



## FACTSHEETS SERIES ON CHINA ENERGY TRANSITION UPDATE

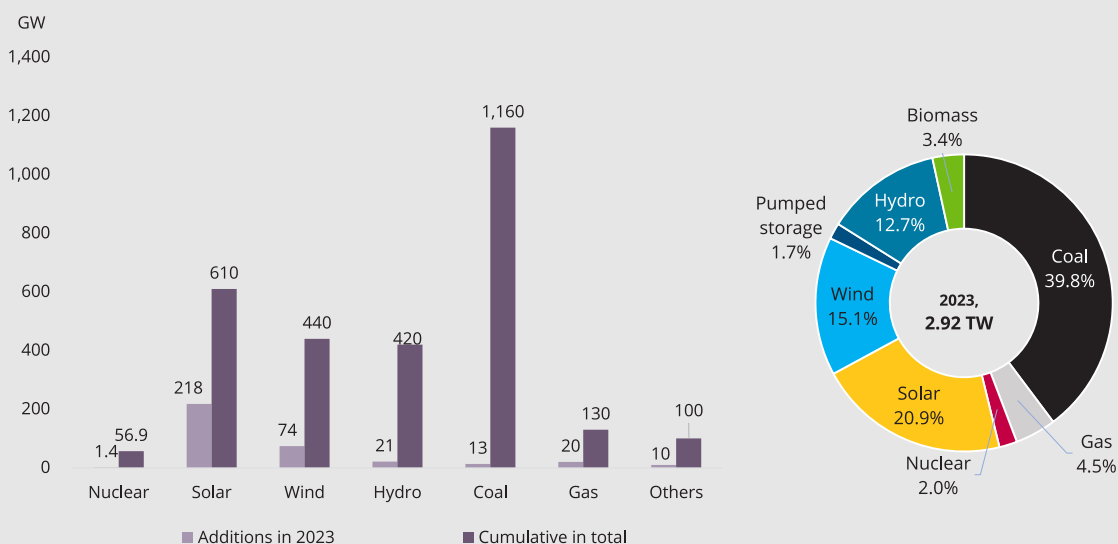
# IN 2023, GREEN POWER WAS BOOMING IN CHINA, BUT COAL ALSO EXPANDED TO ENSURE THE SECURITY OF ENERGY SUPPLY

**By the end of 2023, China's cumulative installed electricity generation capacity reached 2,910 GW, an increase of 13.9% y-o-y.** The share of non-fossil generation capacity rose to over 50% for the first time with 1,570 GW (53.9%), while the share of installed capacity from coal-fired power plants fell below 40%. The total installed capacity of coal-fired thermal power plants was 1,160 GW by the end of 2023 (+13 GW). The total installed capacity of hydropower was 420 GW (+6 GW), of which 50.9 GW (+9.9 GW) was pumped storage; nuclear power was 56.9 GW (+1.4GW). The total installed capacity of wind power was 441 GW (+74.6 GW), of which 404 GW was onshore (+44 GW). The total installed capacity of grid-connected solar

power generation was 610 GW (+217.4 GW), hence solar alone accounted for 58.5% of the increase in non-fossil generation capacity. The cumulative installed capacity of wind and solar power increased from 760 GW in 2022 to 1,051 GW at the end of 2023, an increase of 38.6% y-o-y.<sup>1,2</sup>

Inner Mongolia topped the list with 213.4 GW of installed capacity, which is still dominated by coal, while the installed wind power capacity in the province was also the highest in the country. Shandong and Guangdong provinces ranked second and third with 207.5 GW and 193.3 GW of installed capacity, respectively.

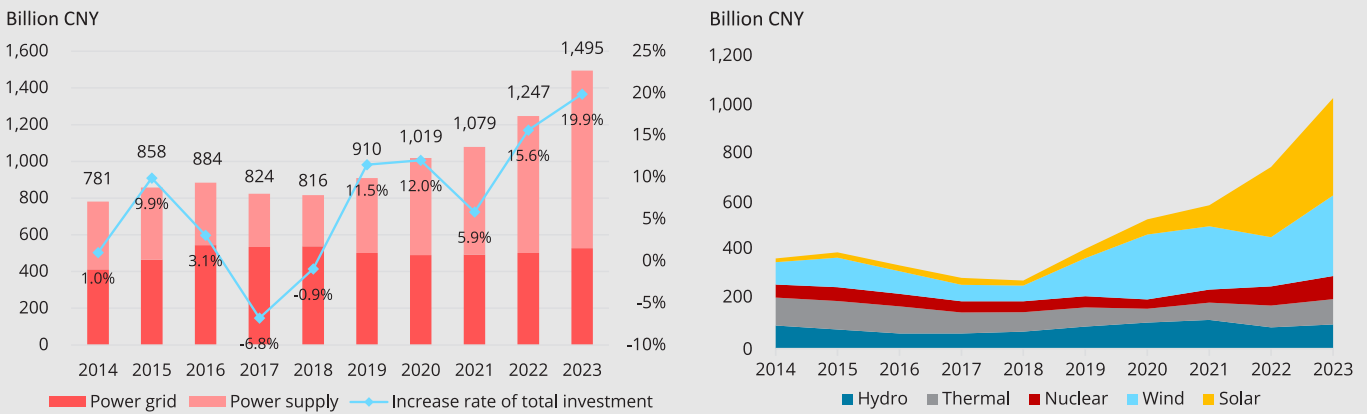
**Figure 1 The installed capacity of energy sources, amount (left) and percentage in total (right)**



**China's power investment has grown rapidly in 2023 and non-fossil energy power investment accounted for 90% of total power investment.** The national power project investment reached 1,495 billion CNY, an increase of 19.9%, of which the power supply construction investment completed 967.5 billion CNY, an increase of 30.1% y-o-y, the power grid construction investment completed 527.5 billion CNY, an increase of 5.4% y-o-y. By different power types, the investment on solar power was 397.4 billion CNY, up 38.7% y-o-y; wind power was 330.1 billion CNY, up 64.1% y-o-y; hydropower was 99.1 billion CNY, up 13.7% y-o-y; thermal power was 102.9 billion CNY, an increase of 15.0%; nuclear power reached 94.9 billion CNY, up 20.8% y-o-y.<sup>3</sup>

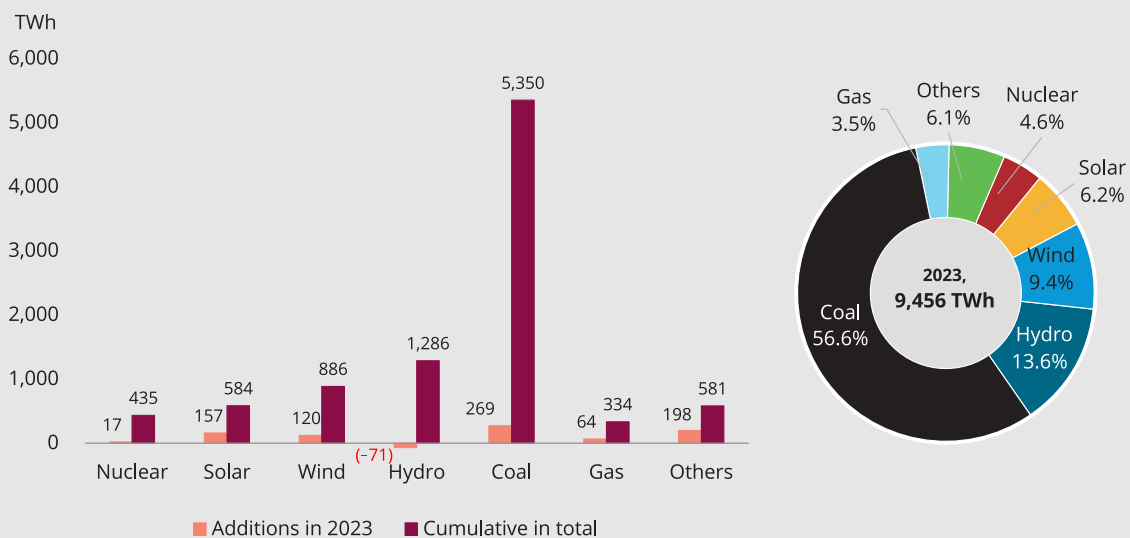
**China's annual power generation in 2023 was 9,456 TWh, an increase of 6.9%.<sup>4</sup>** China's power generation shows a diversified trend in 2023. Thermal power is still the main source of China's electricity supply, but renewable energy is on the rise and will play a more and more important role in the future energy mix. Coal power generation accounted for 56.6% (-1.4%), while solar and wind accounted for 15.6% of the total electricity generation(+1.6% y-o-y).<sup>5</sup> Hydropower generation decreased by 5.2% y-o-y due to drought in the southern regions.

**Figure 2 China total electricity investment (left) and the investment in different power types (right) from 2014 to 2023**



Source: Source: China Energy Media Research Institute, April 2024

**Figure 3 The electricity generation by fuels in 2023, amount (left) and percentage in total (right)**

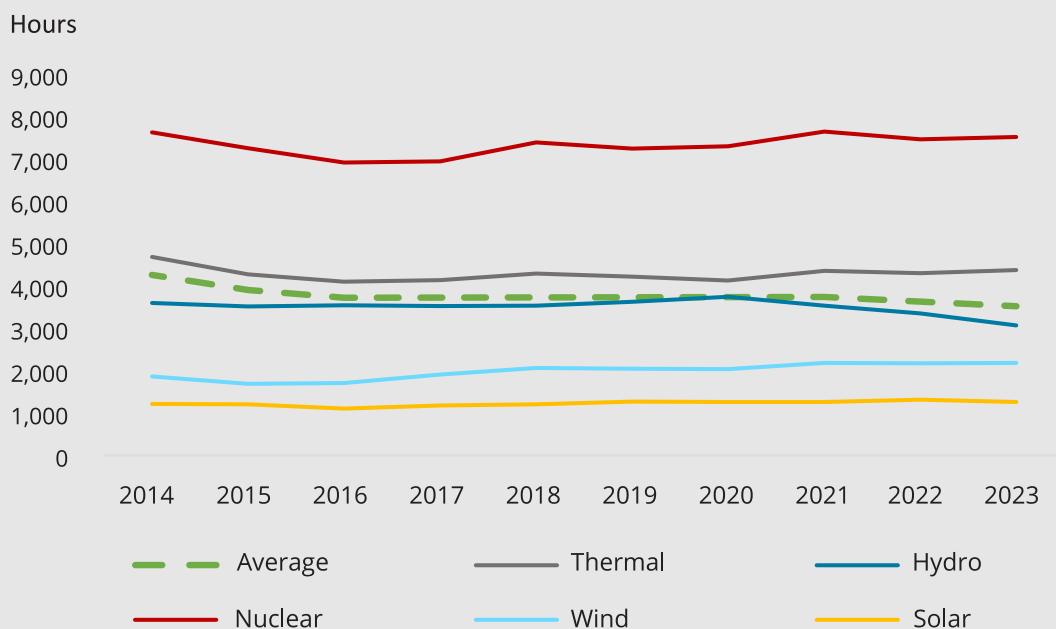


Source: NEA, CEC, March 2024; GIZ analysis, 2024

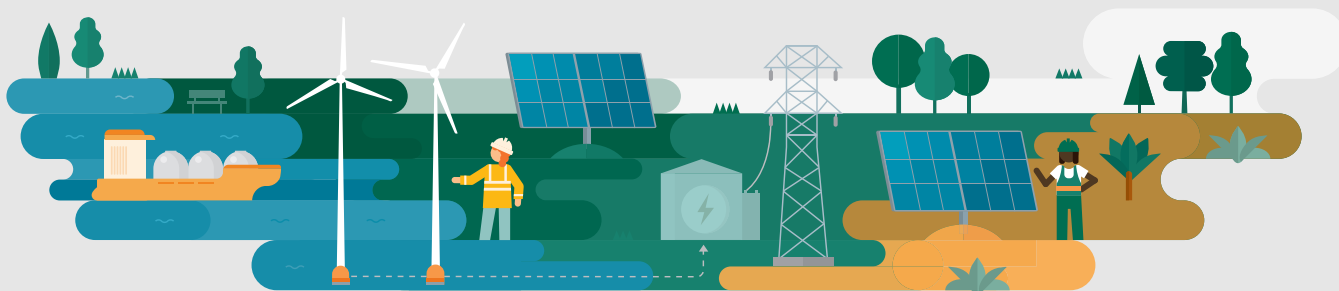
In the year 2023, the average utilization of China's power generation equipment above 6,000 kW was 3,592 hours, a decrease of 101 hours y-o-y. By type, hydropower was 3,133 hours, a y-o-y decrease of 285 hours, of which conventional hydropower was 3,423 hours, a y-o-y decrease of 278 hours, pumped storage was 1,175 hours, down 6 hours y-o-y; thermal power was 4,466 hours, an increase of 76 hours, among which, coal power was 4,685 hours, an increase of 92 hours; nuclear power 7,670 hours, an increase of 54 hours; wind power was for 2,225 hours, an increase of 7 hours y-o-y; solar power was for 1,286 hours, down 54 hours y-o-y.<sup>6</sup>

China added 38,100 km of power transmission lines of 220 kV or above in 2023, the cumulative total length of the transmission grid reached 920,500 km, an increase of 4.3% y-o-y. Cross-regional and cross-provincial electricity transmission was growing rapidly. Cross-regional transmission was 849.7 TWh, an increase of 9.7%, to which the northwest region contributed 309.7 TWh (36.5% of the total) while inter-provincial electricity transmission was 1850 TWh, an increase of 7.2%.<sup>①</sup>

Figure 4 Trend of utilization hours of different power generation equipment from 2014 to 2023

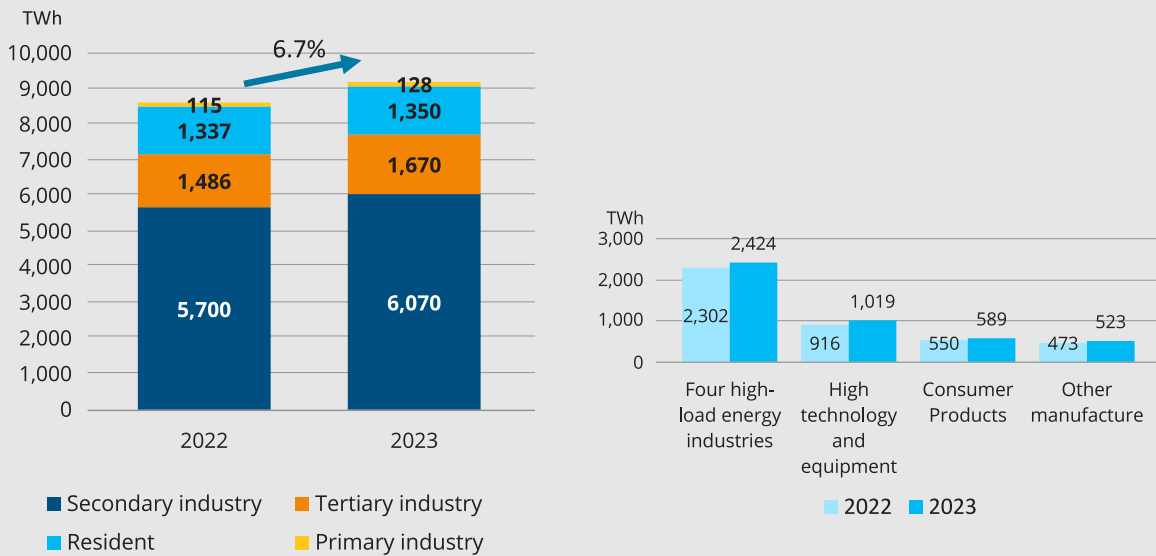


Source: China Energy Media Research Institute, April 2024



① China's power grid is divided into 6 regions, including: Northeast (Liaoning, Jilin, Heilongjiang, Inner Mongolia), Northwest (Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang), North-China (Jing-Jin-Ji, Shanxi, Shandong), East-China (Shanghai, Jiangsu, Zhejiang, Anhui, Fujian), Central-China (Henan, Sichuan, Chongqing, Hubei, Jiangxi, Hunan) and the South-China (Guangdong, Guangxi, Yunnan, Guizhou, Hainan)

**Figure 5 China electricity consumption by industries in 2023**



Source: China Energy Media Research Institute, April 2024; GIZ analysis, 2024

**In 2023, the total electricity consumption in the country was 9,220 TWh, an increase of 6.7%, and the per capita electricity consumption was 6,539 kWh.** In industry, the electricity consumption of the secondary industry sector was the highest with 6,070 TWh, accounting for 65.8%, of which the manufacturing industry consumed 4,554 TWh, increasing by 7.4%. The electricity consumption of the four high-load energy industries (chemical, non-metallic mineral products, ferrous metal smelting, nonferrous metal smelting industry ) was 2,424 TWh, accounting for 53.2%; while high-tech and equipment manufacturing industry and consumer products increased by 11.3% and 7.0% respectively.

In 2023, the electricity consumption of the tertiary industry sector was 1,670 TWh, up 12.2% y-o-y, indicating a steady recovery of the service economy with the end of the pandemic control. The rapid development of electric vehicles has driven the charging and battery swap service industry, and the electricity consumption in 2023 has increased by 78.1% y-o-y. Domestic electricity consumption of urban & rural residents was 1,350 TWh, up 0.9% y-o-y. **China's 31 provinces all registered growth in electricity consumption,** and the eastern, central, western and northeastern regions saw y-o-y growth of 6.9%, 4.3%, 8.1% and 5.1%, respectively, with the western region leading the growth.<sup>7,8</sup>

In the past year, China's energy policy continued to focus on ensuring the safe supply of energy, while emphasizing

the sector coupling of energy and digital information technology and accelerating the large-scale development of green low-carbon energy through demonstration projects. Carbon emission reduction has further become a strategic direction of economic and social development.

According to the forecast of the China Electricity Council, by the end of 2024, the installed capacity will reach 3,205 GW, with an increase of about 12%, of which the cumulative installed capacity of solar and wind will reach 1,300 GW, accounting for about 40% of the total installed capacity, exceeding the installed capacity of coal for the first time.

Taking into account factors such as macroeconomic development and electrification, it is expected that the total electricity consumption will reach 9,800 TWh in 2024, an increase of about 6% over 2023.<sup>9</sup>



**Figure 6 Essential energy policy paths for 2023**

January, <i>Opinions on Comprehensively Promoting the Key work of Rural Revitalization in 2023</i>	Promote the upgrading of rural power grids and develop rural REs
March, <i>Government Work Report</i>	Emphasis to strengthen energy reserves and increase the share of REs
March, <i>Several opinions on accelerating the development of digital and intelligent energy</i>	Integrated development of various energy sources, coupled development of energy and digital information technology
April, <i>Energy work Guidelines for 2023</i>	Energy supply and stable prices are the top priority, and fossil energy needs to remain as backup
July, <i>Opinions on promoting dual control of energy consumption gradually to dual control of carbon emissions</i>	Carbon reduction is a key strategic direction of economic and social development
September, <i>Pilot and demonstration programs to develop renewable energy</i>	Expand the application scenarios of REs, and promote technology, cost reduction, efficiency and mechanism improvement
October, <i>National carbon peak pilot construction program</i>	Carry out carbon peak pilot in 100 selected typical cities and industry parks, to explore paths for cities and parks which with different resource and development bases to achieve the carbon peak goal

Source: GIZ, March 2024

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*Note: All the data quoted in this paper are from official sources to the extent possible. Due to different statistical methods, some data differ from each other, and individual revisions have been made compared with last year's version, or adjustments have been made according to the actual situation. For data that does not affect the overall judgment, the original cited data is retained.*

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## Publisher:

Deutsche Gesellschaft für  
Internationale Zusammenarbeit (GIZ)  
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## Last updated:

 May 2024

This factsheet is published as part of  
the Sino-German Energy Transition  
Project (EnTrans). EnTrans is a  
component of the Sino-German Energy  
Partnership and provides advice to the  
Chinese government and associated

energy policy think tanks.

The GIZ leads the project  
implementation in cooperation with  
the German Energy Agency(dena) and  
Agora Energiewende collaborate with  
the China Electric Power Planning and  
Engineering Institute (EPPEI), the Energy  
Development Research Institute at the  
China Southern Power Grid (EDRI-CSG),  
and the Institute for Applied Ecology at  
the Chinese Academy of Sciences (IAE).



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