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Many thanks to the valuable comments and suggestions of FU Sha, YANG Zhuoxiang and MEI Chengcheng from Energy Foundation China.

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Coal supply and demand

1. Increased production, ensured supply and the quick release of high-quality production capacity

In the third quarter of 2021, electricity supply and demand were tight nationwide. Controlled electricity consumption appeared in many places. In order to ensure the safety and stability of energy and power, the National Development and Reform Commission has reviewed and screened 153 coal mines that meet the requirements of safe production increase and guaranteed supply. These mines are included in the emergency supply list, and listed in the fast track for production capacity verification, which can increase production by 220 million tons per year to ensure coal supply, and the quick release of production capacity. In the fourth quarter, with the promotion of the policy of increasing production and ensuring supply, the high-quality coal production capacity was gradually released, and the production of raw coal turned from decline to increase. According to data from the National Bureau of Statistics, from October to December, the national raw coal production of large scale national industrial above designated size raw coal production was 360 million tons, 370 million tons and 380 million tons respectively, increased 4.0%, 4.6% and 7.2% year-on-year, the first breakthrough of 4% since March. In 2021, the prevention and control of COVID-19 became normal practice, domestic economy are gradually recovering, society has resumed work and production, which brings the increase of electricity consumption and coal demand. The cumulative output of raw coal for the year was 4.07 billion tons, a record high (historical output peak: 3.974 billion tons, 2013), an increase of 4.7% over the previous year, 5.6% over 2019, and an average increase of 2.8% over the two years. The import volume of coal has increased steadily, 320 million tons of coal was imported in 2021, an increase of 6.6% over 2019, reaching a new high since 2013.
The elimination of outdated production capacity continues to advance, the intelligent transformation of coal mines fully launched

By the end of 2021, Inner Mongolia, Guizhou, Guangxi, Hunan, Henan, Sichuan and other provinces have announced the list of coal mines that have been closed or exited or completed the closure of coal mines. Among them, Guizhou completed the closure of 9.45 million tons of coal mines per year, involving 51 coal mines; Inner Mongolia plans to close 6 coal mines, involving a production capacity of 3.3 million tons per year; Henan closed and exited 15 coal mines, involving a production capacity of 2.31 million tons per year; Sichuan closed and exited 5 coal mines, involving a production capacity of 0.59 million tons/year. It is worth noting that in 2021, Chongqing City approved 14 coal mines to be closed in June of that year, with a total production capacity of 11.5 million tons per year, and the coal mining of Chongqing’s state-owned coal mines was withdrawn as a whole[5].

In the context of carbon peaking and carbon neutrality, the coal industry continues to promote supply-side reforms and the elimination of outdated production capacity, and the number of employees in the industry has also declined further with the transformation and development of the industry. After the reduction of overcapacity in the coal industry during the "13th Five-Year Plan", the number of employed persons dropped from about 4.5 million in 2015 to about 2.6 million in March 2020. The 8.656 tons/person in 2020 will increase to 8.786 tons/person.
The center of gravity of coal production has accelerated, and the proportion of large modern coal mines has further increased. In 2021, the layout of national coal intensive development is further optimized. Coal production centers towards advantageous enterprises in areas of Shanxi, Shaanxi, Inner Mongolia and Xinjiang. The annual output of Henan and Shandong fell below 100 million tons, and the 100 million-ton coal-producing provinces decreased from 8 in the previous year to 6, namely Shanxi (1.193 billion tons), Inner Mongolia (1.039 billion tons), and Shaanxi (700 million tons), Xinjiang (320 million tons), Guizhou (131 million tons) and Anhui (113 million tons), the raw coal output of enterprises above designated size in the above six provinces totaled 3.496 billion tons, accounting for 85.9% of the national total production, a year-on-year increase of 6.68%. Among them, the output of Shanxi and Inner Mongolia exceeded 1 billion tons. Since Chongqing's withdrawal from coal mining, the number of coal-producing provinces has reduced to 23 in 2021. There are 11 provinces with an annual output of more than 50 million tons. The number was the same as the previous year, with a total output of 3.89 billion tons, a year-on-year increase of 5.5%. For inter-provincial rankings, except for Henan Province, whose production ranking surpassed Shandong and rose to the seventh place, other provinces stayed the same. The number of provinces with annual production less than 10 million tons increased to 8. According to the Guiding Opinions on Accelerating the Intelligent Development of Coal Mine issued by the National Development and Reform Commission and the National Energy Administration in 2020, by 2025 large coal mines and coal mines with serious disasters will basically reach intelligence; by 2035, all types of coal mines will reach basic intelligence. Under the guidance of the policies, coal enterprises have fully launched the intelligent upgrading and transformation of coal mines. As of the end of 2021, nearly 400 coal mines across the country have started intelligent construction, with a total investment of more than 100 billion yuan. Moreover, the National Energy Administration organized the selection of 71 coal mines for demonstration construction with a cumulative production capacity of 600 million tons per year. The estimated investment is about 15.7 billion yuan. The construction can be completed before 2023, and the intelligent development of coal mines will play a leading and demonstration role.
The market concentration of the coal industry has further increased. In 2021, there are 20 enterprises with raw coal output exceeding 3 million tons nationwide. Among them, 5 enterprises have an output of less than 50 million tons and 1 enterprise has an output of more than 500 million tons. The total raw coal output of the 20 enterprises was 2.656 billion tons, a year-on-year increase of 78.699 million tons or 3.1%, accounting for 65.3% of the national raw coal output. The raw coal output of the top 8 large enterprises was 2.026 billion tons, accounting for 49.1% of the national total, a year-on-year increase of 1.5%. Among them, the raw coal output of enterprises above 100 million tons was 1.84 billion tons, accounting for 44.6% of the national total, a year-on-year increase of 1.5%. The number of coal mines in the country has decreased from about 4,700 in 2020 to less than 4,500, and the output of large coal mines with an annual output of more than 1.2 million tons accounts for about 85% of the country's total, an increase of about 5% over the previous year. Among them, 72 coal mines with an annual output of 10 million tons have been built, with a production capacity of 1.124 billion tons per year, and 24 coal mines with an annual production capacity of 10 million tons are under construction, with a designed production capacity of 300 million tons per year. The proportion of small coal mines with an annual output of less than 300,000 tons in the total production capacity has dropped to about 2%.
In 2021, Shanxi Province has a total of 653 coal mines, with a cumulative production capacity of 1.0604 billion tons per year, including 9 coal mines with an annual output of 10 million tons, with a total production capacity of 133 million tons, accounting for 12.54% of the province's total production capacity; while there are 318 coal mines whose production capacity is below 900,000 tons, with a total production capacity of 253 million tons, accounting for 23.86% of the province's total production capacity. There are 329 coal mines with an annual production capacity of more than 1.2 million tons, with a cumulative production capacity of 801.3 million tons per year, accounting for 75.57%. The distribution of production capacity in Shanxi Province is mainly concentrated in Shuozhou, Changzhi, Lvliang and Jincheng, accounting for 17.63%, 14.68%, 13.18% and 10.50% of production capacity respectively.

In Inner Mongolia, there will be a total of 344 coal mines in 2021, with a cumulative production capacity of 995.35 million tons per year, mainly concentrated in Ordos City, accounting for 67.61% of the total production capacity in the region. There are 206 coal mines with an annual production capacity of more than 1.2 million tons, with a total production capacity of 905.5 million tons per year, accounting for 90.97% of the production capacity in the region. Among them, there are 28 coal mines with an annual production capacity of 10 million tons, with a total production capacity of 399 million tons, accounting for 40.86% of the total production capacity in the region. There are 135 coal mines with a production capacity of less than 900,000 tons, with a total production capacity of 86.85 million tons per year, accounting for 8.73% of the total production capacity of the region. In addition, there are still 6 small coal mines with an annual output of less than 300,000 tons in the autonomous region, accounting for 0.18% of the total production capacity of the region.

In 2021, Shaanxi Province has a total of 370 coal production coal mines, with a total production capacity of 747.35 million tons per year, mainly concentrated in Yulin City, accounting for 74.77% of the province's production capacity. There are 139 coal mines with an annual production capacity of 1.2 million tons or more, with a total production capacity of 614.05 million tons, accounting for 82.16% of the province's total production capacity. Among them, there are 23 coal mines with an annual production capacity of 10 million tons or more, with a total production capacity of 301 million tons, accounting for 40.28%. There are a total of 226 coal mines with an annual output of less than 900,000 tons, with a cumulative production capacity of 128.3 million tons per year, accounting for 17.17% of the total production capacity. Among them, there are 49 small coal mines with an annual production capacity of less than 300,000 tons, with a total production capacity of 14.7 million tons per year, accounting for 2.0%.
4. The coal consumption of thermal power increased year-on-year, and the proportion of coal consumption continued to decline

In 2021, under the macro environment of effective prevention and control of the epidemic and the continued recovery of the domestic economy, the demand for energy grew rapidly, and the growth rate of energy consumption dropped quarter by quarter. In 2021, the total national energy consumption reached 5.24 billion tons of standard coal, a year-on-year increase of 5.2%. Among them, coal consumption increased by 4.6% year-on-year, accounting for 56.0% of the total energy consumption, a decrease of 0.9% from the previous year. Although the proportion has declined, coal is still the main energy source in China. In 2021, the national coal consumption will be 4.27 billion tons, a year-on-year increase of 5%, equivalent to 2.934 billion tons of standard coal, reaching a new peak.
From a quarterly perspective, affected by factors such as economic recovery and the increase in the base during the same period, the national coal consumption grew rapidly in the first quarter, with a monthly growth rate of more than 15%; the economy continued to pick up in the second and third quarters, and coal consumption continued to grow. In addition to the decline in August, they all showed positive year-on-year growth; since the fourth quarter, due to the influence of dual-controls of energy consumption and resolutely curbing the blind development of "dual high" projects, the downstream demand for coal has shrunk.

From the perspective of major coal-consuming industries, the largest downstream demand for coal is still the power generation industry. From November to December, thermal power generation saw a year-on-year negative growth of -2.5% and -4.9%, respectively, and the demand for coal consumption has declined. In 2021, the national thermal power generation increased by 8.9% year-on-year, becoming the main driving force for the growth of coal consumption. In 2021, thermal coal consumption reached 2.42 billion tons, a year-on-year increase of 8.9%, accounting for 56.7% of the total coal consumption, a year-on-year increase of 2 percentage points. In terms of non-power industries, affected by factors such as staggered peak production, the growth rate of non-power industries slowed down in the fourth quarter, mostly showing a negative growth trend, and the coal consumption side's support for the market weakened. The output of major products in the iron and steel and building materials industries have gradually declined from the high growth at the beginning of the year, showing a negative growth trend, and the annual coal consumption has declined year-on-year. In 2021, the steel industry consumed 670 million tons of coal, a year-on-year decrease of 1.9%; the building materials industry consumed 550 million tons of coal, a year-on-year increase of 1.1%. The coal consumption of iron and steel and building materials accounted for 15.6% and 12.8% respectively, seeing 1.1 percentage points and 0.5 percentage points down from the same period last year. The year-on-year growth of raw material coal used in the chemical industry stayed the same, with an annual coal consumption of 310 million tons, a year-on-year increase of 3.6%, and coal consumption accounted for 7.2%, a decrease of 0.1% from the same period last year.\[11\].
Since 2016, the total coal consumption in China has continued to grow, mainly concentrated in thermal coal and coking coal consumption. In the short foreseeable future, coal is still the main energy-consuming product. In the context of carbon peaking and carbon neutrality, a consensus has been formed to gradually reduce dependence on fossil energy, but China currently has no official statistics on coal-related CO\(_2\) emissions. According to estimates, about 70% of carbon emissions come from coal, and China's total coal-related carbon emissions will reach about 7.8 billion tons in 2021, a significant increase from 2020.
Effective regulation leads to the fall of coal prices

Since March 2021, coal related accidents have occurred frequently, local safety and environmental protection supervision has been intensified, coupled with the recovery of the domestic economy after the pandemic, industrial electricity demand remained strong. The coal supply and demand gap has widened, resulting in a continuous rise in thermal coal prices. In mid-October 5,000 Kcal thermal coal price rose to 2,342.5 yuan/ton, reaching a peak record in history[12]. The shortage of thermal coal is severe, and the inventory of coal and power enterprises faces shortage, which influenced the normal operation of the national economy. Coal prices could not function as a market signal, and multiple state departments have carried out intensive policy control to promote the release of coal production capacity. In late October, thermal coal prices began to drop significantly. At the end of 2021, the CECI coastal index (5,000 Kcal), CECI coastal index (5,500 Kcal) and CECI import index were 768 yuan/ton, 848 yuan/ton and 1,410 yuan/ton respectively, an increase of 22.0%, 22.3% and 108.9% compared to the beginning of the year; doubled down from the peak price and gradually returned to a reasonable level. In terms of futures prices, the annual average price of thermal coal mid-long-term contracts (5,500 Kcal water coal) in 2021 is 648 yuan/ton, increased 105 yuan/ton year on year, which remained relatively stable, functioning as a bedrock for ensuring supply and stabilizing prices[8].

![Figure 7 China Electricity Coal Index, Jan-Dec 2021](Source: China Electricity Council)
In 2021, affected by the high overseas energy prices and the limited expansion of domestic supply, coal prices changed in an abnormal manner. The profits of the domestic coal industry also ushered in a substantial increase. According to the data from the National Bureau of Statistics, in 2021, the mining industry realized an operating income of 5,704.87 billion yuan, a year-on-year increase of 41.9%; the total profit will be 1,039.08 billion yuan, an increase of 1.91 times compared with the previous year; the coal mining and washing industry realized an operating income of 3,289.66 billion yuan, a year-on-year increase of 58.3%; the total profit was 702.31 billion yuan, an increase of 212.7%\[^{13}\]. Looking at the main coal producing areas, the economic contribution of the coal industry to each province is different. In 2021, the added value of industries above designated size in Shanxi Province will increase by 12.7% year-on-year, of which the added value of the coal industry will increase by 11.2% year-on-year\[^{14}\]. In Inner Mongolia Autonomous Region, the growth rate of the industrial added value above the designated size reached 6.0%, while the added value of the coal industry increased by 2.1% year-on-year, accounting for 42.3% of the added value of the industrial added value above the designated size\[^{15}\]. The added value of the coal mining and washing industry in Shaanxi Province increased by 5.2%, which was lower than the 7.6% growth rate of the province's industrial added value\[^{16}\].

While high coal prices have brought huge profits to coal companies, coal-fired power generation companies have seen severe lose. According to the rough calculation of the China Electricity Council, the coal power sector of large power generation groups has seen an overall loss in 2021, and some enterprises even reached a loss rate of 100% from August to November\[^{19}\]. At the end of the year, the loss was still as high as 80% and more. The national coal power enterprises lost more than 300 billion yuan, of which the coal-fired power generation sector of the five major power generation groups lost 108.3 billion yuan\[^{17}\].
Electricity supply and demand

1. The installed capacity of non-fossil energy power generation surpassed coal power for the first time

In the fourth quarter, the growth rate of power production gradually slowed down, with a total power generation of 2.02 trillion kWh. The cumulative annual power generation was 8.38 trillion kWh, a year-on-year increase of 9.8%. In 2021, the full-caliber thermal power generation generated 5.64 trillion kWh, accounting for 67.33% of the full-caliber total power generation, an increase of 91% over the previous year; among them, coal-fired power generation is 5.03 trillion kWh, an increase of 8.6 units over the previous year, accounting for 60.0% of the total power generation of full-caliber, a decrease of 0.7% over the previous year. However, due to factors such as less precipitation in major river basins during the flood season, the hydropower generation capacity was down 1.1% at 134 million kWh; wind power and solar power were 656 million kWh and 327 million kWh, a year-on-year increase of 40.5% and 25.2% respectively. Nuclear power generation reached 41 million kWh, a year-on-year increase of 11.3%.

Source: China Electricity Council
In 2021, the national installed capacity of full-caliber power generation reached 2.38 billion kW, an increase of 7.9% over the previous year. Among them, the thermal power installed capacity was 1.30 billion kW, and the coal power installed capacity was 1.11 billion kW, an increase of 2.8% over the previous year, accounting for 46.7% of the total installed capacity. The installed hydropower capacity is about 390 million kW, including 350 million kW of conventional hydropower and 36.39 million kW of pumped storage; the installed capacity of wind power is about 330 million kW, including 300 million kW of onshore wind power and 26.39 million kW of offshore wind power; 310 million kW of solar power, including centralized photovoltaics 200 million kW of power generation, 110 million kW of distributed photovoltaics and 570,000 kW of solar thermal power generation. Nuclear power installed capacity was 53.26 million kW. The total installed capacity of non-fossil energy power generation was 1.12 billion kW, a year-on-year increase of 13.4%, accounting for 47.0% of the total, this scale exceeded the proportion of coal power installed capacity for the first time[19].

On provincial data, as of the end of 2021, the top ten provinces with installed wind power capacity in the country are: Inner Mongolia (39.96 million kW), Hebei (25.46 million kW), Xinjiang (24.08 million kW), Jiangsu (22.34 million kW), Shanxi (21.23 million kW), Shandong (19.42 million kW), Henan (18.5 million kW), Gansu (17.25 million kW), Ningxia (14.55 million kW), Guangdong (11.95 million kW). The top ten provinces with photovoltaic installed capacity in the country are: Shandong (33.43 million kW), Hebei (29.21 million kW), Jiangsu (19.16 million kW), Zhejiang (18.42 million kW), Anhui (17.07 million kW), Qinghai (16.32 million kW), Henan (15.56 million kW), Shanxi (14.58 million kW), Inner Mongolia (14.12 million kW), Ningxia (13.84 million kW)[20].
In addition, of the 176.29 million kW newly installed power generation capacity this year, non-fossil energy accounts for 138.09 million kW, 78.3% of the total capacity. 2021 is the last year for the central government to subsidize new grid-connected offshore wind power projects, with an additional 16.9 million kW of grid-connected offshore wind power, hitting a record high. And the capacity of newly installed coal-fired power units decreased significantly, according to statistics from public information, a total of 14 provinces newly installed coal-fired power units, with a cumulative capacity of 26.832 million kW, a decrease of 13.468 million kW compared with 40.3 million kW in 2020, a year-on-year decrease of 33.42%. In 2021, the newly installed coal-fired power units were mainly concentrated in Shanxi (7.04 million kW), Inner Mongolia (3.34 million kW), Hunan (3 million kW), Guangdong (2.78 million kW), Henan (2 million kW), Jiangxi (2 million kW) and other provinces, with a total capacity of 20.16 million kW, accounting for 75.13% of the total newly installed coal-fired power capacity. In terms of investment in power engineering, in 2021, the key investigation enterprises have an investment of 1,048.1 billion yuan in electric power, a year-on-year increase of 2.9%, including 495.1 billion yuan in power grid investment and 553 billion yuan in power supply, an increase of 1.1% and 4.5% respectively. Among them, the non-fossil energy power generation investment accounted for 88.6% of the power investment.

Figure 10 Installed Capacity of Renewable Energy by Province (10,000 kW)

Source: National New Energy Consumption Monitoring and Early Warning Center, China Electricity Council
Figure 11 Newly Added Coal-fired Power Installed Capacity by Province in 2021

Source: www.bjx.com.cn
2. Electricity consumption

In the fourth quarter of 2021, the total national electricity consumption is 2,147.7 billion kWh. Affected by the base in the same period of the previous year, the electricity consumption in the fourth quarter grew by 3.3% year on year, which was significantly lower than the growth rate of the first three quarters. Under the normalized prevention of COVID-19, the domestic economy has continued recovering, foreign trade exports have grown rapidly. In 2021, the total electricity consumption is 8,312.8 billion kWh, a year-on-year increase of 10.3% and an increase of 14.7% compared with the same period in 2019. In terms of provinces, the average growth rate of 31 provinces in the two years is positive, and the year-on-year growth rate of electricity consumption in 19 provinces exceeds 10%. Among them, the year-on-year growth rates of electricity consumption in Tibet, Qinghai and Hubei reached 22.6%, 15.6% and 15.3% respectively.

In terms of industry, with the further advancement of the rural revitalization strategy, the rural electricity conditions have improved, and the electrification level of the primary industry has gradually improved. The electricity consumption of the primary industry was 102.3 billion kWh, a year-on-year increase of 16.4%, and an average increase of 14.6% in the two years. The electricity consumption of the secondary industry was 5,613.1 billion kWh, a year-on-year increase of 9.1%, and an average increase of 6.4% in the two years. Due to the gradual increase in the base of the same period last year, the year-on-year growth rate of electricity consumption in 2021 has dropped quarter by quarter. The two-year average growth rates of electricity consumption in the secondary industry in each quarter were 7.4%, 7.3%, 6.1%, and 5.4%, respectively. The decline in the growth rate in the third and fourth quarters was greatly affected by the decline in the growth rate of high-energy industry. The national manufacturing electricity consumption was 4,177.8 billion kWh, a year-on-year increase of 9.9%, and the growth rate was 6.8% higher than that of the same period of the previous year. Among them, the electricity consumption of chemical industry, building materials, steel and non-ferrous metals industries was 509.7 billion kWh, 421.1 billion kWh, 636.1 billion kWh and 700.2 billion kWh respectively, totaling 2,267.1 billion kWh, a year-on-year increase of 6.4%. The electricity consumption of the tertiary industry was 1,423.1 billion kWh, a year-on-year increase of 17.8%, and an average increase of 9.5% in the two years. It has basically returned to the level before the pandemic but with structural changes. The domestic electricity consumption of urban and rural residents was 1,174.3 billion kWh, a year-on-year increase of 7.3% and an average growth rate of 7.0% in the two years.
In April 2021, after China proposed "strict control of coal-fired power projects", the approval process for new coal power projects has gradually tightened. According to statistics from SinoCarbon Innovation & Investment Co., Ltd., in 2021, there will be a total of 44 coal-fired power projects under planning, approved and officially replied, with a cumulative installed capacity of 21.408 million kW. Among them, the planned installed capacity of coal-fired power projects is 4 million kW. Approved (pre-approval stage included) projects amounted to 3.297 million kW, and officially replied projects reached 14.111 million kW. From the perspective of unit type, this batch of projects is still dominated by units above 1 million kW, accounting for 65.40%, followed by units of 0.6-1 million kW, accounting for 21.77% of installed capacity. Compared with the 2020 data, the installed capacity of coal-fired power projects approved and promoted in 2021 significantly reduced, down 53.56% year-on-year. After the large-scale power shortage incident across the country, state-owned capital (central enterprises, state-owned enterprises) actively assumed social responsibilities and became the main equity/controlling party for newly promoted coal-fired power projects. In terms of provinces, a total of 12 provinces will promote the approval of coal-fired power projects in 2021. The 44 newly planned, approved and officially replied, coal-fired power projects are mainly concentrated in the central and eastern regions. The cumulative installed capacity of newly promoted coal-fired power units ranks among the top five. The provinces are: Shanxi Province (6.7 million kW), Hubei Province (2.4 million kW), Zhejiang Province (2 million kW), Gansu Province (2 million kW), Shaanxi Province (1.98 million kW), with a cumulative installed capacity of 15.08 million kilowatts, accounting for 70.44%.

Source: www.bjx.com.cn
In addition, in 2021, a total of 17 coal-fired power projects in 11 provinces across the country will start construction, with a cumulative installed capacity of 12.27 million kW; among them, Shaanxi Province will have the highest cumulative installed capacity of construction projects, with a total of 3.32 million kW. Another 58 projects with a total of 32.256 million kW of coal-fired power projects have been put into operation (including trial operation), which are distributed in 16 provinces. Among them, the total number of coal-fired power projects put into operation in Shanxi Province is the highest, with a total of 8.4 million kW. It is worth noting that in the 2023 Coal-fired Power Planning and Construction Risk Warning issued by the National Energy Administration in 2020, Shanxi Province is one of the three provinces with a red warning indicator for coal-fired power installed capacity adequacy (the remaining two provinces are Gansu and Ningxia). In 2021, the role of coal-fired power as an important basic regulatory power source has once again attracted attention, but overall, the tightening of approvals for coal-fired power projects across the country not only reflects the response of local governments to China's commitment to "strictly control coal-fired power projects", but also changes in the positioning and attitude of local governments towards coal-fired power projects.
Policy Trends in the Energy Sector (Oct-Dec)

Improve stable energy supply and ensure clean efficient use of coal

Since August 2021, controlled electricity consumption has been implemented in many places nationwide, which led to social concerns on winter energy supply. On October 18th and 21st, the State-owned Assets Supervision and Administration Commission of the State Council (SASAC) Party Committee held an enlarged meeting and a special meeting to re-deploy and re-arrange the work of central enterprises to further ensure the supply of energy and power this winter and next spring; making arrangements for speeding up the optimization of coal resources, promoting coal-electricity linkage, and enhancing the ability of coal-electricity supply\[24\]. The meeting required coal enterprises to push potential coal mines to release capacity as soon as possible, and central enterprises to actively increase production, expand sales, ensure supply, and regard supply guarantee as the main assessment indicator of this year. Carry out “one-vote veto”, and further promote enterprises to fulfill their responsibilities\[25\]. While ensuring safe and stable supply of energy, policies also indicate that at this stage, the principle of unchanged direction and unabated efforts need to be stick to, making it clear that coal is the bedrock for safe and stable supply of energy in China. Continuous effort needs to be made to promote clean and efficient coal. Utilize and optimize the coal consumption structure to achieve the goal of "carbon peaking and carbon neutrality". Since October 29, the 2021-2022 Autumn and Winter Air Pollution Comprehensive Control Plan and the Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Battle of Pollution Prevention and Control (hereinafter referred to as the Plan and the Opinion) have been successively issued. The Plan proposes to start from the three-key links of industry, energy, and transportation structure adjustment, firmly curb the development of "two high" (energy-intensive and high-emission) projects, actively and steadily promote clean heating in the north, control scattered coal, enlarge coal-fired boilers and kilns elimination and other tasks. All localities are required to complete a total of 3.48 million households of scattered coal replacement before the heating season. Increase the elimination of coal-fired boilers, and steadily promote the shutdown and integration of coal-fired boilers within a heating radius of 30 km of cogeneration units and outdated coal-fired small thermal power plants. By the end of the year, 35 t/h steam coal-fired boilers need to be basically eliminated, and boilers and kilns that use inefficient treatment processes need to be upgraded\[26\]. The Opinions pointed out that under the premise of ensuring energy security, the pace of coal reduction should be accelerated. Coal consumption in Beijing-Tianjin-Hebei and surrounding areas, and the Yangtze River Delta region has dropped by about 10% and 5% respectively; scattered coal in the plains of key
areas has been basically cleared; self-provided power plants are encouraged to be converted into public power plants\[27\]. On the same day, the National Development and Reform Commission and the National Energy Administration issued the Implementation Plan for the Transformation and Upgrading of National Coal-fired Power Units, promoting coal-saving and consumption-reducing transformation, heating transformation, and flexible transformation. For units below 300 g standard coal/kWh, the units that cannot be retrofitted will be phased out and shut down, and will be turned into emergency backup power depending on the situation. During the "14th Five-Year Plan" period, the scale of reconstruction shall not be less than 350 million kW. By the end of 2021, national full-scale thermal power installed capacity shall reach 1.30 billion kW, of which coal-fired power is 1.11 billion kW. Among them, the subcritical unit has an installed capacity of up to 350 million kW, accounting for about 1/3 of the coal-fired units. Due to its low parameters and low steam turbine flow efficiency, the average coal consumption for power supply is generally higher than 330 g standard coal/kWh\[28\], which is much higher than the national average coal consumption of 302.5 g standard coal/kWh in 2021\[29\]. Under the requirement of "modification or stop", to avoid the risk of power supply shortage and asset stranded assets caused by a large number of shutdowns, the comprehensive transformation of subcritical coal-fired units is under enormous pressure. On December 24th, the 2022 National Energy Work Conference was held in Beijing. The conference once again proposed that it is important to adhere to the principle of establishment before breaking down, and make overall plans, focus on the clean and efficient use of coal, and increase the capacity of new energy consumption; on the premise of ensuring safety, optimize the combination of new energy and coal, and promote the withdrawal of traditional energy and the replacement of new energy in an orderly manner\[30\].
Deepen market-oriented reform of coal-fired electricity prices and ensure the safe supply of electricity

To accelerate market-oriented reform of electricity prices, alleviate the current contradictions in coal-fired electricity prices, reasonably divert power generation costs, and ensure the safe and stable supply of electricity, on October 11, the National Development and Reform Commission issued the Notice on Further Deepening Market-Based Reform of On-grid Electricity Prices for Coal-fired Power Generation (hereinafter referred to as the Notice). The Notice clearly states that in principle, all coal-fired power generation will enter the power market, and the on-grid price of all coal-fired power generation will be released in an orderly manner. The original floating range of the coal-fired power generation market transaction price is no more than 10% above, 15% below in principle, which is now expanded to no more and no less than 20%, and the market transaction price of high energy-consuming enterprises is not subject to the 20% increase. In addition, the sales price of electricity in the industrial and commercial catalog is canceled, and promote all industrial and commercial users to enter the electricity market in an orderly manner, and purchase electricity at market prices[31]. The rise in coal prices in 2021 led to losses for coal-fired power companies. After the Notice was issued, some provinces organized the first transactions after the reform. Statistics show that the incremental transaction price in Hubei Province in October reached 499.32 yuan/MWh, an increase of 20% compared to the benchmark price of 416.1 yuan/MWh; Shandong, Jiangsu, and Guizhou also saw an increase in transaction prices in October by nearly 20%[32]. In the announcements of Liaoning, Hubei, Shaanxi, Shanxi, Inner Mongolia, Gansu, Anhui, Shandong and other provinces, the electricity purchase price of high-energy-consuming enterprises is also adjusted to 1.5 times the basic electricity price[33]. The market reaction reflects the urgency and necessity of the reform of on-grid electricity price for coal-fired power generation. The electricity price reform has relieved the operating pressure of coal-fired power companies to a certain extent and stimulated the willingness of power plants to generate electricity[34].
Green finance facilitates carbon peaking and carbon neutrality goals, clean and efficient use of coal gains support

November 8, the People's Bank of China officially created and launched a structural monetary policy tool, the Carbon Emission Reduction Support Tool, and implemented the mechanism of "lending before borrowing" to provide financial support for carbon emission reduction in a steady, orderly, precise, and direct manner\(^{[35]}\). For qualified carbon emission reduction loans issued by national financial institutions to relevant enterprises in key areas of carbon emission reduction through carbon emission reduction support tools, the loan interest rate is roughly the same as the market quotation rate (LPR) of the same-term grade loan. At present, it mainly covers clean energy, energy conservation and environmental protection, carbon emission reduction technology and other fields, with focus on industries with significant emission reduction effects, and requiring financial institutions to publicly disclose information such as loans and carbon emission reductions, which are verified by third-party professional institutions, and supervised by the public. On November 17, the executive meeting of the State Council decided to set up a special re-loan of 200 billion yuan for the clean and efficient utilization of coal to support safe, efficient, green and intelligent coal mining, clean and efficient coal processing, clean and efficient utilization of coal power, clean industrial combustion and clean heating, civil clean heating, comprehensive utilization of coal resources and promote the development and utilization of coalbed methane, a total of seven areas\(^{[36]}\). China's energy structure is biased towards coal. As of 2020, coal-related carbon dioxide emissions account for about 75.8\(^{[37]}\), energy transformation is faced with great pressure. Compared with the carbon emission reduction support tool, this special re-loan is more targeted to the financing needs in the field of clean and efficient utilization of coal, ensuring the accuracy and directness of the use of funds is important for improving energy utilization efficiency and optimizing energy structure. It functions as short- and medium-term tools, combined with the long-term mechanism formed by carbon emission reduction support tools, provide incremental low-cost funds, and become the "dual pillars" to promote green and low-carbon development\(^{[38]}\).
New renewable energy and raw material energy consumption are not included in the total energy consumption control

December 8-10, 2021, the Central Economic Work Conference is held in Beijing to set the development plan for 2022. The conference convey a message that in the new stage of development, it is necessary to understand and grasp the essence of carbon peaking and carbon neutrality, and realize that achieving carbon peaking and carbon neutrality is an inherent requirement to promote high-quality development, but it is impossible to accomplish the task at one stroke; it is necessary to adhere to national overall planning, regard economization as a priority, stick to two-wheel drive, smooth internal and external circulation, and risk prevention\[39\]. The conference pointed out that it is necessary to face the basic condition of coal-centered energy structure, promote clean and efficient use of coal, increase consumption capacity of new energy, and promote the optimal combination of coal and new energy. The conference proposed for the first time that scientific assessment should be carried out. New renewable energy and raw material energy consumption should not be included in the total energy consumption control. The goal of dual-control of energy consumption should create conditions to shift to dual-control of total carbon emissions and intensity. Accelerate the formation of an incentive mechanism for reducing pollution and carbon emission, and prevent simple decomposition\[40\]. Whether new renewable energy is included in the total energy consumption has undergone several stages of adjustment. In 2017, the State Council issued the Comprehensive Work Plan on Energy Conservation and Emission Reduction for "13th Five-Year Plan", which proposed the implementation of dual-control actions on total energy consumption and intensity, and decomposed the targets into regions, industries and key energy-consuming units. In May 2019, the National Development and Reform Commission and the National Energy Administration officially issued the Notice on Establishing and Improving the Renewable Energy Power Consumption Guarantee Mechanism, which for the first time clarified that for the consumption amount corresponding to the completed consumption exceeding the region's consumption responsibility, the exceeding part is not included in the "dual-control of energy consumption" assessment. In August 2019, at the fifth meeting of the Central Finance and Economics Committee, General Secretary Xi Jinping demanded that there should be appropriate flexibility in the control of total energy consumption in areas that meet the energy intensity standards and develop rapidly. At the end of 2020, General Secretary Xi Jinping proposed to improve the dual-control system of energy consumption at the Central Economic Work Conference\[41\].
In the post-pandemic era, China’s economic growth has recovered rapidly, the total energy consumption has continued to rise, and the pressure on the task of "dual-control" of energy consumption also continues to increase. In September 2021, the National Development and Reform Commission issued the *Completing the Dual-Control Plan for Energy Consumption Intensity and Volume*, which pointed out that for regions that have exceeded the incentive renewable energy power consumption, the exceeding renewable energy consumption will not be included in the total energy consumption and intensity assessment; provinces (including autonomous regions and municipalities) that have exceeded the target of reducing energy consumption intensity are exempted from assessment in the dual-control of energy consumption in the current five-year plan. As an important institutional arrangement for scientific assessment and promoting high-quality development, this policy generated from the Central Economic Work Conference increases the differentiated management and flexibility of dual-control, and increases the fairness and justifiability of energy consumption assessment. It further released the upstream industry production capacity constrained by energy consumption and gave more space for economic growth[12].
Promote energy conservation and emission reduction during the "14th Five-Year Plan"

Since the 11th Five-Year Plan, the State Council has formulated and issued comprehensive work plans for energy conservation and emission reduction in each five-year planning period to promote a comprehensive green transformation of the economy and society. In January 2022, the State Council issued the Comprehensive Work Plan on Energy Conservation and Emission Reduction for "14th Five-Year Plan" (hereinafter referred to as the Plan), which clarified the overall requirements, major goals, key projects, policies, and measures for promoting energy conservation and emission. The Plan provides important support for completing the energy saving and emission reduction targets and steadily advancing carbon neutralization during the "14th Five-Year Plan" period. The Plan not only deploys ten key projects, defines the various tasks to be carried out, but also puts forward target requirements for each key project[43]. The key projects for the clean and efficient utilization of coal require that, based on the national conditions of coal-centered structure, we need to adhere to the principle of "establish before break down", strictly and reasonably control the growth of coal consumption, and promote clean and efficient utilization of coal. The goal is that by 2025, the proportion of non-fossil energy in total energy consumption will reach about 20%. During the "14th Five-Year Plan" period, coal consumption in Beijing-Tianjin-Hebei and surrounding areas and the Yangtze River Delta region decreased by about 10% and 5% respectively, and coal consumption in the Fenwei Plain achieve negative growth. It is worth noting that the Plan proposes major reform ideas and measures in the decomposition of energy consumption dual-control targets. In terms of total energy consumption, reasonable flexibility is allowed. The state no longer sets specific total energy consumption targets and local total targets. All localities can determine the total energy consumption according to the actual local economic growth rate and the reduction target of energy consumption intensity issued by the state. It fully respects local development needs, and highlights the role of total energy consumption as a management tool. At the same time, the Plan further emphasizes strengthening the management of the binding target of reducing energy consumption intensity. Based on energy output rate, comprehensive regional development stage, total energy consumption and functional positioning and other factors, rationally determine regional energy consumption intensity reduction targets. It makes the control target more scientific and motivating, which is conducive to further encouraging localities to improve energy efficiency. The core of this important reform highlights the priority of intensity, taking into account the relevant requirements of regional differences and high-quality development[44].
Coal reduction was written into UNFCCC for the first time after COP26

On November 13, 2021, the 26th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP26) concluded in Glasgow, UK. About 200 parties managed to reach the *Glasgow Climate Agreement*, which clarifies the aim of further reduce greenhouse gas emissions and control global warming within 1.5 degrees Celsius to avoid the catastrophic consequences of climate change. Among all UN climate conferences, COP26 included coal reduction in the climate convention for the first time. The parties reached an important consensus on phasing out coal use, reducing inefficient fossil energy subsidies, and accelerating the expansion of clean energy generation and energy efficiency. In addition, on November 4, the COP26 climate summit also announced an international agreement to accelerate the end of coal use, the goal shifted from "no longer use new coal" to "a complete phase out of coal". A total of 190 countries and organizations agreed to sign the *Statement on the Transition of Global Coal Power to Clean Energy*, and organized the establishment of Powering Past Coal Alliance. Agreeing to a commitment to phase out coal power and end support for new coal plants. During the conference, China and the United States issued the *U.S.-China Joint Glasgow Declaration on Enhancing Climate Action in the 2020s*. China once again announced to the international community that China will gradually reduce coal consumption during the "15th Five-Year Plan" period, and strive to speed up the process. This is another important statement by China after "no new coal power projects overseas" pledge.
The first performance period of the national carbon market successfully concluded

December 31, 2021, the first performance cycle of China’s carbon market ended successfully. On October 26, the Ministry of Ecology and Environment issued the *Notice on Implementing the Payment of Carbon Emission Allowances in the First Performance Cycle of the National Carbon Emissions Trading Market*, requiring relevant departments and units to complete the payment of allowances in a timely manner as required; and clarified that Emission-controlled enterprises can use CCER (National Certified Voluntary Emission Reduction) to offset no more than 5% of carbon emission allowances[^47]. The first batch of 2,162 power generation companies included in the carbon market all have an annual emission of more than 26,000 tons of carbon dioxide or equivalent. Since the carbon market officially started trading on July 16, 2021, it has been running for 114 trading days. The cumulative trading volume of allowances has reached 179 million tons, the cumulative trading turnover has reached 7.661 billion yuan, the average transaction price has reached 42.85 yuan/ton, and the compliance rate has reached 99.5%; the closing price on December 31 was 54.22 yuan/ton, up 13% from the first day; the highest price for the year was 62.29 yuan/ton[^48]. Carbon emission rights trading provides more choices for enterprises to reduce emissions through the trading of carbon allowances, and reduces the cost of emission reduction for the whole society. It is a market-oriented means to control greenhouse gas emissions. The experience of the power generation industry in the stable operation of the carbon market will lay the foundation for the subsequent expansion of the industries covered by the carbon market[^49]. The authenticity and reliability of carbon emission data is an important basis for the stable operation of the carbon market and the steady implementation of the carbon peaking and carbon neutrality goals. In November 2021, the ecological environment of Inner Mongolia Autonomous Region notified the first case of illegal carbon emission reporting. In the process of providing services for enterprises, some consulting companies forged the coal sample monitoring reports of enterprises to "optimize" the carbon content of coal-fired elements, thereby causing the carbon emissions of enterprises to "shrink" and reduce the quota gap[^50]. Although the malicious falsification of carbon emission data is only one singular example, the low quality of carbon emission data is a common problem. In October 2021, the Ministry of Ecology and Environment issued the *Notice on promoting the Supervision and Management of Data Quality in the Carbon Emissions Trading Market*, which clearly stated that local ecological and environmental departments should realize the importance of effective supervision and management of data quality in the national carbon market, carry out self-examination and other relative measures to ensure data quality[^51].
Reference

Fourth quarter and annual data of the coal market


Policy trends in the energy sector (Oct-Dec)

http://www.gov.cn/xinwen/2021-10/23/content_5644437.htm

http://www.gov.cn/xinwen/2021-10/19/content_5643647.htm


http://www.gov.cn/zhengce/2021-11/07/content_5649656.htm

https://mp.weixin.qq.com/s/Eff-EiigZ92wRzFq69to5w
http://www.nea.gov.cn/2022-01/26/c_1310441589.htm

http://www.nea.gov.cn/2021-12/24/c_1310391378.htm


https://news.solarbe.com/202111/01/345732.html


http://gidmodel.org.cn/

http://paper.ce.cn/jjrb/html/2021-11/21/content_453781.htm

http://www.xinhuanet.com/politics/leaders/2020-12/18/c_1126879325.htm

[40] Chinese government website. The Central Economic Work Conference Was Held, Xi Jinping and Li Keqiang Made an Important Speech.
http://www.gov.cn/xinwen/2021-12/10/content_5659796.htm

http://www.gov.cn/zhengce/2021-09/18/content_5638215.htm

https://mp.weixin.qq.com/s/kWzvfdNhYduqaKm7XxMDdA

http://www.gov.cn/zhengce/content/2022-01/24/content_5670202.htm

https://mp.weixin.qq.com/s/xH7gzuW4_GHBN_RRyHdZXQ