

Summary of China's energy and power sector statistics in 2022

(China Energy Policy Newsletter - Special issue of March 2023)

Summary of China's Energy and Power Sector Statistics is a special report released by the China Energy Transformation (CET) programme for the third consecutive year. The report mainly introduces the annual supply and consumption data¹ of energy and electricity, especially the development of renewable energy sources. The CET programme added contents of new-type energy storage, hydrogen energy and power market in the 2022 edition. All the data in the report are compiled and calculated based on the public information of Chinese ministries, government think tanks and industry associations, aiming to present accurate annual statistics of China's energy and power sector in English. The report is published every year as the March special issue of the *China Energy Policy Newsletter*, and you can download the [2021](#) and [2020](#) editions from the CET website. If you have any questions, please contact the [policy monitoring team](#) of the CET programme.

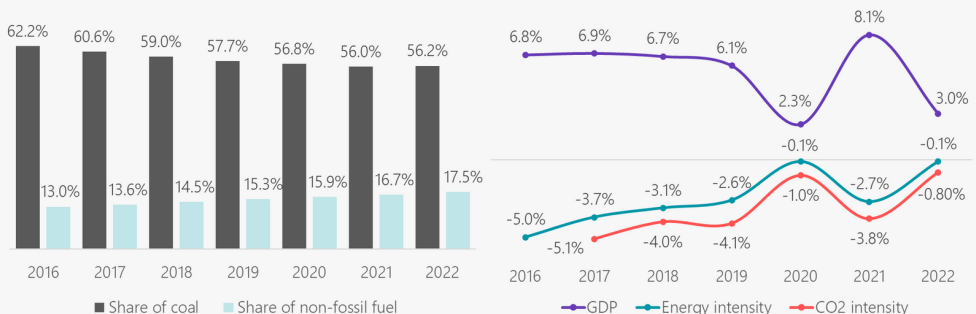
¹ All figures are based on coal substitution method.

Low-carbon energy transition continues to deepen

China's GDP growth rate in 2022 was 3.0%, lower than the development target of 5.5% due to factors such as the COVID-19 pandemic. In terms of industries, the proportions of primary industry (7.3%), secondary industry (39.9%) and tertiary industry (52.8%) mostly stayed the same compared with last year. The total primary energy consumption reached 5.4 billion tce (tonnes of coal equivalent), a year-on-year increase of 2.9%, a decrease of 2.3 percentage points from 2021, slightly lower than the GDP growth rate. Raw coal consumption continued to increase, but the growth rate decreased by 0.3 percentage points year-on-year to 4.3%. The consumption of natural gas and crude oil decreased for the first time since 2000, by 1.2% and 3.1%, respectively. Coal is still the dominant energy resource in China, accounting for 56.2% of the total primary energy consumption. However, the proportion of non-fossil energy continued to rise, and China's dependence on fossil fuels declined in overall. Energy consumption intensity (-0.1%) and carbon dioxide emission intensity (-0.8%) maintained a downward trend. The decline rates were the same as in 2020, with the low-carbon energy transition continuing to deepen. [11][12]

” *Non-fossil fuel accounted for about **17.5%** of total primary energy consumption in 2021, a year-on-year increase of 0.8 percentage points.*

2016-2022 The proportion of coal and non-fossil energy in total primary energy consumption (left); 2016-2022 The annual growth rate of GDP, energy consumption intensity and carbon intensity (right)



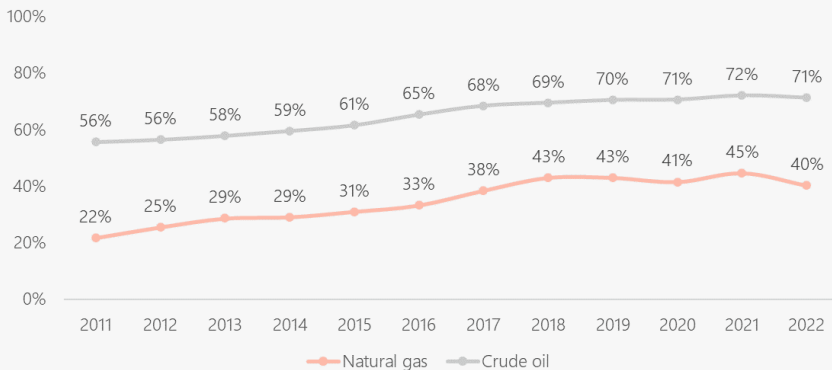
Note: Energy consumption intensity refers to energy consumption per RMB 10,000 GDP; carbon intensity refers to CO2 emission per RMB 10,000 GDP.

Source: National Bureau of Statistics (NBS), accessed in March 2023

Significant reduction in fossil energy imports

Affected by rising global energy prices and tight supply, China has increased energy production to ensure energy security. In 2022, China's total primary energy production reached 4.7 billion tce, a year-on-year increase of 9.2%, an increase of 3 percentage points from 2021. Among these, the annual growth rate of raw coal production reached 10.5%, an increase of 4.8 percentage points year-on-year; the growth rate of natural gas production slowed down, with a year-on-year decrease of 1.8 percentage points; the growth rate of crude oil production increased steadily, an increase of 0.8 percentage points year-on-year. At the same time, China has reduced its imports of fossil fuels. Among these, coal imports decreased by 9.2% year-on-year; natural gas imports fell by 9.9% year-on-year despite years of continuous import growth; crude oil imports fell by 0.9% on the basis of the first decline of 5.4% in 2021. [11] Coal continued to play a ballasting role in ensuring energy supply, and the import dependence on natural gas and crude oil both dropped for the first time, with the import dependence on natural gas decreased by 4.4 percentage points year-on-year to 40.2%, and that of crude oil decreased by 0.8 percentage points year-on-year to 71.2%. [13]

2011-2022 Import dependence on natural gas and crude oil



Source: NBS and China Petroleum and Chemical Industry Federation (CPCIF), accessed in March 2023



The total electricity consumption is lower than expected

In 2022, the electricity consumption of China's whole society was 8,637 TWh, a year-on-year increase of 3.6%, lower than the 5%~6% forecast by the China Electricity Council (CEC) at the beginning of the year. This was mainly due to the impact of the COVID-19 pandemic and the slowdown in economic growth, the growth rate of electricity consumption in the secondary industry, which accounts for the largest proportion, was only 1.2% in 2022. In terms of regions, 27 out of 31 provinces saw positive growth in electricity consumption, among which the electricity consumption in central China (6.7%), eastern China (4.2%) and northwest China (2.4%) increased significantly year-on-year. In terms of industries, the electricity consumption of residents grew the fastest, reaching 13.8%, followed by the primary industry (10.4%), the tertiary industry (4.4%) and the secondary industry (1.2%). [3]



Primary industry - Further promoted the retrofit of rural power grids, and the level of electrification continued to increase, driving electricity consumption to maintain double-digit growth.



Secondary industry - Industrial electricity consumption showed negative growth in the second and fourth quarters. Especially in energy-intensive industries, electricity consumption in the building materials and cement industries decreased by 15.9% year-on-year, the ferrous metal smelting industry decreased by 4.8% year-on-year, and the non-metallic mineral products industry decreased by 3.2% year-on-year. However, the electricity consumption of some high-tech and equipment manufacturing industries has grown rapidly, such as the electricity consumption of the new energy vehicle manufacturing industry, which increased by 71.1% year-on-year.

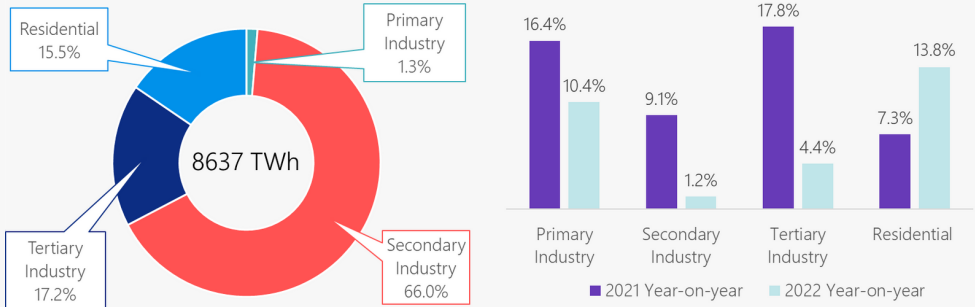


Tertiary industry - Affected by the COVID-19 pandemic, the growth rate of electricity consumption in the service industry dropped significantly. Despite this, the electricity consumption of the electric vehicle charging service industry still increased by 38.1% year-on-year.



Urban and rural residents - The continuous high temperature in summer and the extremely cold weather in winter drove the rapid growth of residential electricity consumption. The growth rate of electricity consumption in the third and fourth quarters reached 19.8% and 14.9%, respectively.

2022 Total electricity consumption by sector (left); 2021-2022 Year-on-year growth rate of electricity consumption by industry (right)



Source: China Electricity Council (CEC), accessed in March 2023

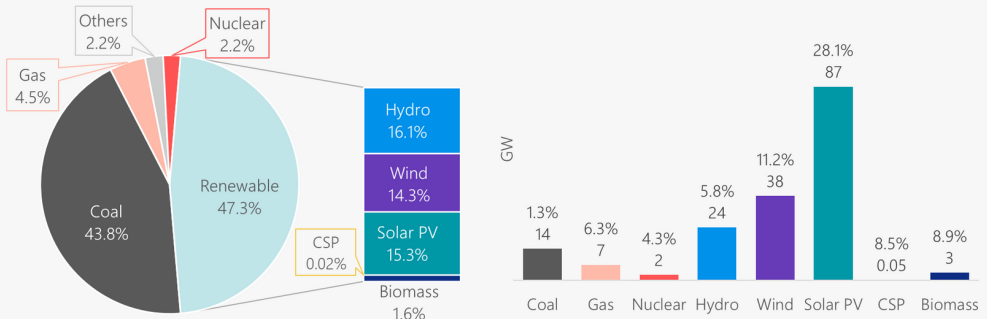


The installed capacity of non-fossil power generation accounts for nearly half

By the end of 2022, China's total installed power generation capacity reached 2,564 GW, a year-on-year increase of 7.8%, and the growth rate was the same as that in 2021. [2] Among these, the proportion of non-fossil energy in the total installed capacity increased to 49.6%, and its proportion in the annual power investment reached 87.7%. The total installed capacity of renewable energy power generation exceeded 1,200 GW, of which wind power and solar PV have become the mainstay of newly added capacity, accounting for 66.2% in 2022. The newly installed capacity of coal power was 14 GW, which was 16 GW less than that in 2021 and lower than the 31 GW forecast by the CEC at the beginning of the year. The total installed capacity of coal power reached 1,123 GW, and its proportion further dropped from 46.7% to 43.8%. [6]

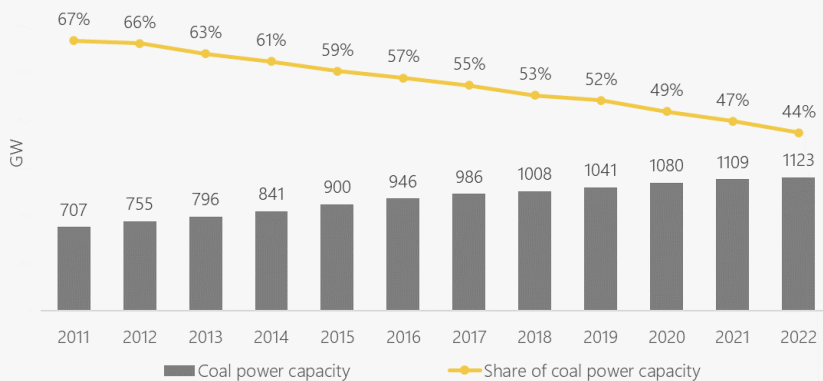
” Renewable energy accounted for 47.3% of the total installed power generation capacity, a year-on-year increase of 2.6 percentage points.

2022 Total installed power generation capacity and proportion by fuel (left); 2022 Newly installed power generation capacity and year-on-year growth rate by fuel (right)



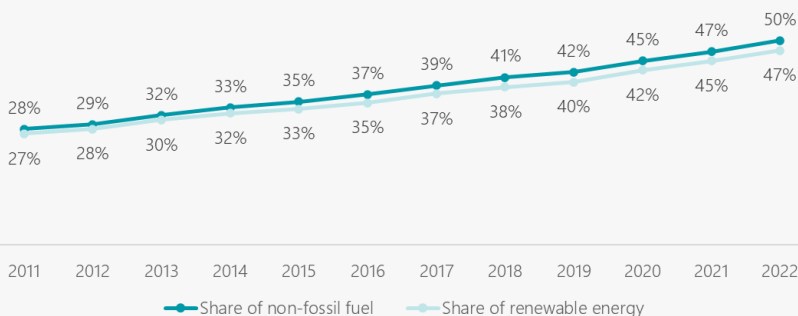
Source: Data on nuclear, hydro, wind, solar PV and biomass are from the National Energy Administration (NEA), February 2023; data on CSP is from China Solar Thermal Alliance (CSTA), January 2023; data on coal and others are calculated based on CEC, NEA and CSTA's data, accessed in March 2023

2011-2022 Total installed capacity and proportion of coal power



Source: CEC, accessed in March 2023

2011-2022 Proportion of non-fossil energy and renewable energy in total installed power generation capacity

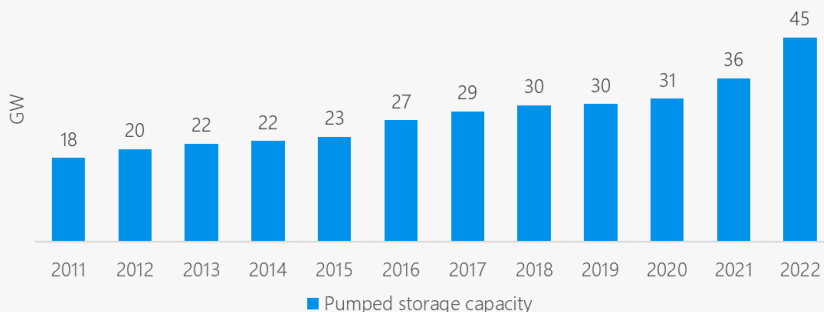


Source: Calculated based on CEC and NEA's data, accessed in March 2023

Pumped storage and solar PV development speed up

The total installed capacity of hydropower reached 414 GW in 2022, of which 24 GW was newly installed, the same as that in 2021. Pumped storage, a key expanding flexible power source during the 14th Five-Year Plan period (2021-2025), saw a rapid proportion increase from 9.2% to 36.9% in newly installed hydropower. [1] For the development status and latest policies of pumped storage in China, please see [here](#). The installed capacity of non-hydro renewable energy accounted for more than 30%, and the total installed capacity of solar PV surpassed that of wind power for the first time. The growth rate of wind power capacity and biomass power capacity slowed down. As one of the key development goals of the 14th Five-Year Plan, for the development status and latest policies of large-scale wind power and solar PV bases, please see [here](#).

2011-2022 Total installed capacity of pumped storage power



Source: CEC and NEA, accessed in March 2023



Solar PV - The newly installed solar PV capacity was 87 GW, an increase of 34 GW year-on-year, and the total installed capacity reached 392 GW. [1] The ratio of utility-scale capacity and distributed capacity was 6:4. Distributed solar PV remained to be the main body of newly added solar PV capacity, accounting for 58.5% in 2022. Although the national feed-in tariff subsidy for household solar PV has been withdrawn from 2022, the newly installed capacity of household solar PV still increased by 17.1% year-on-year to 25 GW; distributed industrial and commercial solar PV has been growing explosively, and newly installed capacity was 3.4 times that of 2021, reaching 26 GW.

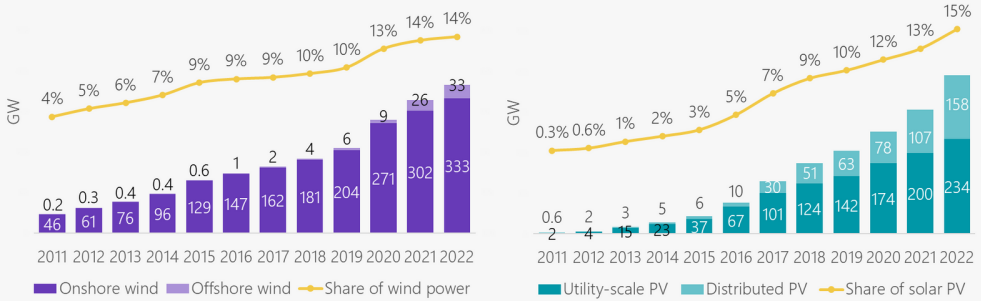


Wind power - The newly installed capacity of wind power was 38 GW, a year-on-year decrease of 10 GW, and the total installed capacity was 365 GW. This was mainly due to a decline in offshore wind power installations. 2022 was the first year to withdraw the national feed-in tariff subsidy for offshore wind power and a period of accumulation for a new round of project construction. Despite this, the newly installed capacity of offshore wind power was still the second highest in history, reaching 5 GW, which shows the enthusiasm for offshore wind power development.



Biomass power - The newly installed biomass power capacity was 3.3 GW, a year-on-year decrease of 4.3 GW, and the total installed capacity reached 41 GW. This was mainly due to the decrease in the installed capacity of power generation from agricultural and forestry residues caused by the reduction of the national feed-in tariff subsidy. Waste power generation is relatively less affected and is still the main force for newly increased biomass power capacity. [1][9][17]

2011-2022 Total installed capacity and proportion of wind power (left) and solar PV (right)



Source: NEA, accessed in March 2023



Renewable energy accounts for more than 30% of power generation

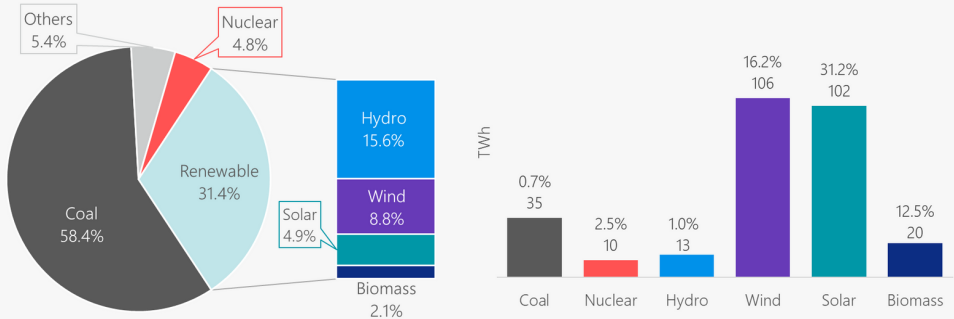
In 2022, China's total power generation was 8,694 TWh², a year-on-year increase of 3.8%, and a decrease of 7.6 percentage points compared to 2021. Coal power was still the most important power source, accounting for 58.4% of total power generation, but its growth rate increased by 0.7% year-on-year only. Non-fossil power generation increased by 8.7% year-on-year, significantly higher than the growth rate of total power generation and electricity consumption, accounting for 36.2% of the total electricity consumption. [6] Among these, the total power generation of wind power and solar PV exceeded 1,000 TWh, a year-on-year increase of 21%, accounting for 13.8% of the total electricity consumption, which is close to the domestic electricity consumption of all urban and rural residents. The role of renewable energy in securing energy supplies is becoming increasingly apparent. [1]



Renewable energy accounted for **31.6%** of the total electricity consumption, an increase of **1.7 percentage points** year-on-year.

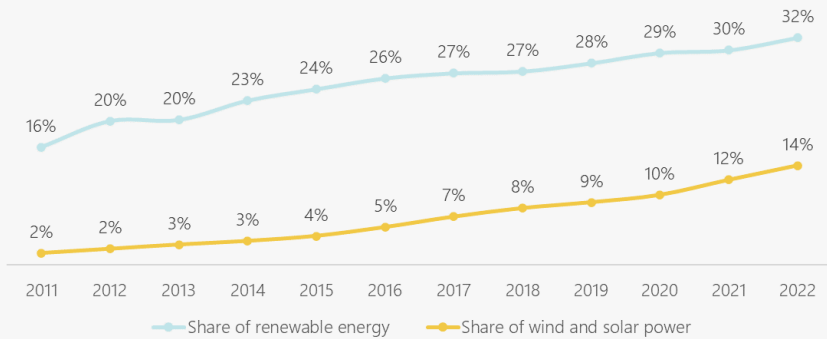
² 8,694 TWh is the full-caliber power generation in China obtained through calculation, so it is higher than the 8,389 TWh power generation of large-scale industrial enterprises announced by the China Electricity Council in the 2022 *Express List of National Electricity Industry Data*.

2022 Total power generation and proportion by fuel (left); 2022 Newly added power generation and year-on-year growth rate by fuel (right)



Source: Data on coal, nuclear, and hydro are from CEC, February 2023; data on wind, solar and biomass are calculated based on CEC and NEA's data, accessed in March 2023

2011-2022 The proportion of renewable, wind power and solar PV in total electricity consumption

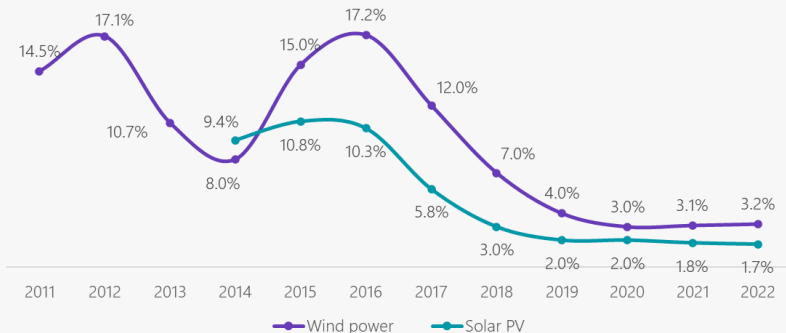


Source: CEC, NEA and NBS, accessed in March 2023

In 2022, the overall operating efficiency of power-generating units across the country declined, and the annual average full load hours decreased by 125 hours to 3,687 hours. Among these, the full load hour of solar power generation increased by 56 hours year-on-year, while coal power (-8 hours) and wind power (-9 hours) remained stable. Affected by factors such as gas prices and water flow, gas power (-258 hours), nuclear power (-186 hours) and hydropower (-194 hours) saw significant declines. [6]

The average utilisation rates of wind power and solar PV were 96.8% and 98.3%, respectively, both higher than the binding target of 95%, basically the same as that in 2021. The utilisation rate of wind power in other provinces was higher than 95% except for western Inner Mongolia, Gansu and Qinghai; the utilisation rate of solar PV in other provinces was higher than 95% except for Qinghai and Tibet. Based on this calculation, the national wind curtailment rate was 3.2%, and the solar curtailment rate was 1.7% in 2022. [4]

2011-2022 Wind power and solar PV curtailment rates

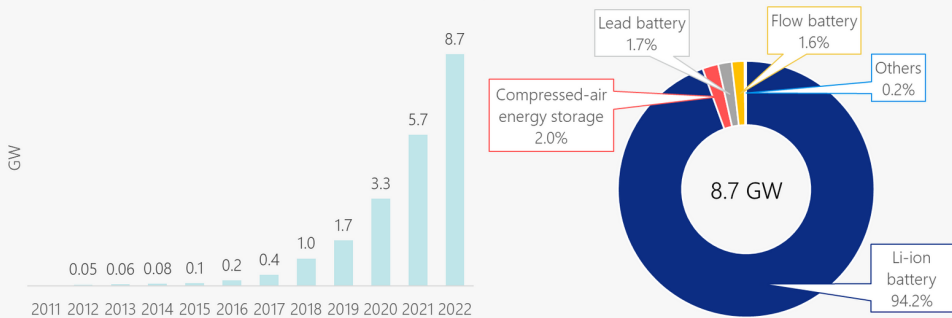


Source: NEA and National New Energy Consumption Monitoring and Warning Centre (NECMWC), accessed in March 2023

New-type energy storage continues to maintain rapid growth

In February 2022, the National Development and Reform Commission (NDRC) and the National Energy Administration (NEA) jointly issued the *14th Five-Year Plan for Implementing the New-Type Energy Storage Development*, requiring the new-type energy storage³ industry to be capable for large-scale commercial application by 2025. [19] For details of the policy, please see [here](#). In 2022, the new-type energy storage industry maintained rapid development, with a cumulative installed capacity of 8.7 GW, a year-on-year increase of 51.8%, and an average energy storage time of about 2.1 hours. Among the newly installed capacity, Shandong and Ningxia each accounted for 30%, with hundreds of mega-watt projects becoming the norm. By 2022, the top five provinces in terms of total installed capacity were Shandong (1.6 GW), Ningxia (0.9 GW), Guangdong (0.7 GW), Hunan (0.6 GW) and Inner Mongolia (0.6 GW). In terms of technology, lithium-ion battery energy storage had the absolute dominant position, accounting for 94.5% of the total installed capacity; the proportion of compressed air energy storage and liquid flow batteries saw a significantly faster growth rate; flywheel, gravity, sodium ion and other energy storage technologies entered the engineering demonstration stage. [1]

2011-2022 Total installed capacity of new-type energy storage (left); 2022 Total installed capacity of new-type energy storage by technology (right)



Source: NEA and China Energy Storage Alliance (CESA), accessed in March 2023

³ New-type energy storage refers to energy storage technologies other than pumped storage.

Green hydrogen promotes the whole industry chain of hydrogen energy

In March 2022, the NDRC and the NEA jointly issued the *Medium and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)*, proposing to focus on developing hydrogen production from renewable energy. [18] For details of the policy, please see [here](#). According to statistics, more than 40 green hydrogen projects were put into operation in China in 2022, mainly distributed in Inner Mongolia, Hebei, Ningxia, Gansu, and Xinjiang with rich wind and solar resources. Driven by the green hydrogen project, the production, storage, transportation, refuelling of hydrogen energy, and the application of fuel cells achieved all-around development in 2022. At present, five hydrogen energy demonstration city clusters have been formed in Beijing, Shanghai, Guangdong, Henan and Hebei. [17]

Hydrogen production by water electrolysis - The low-cost alkaline electrolyser is widely used in China for green hydrogen production equipment. The hydrogen production capacity of a single mainstream electrolyser is 1,000 standard cubic meters per hour, and the power consumption is 4~5 kWh/Nm³. Due to the high cost of proton exchange membrane (PEM) electrolysers, the large-scale application has not yet been realised.

Hydrogen energy storage and transportation - Hydrogen energy is mainly transported in the form of high-pressure gas, and the 20 MPa tube bundle vehicle is the main means of transportation. Constrained by technology and safety standards, China will still adopt this storage and transportation method in the short term.

Hydrogen refuelling stations - China has built more than 270 hydrogen refuelling stations, including 100 pure hydrogen refuelling stations and 50 oil-hydrogen joint stations. Guangdong (47), Shandong (27) and Jiangsu (26) ranked in the top three.

Fuel cell vehicles - With the implementation of local subsidy policies, some cities have accelerated the deployment of fuel cell vehicles. Among these, the sales of fuel cell heavy trucks increased by more than 200% year-on-year, accounting for half of the annual sales of fuel cell vehicles, showing a strong development momentum. Fuel cell vehicles continued to develop in the direction of large power. The proportion of large-power systems (above 70kW) reached 83% at the end of 2022.

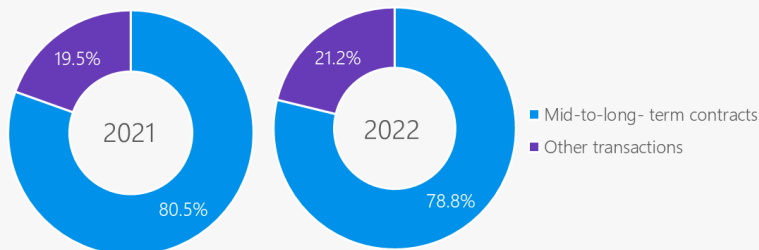


Spot power market construction further improves

In 2022, China's market-based power transactions increased significantly, with the annual transaction volume reaching 5,254 TWh, a year-on-year increase of 39%. It accounted for 60.8% of the total electricity consumption, a rise of 15.4 percentage points year-on-year. Among these, medium and long-term transactions increased by 36.2% year-on-year, accounting for 78.8% of the annual transaction volume. [14] The spot trading volume of electricity is still very limited.

China has established 14 provincial-level spot power markets, of which five have achieved continuous settlement throughout the year. China Southern Power Grid launched the first regional spot power market in 2022, preparing for the realisation of inter-provincial spot transactions. For details on the development status of China's spot power market, please see [here](#). To effectively increase the volume of spot transactions and promote the construction of the spot power market from pilots to the whole country, in November 2022, the NEA issued the *Basic Rules for the Electricity Spot Market (Draft for Comments)* and *Measures for the Supervision of the Electricity Spot Market (Draft for Comments)*. The two policy drafts proposed the construction path of provincial, inter-provincial and inter-regional spot power markets, and further clarified the basic rules of the spot power market. [15] For more information on the policy, please see [here](#).

2021-2022 National market-based power transaction volume



Source: CEC, accessed in March 2023

Power sector development outlook and policy trends in 2023

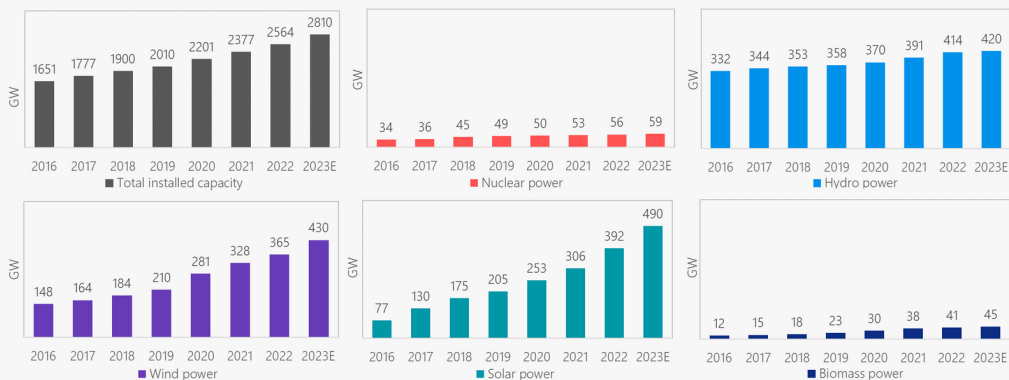


Power sector development outlook

According to the forecast of the CEC, with the overall economic operation recovery, the national electricity demand of China is expected to increase by about 6% to reach 9,150 TWh in 2023. Favourable real estate policies will promote the recovery of electricity consumption in the steel and building materials industries; the adjustment of the COVID-19 pandemic prevention and control measures will become the main driving force for the increase in electricity consumption in the tertiary industry. Due to the uncertainties in precipitation, wind and solar resources and fuel supply, it is expected that the national power supply and demand will be in a tight balance. Among these, the power supply in the central, eastern and southern regions will be tight in summer; the power supply in the central, eastern, southern and northwest regions will be tight in winter. [6]

Installed power generation capacity - It is estimated that the total installed power generation capacity in China will reach about 2,810 GW in 2023, and the proportion of non-fossil energy will reach 52.5%. Among these, nuclear power is 59 GW, hydropower is 420 GW, wind power is 430 GW, solar power is 490 GW, and biomass power is 45 GW. The installed capacity of both wind power and solar power will surpass that of hydropower for the first time. [6]

2016-2023E Total installed capacity by fuel



Source: CEC and NEA, accessed in March 2023

New-type energy storage - In 2022, the total newly planned and under-construction new-type energy storage projects nationwide were around 102 GW, most of which planned to be implemented between 2023 and 2024, far exceeding the installed capacity target of 30 GW in 2025. Based on it, the China Energy Storage Alliance (CESA) predicts that new-type energy storage will continue to develop rapidly, and the compound annual growth rate during the 14th Five-Year Plan period will remain between 55% and 70%. [16]

Hydrogen - In the hydrogen energy field, local provinces have announced 35 critical projects in early 2023, with a total investment of more than 49 billion RMB. [21] However, China's current green hydrogen industrialisation process still faces major challenges, including insufficient economics and unclear technical routes for large-scale production. It is necessary to strengthen policy support to steadily build a green hydrogen industrial system. [17]



New energy policy trends in 2023

01 | Renewable power project construction

In addition to continuing to promote large-scale wind power bases in desert areas, the government will formulate and launch policies for other key projects proposed in the *14th Five-Year Plan for Renewable Energy Development*, such as deep-sea wind power demonstration, rural decentralized wind power and distributed solar PV, new energy power station upgrading and rural energy revolution pilot counties.

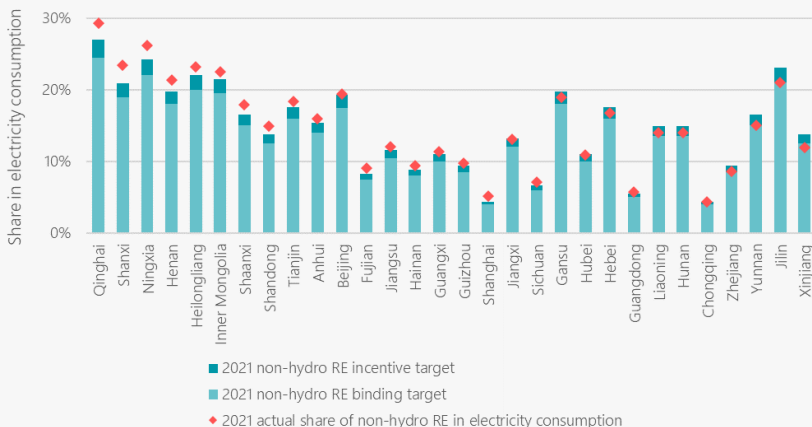
02 | Renewable power consumption

The government will continue to increase the mandatory annual renewable power consumption targets of each province, and at the same time, implement the policy that an annual increase in renewable power consumption during the 14th Five-Year Plan period compared with the previous year will be deducted from the national and local energy consumption assessment, to enhance the consumption capacity of renewable power.

Green power trading and green certificate policies will also be refined. China launched two green power trading pilots in July 2021. This is an independent trading system for green power established under the mid-to-long-term power transaction framework. When purchasing green power, the buyers obtain corresponding retroactive green certificates. Currently the sellers of green power/green certificates mainly cover wind power and solar PV generators. For the next step, the energy administrative department will formulate detailed rules for issuing green certificates for all types of

renewable power projects, promote price-parity and subsidized renewable power projects to participate in green power trading in different ways, and promote green power consumption authentication and identification mechanisms. For details on the green power trading pilots, see [here](#); for details on the green certificate mechanism, see [here](#); for the green certificate transactions in 2022, see [here](#).

Completion status of 2021 renewable energy power consumption targets by province



Notes: This is ranked by the surplus amount of actual consumption compared with the binding target.

Source: NEA, May 2022

03 | Power market

The government will continue to improve the construction of the power market system and the adaptability to a high proportion of new energy. The scale and mode of the participation of renewable power projects will continue to expand, including the medium- to-long-term contract market, the spot market, and the ancillary service market.

04 | Law formulation

The government will promote the revision of the *Renewable Energy Law* around the new situation and new requirements for the development of renewable energy.

Appendix - China's energy and power sector statistic datasheet in 2022

	Amount	Year-on-year	Amount	Year-on-year
Energy consumption	Data		Reference	
Total (billion tce)	5.4	2.9%	[11]	[11]
Coal (billion tons)	4.4	4.3%	[11][20] calculated	[11]
Natural gas (billion m3)	365	-1.2%	[11][20] calculated	[11]
Crude oil (million tons)	701	-3.1%	[11][20] calculated	[11]
Share of coal	56.2%	0.2pct	[11]	[11][20] calculated
Share of non-fossil fuel	17.5%	0.8pct	[12]	[12]
Energy production				
Total (billion tce)	4.7	9.2%	[11]	[11]
Raw coal (billion tons)	4.6	10.5%	[11]	[11]
Natural gas (billion m3)	220	6.0%	[11]	[11]
Crude oil (million tons)	205	2.9%	[11]	[11]
Energy import (million tons)				
Coal	293	-9.2%	[11]	[11]
Natural gas	109	-9.9%	[11]	[11]
Crude oil	508	-0.9%	[11]	[11]
Electricity consumption (TWh)				
Total	8637	3.6%	[3]	[3]
Primary Industry	115	10.4%	[3]	[3]
Secondary Industry	5700	1.2%	[3]	[3]
Tertiary Industry	1486	4.4%	[3]	[3]
Residential	1337	13.8%	[3]	[3]
Power installed capacity (GW)				
Total	2564	7.8%	[2]	[2]
Thermal *	1291	2.6%	[1] calculated	[1][20] calculated
of which coal	1123	1.3%	[2][6] calculated	[2][6][20] calculated
of which natural gas	115	6.3%	[10]	[10][20] calculated
of which oil, exhaust heat, surplus pressure and gases	53	28.5%	[1][2][6][10] calculated	[1][2][6][10][20] calculated
Nuclear	56	4.3%	[2]	[2]
Hydro	414	5.8%	[2]	[2]
of which pumped storage	45	24.3%	[1]	[1] calculated
Wind	365	11.2%	[2]	[2]
of which onshore wind **	335	10.9%	[2][8] calculated	[2][8][20] calculated
of which offshore wind	31	15.6%	[8]	[8][20] calculated
Solar PV	392	28.1%	[9]	[9][4] calculated
of which utility-scale PV	234	17.2%	[9]	[9][20] calculated
of which distributed PV	158	46.7%	[9]	[9][20] calculated
CSP	0.6	8.5%	[7]	[7] calculated
Biomass	41	8.9%	[1]	[1] calculated
Other non-fossil fuels	4.6	225.9%	[1][2][6][7][9][10] calculated	[1][2][6][7][9][10][20] calculated
New-type energy storage	8.7	51.8%	[1]	[1][5] calculated
Non-fossil fuel	1273	13.9%	[1][2][6][7][9][10] calculated	[1][2][6][7][9][10][20] calculated
Renewable energy	1213	14.3%	[1][2][7][9] calculated	[1][2][7][9] calculated
Share of non-fossil fuel	49.6%	2.6 pct	[1][2][6][7][9][10] calculated	[1][2][6][7][9][10][20] calculated
Share of renewable energy	47.3%	2.6 pct	[1][2][7][9] calculated	[1][2][20] calculated
Power generation (TWh)				
Total	8694	3.8%	[3][6] calculated	[3][6][20] calculated
Thermal *	5547	1.2%	[1][3][9][11] calculated	[1][3][9][11][20] calculated
of which coal	5077	0.7%	[6]	[6]
of which natural gas, oil, exhaust heat, surplus pressure and gases	469	3.0%	[1][3][6][9][11] calculated	[1][3][6][9][11][20] calculated
Nuclear	418	2.5%	[11]	[11]
Hydro	1355	1.0%	[11]	[11]
Wind	763	16.2%	[11]	[11]
Solar	427	31.2%	[11]	[11]
Biomass	184	12.5%	[1][3][11] calculated	[1][3][11][20] calculated
Other non-fossil fuels	0.1	-54.3%	[1][3][6][9][11] calculated	[1][3][6][9][11][20] calculated
Non-fossil fuel	3147	8.7%	[3][6] calculated	[6]
Renewable energy	2729	9.9%	[1][3] calculated	[1][3][20] calculated
Share of non-fossil fuel	36.2%	1.7 pct	[3][6] calculated	[3][6][20] calculated
Share of renewable energy	31.4%	1.8 pct	[1][3][6] calculated	[1][3][6][20] calculated
Utilization hours (hours)				
National	3687	-125	[6]	[6]
Thermal	4379	-65	[6]	[6]
of which coal	4594	-8	[6]	[6]
of which natural gas	2429	-258	[6]	[6]
Nuclear	7616	-186	[6]	[6]
Hydro	3412	-194	[6]	[6]
Wind	2221	-9	[6]	[6]
Solar	1337	56	[6]	[6]
Curtailement				
Wind	3.2%	-0.1 pct	[4]	[4][20] calculated
Solar PV	1.7%	-0.1 pct	[4]	[4][20] calculated

*The figure of thermal power is revised as CEC's thermal power - NEA's biomass power because CEC's thermal power data includes biomass. ** The figure of onshore wind is calculated by NEA's total wind power - CWEA's offshore wind power.

References

- [1] "国家能源局举行新闻发布会，发布2022年可再生能源发展情况等," National Energy Administration, 14 February 2023, accessed at <http://www.rmzxb.com.cn/c/2023-02-14/3291928.shtml>.
- [2] "国家能源局发布2022年全国电力工业统计数据," National Energy Administration, 16 January 2023, accessed at <http://www.rmzxb.com.cn/c/2023-02-13/3291158.shtml>.
- [3] "2022年全国电力工业统计快报一览表," China Electricity Council, 18 January 2023, accessed at <https://www.cec.org.cn/upload/1/editor/1674033286551.pdf>.
- [4] "2022年12月全国新能源并网消纳情况," National New Energy Consumption Monitoring and Alarming Centre, 13 February 2023, accessed at <https://mp.weixin.qq.com/s/W0uUfhBa6n8Sb80EFLaqhg>.
- [5] "《储能产业研究白皮书2022》," China Energy Storage Alliance, 26 April 2022, accessed at <http://www.esresearch.com.cn/#/resReport/Rdetail>.
- [6] "中电联发布2023年度全国电力供需形势分析预测报告," China Electricity Council, 19 January 2023, accessed at <https://cec.org.cn/detail/index.html?3-317477>.
- [7] "《中国太阳能热发电行业蓝皮书2022》发布," China Solar Thermal Alliance and China Renewable Energy Society, 1 February 2023, accessed at <http://obor.nea.gov.cn/detail/2/18832.html>.
- [8] "2022风电数据出炉：金风吊装量第一，远景海外发运第一," Chinese Wind Energy Association, 28 February 2023, accessed at <https://new.qq.com/rain/a/20230228A01JR100>.
- [9] "2022年光伏发电建设运行情况," National Energy Administration, 17 February 2023, accessed at http://www.nea.gov.cn/2023-02/17/c_1310698128.htm.
- [10] "中国电力版图（2022版）," Power Knowledge, 20 February 2023, accessed at <https://www.163.com/dy/article/HTVU1KHU0514DRR7.html>.
- [11] "中华人民共和国2022年国民经济和社会发展统计公报," National Statistic Bureau, 28 February 2023, accessed at http://www.stats.gov.cn/tjsj/zxfb/202302/t20230227_1918980.html.
- [12] "盛来运：风高浪急显韧劲 踔厉奋发再创新绩——《2022年国民经济和社会发展统计公报》评读," National Statistic Bureau, 28 February 2023, accessed at http://www.stats.gov.cn/tjsj/sjld/202302/t20230227_1918981.html.
- [13] "中国油气对外依存度历史首次双下降," China Petroleum and Chemical Industry Federation, 17 February 2023, accessed at <https://baijiahao.baidu.com/s?id=1758036640441851022&wfr=spider&for=pc>.
- [14] "2022年1-12月份全国电力市场交易简况," China Electricity Council, 28 January 2023, accessed at <https://cec.org.cn/detail/index.html?3-317500>.
- [15] "国家能源局综合司关于公开征求《电力现货市场基本规则（征求意见稿）》《电力现货市场监管办法（征求意见稿）》意见的通知," National Energy Administration, 22 November 2022, accessed at http://www.nea.gov.cn/2022-11/25/c_1310679693.htm.
- [16] "CNESA重磅 | 2022储能产业盘点：大势已成，因势而动," China Energy Storage Alliance, 16 January 2023, accessed at https://www.sohu.com/a/630755876_121123908.
- [17] Energy Research Institute of Chinese Academy of Macroeconomic Research.
- [18] "《氢能产业发展中长期规划（2021-2035年）》," National Energy Administration, 23 March 2022, accessed at http://zfxqk.nea.gov.cn/2022-03/23/c_1310525630.htm.
- [19] "关于印发《“十四五”新型储能发展实施方案》的通知,发改能源[2022]209号," National Development and Reform Commission and National Energy Administration, 22 February 2022, accessed at https://www.sohu.com/a/525162072_120112874.
- [20] "Summary of statistic data in China energy and power sectors in 2021," Danish Energy Agency, 15 March 2021, accessed at <https://www.cet.energy/2022/03/15/summary-of-statistic-data-in-china-energy-and-power-sectors-in-2021/>.
- [21] "投资超490亿！2023年全国氢能重点项目盘点！" Wind Power Headline, 16 February 2023, accessed at <https://baijiahao.baidu.com/s?id=1757980336361065577&wfr=spider&for=pc>.