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CHINA ENERGY POLICY NEWSLETTER

China Energy Transformation Programme

1. China energy transition updates

China to focus on controlling fossil energy consumption in 2023

On March 5, 2023, at the first meeting of the 13th National People's Congress, then Premier Li Keqiang read out the *2023 Government Work Report* on behalf of the State Council. China's GDP growth target for 2023 is around 5%, which is slightly lower than the target for 2022 (5.5%) and the average growth rate (5.2%) in the past five years, and economic growth is expected to remain stable. For the energy field, in terms of ensuring energy security, the government requires strengthening domestic exploration and development of critical energy and mineral resources and increasing reserves and production; in terms of green transformation, the *Report* clearly states that energy consumption per unit of GDP and emissions of major pollutants should continue to decline, and focuses on controlling fossil energy consumption and stably improving the quality of the ecological environment. In 2023, China will accelerate the construction of a new-type energy system, promote the clean and efficient utilisation of coal, and technology research and development, and increase the proportion of renewable energy.¹

China's electrification process is accelerating

The China Electricity Council (CEC) recently released the *China Electrification Annual Development Report 2022*, summarising the progress of China's electrification in 2021. By the end of 2021, electricity accounted for 26.9% of total final energy consumption, the largest year-on-year increase in the past five years, an increase of 4.8 percentage points from 2016. The country achieved 189 TWh of electricity replacement to fossil energy throughout the year, accounting for 23.3% of the electricity increment. Electrification has been accelerating nationwide, with heat pump heating/cooling, electric vehicles, and EV charging and battery swapping industries performing most significantly.

¹ “政府工作报告——2023年3月5日在第十四届全国人民代表大会第一次会议上,” State Council, 5 March 2023, accessed at <http://www.gov.cn/zhuanti/2023lhfgzbg/index.htm>.

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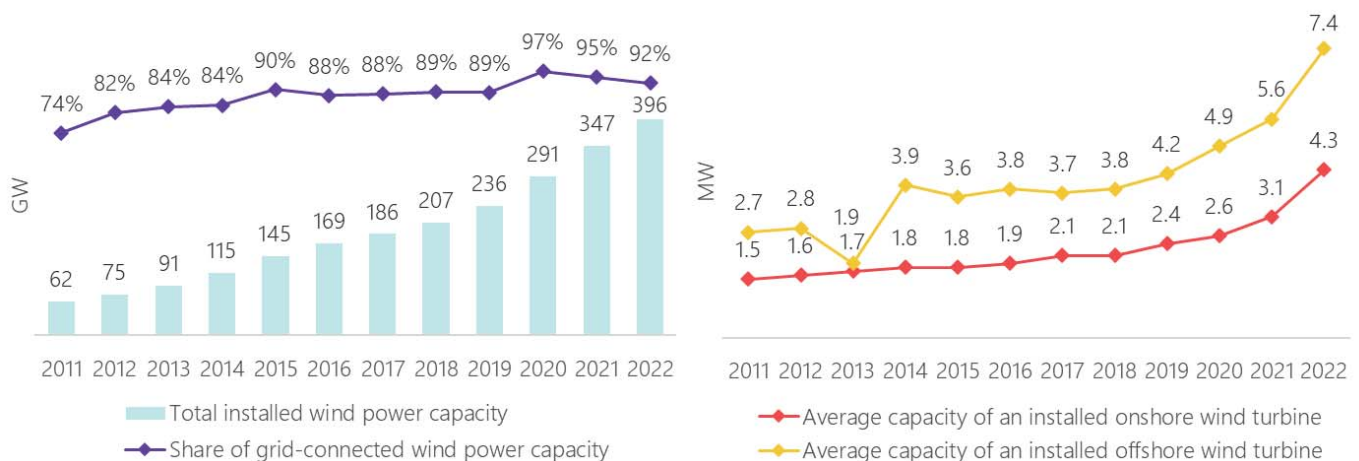
The electrification process in China is generally in the middle stage of development. Among the energy end-use sectors, the building sector ranks first in electrification rate, reaching 44.9%, and the year-on-year increase is also the largest, followed by agriculture and rural household electricity consumption (35.2%), industry (26.2%) and transportation (3.9%). The country's per capita domestic electricity consumption has reached 835 kWh/person, one-third of the OECD countries. The average annual power outage time of power users is 11.26 hours per household, of which Beijing, Shanghai, Tianjin, Guangzhou, and Shenzhen all have less than 1 hour per household. From a geographical point of view, the coastal Guangdong-Hong Kong-Macao Greater Bay Area and the Yangtze River Delta region have the highest degree of electrification; Beijing, Tianjin, and Qinghai have the most considerable electrification growth rates; Northeast China, Hebei, Shanxi, and Xinjiang have just entered the middle stage of electrification.²

CWEA published the statistics on China's wind power industry in 2022

According to statistics from the China Wind Energy Association (CWEA), the cumulative installed capacity³ of wind power units in China reached 396 GW in 2022, a year-on-year increase of 14.1%, of which 365 GW was onshore wind power and 30 GW was offshore wind power. In 2022, the newly installed onshore wind power unit reached 45 GW, an increase of 4 GW year-on-year, accounting for 89.7% of total incremental wind power units; the average capacity of new units was 4.3 MW, a year-on-year increase of 37.9%. The proportion of units of 3 MW and above in the total installed capacity increased by 4.3 percentage points year-on-year to 27.3%. The market share of Goldwind, Envision Energy, and Mingyang Smart Energy ranked among the top three, reaching 24.1%, 11.6%, and 9.0%, respectively. Their market concentration has increased slightly, and the total proportion has increased by one percentage point year-on-year.

Offshore wind power units increased by 5 GW, a year-on-year decrease of 9 GW, accounting for 10.3%; the average newly installed capacity of the individual unit was 7.4 MW, a year-on-year increase of 33.4%. The proportion of 5 MW and above units in the total installed capacity increased by seven percentage points year-on-year, accounting for 65.8%. Shanghai Electric Wind Power, Mingyang Smart Energy, and Goldwind ranked in the top three in terms of market share, reaching 32.6%, 22.1%, and 14.1%, respectively. Their market concentration decreased slightly, and the total proportion decreased by two percentage points year-on-year.⁴

2011-2022 Total installed and grid-connected wind power capacity (left); 2016-2022 Average capacity of installed onshore and offshore turbines (right)



Source: China Wind Energy Association (CWEA) and NEA, accessed in April 2023

² “一图读懂 | 中国电气化年度发展报告2022,” China Electricity Council, 27 February 2023, accessed at https://www.sohu.com/a/647213515_777961.

³ The installed capacity of wind power refers to the installed capacity after the wind turbine manufacturer has shipped it to the wind farm site, the construction unit has completed the hoisting of all components and completed the installation acceptance or static state testing. The figure will be bigger than the grid-connected capacity of wind power published by the National Energy Administration.

⁴ “2022年中国风电吊装容量统计简报发,” China Wind Energy Association, 28 March 2023, accessed at <https://mp.weixin.qq.com/s/OWjtwPVOTkz18HXDJFXGLg>.

The coal power prices and steam coal prices in China increased significantly in 2022

According to data released by the National Energy Administration (NEA), the average transaction price of coal power nationwide reached 0.449 RMB/kWh in 2022, an increase of about 18.3% compared to the baseline price⁵, approaching the upper limit of 20%. Despite China's increased production and inventory and reduced coal imports last year, the steam coal price has continued to rise due to the tight global coal supply and rising energy prices. The price of steam coal (5500 kcal) in many provinces has doubled in the past two years, with the most significant increases being in Inner Mongolia (+150%) and Shanxi (+130%). Coal trading has further concentrated on coal production enterprises with good resource conditions. In 2022, the revenue of large-scale coal enterprises nationwide increased by 19.5% year-on-year, and the profit increased by 44.3% year-on-year. At the same time, prices in major international coal supply markets remained high, with the average annual FOB prices of coal in Australia and Indonesia rising by 110% and 127%, respectively, year-on-year.

Affected by these factors, the medium and long-term contract price of steam coal (5500 kcal) nationwide increased by 11% year on year, and the peak-valley difference of coal spot price reached 900 RMB per ton. It is expected that in 2023, the supply and demand of the coal market in China will maintain a basic balance, with enhanced supply security capacity and expanded medium and long-term contract scope. However, affected by factors such as international energy supply and demand situation, extreme weather, renewable energy output, and environmental constraints, the contradiction between coal supply and demand by region, by period, and by type still exists.⁶

Shandong is considering a negative price mechanism for the spot power market

In March 2023, the Shandong Development and Reform Commission issued the *Notice on the Issues Related to Regulations on the Upper and Lower Limits of Electricity Spot Market Price in Shandong (draft for Comments)* (CNH: 《关于山东电力现货市场价格上下限规制有关事项的通知（征求意见稿）》), suggesting setting an upper limit (1.5 RMB/kWh) and lower limit (-0.1 RMB/kWh) on the clearing price of the spot power market.⁷ This means that the spot power market of Shandong may become the first to introduce a negative electricity price policy in China. Shandong is the province with the most installed solar PV capacity in China, reaching 43 GW in 2022, accounting for about 11% of the country.⁸ In addition, Shandong has 23 GW of installed wind power capacity, ranking fifth in China.⁹ As a result, since 2019, the daytime spot power price in Shandong has been negative many times.¹⁰ In particular, in the past year (February 2022 to January 2023), it appeared in 176 days in Shandong, with the clearing price as low as -0.08 RMB/kWh, and the average maximum price difference for the whole year reaching 0.63 RMB/kWh.¹¹

In the future, with the continuous increase of solar PV and wind power generation, the frequency and duration of negative power prices and the maximum price difference will increase, stimulating the enthusiasm for developing energy storage projects to some extent. The formal introduction of negative power price rules will help to improve the mechanical design of the spot power market and lay a good foundation for energy storage to participate in market-oriented peak-load regulation.

⁵ “国家能源局：2022年全国燃煤发电机组市场平均交易价格达0.449元/千瓦时，” National Energy Administration, 13 February 2023, accessed at http://www.360doc.com/content/23/0215/06/32584286_1067706655.shtml.

⁶ “中煤协：2022年煤炭现货价格峰谷差达约900元/吨，” China National Coal Association, 28 March 2023, accessed at <https://new.qq.com/rain/a/20230329A02QFE00>.

⁷ “关于征求《关于山东电力现货市场价格上下限规制有关事项的通知（征求意见稿）》意见的公告，” Shandong Development and Reform Commission, 13 March 2023, accessed at http://fgw.shandong.gov.cn/art/2023/3/13/art_91686_10387954.html.

⁸ “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.

⁹ “「聚焦两会」全国人大代表、金晶科技董事长王刚：推动新能源科学有序发展，” Securities Times, 10 March 2023, accessed at <https://baijiahao.baidu.com/s?id=1759953684370312726&wfr=spider&for=pc>.

¹⁰ “负电价要成“常客”，电力市场能做什么？，” China Energy News, 25 March 2022, accessed at <http://baijiahao.baidu.com/s?id=1761318568148750984&wfr=spider&for=pc>.

¹¹ “山东负电价由来已久，储能更应关注价差，” Energy Storage Market, 14 March 2023, accessed at <https://mp.weixin.qq.com/s/wJQk-pUGLv4KmkXTQBGAQ>.

2. The development and operation mechanism of the green power market in China

In February 2023, the National Development and Reform Commission (NDRC), the Ministry of Finance (MoF), and the National Energy Administration (NEA) jointly issued the *Notice on Green Electricity Projects Subsidized by the Central Government to Participate in Green Electricity Trading* (CHN: 国家发改委 财政部 国家能源局关于享受中央政府补贴的绿电项目参与绿电交易有关事项的通知), encouraging renewable power projects under the national feed-in tariff subsidy to participate in green power market trading. The green power market is an independent medium-to-long-term market dedicated to renewable power generation. The main players are utility-scale wind power and solar PV projects with grid parity after 2017. This policy aims to include a stock of subsidised projects, which guarantees the payment of project subsidies while expanding the trading volume of green power.

Background: The history of feed-in tariff subsidy, green certificate market and green power market

Feed-in tariff subsidy, green certificate market, and green power market are three important policy nodes related to the revenue of renewable power projects, primarily to support the non-hydro renewable power, mainly wind power and solar PV, from relying on economic incentives to market-based development. After the *Renewable Energy Law* came into effect in 2006, the central government established the "fixed feed-in tariff + guaranteed acquisition" policy for non-hydro renewable power projects. In other words, for every 1kWh of electricity generated, a fixed feed-in tariff higher than the local coal-fired benchmark tariff is paid, and the government subsidises the difference. At the same time, the grid enterprise guarantees the purchase of a minimum number of hours of power generation. The source of the subsidy is the renewable energy surcharge on consumers' electricity bills. As costs fall, the subsidies have gradually phased out during the 13th Five-Year Plan period (2016-2020). However, as renewable power generation is significantly higher than expected, more than the renewable energy surcharge is needed to cover the required subsidies. The subsidy gap expands year by year.

Therefore, in 2017, China launched the voluntary green certificate trading market to promote green electricity consumption while broadening the subsidy revenue channel. The initial participants in the green certificate market are subsidised wind power and solar PV projects, and there are two forms of trading: 1) electricity sold together with green certificates; and 2) electricity sold at the coal benchmark tariff while green certificates are sold separately. According to the policy, projects participating in voluntary green certificate trading will no longer receive feed-in tariff subsidies, directly leading to minimal trading volume. At the same time, with wind power and solar PV having achieved scaled-up and cost-efficient development in some regions, China launched price parity (i.e. subsidy-free) pilots for wind power and solar PV project in 2018 and 2019, respectively. Two to three years later, trading volume improved as the government allowed price parity wind power and solar PV projects to participate in the green certificate market.

To promote the "Integration of electricity and certificate" form of trading, China launched the green power market in 2021. Price parity wind power and solar PV projects became the major players. In August 2022, the government included other renewable energy sources, such as hydropower, biomass, and geothermal power, in the scope of green certificates and green power trading; in February 2023, the government clarified the rules of green power trading for subsidised renewable power projects, aiming to improve the green power market mechanism.

Green power market trading mechanism

The power generation of renewable power projects contains two parts: guaranteed electricity and market-based electricity. Guaranteed electricity, i.e., the power grid uniformly buys a certain number of hours of power generation, and the price is the local baseline price of coal power¹¹; market-based electricity is the power generation beyond the guaranteed amount, and the power generation enterprises directly participate in the power market transaction, and the transaction price is determined by the market, which is mainly medium and long-term contracts at present. The price formed under this trading mechanism is a single price, which cannot directly reflect the green premium of renewable electricity.

After the launch of the green power market, the amount of guaranteed electricity and market-based electricity can freely choose to participate in the general power market or green power market, the difference is that the transaction price in the green power market will reflect the green premium part, and the buyers will get a traceable green certificate. In the trading of guaranteed electricity, the amount of the transaction price higher than the coal power baseline price can be seen as a green premium; in the trading of market-based electricity, the part of the transaction price higher than the price obtained by participating in the general power market can be seen as green premium.

For grid parity projects, the green premium revenue goes to all power generation enterprises. For subsidised projects, the green premium goes to the government and is used as subsidy funds, but the subsidy the project ultimately receives remains unchanged. When the subsidised project's green power trading amount accounts for more than 50% of its annual feed-in electricity, and is higher than the average proportion of green power trading volume in the region, the government will prioritise granting subsidies.¹²

¹¹ From January 1, 2020, the coal power price has been changed from a fixed benchmark price to a "baseline price + floating price", with the current floating range being $\pm 20\%$.

¹² "国家发改委 财政部 国家能源局关于享受中央政府补贴的绿电项目参与绿电交易有关事项的通知," National Development and Reform Commission, Ministry of Finance, National Energy Administration, 15 February 2023, accessed at <https://mp.weixin.qq.com/s/H0F6pQSJOgL1axZU5NG5Fw>.

3. Policy monitoring

2023-03-20

http://gj.mnr.gov.cn/202303/t20230328_2779460.html

The government updates land use regulations for solar PV project development

Notice on Regulating Land Use Management on Supporting the Development of Solar PV Power Generation Industry, MNR General Office Development [2023] No.12

The government encourages using unused land and stock construction land to develop the solar PV industry. Encourage the construction of large-scale solar PV bases in deserts, Gobi, and other areas under the premise of strictly protecting the ecology; for oil fields, gas fields, and coal mining subsidence areas that are difficult to reclaim or repair, promote the planning and construction of solar PV bases in non-cultivated areas. New construction and expansion of solar PV projects shall not occupy permanent basic farmland, basic grasslands, Class I protected forest land, and key state-owned forest areas in Northeast China and Inner Mongolia.

2023-02-27

http://www.gov.cn/zhengce/zhengceku/2023-03/23/content_5747955.htm

NEA promotes the integrated development of oil and gas exploration and new energy

Notice on Issuing the Action Plan for Accelerating the Integrated Development of Oil and Gas Exploration and Development and New Energy (2023-2025), NEA Oil and Gas Development [2023] No.21

In onshore oil and gas mining areas, the government encourages the active development of utility-scale, distributed, and self-use wind power and solar PV projects. To focus on promoting utility-scale wind power and solar PV projects in Daqing, Changqing, Shengli, Tarim, Xinjiang, and North China oil fields; focus on promoting low wind speed projects in distributed projects; build CSP and heat storage projects in oil and gas fields in Xinjiang, Qinghai, and Gansu. In offshore oil and gas fields, promote oil and gas platforms and offshore wind power to form a regional power system to achieve 100% or partial green power replacement; develop floating wind power in an orderly manner to provide green energy for deep-sea oil and gas platforms.

2023-02-05

https://www.sac.gov.cn/xw/tzqg/art/2023/art_584bc1a52522490682d3b0482f5155f7.html

The framework of the new-type energy storage standard system determined

Notice on Issuing the Guidelines for the Standard System Construction of New Energy Storage

To build a new-type energy storage standard system that conforms to China's national conditions and is in line with international standards, the Standardization Administration issued a guideline, proposing 205 new-type energy storage-related standards. In 2023, the government will focus on formulating and amending more than 100 standards, including safety standards, technical requirements and testing standards for key equipment, and standards for critical links in the industrial chain. By the end of 2023, China will initially establish a standard system to support the commercial development of the new-type energy storage industry. By 2025, a relatively complete series of standards will be formed in electrochemical energy storage, compressed air energy storage, reversible fuel cell energy storage, supercapacitor energy storage, flywheel energy storage, and superconducting energy storage.