MARCH 2022

CHINA ENERGY POLICY NEWSLETTER

Boosting Renewable Energy as Part of China's Energy Revolution

1. China energy transition updates

The central government proposed the concept of "silicon energy" for the first time

A recent speech of Chinese President Xi Jinping emphasizes that the promotion of new energy and clean energy[1] should be given a more prominent position, and should actively and orderly develop the solar energy, silicon energy, hydrogen energy and renewable energy. This is the first time the central government has proposed the concept of silicon energy.[2] At present, no government department has made any official explanation for this concept, while some energy experts interpretate that it highlights the need of the positive and orderly development of the solar PV equipment manufacturing industry.

The 14th Five-year Plan for Energy Saving and Emission Reduction issued

The document points out the direction for China's energy saving and emission reduction work during the 14th Five-Year Plan period (2021-2025). By 2025, the total national energy consumption should be reasonably controlled, and the energy intensity (energy consumption per unit of GDP) aims to drop by 13.5% compared with 2020. For the four main emission indicators, the total emissions of chemical oxygen demand, ammonia nitrogen, nitrogen oxides and volatile organic compounds should be reduced by 8%, 8%, more than 10% and more than 10%, respectively. The government has put forward specific goals for ten major industries including industry, parks, towns, and transportation. The key points include[3]:

- Complete the ultra-low emission retrofit of 530 million tons of steel production capacity
- Coal-fired boilers in key areas for air pollution prevention[4] to fully realize ultra-low emissions

[1] Clean energy refers to natural gas, nuclear and renewable energy.

[2] "习近平主持中共中央政治局第三十六次集体学习," Xinhua News Agency, 25 January 2022, accessed at **https://www.ccps.gov.cn/xtt/202201/t20220125_152742.shtml**.

[3] "国务院关于印发"十四五"节能减排综合工作方案的通知,国发〔2021〕33号," State Council, 28 December 2021, accessed at **http://www.gov.cn/zhengce/content/2022-01/24/content_5670202.htm**; "能耗下降13.5% "十四五"节能减排这么干！," People's Daily, 26 January 2022, accessed at **https://baijiahao.baidu.com/s?id=1722989743946087030&wfr=spider&for=pc**.

[4] Including Beijing-Tianjin-Hebei and surrounding areas, the Yangtze River Delta and the Fen-Wei River Plain.

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Danish Energy Agency

可再生能源推动能源革命研究
Boosting Renewable Energy
As part of China's energy revolution

国家发展和改革委员会
能源研究所
Energy Research institute, NDRC, P.R.C

- Energy consumption per unit of added value of industrial enterprises above designed size[5] to decrease by 13.5%
- Over 30% of production capacity in key industries[6] and data centers to reach the energy efficiency standard
- The proportion of residential clean heating to be increased significantly
- The sales volume of new energy vehicles reaches about 20% of the total sales of new cars
- Coal consumption in the Beijing-Tianjin-Hebei and surrounding areas, and the Yangtze River Delta region to decrease by about 10% and 5%, respectively, and the coal consumption in the Fen-Wei River Plain to achieve negative growth.

The 14th Five-Year Plan for New-Type Energy Storage Development released

The government requires that by 2025, new-type energy storage[7] should enter the stage of large-scale development from the initial stage of commercialization, and has the conditions for large-scale commercial application. The system cost of electrochemical energy storage technology should be reduced by more than 30%, and hydrogen energy storage and thermal (cold) energy storage to make breakthroughs in long-time storage technology. By 2030, new-type energy storage will develop in a fully market-oriented environment, including the realization of independent and controllable key technical equipment, as well as the establishment of mature market mechanisms, business models and standard systems. Key tasks include[8]:

- In areas rich in new energy resources, such as Inner Mongolia, Xinjiang, Gansu and Qinghai, focus on the deployment a number of energy storage facility configured new energy power plants
- In Northeast China, North China, Northwest China and Southwest China, support the power exports and local consumption of renewable energy power bases, relying on active and new inter-provincial power transmission channels through the integration project of "wind-solar-hydro-thermal-storage"
- Exploration of hydrogen production technology, reasonable energy storage scale and operation mode of energy storage in large-scale wind and solar bases in the Gobi and desert areas
- Conduct research on new-type energy storage for large-scale offshore wind power bases in Guangdong, Fujian, Jiangsu, Zhejiang and Shandong to reduce capacity requirements for transmission channels
- Explore the use of retired thermal power plants and supporting power substations to build new-type energy storage projects or wind-solar-storage facilities
- Encourage new energy power plants to configure energy storage capacity through self-construction, lease or purchase

NEA clarifies the functional positioning of coal power during the 14th Five-Year Plan period

The National Energy Administration (NEA) recently made it clear that it will strictly control the construction of coal power projects during the 14th Five-Year Plan period. In principle, no news coal power projects purely for power generation will be built. The government will arrange a certain scale of coal power for flexible power dispatch according to the needs to ensure the security of power supply and promote the consumption of new energy. In the next step, the government will actively promote the flexibility retrofit and life extension of coal power plants, and improve the peak shaving capacity of coal power units to meet the demand for ancillary services.[9]

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[5] Industry above designated size refers to industrial enterprises with annual main business income of more than RMB 20 million.

[6] Key industries include iron and steel, electrolytic aluminum, cement, plate glass, oil refining, ethylene, synthesis ammonia and calcium carbide.

[7] New-type energy storage refers to energy storage technologies other than pumped storage.

[8] "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**.

[9] "国家能源局：原则上不再新建单纯以发电为目的的煤电项目," National Energy Administration, 28 February 2022, accessed at **https://news.bjx.com.cn/html/20220228/1206838.shtml**

NDRC further improves the coal pricing mechanism

The National Development and Reform Commission (NDRC) recently issued a policy to further improve the regulations on the coal pricing mechanism, mainly including three core contents: 1) clarifying the reasonable price range of medium- and long-term coal contracts; 2) improving the transmission mechanism of coal costs in coal power feed-in tariffs (FiTs); 3) formulating a coal price and coal power FiTs intervention system.

The policy stipulates a reasonable range of medium- and long-term transaction prices (when mining up) in the three major coal producing areas of Shanxi, Shaanxi and Inner Mongolia, respectively. The NDRC will guide the coal price to operate within these reasonable ranges, which gives the market clearer expectation, and is conducive to stabilizing the balance of coal supply and demand. Meanwhile, the government encourages the establishment of terms linked to the medium- and long-term coal price in medium- and long-term coal power FiTs to strengthen the effective transmission of coal costs. At present, China's coal price and coal power FiTs are both range prices, which means that the price elasticity of coal power can be increased by means of range-and-range price linkage, and coal power enterprises can better transmit fuel costs and ensure profits.

The NDRC also requires a sound monitoring system for coal prices and coal power FiTs. That is, when both of them are within a reasonable range, improper intervention is strictly prohibited, and the government will strengthen anti-monopoly supervision in the spot power market; however, when the price exceeds the reasonable range, the government will guide the return of coal prices in accordance with the *Price Law*. In addition, the government also plans to enhance the dispatchability of coal reserves, and this series of measures will become a strong guarantee for improving the marketization and pricing progress.[10]

Development of CSP in China up to 2021

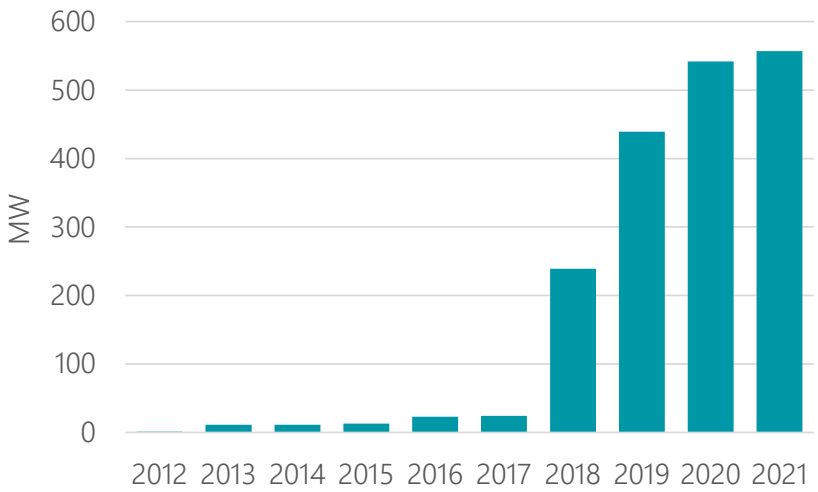
The development of concentrated solar power (CSP) projects in China has gone through ten years. In 2013, China's first large-scale CSP project was put into operation in Qinghai. A year later, the NDRC set the fixed FiT of CSP at 1.2 RMB/kWh for the first time, marking that China's CSP development has entered the stage of commercial operation. In 2016, the NEA took the lead in launching the first batch of CSP demonstration projects, and the approved FiT was 1.15 RMB/kWh. This batch consists of 20 projects with a total capacity of 1,349 MW.[11] They are distributed in Northwest China and North China, mainly in Qinghai, Gansu, Xinjiang, Inner Mongolia and Hebei. By the end of 2021, the cumulative grid-connected installed capacity has exceeded 500 MW. Among which, the tower, trough and linear Fresnel technology routes account for 60%, 28% and 12% respectively.[12]

Although the installed capacity of CSP projects commissioned and connected to the grid during the 13th Five-Year Plan period (2016-2020) was less than half of the total amount of the first batch of pilot projects, China's CSP manufacturing industry chain has been established. According to the current policy, China will no longer provide FiT subsidies at the national level for CSP projects during the 14th Five-Year Plan period (2021-2025). However, in most large-scale bases, the wind power-solar PV-CSP bundled bidding could take the advantages of heat storage and dispatchable output of CSPs, but low-priced wind power and solar PV, together with CSP, which is not yet economically competitive to form a large-scale clean energy base that can be connected to the grid. Among the first batch of large-scale wind power-solar PV bases in 2021, Jilin, Gansu, and Qinghai have tendered a total of 1.01 GW of CSP projects. It is expected that the new CSP generation during the 14th Five-Year Plan period will mainly adopt this model of construction and business, and the planned capacity of newly constructed projects is at least 2.5 GW.

[10] "国家发展改革委关于进一步完善煤炭市场价格形成机制的通知，发改价格〔2022〕303号," National Development and Reform Commission, 24 February 2022, accessed at **https://www.ndrc.gov.cn/xxgk/zcfb/tz/202202/t20220225_1317003_ext.html**.

[11] "国家确定首批20个太阳能热发电示范项目," National Energy Administration, 18 September 2016, accessed at **http://energy.people.com.cn/n1/2016/0918/c71661-28721376.html**.

[12] "《2021中国太阳能热发电行业蓝皮书》发布," National Energy Administration, 12 Febuary 2022, accessed at **https://baijiahao.baidu.com/s?id=1724561614368017399&wfr=spider&for=pc**.



Source: data of 2012-2019 from China Solar Thermal Alliance (CSTA); data of 2020-2021 is calculated based on data of China Electricity Council (CEC) and National Energy Administration (NEA), accessed in March 2022

China built the first megaton CCUS project

China's first megaton carbon capture, utilization and storage (CCUS) project was completed and put into operation in Shandong province. The project uses exhausted CO_2 gas from a coal-to-gas facility in a fertilizer plant as a raw material to produce liquid CO_2 products, which are sent to a nearby oilfield for storage. The oilfield covers geological reserves of 60 million tons and has an annual injection capacity of 1 million tons. The project is expected to reduce CO_2 emissions by 1 million tons per year, equivalent to planting nearly 9 million trees. This is the largest demonstration base of a complete CCUS industry chain in China, providing referrable cases for the large-scale development of CCUS in the future.[13]

[13] "中国石化宣布：我国首个百万吨级CCUS项目全面建成！," Sinopec, 30 January 2022, accessed at **https://baijiahao.baidu.com/s?id=1723332843946172748&wfr=spider&for=pc**.

2. Overview of the *2022 Government Work Report* with focus of energy

On March 5, 2022, the Fifth Session of the 13th National People's Congress was held in Beijing. Premier Li Keqiang of the State Council read out the *2022 Government Work Report*.[14] The Report outlooks on the overall economic work of this year. The national GDP growth target in 2022 is about 5.5%, which will continue to maintain a medium-to-high speed growth trend. The importance of fiscal policy has increased significantly, and the *Report* fully reflects the three major starting points of expanding infrastructure investment, reducing taxes and fees, and increasing transfer payments.[15] For example, the *Report* has made more detailed plans for infrastructure deployment in the fields of railways, roads, water transport, and hydropower; the budget for transfer payments has increased by 18%, the largest increase in many years.

In the field of energy, China continued to actively respond to climate change in 2021, the government has issued the *2030 Carbon Peaking Action Plan*, launched the national carbon market, and the installed capacity of renewable power generation has exceeded 1,000 GW. In 2022, the government will focus on key tasks such as energy security, carbon peaking and carbon neutrality, and dual control of energy consumption.[16]

Energy Security

The Report reiterates to ensure energy security, but compared with the 2021 version, the 2022 version emphases more on the production guarantee capability of domestic resources, requires to accelerate the exploration and development of resources such as oil, gas and minerals, and to improve the national strategic material reserve system.

Carbon Peaking and Carbon Neutrality

Coal

To strengthen the efficient utilization of coal with low emissions, and the *Report* has put forward this task continuously for three years; however, the 2022 version adds the contents of orderly reduction and substitution of coal consumption capacity, and promotes energy-saving and carbon-reducing retrofit, flexibility retrofit and the retrofit from condensing units to combined heat and power (CHP) units, refining the main technical path of the task landing.

Renewable Energy

The *Report* specifically points to promoting the planning and construction of large-scale wind and solar power generation bases and supporting flexible power sources, and improving the grid's ability to consume renewable power; compared with the term of "strive to develop new energy" proposed in the 2021 version, the 2022 version further emphasizes the importance of matching the installed scale of renewable energy with the consumption capacity.

Energy saving and carbon emissions

Resolutely curb the blind development of energy-intensive and emission-intensive projects, and promote energy saving and carbon reduction measures in industries such as steel, nonferrous metals, petrochemicals, chemicals, and building materials.

Pollutants

The quality of the ecological environment continues to improve, and the discharge of major pollutants continues to decline.

Dual Control of Energy Consumption

Incremental renewable power consumption is not included in the total energy consumption control, and raw material energy consumption is not included in the dual energy consumption control[17]; the assessment on energy intensity (energy consumption per unit of GDP) during the 14th Five-Year Plan period will be flexible, avoiding to affect the normal energy consumption of enterprises; to promote the transition from dual control of energy consumption to dual control of carbon emissions.

14 "李克强总理作政府工作报告（文字摘要）," Xinhua News Agency, 5 March 2022, accessed at http://www.gov.cn/premier/2022-03/05/content_5677248.htm.

15 "中金：一文读懂2022年《政府工作报告》," China International Capital Corporation, 6 March 2022, accessed at https://hk.eastmoney.com/a/202203062298068142.html.

16 "最全！一图读懂2022年《政府工作报告》," Xinhua News Agency, 5 March 2022, accessed at https://baijiahao.baidu.com/s?id=1726427097386503951&wfr=spider&for=pc; "细读！2022政府工作报告能源热词透露的新变化," Energy Observer, 6 March 2022, accessed at https://www.sohu.com/a/527656369_121134460.

17 "国务院关于印发"十四五"节能减排综合工作方案的通知,国发〔2021〕33号," State Council, 28 December 2021, accessed at http://www.gov.cn/zhengce/content/2022-01/24/content_5670202.htm.

3. The timeline and roadmap for the development of the national power market system clarified

On January 18, 2021, the NDRC and the NEA jointly issued a policy document providing guidance for the establishment of a unified national power market system. The government aims to preliminarily establish a national unified power market system by 2025, that is, the coordinated operation of the national market and the regional markets and provincial (district, municipal) markets, including the integrated regulation design of medium- and long-term contracts, spot power market and ancillary service market mechanisms; the scale of market-based transactions and green power transactions should increase significantly, and market transactions and pricing mechanisms that are conducive to the development of new energy and energy storage should have taken shape. By 2030, the system will be established essentially, the power market at all levels achieves joint operation, new energy will fully participate in market-based transactions, and market players will be able to compete fairly and choose independently.[18]

This means that China will adopt a top-down approach to promote the construction of the national power market system. It is different from the reform path of power marketization in Europe. In Europe, the national and regional power markets are gradually coupled from the bottom up, while China establishes a top-level design first, then the government departments promote the integration of markets at all levels to this goal.

Current situation and challenges of the national power market system

Since the government launched the new-round power system reform in 2015, China's power marketization has continued to improve. By the end of 2021, the national market-oriented power transaction volume has reached seven times that of 2015, accounting for 44.6% of the total national power consumption. China has established two national-level power trading centers in Beijing and Guangzhou, which are responsible for inter-provincial power trading within the State Grid and Southern Power Grid regions respectively, and the provinces also set up provincial-level trading centers to carry out intra-provincial transactions. At present, the medium- and long-term contracts of inter-provincial and intra-provincial power transmission have been normalized, with thermal power as the main seller and industrial and commercial users as major buyers. At the same time, eight provinces have started pilot spot trading, and six more pilots will start trial operation by the end of June 2022.

As the proportion of renewable power generation continues to increase, the power grid has an increasing demand for inter-provincial power exchange, the largest inter-provincial exchange of electricity has accounted for 23% of the power load of the entire grid in 2021. According to the current rules, inter-provincial transactions are mainly determined through bilateral agreements between local governments, then for surplus electricity to do intra-provincial transactions, which makes it impossible for power plants outside the province to compete directly with power plants in the province. Therefore, unifying transaction rules and transaction varieties and giving users the autonomy to purchase electricity are the key points of the reform.

Improve the adaptability of the power market to a high proportion of new energy [19]

The document proposes **to transform the bilateral agreements on inter-provincial power transmission into medium- and long-term contracts authorized by the government**, to encourage power generation enterprises to conduct direct transactions with electricity sales companies and users, and promote the dynamic connection of price formation mechanisms in inter-provincial and intra-provincial markets, in order to optimize the allocation of national power resources to the greatest extent possible. This transformation will start from incremental electricity consumption and go gradually into the electricity consumption stock.

To achieve the goal of *fully realizing the market transactions of new energy by 2030*, the document proposes **to establish peak shaving services in the spot power market and establish a cost recovery mechanism for being capacity reserves**. At present, peak shaving market in China is independent in different regions. For example, in Northeast China, thermal power plants take the initiative to reduce the load and get benefits from new energy power plants when new energy output is booming, which means that the benefits of the peak shaving market are purely a game between thermal power and new energy.

After integrating the peak shaving market into the spot power market, part of the peak shaving cost will be passed on to users, allowing all beneficiaries to pay for peak shaving. This is consistent with the direction of improving the cost-sharing mechanism for ancillary services that the government has been vigorously promoting. In addition, thermal power has always played the role of a backup machine when the output of new energy is insufficient, but the utilization hours of these units are relatively low, and it is difficult to support the survival of power plants only by relying on the actual power generation. Therefore, the document proposes **to establish a market-oriented cost recovery mechanism, such as a compensation system, capacity market and short-term high electricity prices with very high or no upper limit**, to ensure the capex recovery of these reserves.

Other market-based trading mechanisms that promote the consumption of renewable energy, such as green power trading and distributed market-based trading, will also be encouraged.

18 "国家发展改革委 国家能源局关于加快建设全国统一电力市场体系的指导意见，发改体改〔2022〕118号," National Development and Reform Commission, National Energy Administration, 18 January 2022, accessed at https://www.ndrc.gov.cn/xxgk/zcfb/tz/202201/t20220128_1313653.html?code=&state=123.

19 "全国统一电力市场路线图确定，电力行业再启格局之变," Caijing, 28 January 2022, accessed at https://www.sohu.com/a/519660220_120814277.

4. Policy monitoring

2022-02-28
http://www.chinapower.com.cn/tynfd/hyyw/20220228/135807.html

The government released the second batch of large-scale wind and solar power bases

Notice on Issuing the Planning and Layout Plan for Large-scale Wind Power and Solar PV Bases Focusing on Gobi and Desert Areas, NDRC Infrastructure [2022] No.195

In February 2022, the NEA and the NDRC jointly issued a list of the second batch of large-scale wind and solar power generation bases in deserts and Gobi, with a total installed capacity of 455 GW, among which 284 GW is of the three main desert areas in Inner Mongolia, 37 GW of the coal mining subsidence area, and 134 GW of other deserts and the Gobi area. In terms of time scale, the government plans to complete the construction of 200 GW of the above capacity during the 14th Five-Year Plan period, including 150 GW for power exports and 50 GW for local use; and 255 GW during the 15th Five-Year Plan period (2026-2030), including 165 GW for power exports and 90 GW for local use. Previously, in November 2021, the NEA and the NDRC issued the first batch of large-scale wind and solar bases, covering 19 provinces and a total capacity of 97.05 GW.

2022-02-18
https://www.ndrc.gov.cn/xwdt/tzgg/202202/t20220218_1315823.html?code=&state=123

To establish a cascade electricity pricing system for energy-intensive industries

Notice on Issuing the Policy Tools to Facilitate the Stable Growth of Industrial Economy, NDRC Industry [2022] No. 273

To ensure the stable growth of the industrial economy, 12 ministries and commissions jointly issued a series of policies and measures in taxation, pricing, environment, land use, etc. Among them, the government requires the establishment of a national unified cascade electricity pricing system for energy-intensive industries to adhere to green development. For the under-planning, under-construction and in-operation enterprises that meet the energy efficiency standards, there will be no price increase for electricity consumption. For enterprises that fail to meet the standards, there will be a cascade electricity price according to the gap with the energy efficiency standard level, and the price increased will be used as a special fund to support industrial enterprises to carry out technical retrofit of energy saving, pollution reduction and carbon reduction.

2022-01-30
https://www.ndrc.gov.cn/xxgk/zcfb/tz/202202/t20220210_1314511.html?code=&state=123

NDRC clarified specific measures for carbon neutral in the energy sector

Opinions on Improving the System, Mechanism and Policy Measures for the Green and Low-carbon Energy Reform, NDRC Energy [2022] No. 206

This is a detailed document of the carbon peaking and carbon neutrality "1+N" policy system for the energy sector, proposing a total of 38 specific measures. The document re-emphasized key renewable energy projects related to power generation, heating and rural development. This includes large-scale wind and solar power generation bases mainly in the Gobi and desert, building-integrated solar PV, solar/geothermal/biomass energy supply systems for building, and priority for development of rooftop solar PV, biogas and other biomass power generation projects in rural areas. In terms of improving the mechanism, the government requires to establish a power dispatch mechanism that can fully support power export of new energy bases, the unified planning of land use for decentralized wind and solar power projects in rural areas, to establish a benefit-sharing mode of investment and operation, and the strengthening of the innovation of local power trading models.

2021-12-31
http://www.gov.cn/zhengce/zhengceku/2022-01/05/content_5666484.htm

7 ministries release the 14th Five-Year Plan for Smart PV Industry

Notice on Issuing the Action Plan for the Innovation and Development of Smart Solar PV Industry (2021-2025), MIIT United Electronics [2021] No. 226

The government requires a continuous expanding of application scale of solar PV in green industry, construction, transportation, agriculture and rural development during the 14th Five-Year Plan period, and to form a stable business operation mode, which aims to build a diversified smart PV product system suitable for the rural self-owned rooftops, urban and building energy conservation, and ecological transportation networks. For example, to promote the integrated development of solar PV plants with pumped hydro storage, electrochemical energy storage, and flywheel energy storage, and build a number of generation-side energy storage facility configured solar PV; to encourage the application of smart PV systems to the pilot county-wide (city, district) rooftop PV projects; to encourage new government-invested public welfare buildings to promote rooftop solar PV systems in proper urban and rural areas, etc.