

JCOAL “2024年能源稳定供给与脱碳行动国际大会”

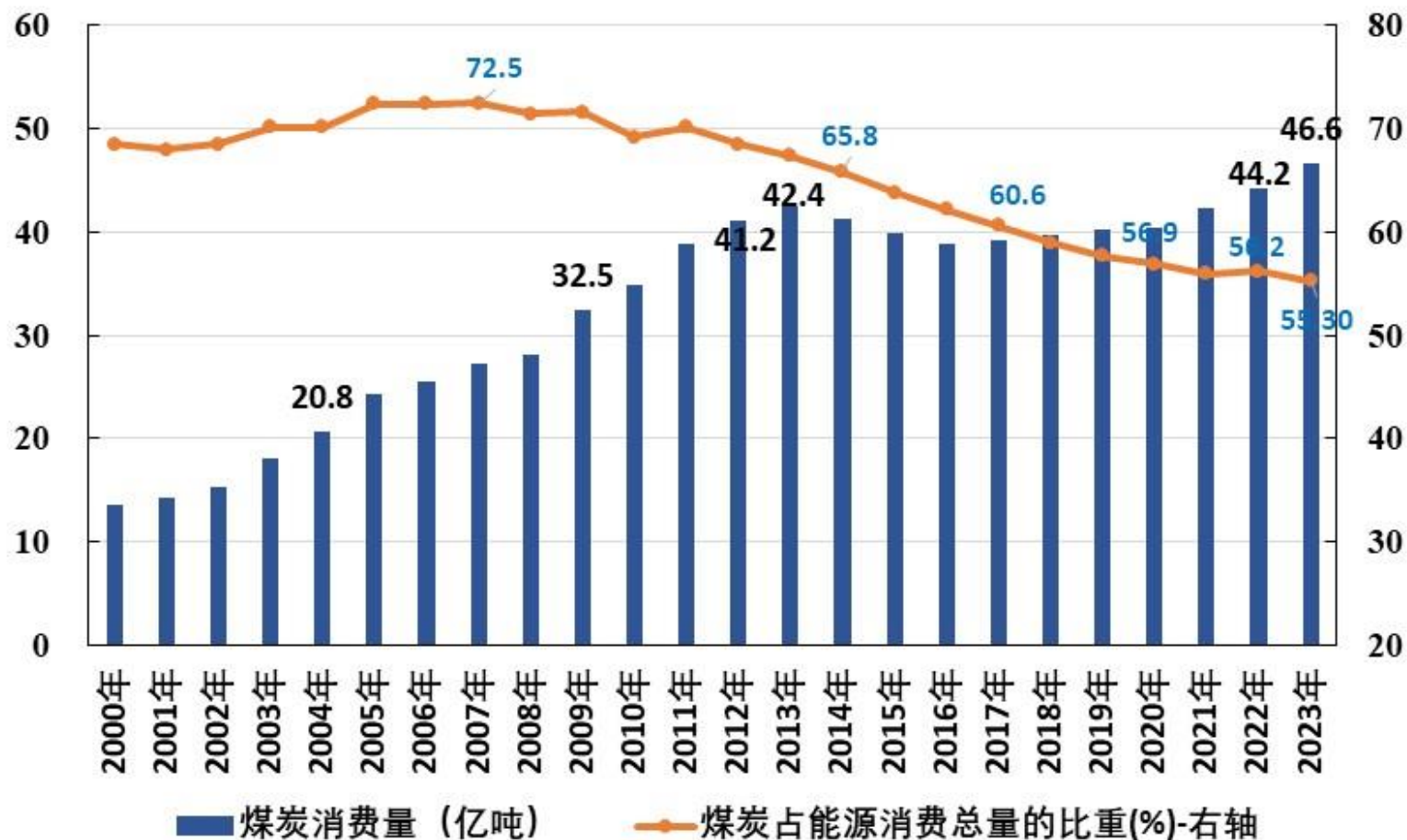
# 中国煤炭供求格局与转型发展

The Supply and Demand Situation and Transformation Development of Coal in China

二〇二四年九月三日 · 东京  
September 3rd, 2024 · Tokyo

# 中国煤炭消费进入峰值平台期，占比显著下降

China's coal consumption will enter a peak plateau period with a significant decrease in proportion of Primary

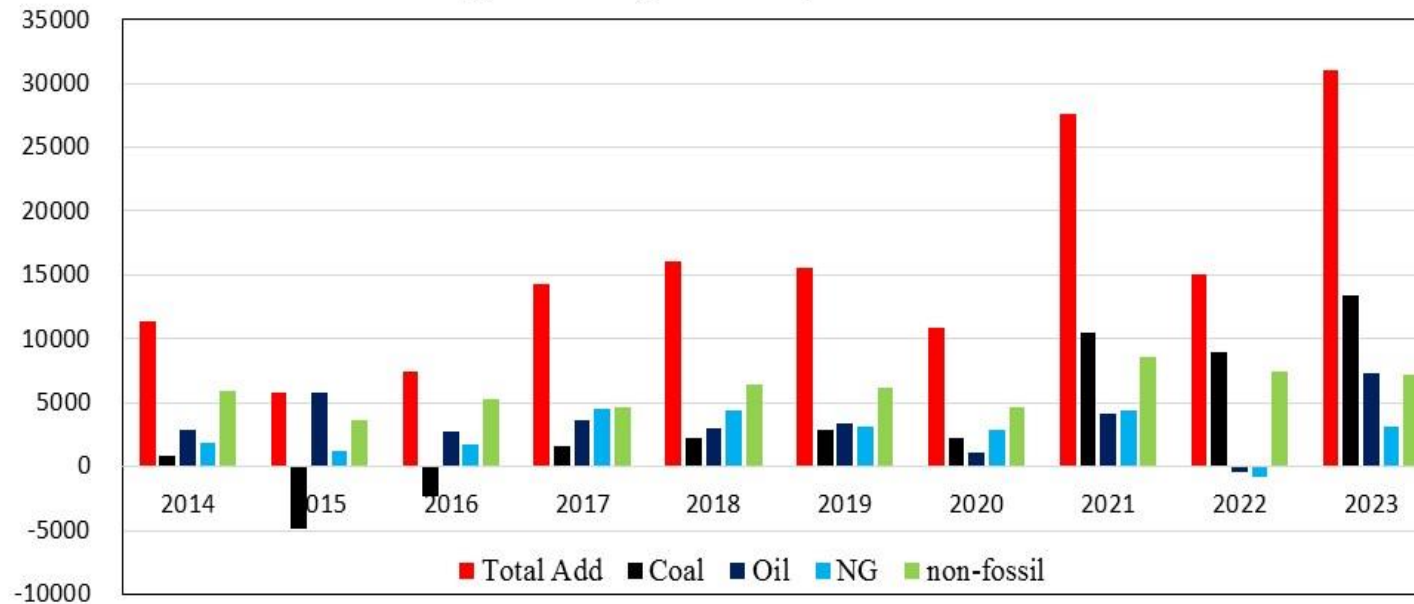


- 根据《中国能源统计年鉴》数据，2014年，全国煤炭消费41.4吨，在一次能源中消费占比为65.8%，2023年，全国煤炭消费量约46.6亿吨，在全国能源消费总量中的比重下降至55.3%。
- According to the China Energy Statistical Yearbook, in 2014, the national coal consumption was 41.4 tons, accounting for 65.8% of primary energy consumption. In 2023, the national coal consumption was about 4.66 billion tons, and its proportion in the total national energy consumption decreased to 55.3%.

# 中国煤炭消费进入峰值平台期，占比显著下降

China's coal consumption has entered a peak plateau period with a significant decrease in proportion of Primary

New Add Energy Consumption composition from 2014 to 2023



◆ 2024年上半年，煤炭消费同比略有增长。

In the first half of 2024, coal consumption slightly increased compared to the same period last year.

◆ 火力发电量、化肥产量同比分别增长1.7%和8.8%，带动电力、煤化工用煤增长；

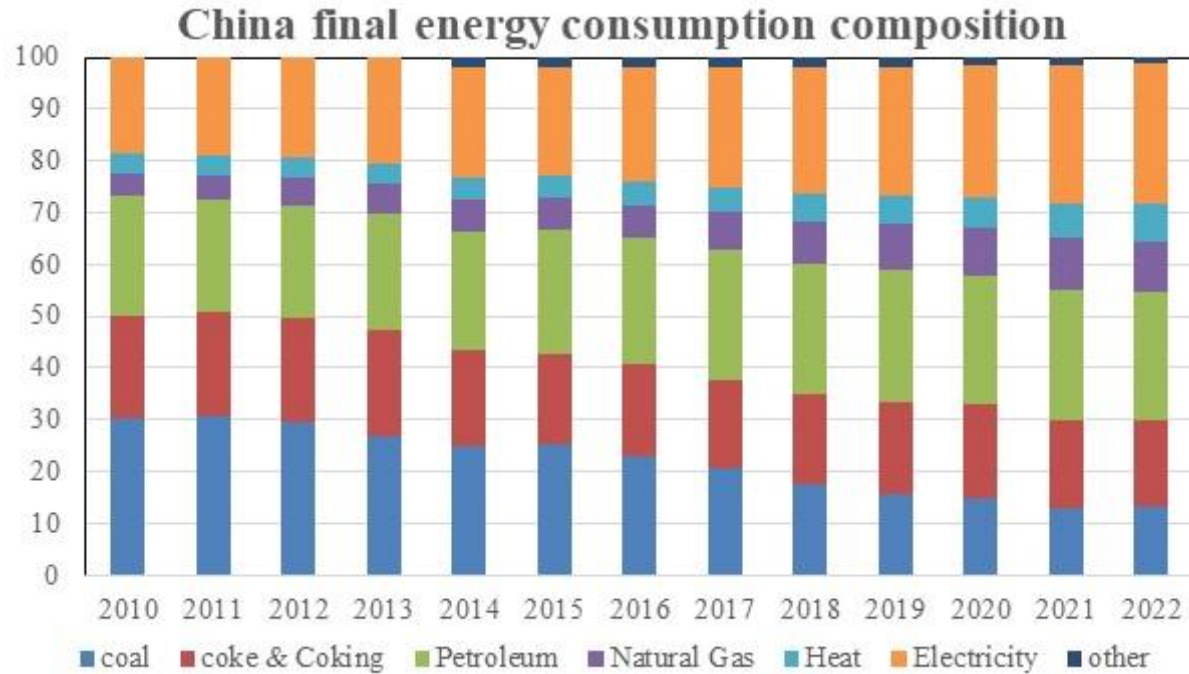
Thermal power generation and fertilizer production increased by 1.7% and 8.8% respectively year-on-year, driving the growth of coal consumption in electricity and coal chemical industries;

◆ 生铁、水泥产量同比分别下降3.6%和10.0%，带动钢铁、建材用煤下降。

The production of pig iron and cement decreased by 3.6% and 10.0% respectively year-on-year, leading to a decrease in coal consumption for steel and building materials.

# 中国煤炭消费进入峰值平台期，占比显著下降

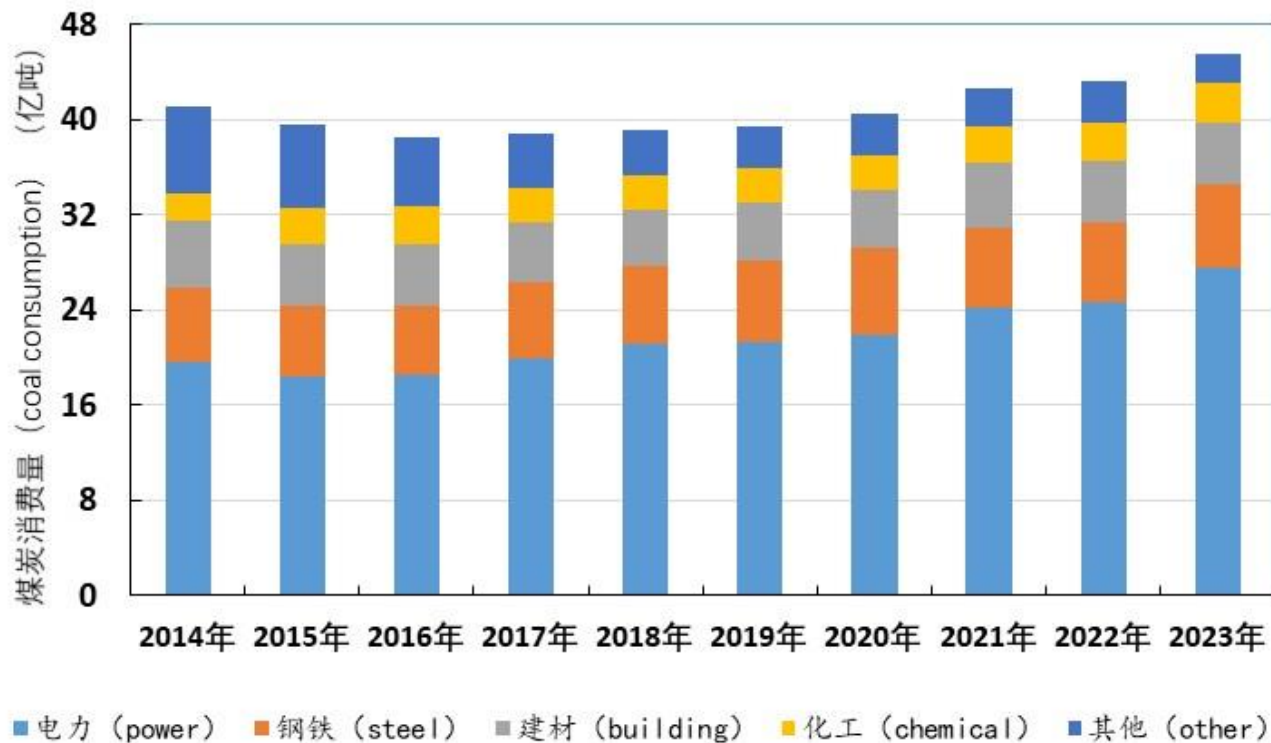
China's coal consumption has entered a peak plateau period with a significant decrease in proportion of Primary



- 在终端能源结构中，煤炭占比也不断的下降，特别是北方冬季清洁供暖和蓝天保卫战行动实施以来，每年下降1个百分点以上；  
In the final energy structure, the proportion of coal has also been declining, especially since the implementation of the northern winter clean heating and blue sky defense campaign, which has dropped by more than 1 percentage point annually;
- 散煤利用是治理的重点，按照节能降碳的行动安排，到2025年底，大气污染防治重点区域平原地区散煤基本清零，基本淘汰35蒸吨/小时及以下的燃煤锅炉及各类燃煤设施。  
The utilization of loose coal is a key focus of governance. According to the action plan of energy conservation and carbon reduction, by the end of 2025, the scattered coal in the key areas of air pollution prevention and control in plain areas will be basically eliminated, and coal-fired boilers and various coal-fired facilities with a capacity of 35 tons per hour or less will be basically phased out.

# 电力和化工用煤成为煤炭消费增长的主要动力

Electricity and chemical coal have become the main driving forces for coal consumption growth



从2014年到2023年 (From 2014 to 2023)

- 全国燃煤发电装机由8.25亿千瓦增加到11.6亿千瓦；  
The installed capacity of coal-fired power generation in China has increased from 825 million kilowatts to 1.16 billion kilowatts;
- 燃煤发电与供热耗煤量由19.7亿吨增加到29.6亿吨；  
The coal consumption for coal-fired power generation and heating has increased from 1.97 billion tons to 2.96 billion tons ;
- 燃煤发电量由4.2万亿度增加到5.4万亿度；  
The coal-fired power generation has increased from 4.2 trillion kWh to 5.4 trillion kWh;

- 煤电装机超低排放改造超过10.7亿千瓦，占比达到90%以上；  
The ultra-low emission transformation of coal-fired power installed capacity has exceeded 1.07 billion kilowatts, accounting for over 90%;
- 6000千瓦及以上火电厂供电煤耗由319克标准煤下降到301.6克标准煤  
The coal consumption for power supply of 6000 kW and above thermal power plants has decreased from 319 grams of standard coal to 301.6 grams of standard coal per kwh.

# 电力和化工用煤成为煤炭消费增长的主要动力

Electricity and chemical coal have become the main driving forces for coal consumption growth



宁东能源化工基地400万吨煤炭直接液化项目夜景  
Night view of the 4 million ton coal direct liquefaction project at Ningdong  
Energy and Chemical Industry Base

中国现代煤化工产业从示范到产业化发展，关键核心技术攻关、核心装备制造等方面取得了重大突破性进展。China's modern coal chemical industry has made significant breakthroughs in key core technology research and core equipment manufacturing, from demonstration to industrial development.

- 100万吨煤炭直接液化示范取得成功，400万吨煤炭间接液化顺利投入运营。  
The demonstration of direct liquefaction of 1 million tons has been successful, and the indirect liquefaction of 4 million tons has been smoothly put into operation.
- 全国煤制油产能由158万吨/年增加到931万吨/年；煤制气产能由27亿立方米/年增加到74.55亿立方米/年；  
The national coal to oil production capacity has increased from 1.58 million tons per year to 9.31 million tons per year; The coal to gas production capacity has increased from 2.7 billion cubic meters per year to 7.455 billion cubic meters per year;

# 电力和化工用煤成为煤炭消费增长的主要动力

Electricity and chemical coal have become the main driving forces for coal consumption growth



宁东煤炭化工基地鸟瞰图

View of Ningdong Coal Chemical Industry Base

- 煤（甲醇）制烯烃产能由226万吨/年增加到1872万吨/年，煤制乙二醇产能由112万吨/年增加到1143万吨/年。

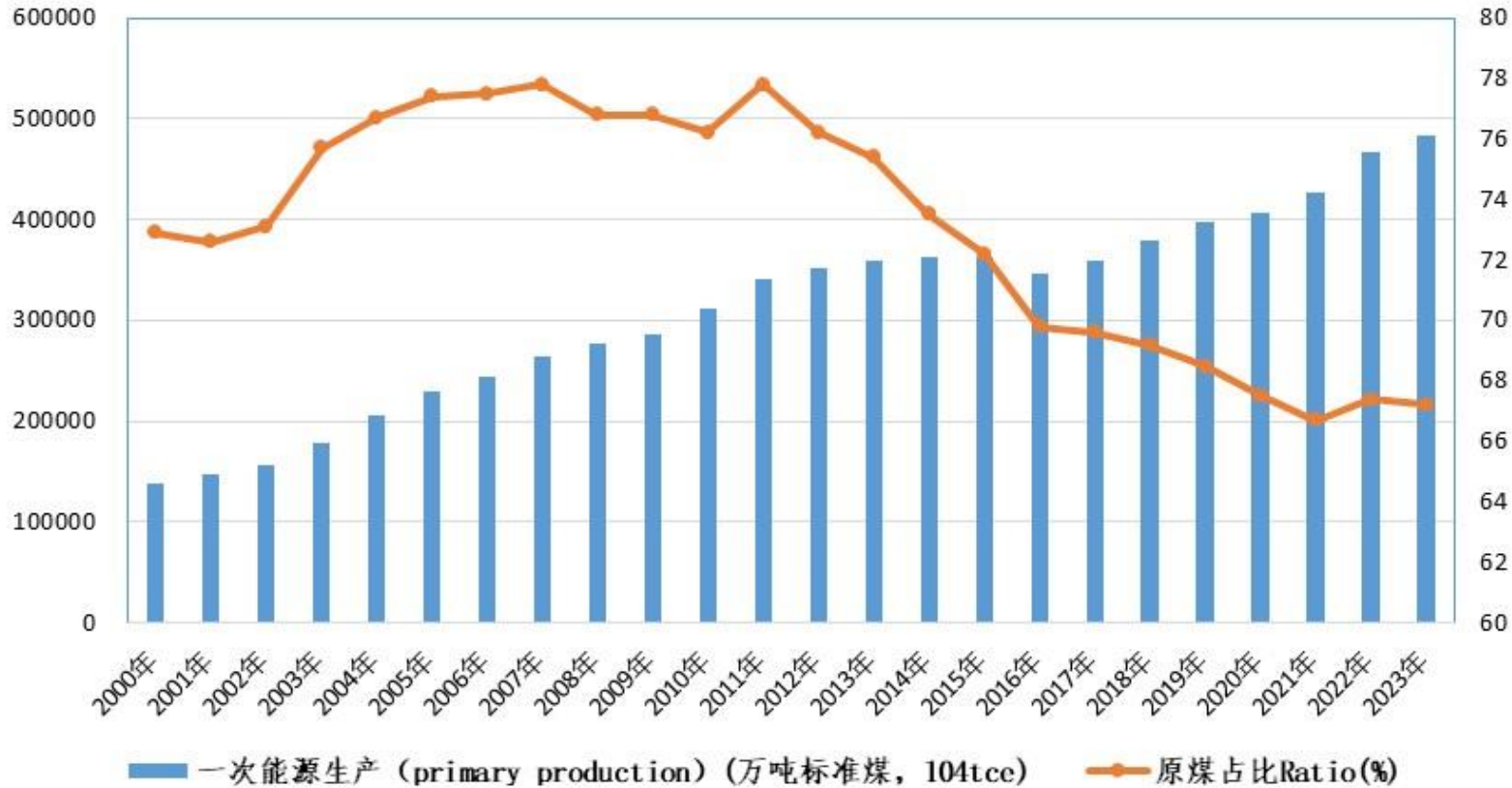
The production capacity of coal (methanol) to olefins has increased from 2.26 million tons to 18.72 million tons per year, and the coal to ethylene glycol has increased from 1.12 million tons to 11.43 million tons per year.

- 在煤基新材料方面，碳化硅、硅烷、石墨烯、锂电池负极材料和BDO（1,4丁二醇）、MMA（甲基丙烯酸甲酯）等高端精细煤化工产品与卡脖子技术研发制造也取得了重大进展，展现了美好发展前景。

In the field of coal based new materials, significant progress has been made in the research and manufacturing of high-end fine coal chemical products and bottleneck technologies such as silicon carbide, silane, graphene, lithium battery negative electrode materials, BDO (1,4-butanediol), MMA (methyl methacrylate), etc., demonstrating a promising development prospect.

# 中国国内煤炭产量占一次能源比重快速下降

The proportion of domestic coal production in primary energy in China is rapidly declining



根据国家统计局发布数据:

According to data released by the National Bureau of Statistics:

2023年全国规模以上原煤产量达到46.6亿吨, 较2014年增加7.9亿吨;

In 2023, the national production of raw coal above designated size will reach 4.66 billion tons, an increase of 790 million tons compared to 2014;

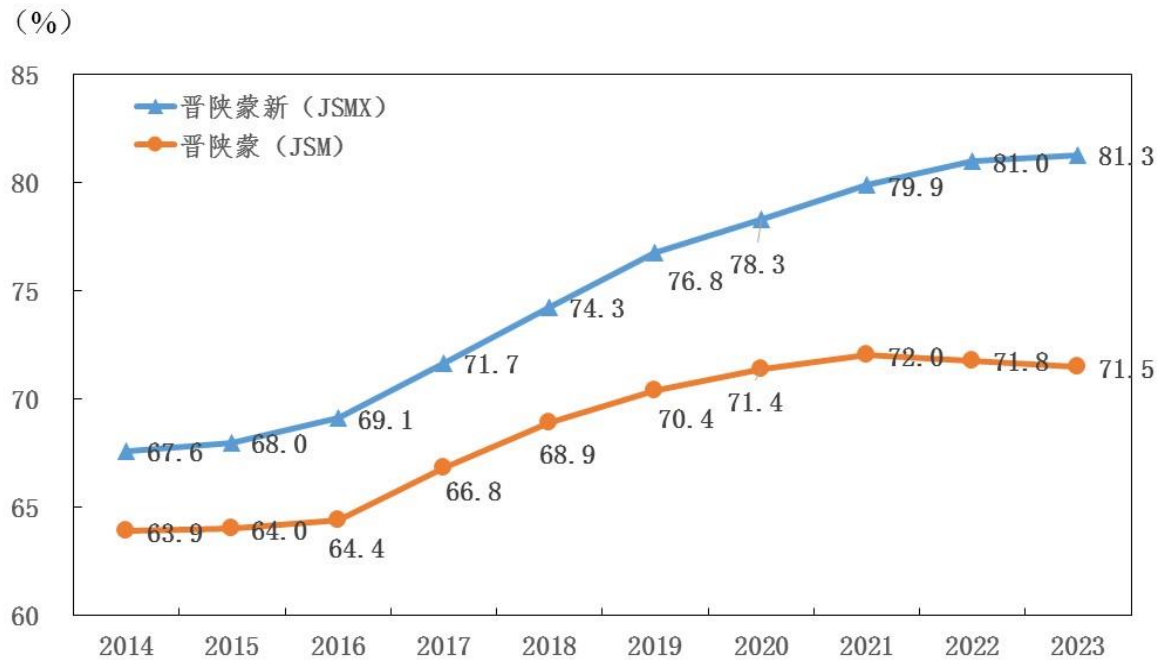
原煤占我国一次能源生产总量的比重由73.5%降低至67.2%;

The proportion of raw coal in China's total primary energy production has decreased from 73.5% to 67.2%;



# 中国煤炭开发布局进一步西移

## China's coal development layout further shifts westward



由于东中部地区矿区由于煤炭资源开采历史长、开发强度大，生产煤矿资源枯竭报废规模逐步扩大，煤炭生产重心转向晋陕蒙新等地区趋势更加明显。

Due to the long history and high development intensity of coal resources in the mining areas of the eastern and central regions, the scale of coal mine resource depletion and scrapping is gradually expanding, and the focus of coal production is shifting towards areas such as Shanxi, Shaanxi, Inner Mongolia, and Xinjiang.

晋陕蒙新原煤产量由2014年的26.2亿吨增加到2023年的37.9亿吨，占全国的比重由67.6%提高到81.3%。

The production of new raw coal in Shanxi, Shaanxi, and Inner Mongolia has increased from 2.62 billion tons in 2014 to 3.79 billion tons in 2023, accounting for 67.6% of the national total and 81.3%,

山西、内蒙古原煤产量迈入10亿吨级行列。

Shanxi and Inner Mongolia's raw coal production has entered the ranks of 1 billion tons.

新疆煤炭资源开发进入加速阶段，2023年达到4.56亿吨。但由于运输距离较远，中国东部地区利用新疆煤炭资源规模不大。

The development of coal resources in Xinjiang has entered an accelerated stage, reaching 456 million tons in 2023. However, due to the long transportation distance, the scale of utilizing Xinjiang coal resources in eastern China is not large.

与此同时，西北地区也是中国风光资源富集区，注重煤炭的开发利用与新能源的耦合协同发展。

At the same time, the northwest region is also an area rich in Chinese scenic resources, emphasizing the coordinated development of coal development and utilization with the coupling of new energy.

# 煤炭产业集中度不断提高

The concentration of the coal industry continues to increase

2014和2023年中国亿吨级煤炭企业及产量

China enterprises of coal production that capacity exceeding 100 million tons in 2014 and 2023

| 企业<br>enterprises       | 2014<br>(100Mt) | 企业<br>enterprises      | 2023<br>(100Mt) |
|-------------------------|-----------------|------------------------|-----------------|
| 神华集团 (Shenghua)         | 47351           | 国家能源集团(CHN Energy)     | 61665           |
| 中煤集团(ChinaCoal)         | 18304           | 晋能控股集团 (Jing Energy)   | 43747           |
| 大同煤矿集团(Datong Coal)     | 16754           | 山东能源 (Shandong Energy) | 27366           |
| 山东能源集团(Shandong Energy) | 13926           | 中煤集团(ChinaCoal)        | 26948           |
| 陕煤集团(Shaanxi Coal)      | 12712           | 陕煤集团(Shaanxi Coal)     | 24714           |
| 山西焦煤集团(shanxi Coking)   | 10700           | 山西焦煤集团(shanxi Coking)  | 18486           |
| 兖矿集团(Yankuang)          | 10212           | 华能集团(China Huaneng)    | 10800           |
| 冀中能源集团(Jizhong)         | 10200           | 潞安化工集团(Luan Group)     | 10495           |
| 河南能源集团(Henan)           | 10186           |                        |                 |
| 总计(total)               | 150345          |                        | 224221          |
| 占比 (%)                  | 41.5%           |                        | 46.4%           |

数据来源：中国煤炭工业协会

加快推进煤炭资源整合和煤矿企业兼并重组，发展大型煤炭企业集团。2014年，全国原煤产量超过亿吨企业达到9家，原煤产量合计约为15.0吨，占全国原煤生产总量的38.8%；2023年，全国原煤产量超过亿吨企业达到8家，原煤产量合计约为22.4吨，占全国规上原煤生产总量的48.5%，相比2014年提高近10个百分点。

Accelerate the integration of coal resources and the merger and reorganization of coal mining enterprises, and develop large-scale coal enterprise groups. In 2014, there were 9 enterprises in China that produced over 100 million tons of raw coal, with a total raw coal production of approximately 15.0 tons, accounting for 38.8% of the country's total raw coal production; In 2023, there will be 8 enterprises in China with a raw coal production exceeding 100 million tons, with a total raw coal production of about 22.4 tons, accounting for 48.5% of the total production of raw coal above designated size in the country, an increase of nearly 10 percentage points compared to 2014.

# 煤炭产业集中度不断提高

The concentration of the coal industry continues to increase

- ◆十年来，中国有序淘汰一批生产效率低、技术装备水平低、安全保障程度低、资源枯竭的落后产能煤矿。

Over the past decade, China has orderly phased out a batch of outdated coal mines with low production efficiency, low technological equipment level, low safety guarantee level, and resource depletion.

- ◆截至2023年底，全国累计退出煤矿6000处左右、退出落后煤炭产能10亿吨/年以上，煤矿数量减少到4300处以下。年产120万吨及以上的大型煤矿产量占全国的85%以上，建成年产千万吨级煤矿81处。

By the end of 2023, a total of about 6000 coal mines and over 1 billion tons/year of outdated coal production capacity will be withdrawn nationwide, and the number of coal mines will be reduced to below 4300. Large coal mines with an annual output of 1.2 million tons or more account for over 85% of the national output, and 81 coal mines with an annual output of tens of millions of tons have been built.

- ◆全国煤矿数量由2014年的1.3万多处减少到4300处左右，原煤产量由38.7亿吨增长到47.1亿吨；建成年产千万吨级特大型煤矿82处，核定产能13.6亿吨/年；建成安全高效煤矿1146处，产量占全国的比重由38%提高到70%以上，主要技术指标达到世界领先水平。

The number of coal mines in China has decreased from over 13000 in 2014 to around 4300, and the raw coal production has increased from 3.87 billion tons to 4.71 billion tons; 82 super large coal mines with an annual output of tens of millions of tons have been built, with a confirmed production capacity of 1.36 billion tons per year; 1146 safe and efficient coal mines have been built, and the proportion of production in the country has increased from 38% to over 70%. The main technical indicators have reached the world's leading level.

# 煤炭开发智能化水平不断提升

The level of intelligence in coal development continues to improve

◆ 煤矿智能化建设快速推进，截至2024年5月，全国累计建成智能化采煤工作面1993个，智能化掘进工作面2232个，智能化煤矿产能占比超过60%以上。

**The intelligent construction of coal mines is rapidly advancing. As of May 2024, a total of 1993 intelligent coal mining working faces and 2232 intelligent excavation working faces have been built nationwide, and the proportion of intelligent coal mine production capacity exceeds 60%.**



智能矿山的建设一方面要求从业人员综合素质水平高，另一方面，也大幅度减少用工需求。从而降低传统意义上的产业工人逐步进入退休行业，年轻一代到煤炭行业工作意愿不高所带来的用工慌的压力。

**The construction of intelligent mines requires a high level of comprehensive quality among practitioners, while also significantly reducing the demand for labor. Thus reducing the pressure of labor shortage caused by the gradual retirement of traditional industrial workers and the low willingness of the younger generation to work in the coal industry.**

# 中国煤炭进口不断增长

## China's coal imports continue to grow

- ◆ 十年来，我国深入推进“一带一路”国际合作，按照市场选择的原则，中国进口煤炭力度持续加大。  
In the past ten years, China has deeply promoted the international cooperation of the "the Belt and Road". In accordance with the principle of market selection, China has continued to increase its import of coal.
- ◆ 中国，特别是东南沿海地区加大进口煤炭调节力度，煤炭年进口量呈逐年递增趋势。2023年全国煤炭年进口量更是突破4亿吨，相较于2014年增加超过1.8亿吨。  
China, especially the southeastern coastal areas, have increased their efforts to regulate the import of coal, and the annual import volume of coal has been increasing year by year. In 2023, the annual import volume of coal in China will exceed 400 million tons, an increase of over 180 million tons compared to 2014.
- ◆ 总体来看，中国进口煤炭占消费总量比例不算高，煤炭价格波动主要受国内市场影响；  
Overall, the proportion of imported coal in China's total consumption is not high, and fluctuations in coal prices are mainly influenced by the domestic market;

中国煤炭进口来源及价格基本情况（万吨、美元/吨）  
Information on the sources and prices of coal imports in China (100Mt, \$/ton)

| 年份 (Year)       | 2014  | 2015  | 2016  | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  |
|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 印尼(Indonesia)   | 11096 | 7376  | 10380 | 10901 | 4406  | 13762 | 14084 | 19566 | 17065 | 22024 |
| 俄罗斯(Russia)     | 2524  | 1580  | 1885  | 2807  | 2379  | 3224  | 2854  | 5699  | 6806  | 10213 |
| 蒙古(Mongolia)    | 1923  | 1439  | 2640  | 3399  | 3191  | 3635  | 2854  | 1644  | 3115  | 6994  |
| 澳大利亚(Australia) | 9442  | 7091  | 7054  | 8006  | 7977  | 7709  | 7751  | 1171  | 285   | 5247  |
| 其他(Other)       | 4115  | 2917  | 3592  | 1977  | 10170 | 1637  | 2856  | 4242  | 1959  | 2962  |
| 进口总量 (Total)    | 29100 | 20403 | 25551 | 27090 | 28123 | 29967 | 30399 | 32322 | 29320 | 47440 |
| 进口均价 (Price)    | 77    | 64    | 55    | 84    | 87    | 78    | 67    | 111   | 145   | 112   |

数据来源：海关总署

# 推进煤炭绿色低碳转型，促进煤炭清洁高效利用

Promote the green and low-carbon transformation of coal, and promote the clean and efficient utilization of coal

- 应对全球气候变化，实现“双碳”目标，大规模的替代煤炭是必然选择；
- To address global climate change and achieve the "dual carbon" goal, large-scale substitution of coal is an inevitable choice;
- 《关于完整准确全面贯彻新发展理念做好碳达峰碳中和工作的意见》明确提出要加快煤炭减量步伐，“十四五”严控煤炭与煤电发展规模，“十五五”时期逐步减少；
- “The Opinion on Fully Implementing the New Development Concept and Doing a Good Job in Carbon Peak and Carbon Neutrality” clearly proposes to accelerate the pace of coal reduction, strictly control the scale of coal and coal-fired power development during the 14th Five Year Plan period, and gradually reduce it during the 15th Five Year Plan period;
- 《2030年前碳达峰行动方案》提出“推动重点用煤行业减煤限煤。大力推动煤炭清洁利用，逐步减少直至禁止煤炭散烧。”
- The Action Plan for Peaking Carbon Emissions Before 2030 proposes to "promote the reduction and restriction of coal consumption in key coal consuming industries. Vigorously promote the clean utilization of coal, gradually reduce until the prohibition of coal burning in bulk
- 立足能源资源禀赋，积极稳妥推进碳达峰碳中和，有序推进煤炭减量替代，不能盲目“去煤化”
- Based on the endowment of energy resources, actively and steadily promote carbon peak and carbon neutrality, orderly promote coal reduction and substitution, and cannot blindly "de coalize"
- 煤炭在中国能源体系中发展定位由“以为为主”基础性能源向“兜底”性安全保障转变；煤电由“基荷”为主向“基荷”与“调节”并重转变。
- The development positioning of coal in China's energy system has shifted from being a "primary" basic energy source to a "backup" security guarantee; Coal power is shifting from a focus on "base load" to a balance between "base load" and "regulation".

# 推进煤炭绿色低碳转型，促进煤炭清洁高效利用

Promote the green and low-carbon transformation of coal, and promote the clean and efficient utilization of coal

- 正确处理好煤电与可再生能源电力的组合关系；
- Properly handle the combination relationship between coal-fired power and renewable energy electricity;
- 推进煤电节能降碳改造、灵活性改造和供热改造的“三改联动”；“十四五”前两年，煤电“三改联动”改造规模合计超过4.85亿千瓦。
- Promote the "three reforms linkage" of energy-saving and carbon reduction transformation, flexibility transformation, and heating transformation in coal-fired power plants; In the first two years of the 14th Five Year Plan, the total scale of coal and electricity "three reform linkage" transformation exceeded 485 million kilowatts.
- 积极推进煤电低碳化改造建设行动，通过“生物质掺烧”、“绿氨掺烧”和“碳捕集利用与封存三种方式”，鼓励煤炭与煤电联营、煤电与可再生能源联营“两个联营”和沙漠、戈壁、荒漠地区大型风电光伏基地配套煤电项目率先实施绿氨掺烧示范。
- Actively promote the low-carbon transformation and construction of coal-fired power plants, and encourage the "two joint ventures" of coal and coal-fired power, coal-fired power and renewable energy through "biomass co firing", "green ammonia co firing" and "carbon capture, utilization and storage", as well as large-scale wind and photovoltaic base supporting coal-fired power projects in desert, Gobi and desert areas to take the lead in implementing green ammonia co firing demonstrations.

# 推进煤炭绿色低碳转型，促进煤炭清洁高效利用

Promote the green and low-carbon transformation of coal, and promote the clean and efficient utilization of coal



江苏省泰州燃煤电厂的年产50万吨碳捕集设施

Annual production of 500000 tons of carbon capture facilities at Taizhou Coal fired Power Plant in Jiangsu Province

煤电与CCS：截至2022年底，我国已投用的煤电CCUS项目13个，总捕集能力约60万吨/年。

Coal power and CCS: As of the end of 2022, China has 13 coal-fired CCUS projects in operation, with a total capture capacity of approximately 600000 tons per year.

2023年6月，中国能源在江苏泰州燃煤电厂启动了一个年产50万吨碳捕集利用和封存设施。该项目是目前亚洲最大的CCUS燃煤项目，采用胺基二次燃烧技术，通过高性能吸收塔和高效胺回收的突破实现的。一些捕集的CO<sub>2</sub>将被输送到中国石化华东石油局用于EOR。

In June 2023, China Energy launched a carbon capture, utilization, and storage facility with an annual output of 500000 tons at the Taizhou coal-fired power plant in Jiangsu Province. This project is currently the largest CCUS coal-fired project in Asia, utilizing amine based secondary combustion technology and achieving breakthroughs through high-performance absorption towers and efficient amine recovery. Some captured CO<sub>2</sub> will be transported to Sinopec East China Petroleum Bureau for EOR.



# 推进煤炭绿色低碳转型，促进煤炭清洁高效利用

Promote the green and low-carbon transformation of coal, and promote the clean and efficient utilization of coal



陕煤集团榆林化学公司40万吨/年CCS先导试验项目

**40ktons/year CCS pilot test project of Shaanxi Coal Group Yulin Chemical Company**

煤化工与绿氢耦合，煤化工与CCS

Coal chemical industry and green hydrogen coupling, coal chemical industry and CCS

陕煤集团榆林化学公司40万吨/年CCS先导试验项目采用“集约化、大规模、清洁利用和有效利用”现代洁净煤技术，从源头减少二氧化碳排放，打造西北地区二氧化碳减排国家级示范基地

The 40ktons/year CCS pilot test project of Shaanxi Coal Group Yulin Chemical Company adopts modern clean coal technology of "intensive, large-scale, clean and effective utilization" to reduce carbon dioxide emissions from the source and create a national demonstration base for carbon dioxide reduction in the northwest region

Thank you for your attention!