

3

中国煤炭清洁高效利用成效显著

China has done a lot of works on the clean and efficient use of coal, and the results are remarkable



(一)、近年来中国的燃煤污染基本得到根治，雾霾天气已经很少出现

Near days , China's smog and air pollution have been fundamentally brought under control

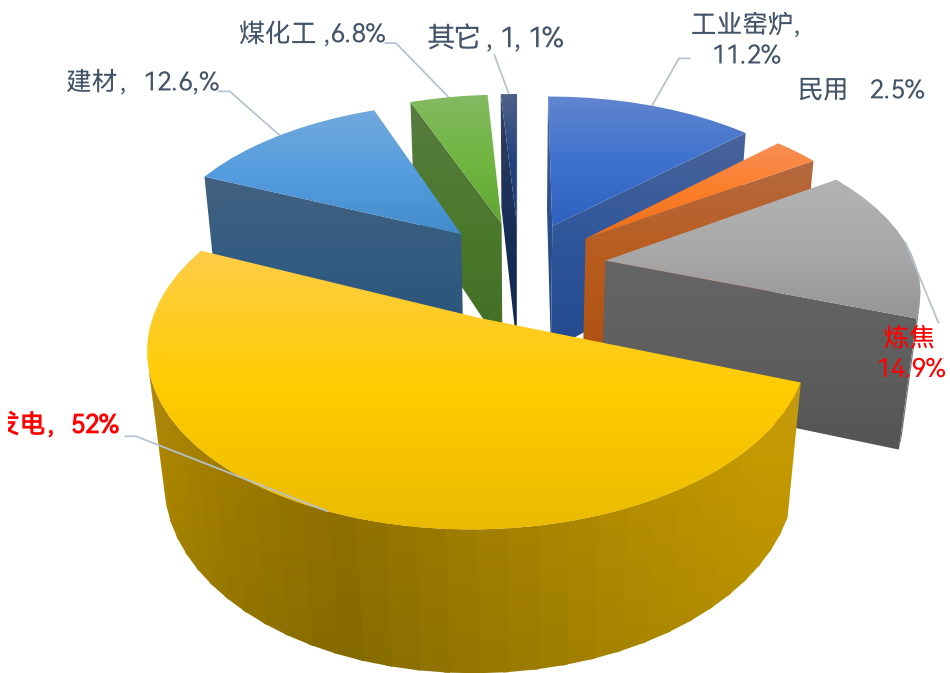


(二) 中国煤炭消费构成/Chinese coal consumption



中国煤炭消费构成更加复杂，治理更加困难

The composition of China's coal consumption is more complex and it is more difficult to replace



(三) 中国煤炭清洁高效利用做法/methods of clean coal



1、原煤洗选/Strengthen raw coal washing

截至2022年底，中国建成在运的选煤能力35亿吨，原煤入选量31.3亿吨，原煤入洗率下降到69.7%。在运行规模以上选煤厂已有2400多座，超过千万吨的特大型选煤厂有84座。千万吨级湿法全重介选煤技术、大型复合干法和块煤干法分选技术、智能化选煤厂建设、细粒级煤炭资源的高效分选技术、大型井下选煤排矸技术和新一代空气重介干法选煤技术成功应用。

By the end of 2022, China had built 3.5 billion tons of coal preparation capacity in transit, 3.13 billion tons of raw coal was selected, and the raw coal washing rate dropped to 68.6%. There are more than 2,400 CPPs above the operating scale, and there are 84 super-large CPPs with more than 10 million tons. Ten million ton wet all-heavy medium coal separation technology, large-scale composite dry process and lump coal dry separation technology, intelligent CPP construction, efficient separation technology of fine coal resources, large-scale underground coal separation and waste disposal technology and a new generation of air heavy medium dry coal separation technology have been successfully applied.

年 代/year	2016	2017	2018	2019	2020	2021	2022
原煤产量 (亿吨) Raw coal production	34.1	35.2	36.8	38.5	39	41.3	45.6
入选煤量 (亿吨) Raw coal washing	23.5	24.7	26.42	28.2	29.1	29.6	31.3
入选率 (%) Raw coal washing rate	68.91	70.17	71.69	73.24	74.7	71.7	69.7



2、绿色高效煤电/ Clean coal power generation

2022年我国燃煤发电装机达到13.3亿千瓦，占全部装机的52%，完成超低排放改造10.5亿千瓦，80%为单机容量300MW以上的超临界、超超临界特大型机组，最低供电煤耗达到249.31gce/kwh。目前正在进行“三改联动”升级改造和700° C高超临界+超低排放+CCS/CCUS研发示范，而且百万吨级CCS也在示范（国能泰州、胜利油田）。

In 2022, China's coal-fired power generation capacity reached 1.33 billion kilowatts, accounting for 52% of the total installed capacity, the completion of ultra-low emission transformation of 1.05 billion kilowatts, 80% of the single capacity of more than 300MW supercritical, ultra-supercritical ultra-large units, the best coal consumption of power supply is 249.31gce/kwh. At present, the "three reform linkage" upgrading and 700° C+ ultra-low emission +CCS/CCUS demonstration are being carried out, and million-ton CCS is also in demonstration operation (Guoneng Taizhou and Shengli Oilfield etc.)

SS 浓度 1.1mg/Nm³

SO₂浓度 13.9mg/Nm³

NO_x浓度 15.2mg/Nm³

Ultra-low emission



3、大型煤焦化超低排放和绿色化循环经济园区实例

A Large-scale coal coking park



尼龙66

nylon 66

Moving towards carbon neutrality in the plant

We wish 期待: CO₂-CCUS/CCS

向厂内碳中和迈进。。。



4、现代煤化工/New coal chemical industry

2022年中国煤化工产能产量

China's coal chemical production & capacity in 2022

种类	项目数	产能	产量
煤制油/ coal to oil	33	1152	796
煤制气/ coal to gas	5	61.25	60.52
煤制烯烃/ Coal to olefin	27	1142	1180
煤制乙二醇/ ethylene glycol	38	1135	427
煤制合成氨/ synthetic ammonia		7500	5200
煤制甲醇/ Coal to methanol		9914	7816
焦炭/ coke	500	68000	45100
电石/ Calcium carbide		4200	2420
兰炭/ Blue semi-coke	126	13000	6300

单位：万吨、亿米³/年

(1) 煤制油：中国已建成33个煤基油品项目，产能达到1152万吨。

(2) 煤制天然气：中国已建成投产煤制天然气产能61.25亿Nm³/a，2022年生产天然气60.52亿Nm³/a。

(3) 煤（甲醇）制烯烃：中国已建成投产煤制烯烃27处，产能达到1142万t/a。

(4) 煤制乙二醇：中国已建成投产煤制乙二醇项目28家，产能达到1135万t/a。

(5) 百万吨级煤制乙醇、千万吨级低阶煤粉煤热解：多个示范项目正在建设和试运行。



5、散煤治理情况/coal Scattered Burning control

(1) 工业锅炉/窑炉/

Industrial boiler/furnace

工业锅炉/窑炉（42万台）超低排放改造和减煤替代，压减耗煤3.6亿吨。



过去景象/in the past



现在景象/now

(2) 民用散煤替代

Living scattered coal replaced

北方地区家庭冬季分散燃煤采暖完成煤改气、煤改电2700多万户，减少民用散煤6500多万吨。



6、低阶煤分质利用/by step to utilization of low rank coal

(1) 中国目前超过一半商品煤为长焰煤，我们发现这些长焰煤很多都富含煤焦油（含油10-17%富油煤），是很好的热解制油原料。

(2) 对这些低阶煤进行中低温热解，可以获得大量的甲烷、氢气和中低温轻质煤焦油，形成的半焦（兰炭）可以继续燃烧使用，而且不耗水，是很好的“新型煤制油”工艺。目前已经进行1500万吨级粉煤快速热解示范，焦油产量达到17.8%。

