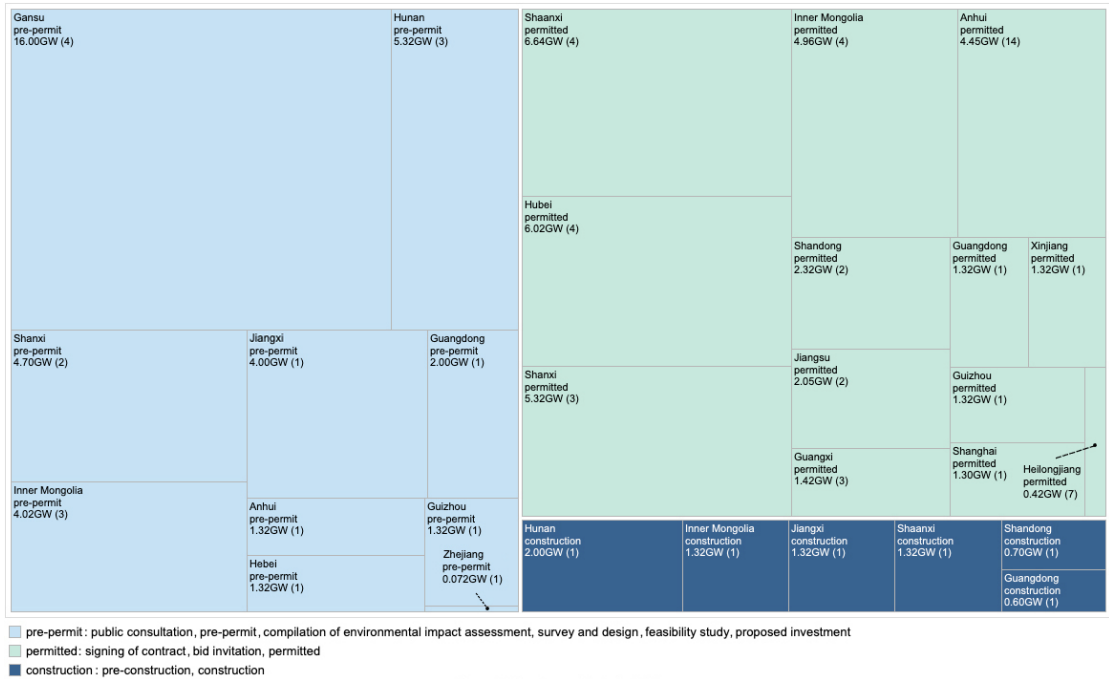


Figure 9. New Power Plants in 2020

Source: Programme of Energy and Climate Economics at Renmin University of China (PECE)

3. Remarkable trend towards scale expansion of coal-fired electric generating units

To satisfy the function transformation of coal-fired power in the new era, China's coal-fired power industry strives for high-quality development and is powered by scientific and technological innovation and technical progress. By the end of 2020, based on the analysis of 2,880 coal-fired electric generating units in 29 provinces in China (excluding Beijing and Tibet) collected from Programme of Energy and Climate Economics at Renmin University of China (PECE) (the total installed capacity was about 1,003 million kW; Beijing shut down all coal-fired electric generating units in 2017, and Tibet was faced with data deficiency), coal-fired electric generating units with a capacity of over 600,000 kW mounted up to more than 50% of all units in 16 provinces, among which, coal-fired generating units with a capacity of over 1 million kW accounted for more than 10% in 15 provinces. On the other hand, only 6 provinces had more than 10% of coal-fired electric generating units with a capacity less than 200,000 kW, of which Heilongjiang and Jilin had more than 20% of them, with a capacity of less than 300,000 kW. In 2020, 52% of the coal-fired electric generating units in new projects under approval/review/construction featured a capacity of more than 1 million kW, and 50% of them featured over 600,000 kW in 17 provinces.

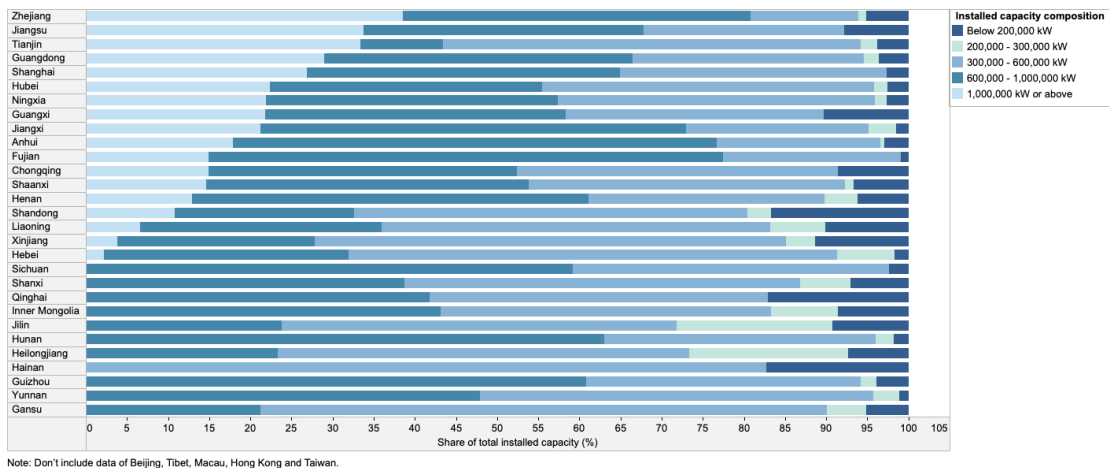
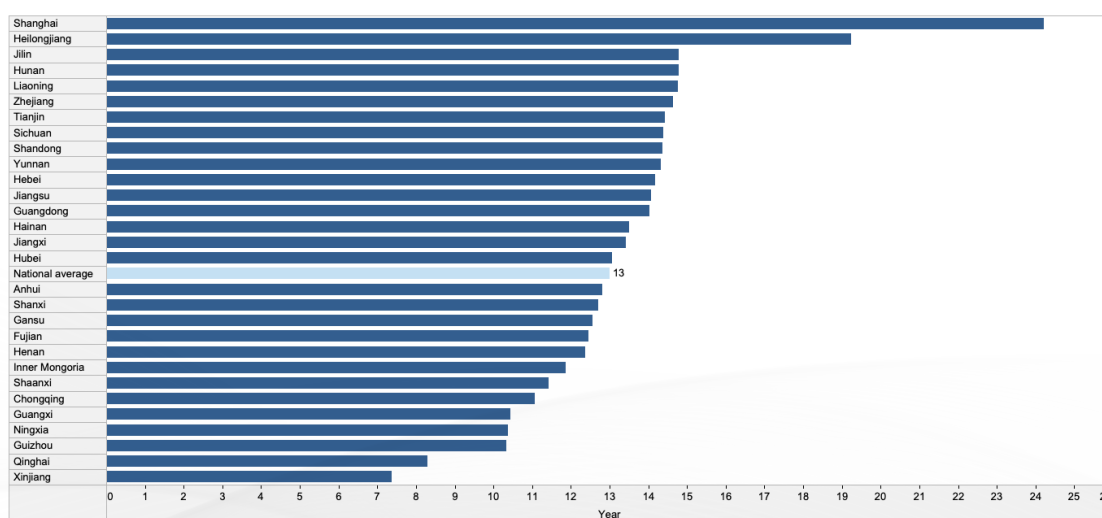


Figure 10. Installed capacity composition of existing coal-fired power units

Source: Programme of Energy and Climate Economics at Renmin University of China (PECE)

4. Short average service life of coal-fired electric generating units

According to the *Research on the Flexible Operation and Life Extension of Coal-fired Generating Unit* developed by China Electricity Council, the designed life of thermal power generating units in western countries is generally 30 years, while the service life of foreign coal-fired electric generating units is generally longer than the designed life, and the longest service life is 52 years. The average service life of the units in operating power plants nationwide was 13.1 years by the end of 2020, only half of the global average. The short service life of these units was mainly the result of fierce market competition, excessive capacity reduction, construction of units with larger capacity and shut down of units with small capacity. By region, only power plants in Shanghai had an average service life of over 20 years. In old industrial cities like Heilongjiang, Jilin and Liaoning, the average service life of power plants was all above 15 years. In the northwest region, the average service life of power plants was below 11 years.



Note: Don't include data of Beijing, Tibet, Macau, Hong Kong and Taiwan.

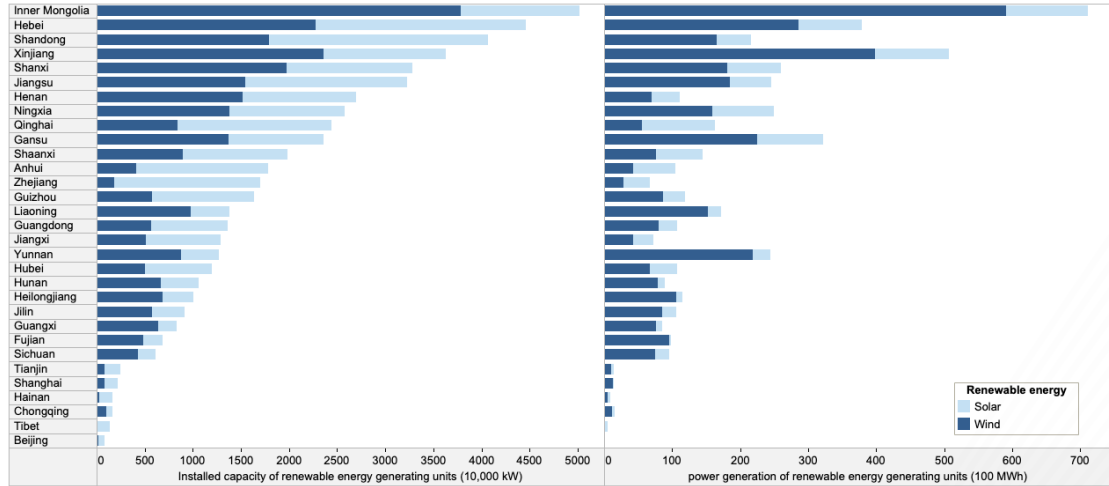
Figure 11. Average service life of coal-fired power plants

Source: Programme of Energy and Climate Economics at Renmin University of China (PECE)

5. Transition of new energy as main power supply

New energy became the main source of new power generating units in 2020. The installed capacity of grid-connected wind power and solar power generators totaled up to 71.67 million kW and 48.2 million kW, respectively. They collectively amounted to 62.8% of the total new installed capacity in 2020, becoming the main force of increased capacity for 4 consecutive years. The installed capacity of grid-connected wind power generating units nationwide reached 281.53 million kW, up 34.6% year on year and accounting for 12.79% of the total installed capacity. The top 10 provinces in terms of installed capacity of wind power generating units in China were: Inner Mongolia, 37.86 million kW; Xinjiang, 23.61 million kW; Hebei, 22.74 million kW; Shanxi, 19.74 million kW; Shandong, 17.95 million kW; Jiangsu, 15.47 million kW; Henan, 15.18 million kW; Ningxia, 13.77 million kW; Gansu, 13.73 million kW and Liaoning, 9.81 million kW. In 2020, the installed capacity of grid-connected solar power generating units nationwide reached 253.43 million kW, up 24.1% year on year, accounting for 11.52% of the total installed capacity. The installed capacity of distributed photovoltaic power generating units was 78.31 million kW, equal to 30.9% of the total photovoltaic power generating units. The top 10 provinces in terms of installed capacity of solar power generating units in China were: Shandong, 22.72 million kW; Hebei, 21.9

million kW; Jiangsu, 16.84 million kW; Qinghai, 16.01 million kW; Zhejiang, 15.17 million kW; Anhui, 13.7 million kW; Shanxi, 13.09 million kW; Xinjiang, 12.66 million kW; Inner Mongolia, 12.37 million kW and Ningxia, 11.97 million kW.



Note: Don't include data of Macau, Hong Kong and Taiwan.

Figure 12. Installed capacity and power generation of renewable energy

Source: National New Energy Consumption Monitoring and Early Warning Center

Coal-related CO₂ emissions

1. Total quantity and proportion of coal-related CO₂ emissions

China has no official statistics on coal-related CO₂ emissions. According to IPCC emission factors, 2.66-2.72 tons of CO₂ is emitted per ton of standard coal equivalent, which was the basis for the estimation of coal-related emissions in 2018-2020. Even though we are at a critical time of reforming the coal industry structure and achieving "CO₂ emissions peak" by 2030, with the increase of actual coal consumption, the conservative estimate of carbon dioxide emissions from coal consumption was above 7.5 billion tons in 2020. The proportion of coal-related CO₂ emissions was on a stale decrease up to 2000 and dropped to 75.8% of the total emissions by 2020. However, coal-related CO₂ emission is still the main source of CO₂ emissions in China.

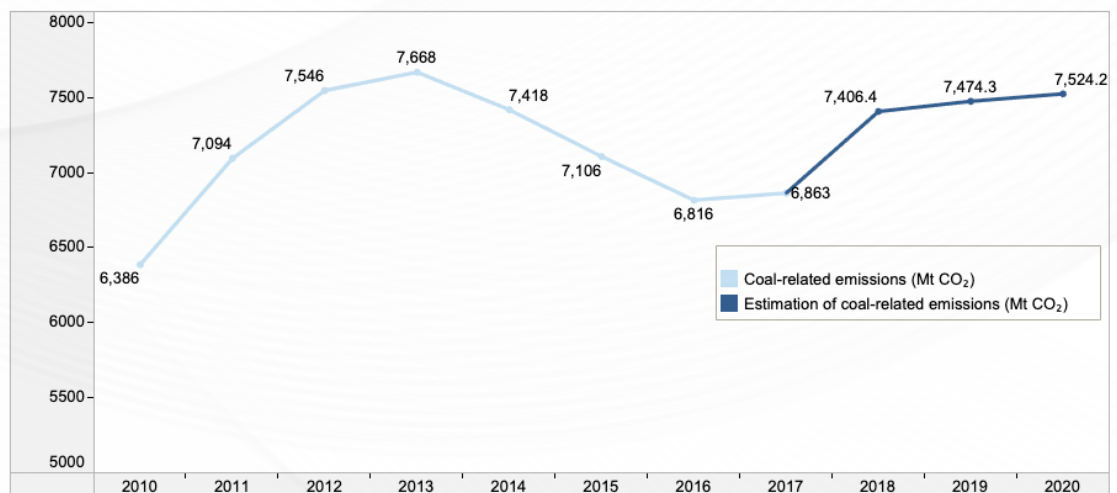
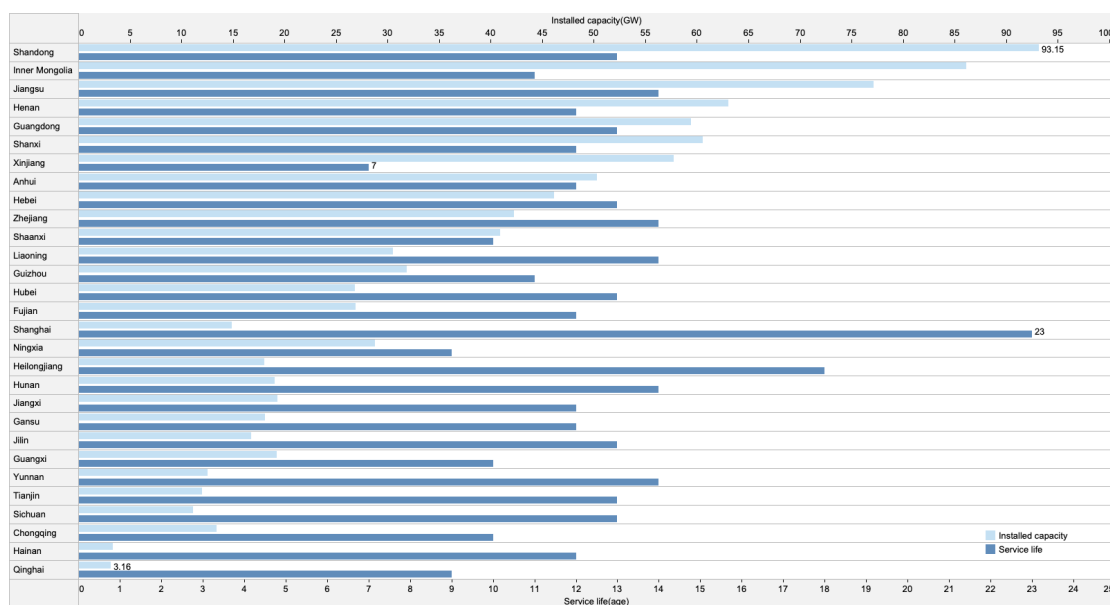


Figure 13. Coal-related CO₂ emissions, 2010-2020

Source: Global Infrastructure Emissions Database

2. Distribution of committed emissions of coal-fired electric generating units

The average design service life of coal-fired electric generating units is about 30 years. These units produce a large amount of committed emission during operation, resulting high carbon lock-in, which will affect the realization of China's future emission reduction target and low-carbon transition. In terms of the capacity distribution of operating power plants in provinces, Inner Mongolia, Xinjiang and Shandong have units with large installed capacity, and are the main emission areas in the future. In terms of the service life of operating power plants in provinces, coal-fired electric generating units in Xinjiang, Ningxia and Qinghai have just served for a relatively short time. Those units will generate long-term committed emissions, and are subject to greater risk of stranded assets.



Note: Don't include data of Beijing, Tibet, Macau, Hong Kong and Taiwan.

Figure 14. Installed capacity and service life of coal-fired electric generating units

Source: Programme of Energy and Climate Economics at Renmin University of China (PECE)

Development Trend of Coal Industry

CO₂ emissions peak and carbon neutrality

President Xi Jinping stressed at many international joint conferences and global climate conferences in 2020 that China would increase its nationally determined contributions, and strive to have CO₂ emissions peak by 2030 and carbon neutrality by 2060. Under the target of CO₂ emissions peak and carbon neutrality, the proportion of non-fossil energy to primary energy shall be increased from 20% to 25% by 2030. The cumulative installed capacity of wind power and photovoltaic power generating units shall reach over 1.2 billion kW. The amount of electricity generated by renewable energy sources including wind power and photovoltaic power shall be substantially increased. When presiding over the 9th meeting of the Central Committee for Financial and Economic Affairs on March 15, 2021, General Secretary Xi Jinping first proposed to build a new type of power system with new energy as the main source. Xi said at the Leaders Summit on Climate on April 22 that China would strictly control coal-fired power generating projects, curb the growth of coal consumption during the 14th Five-year Plan period and gradually reduce coal consumption during the 15th Five-year Plan period. On May 26, Han Zheng, a member of the Standing Committee of the Political Bureau of the Communist Party of China and Vice Premier of the State Council, presided over the first plenary meeting of the leading group on CO₂ emissions peak and carbon neutrality. Han pointed out that the leading group shall play a coordinating role, specify responsibilities of local governments, and give full play to the leading role of state-owned enterprises, especially central enterprises, to ensure the implementation of decisions and arrangements made by the CPC Central Committee.

1. Various development plans for coal industry for the 14th Five-Year Plan

In March 2021, the *Outline of the 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives Through the Year 2035* was approved in the fourth plenary session of the 13th National People's Congress. The outline clarified the mission of pushing forward the energy reform to establish a clean and low-carbon energy mix featuring safety and high efficiency. Efforts should be made to control the quantity and scale of coal mining to integrate the mining and use of energy and resource and restore the ecosystem of mine. Capacity construction of coal reserves is expected to improve to meet the essential needs of coal, petroleum, and natural gas demand by domestic supply and to stabilize electricity supply. Pool coal in resource-rich regions to pace the development of coal-fired power generation plants and replace coal with electricity and promote flexible transformation for coal-fired plants.

At present, the National Development and Reform Commission (NDRC) is drawing up an action plan for carbon emissions to peak by 2030 in the fields and industries regarding electricity, steel, non-ferrous metal, petrochemical, building materials, construction, transportation. It is necessary to take active steps to draft the security plan to tackle obstacles in developing green low-carbon technology and to consolidate the carbon sequestration capability with a clear timetable, roadmap, and working plan towards the goals of achieving CO₂ emissions peak and carbon neutrality.

On March 18, Zhao Penggao, Deputy Director of Department of Resource Conservation and Environmental Protection of the National Development and Reform Commission (NDRC), presided over the symposium to strengthen top-level design for achieving CO₂ emissions peak and carbon neutrality to implement the decisions and plans of the Party Central Committee and the State Council. Experts attending the meeting suggested that we should speed up the top-design policies to raise public awareness. The policies should prioritize key missions in realizing CO₂ emissions peak and carbon neutrality, set phased objectives supported by scientific evidence, and elaborate basic principles, directions, and tasks of implementation. In order to fulfill the two goals as planned, accountability of different industries and local authorities should be clear cut and the "1+N" policy system should be established. On June 9, Zhao Penggao, Deputy Director of Department of Resource Conservation and Environmental Protection of NDRC, hosted the meeting in Hangzhou, Zhejiang. The meeting focused on achieving CO₂ emissions peak and carbon neutrality in pilot regions. The conference stressed two missions of controlling the volume and intensity of energy consumption and curbing the development of high-pollution and high-consumption projects. By doing so, we expect to meet the goal of reducing energy intensity by 3% by the end of this year and yield substantial results in all aspects. On June 16, Zhao Penggao, Deputy Director of Department of Resource Conservation and Environmental Protection of NDRC, hosted the meeting in Beijing. The meeting focused on achieving CO₂ emissions peak and carbon neutrality in pilot regions. The meeting urged local governments over the issue of establishing the coordination mechanism of achieving peak carbon dioxide emissions and carbon neutrality. Efforts should be made in consolidating the formulation of statistical accounting standards for carbon emission, studying major issues and accelerating to build up the "1+N" policy system. Work should be continued in promoting the key areas, such as energy, industry, urban-rural construction and transportation and improving information reporting, delivery and sharing system to safeguard a good start for achieving peak carbon dioxide emissions and carbon neutrality.

Local authorities are determined to take solid efforts in achieving peak carbon dioxide emissions and carbon neutrality by formulating action plans for achieving CO₂ emissions peak by 2030. The industrial structure and energy mix will be improved. While promoting the clean and efficient use of coal, local governments should make a major push to develop new energy sources. Guangxi proposed to develop clean coal-fired power generation plants in a moderate approach; Yunnan offered to construct coal plant integration base to debunk the structural conflict in electricity; Shaanxi planned to adjust and optimize the coal-fired power generation plants layout and take active action in tapping into wind power, photovoltaic power and biomass; Guizhou put forward to renovate and upgrade the coal power generator and phase out unqualified units in consumption and emission; Tianjin would continue to reduce total coal consumption and improve energy mix; Hunan proposed to establish energy reserve base of coal, petroleum and natural gas; Inner Mongolia was determined to strictly control the intensity of coal mining, enhance the clean production and efficient mining of coal industry and promote graded, quality-based and cascaded utilization of coal. And to set demonstration application combing carbon capture, storage and utilization; Shanxi responded to promote the clean and efficient use of coal, accelerate smart green mining and promote graded, quality-based and cascaded utilization of coal. They regarded the new carbon-based materials as the sustainable development path of the coal industry and substantially increased the proportion of coal used as raw materials and processed materials; Ningxia intended to tap the coal resources in a proper way; Jiangsu offered to optimize the energy mix and reduce coal utilization as the national plan. Local governments held different attitudes towards the coal industry development based on their development philosophy. Provinces relying on the coal industry still take coal as the major resource for development, hence propose measures to clean use, layout optimization, structure improvement and stock vitalization, which poorly demonstrate their resolve to realize industrial transformation. Since the 14th Five-Year Plan is projected to be completed before a series of important directions on achieving CO₂ emissions peak and carbon neutrality from the Central Committee, the requirements of the latest policies are not fully reflected to some extent. It is expected that more provincial governments take more measures in action plans for carbon peak and special development plans for energy.

2. Development goals of large energy groups

To realize the goals of achieving CO₂ emissions peak and carbon neutrality, state-owned enterprises (SOEs) in energy sector drafted development blueprints with the tension of competition. The plan focuses on the goal of new energy installed capacity and its proportion in the energy mix. With the aim to transfer the role of coal from main supply to supporting supply, its installed capacity in the future will drop rapidly. China Energy set the goal of achieving CO₂ emissions peak by 2025. Integrated development of wind, solar, and coal by properly utilizing energy storage will be accelerated by establishing several energy integration bases with tens of millions kW capacity. During the 14th Five-Year Plan period, China Energy will stick to the goal of adding 70-80 million kW new energy installed capacity and increasing its proportion to 40%; State Power Investment Corporation Limited (SPIC) proposed to achieve CO₂ emissions peak by 2023. By 2025, its electricity installed capacity is expected to reach 220 million kW with new energy installed capacity proportion climbing to 60%. By 2035, the electricity installed capacity will be further improved to 270 million kW with new energy installed capacity taking up 75%; China Huaneng Group will endeavor to set up three pillars of new energy, nuclear power and hydropower with clean energy accounting for higher proportion and the coal and emissions decreasing. By 2025, the company intends to increase the clean energy installed capacity proportion over the half and decrease the emission intensity by 20% compared with that in the 13th Five-Year Plan; China Huadian Corporation is committed to achieve CO₂ emissions peak by 2025 and plans to close over 3 million kW coal installed capacity in 5 years. Efforts will be made to add 75 million kW new energy installed capacity in the 14th Five-Year Plan period.

3. National Energy Administration's policies on coal industry

In 2021, though the National Energy Administration (NEA) issued a series of policies and notices concerning coal industry, its guidance on the development and positioning of coal industry in the future remains ambiguous.

On one hand, NEA issued the Guiding Opinions on Work in Energy Sector 2021 on April 22, pointing out that against the backdrop of complex changes at home and abroad, energy security risks cannot be overlooked. Tasks are still heavy to implement the goal of achieving CO₂ emissions peak and carbon neutrality and transform to the green and low-carbon development. The guidance set the aim to adjust the energy mix by declining coal consumption under 56%. Totally 200 billion kW alternative power of electricity will be added to increase electricity proportion of end-use energy consumption structure to 28%. Key missions regarding coal industry include: further control coal consumption volume, strengthen the management of scattered coal for civil uses and promote the clean and efficient use of coal, protect ecosystem of coal mine and improve the coal-fired power generation plants layout and installed capacity structure.

Meanwhile, NEA also issued policies to promote the high-quality development of coal industry. On June 5, NEA joining hands with National Mine Safety Administration issued *Guidelines for Intelligent Construction of Coal Mines (2021 Edition)*. Based on the three-phase objectives stated in *Opinions on Accelerating the Intelligent Development of Coal Mine* [FGNY (2020) No.283], the guidelines prioritize missions of making breakthrough in the following key technologies and equipment in intellectual development, including integration platform of the coal mine management and control, fully mechanized top coal caving mining, speedy drilage, main and auxiliary transportation, security monitoring, coal separating plant, and robot. By doing so, a system of intelligent development technology and standard will be formed covering design, construction, assessment and acceptance review to guide the construction of a batch of intelligent coal mines with a variety of types and modes to improve the security level to a higher place. On July 2, NEA issued *Notice on Promoting Approval of Orderly Construction and Production in Coal Mine Projects*, stressing four missions: first, plan to examine and approve a batch of coal mine projects with advanced production capacity in an orderly manner; second, speed up the construction of a batch of approved projects; third, take active action in promoting a batch of constructed projects to production; fourth, continue to create an orderly atmosphere for coal mine projects construction.

Concern on financial risks of coal and coal power enterprises

Recently, influenced by the environmental protection policies and the supply side reform of the coal industry, the overall revenue and profits of the whole industry went downward with fluctuations. According to the National Bureau of Statistics, in 2020, the main business revenue of coal enterprises above designated size in China totals CNY 2.0002 trillion, dropping by 19.3% year on year. The total profit of these enterprises is CNY 222.3 billion, decreasing by 21.7% year on year. Some enterprises were hit by the pandemic in 2020 and were at a record low of the year-on-year growth speed. The scale of losses in the industry remains a record high.

In 2019, the State-owned Assets Supervision and Administration Commission (SASAC) issued *Pilot Measures for the Regional Integration of Central Government State-Owned Enterprises in the Coal-fired Power Generation*. The Measures include provinces and autonomous regions with excess coal power capacity and consecutive losses of coal enterprises into the first batch of pilot regional integration of coal power resources of central enterprises. Statistics show that the coal power industry suffers successive losses on a large scale. By the end of 2018, losses of five central groups reached CNY 37.96 billion, with 54.2% of coal-fired power generation plants running at a loss. The scale of losses in the fossil-fuel power industry stays over 40% after 2019.

Profit and loss of enterprises in the coal industry are rather polarized. In 2020, among the pre-IPO coal enterprises, Shaanxi Heima Coking and Shanxi Coking increased net profits by over 100% year on year. While the net profits of listed enterprises to delist, Anyuan Coal Industry Group, Dayou Energy, and Liaoning Energy dropped over 1,000% year on year. Drawing upon the Yongcheng Coal&Electricity Group (CYMG) incident, many financial institutions no longer take credit bonds as collateral for pledge-style repo. Consequently, the bonds of many coal enterprises were sold off. The shock of this incident has greatly hurt the credit of SOEs. Since the breach of contract by CYMG to the end of 2020, no SOE bonds have been issued in Henan province. Several financial institutions were urged by the National Association of Financial Market Institutional Investors to conduct self-investigation, and related banks and financial intermediaries were under investigation.

Looking into the future, when compared with the 13th Five-Year Plan, the business environment of the coal industry in the 14th Five-Year Plan period is more complex, with more changes and uncertainty in business performance. The time and space for its survival in the future is shortened and squeezed with increasing risks in the system. Featuring with high carbon, the coal power industry is doomed to face a series of challenges in its development space and operation profits during the 14th Five-Year Plan period. The risks are believed to be more severe and acute in more aspects considering the implementation of the two goals.

First, new challenges will emerge in the 14th Five-Year Plan, such as quota constraints on carbon emissions and cost increase. China has launched its national carbon emissions trading market in 2021, with 2,225 power enterprises in the first batch. Gradual measures to reduce the proportion of free quota allocation and raise the carbon price will allow low carbon units with high efficiency to have more quota and increase the emission costs of high carbon units with low efficiency. As a result, the operation cost will increase, and profits margins will be tightened.

Second, the coal power industry takes the lead in replacing "planned electricity" of high profits margins with all electricity on-grid bidding. In 2019, NDRC clarified details, noting that coal-fired power generation with feed-in tariff formed based on market-oriented transaction continues to use the existing market rules; as to other generation qualified to trade in market, its feed-in tariff is set based on "benchmark price + fluctuations" with no rise in fluctuations in 2020; the mechanism of price linkage between coal and electricity is invalid. The change marks the first farewell to the mode of "planned generation with price settled by the government". The fundamental transformation of reducing planned generation and expanding market generation has been completed. With its implementation through the 14th Five-Year Plan period, it is estimated that the overall market trade price will be lower than the benchmark price.

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