

Development of Renewable Energy in Our Country: HEP, Solar Power and Wind Power

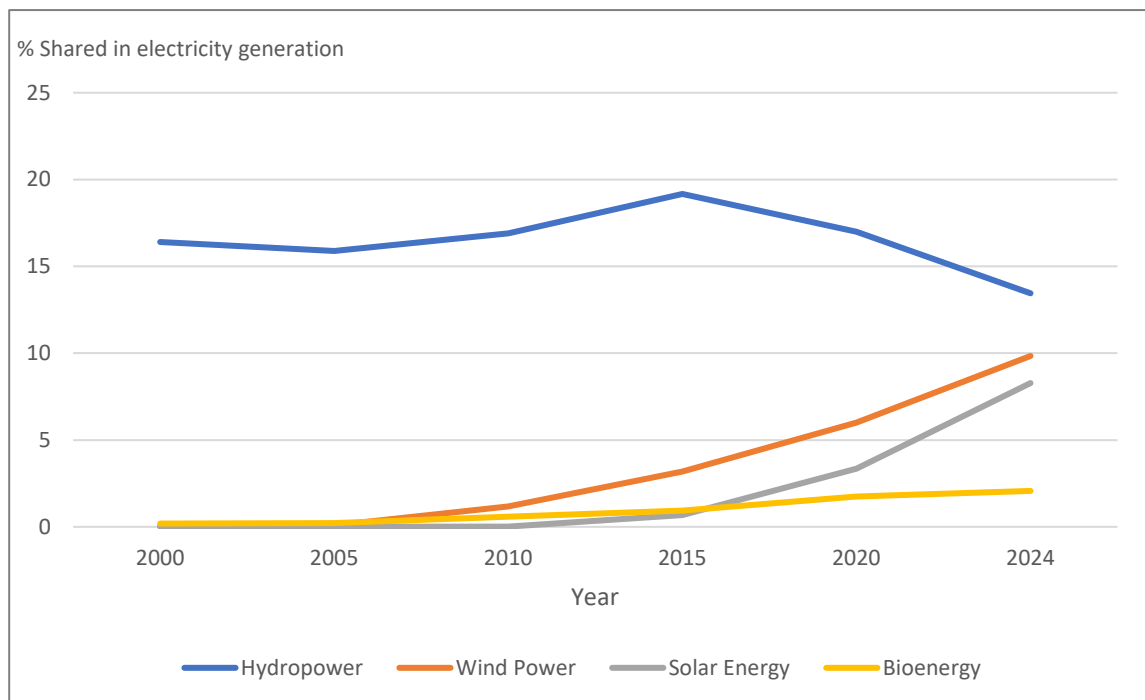
I. The Importance of Energy Transition

- With rapid economic development, there is a surge in the demand of energy consumption in our country. Energy transition becomes an urgent need so as to support a sustainable economic growth and build a green and low carbon environment.
- According to the “[White Paper on China’s Energy Transition](#)”, the consumption of renewable energy in 2023 accounted for 26.4% of the total energy consumption, with an increase of 10.9% compared with that in 2013. The amount of electricity generated from renewable energy was about 3800 TWh, accounting for 39.7% of total electricity generation, with a rise of around 15% from 2013.

II. Accelerating the Development of Renewable Energy

The major sources of renewable energy in our country are hydropower, wind power, solar power, geothermal power and bioenergy. In the report of Asia Natural Gas and Energy Association, the importance of renewable energy in electricity production is growing. In 2024, the shares of electricity generated from hydropower, wind power and solar power were 13.5%, 9.8% and 8.28% respectively (Figure 1) in our country.

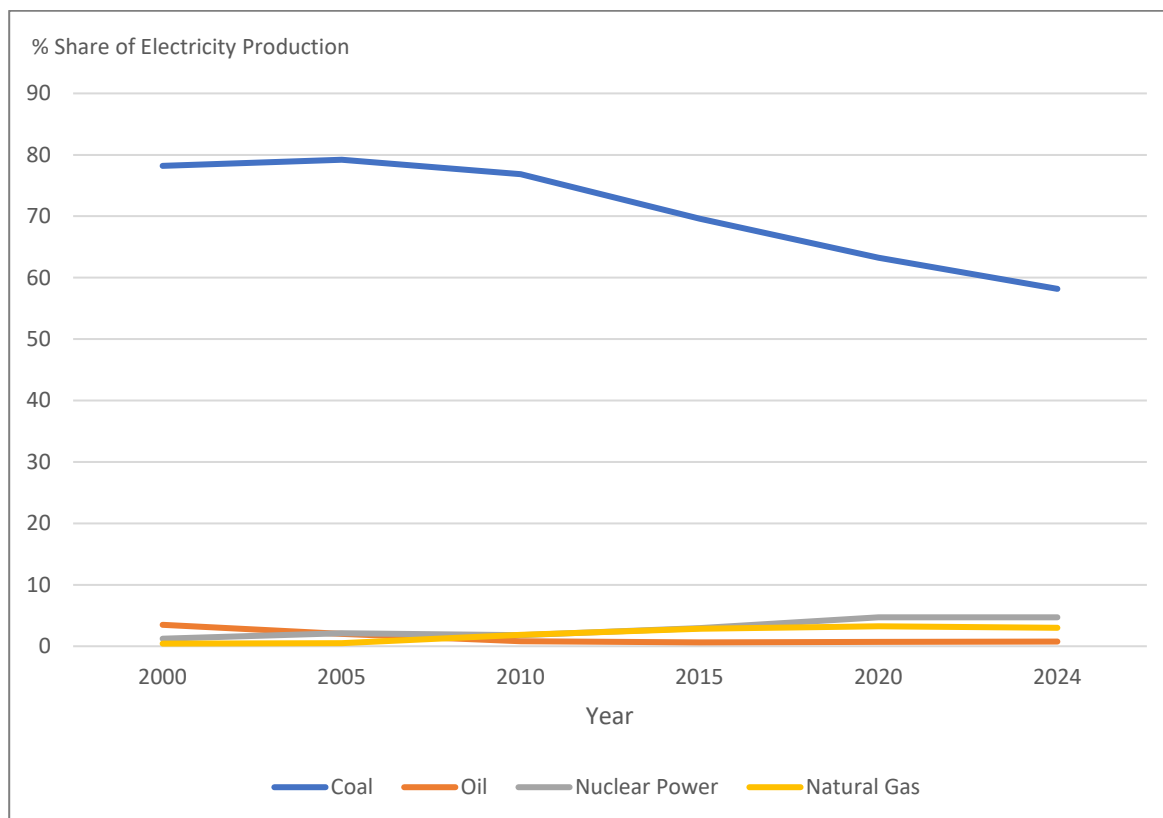
Figure 1: Share of Renewable Energy in Electricity Production



Source: Asia Natural Gas and Energy Association, <https://angeassociation.com/location/china/>

With the increasing use of renewable energy, the demand for coal-fired power generation has reduced (Figure 2). The number of coal-fired power plants has dropped by 80% from 2013 to 2023, effectively reducing the emission of PM2.5.

Figure 2: Share of Non-Renewable Energy in Electricity Production



Source: Asia Natural Gas and Energy Association, <https://angeassociation.com/location/china/>

1) Hydropower

- Hydropower (HEP) is the largest source of renewable energy in our country. In 2021, China is the largest producer of HEP in the world.
- The greatest annual amount of HEP is generated at Three Gorges Dam of Chang Jiang, followed by Baihetan Dam (白鶴灘水壩) and Xiluodu Dam (溪洛渡水壩) at Jinsha River¹ (金沙江).
- Our country strives to promote scientific coordination of HEP development and conservation of ecosystem and environment. Existing large HEP plants have been upgraded and green transformation and modernisation of small HEP plants have been steadily advanced.

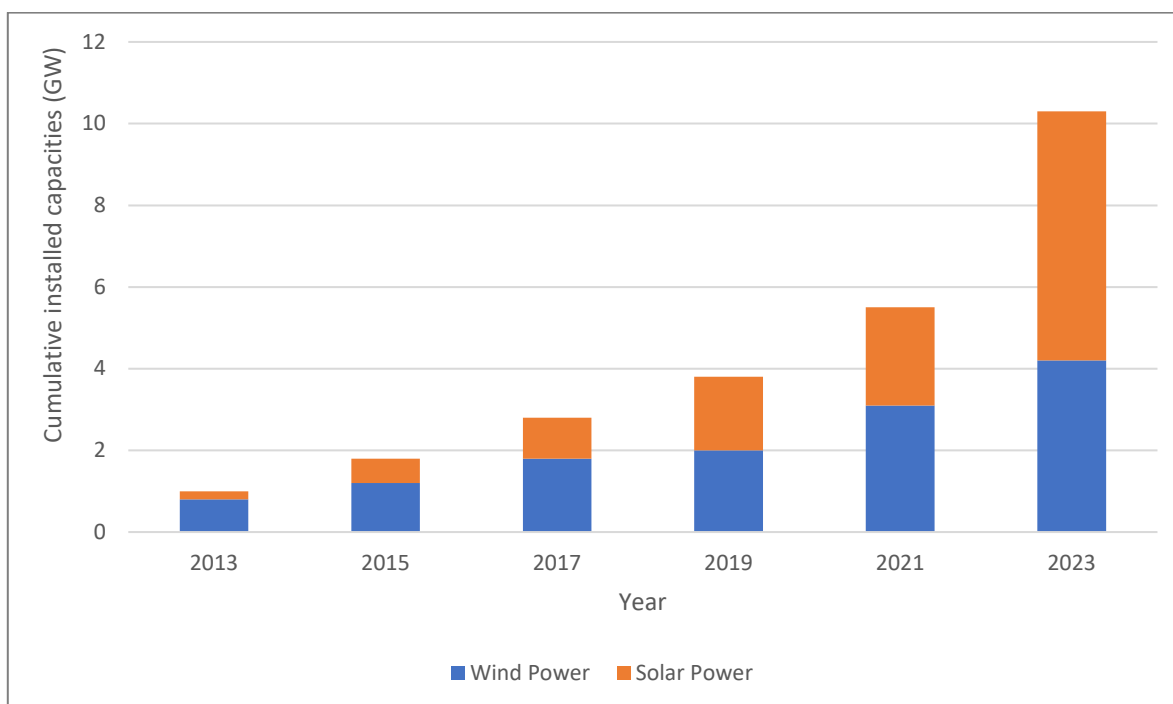
¹ This project has created six world records, including a total installed capacity of 16 million kilowatts for the hydropower station. Currently, six technical indicators rank first in the world: a single turbine generator capacity of 1 million kilowatts, the largest underground cavern group; the world's first 300-meter high arch dam's seismic resistance parameters; and the use of low-heat cement concrete throughout the dam.

<https://chinacurrent.com/education/article/2021/08/22442.html>

2) Wind Power and Solar Power

- Our country possesses abundant wind and solar resources, making them predominant sources of renewable energy in the country.
- According to the “White Paper of China’s Energy Transition”,
 - large scale wind and solar power bases have been constructed by stages with the main centres located at Kubuqi (庫布其), Ulan Buh (烏蘭布和), Tengger (騰格裡) and Badain Jaran deserts (巴丹吉林沙漠), expected to reach a total installed capacity of 450 GW.
 - Large scale offshore wind farms were developed in clusters with a cumulative installed capacity of 37,280 MW.
 - The installed capacity of distributed solar power exceeded 250 GW, accounting for more than 40 percent of the total installed capacity of solar power (國家能源局, 2024)
 - By the end of 2023, the cumulative installed capacities of wind and solar power reached 441 GW and 609 GW respectively, a tenfold increase over the past decade. (Figure 3)

Figure 3: Cumulative Installed Capacities of Wind and Solar Power



Source: 國家能源局《中國的能源轉型》白皮書，2024

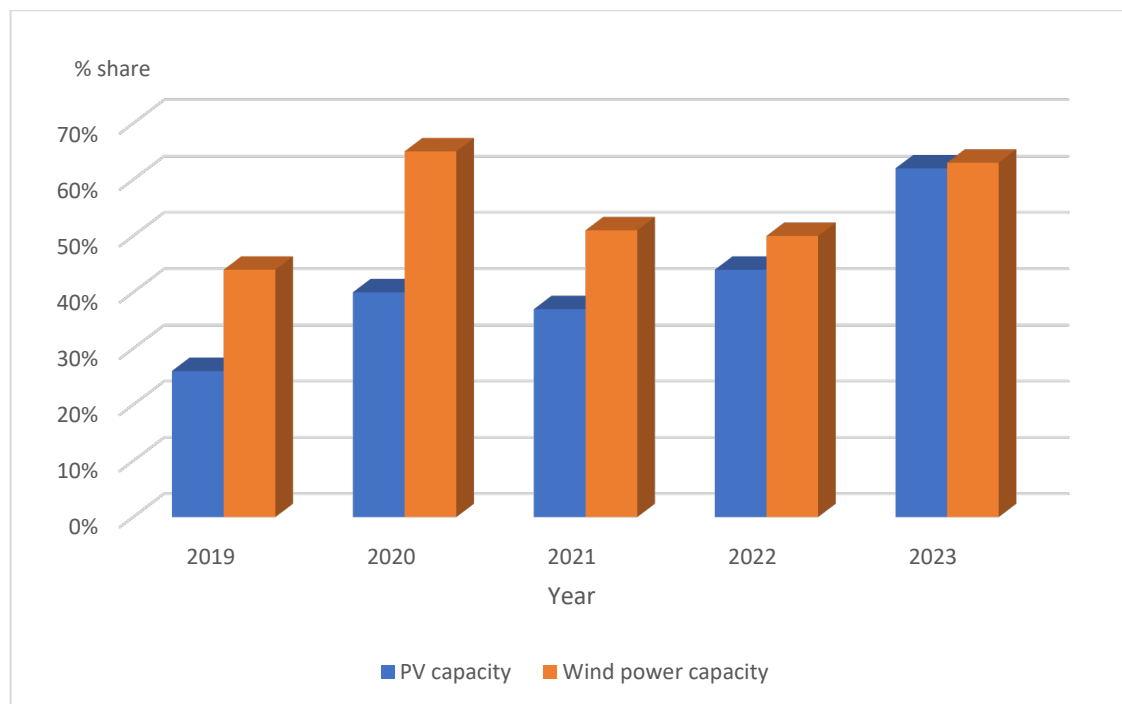
- Installation of small new energy production systems has made rapid progress. Wind and solar energy projects are launched in rural areas, featuring the “wind power in villages” and “PV (solar panel) plus agriculture” models. It enhances the economic development of the rural areas.

- To build a green environment, projects with integrated use of solar power generation with agriculture, transport and desertification control and management are piloted. Examples include:
 - The large station at Tunli Town, Linfen City, Shanxi Province has adopted the “PV plus agriculture” model, with growing of oil-yielding peonies in greenhouses with power-generating solar panels. It helps to increase the efficiency of land use.
 - Desertification control PV project was carried out at Kubuqi Desert, Ordos City, Inner Mongolia Autonomous Region, adopting the solar power generation with desert greening model. The installed PV power capacity reaches 2,000 MW. The space under the solar panels is used for growing plants and rearing animals. It is expected to restore 6,670 hectares of desert and reduce the transportation of sediment to Huang He by about 2 million tonnes.

III. Our Country’s Contribution to the Global Development of Green Energy

- Our country’s rapid renewable energy development is underpinned by sustained technological innovation, a sound system of industrial and supply chains, sufficient market competition, and the advantages of a super-scale market.
- According to the International Renewable Energy Agency, from 2014 to 2023, the global levelised cost of electricity (LCOE) for wind and solar projects has fallen by more than 60% and 80% respectively. As a result, more countries prefer to use solar and wind power.
- From 2019 to 2023, our country contributed to half of the global expansion of solar energy.
- According to the “[Renewables 2023](#)” released by the International Energy Agency (IEA), China is a front-runner in the global renewable energy sector and a major driving force behind the world's rapid expansion of renewable energy capacity. From 2014 to 2023, the share of global consumption of renewable energy rose from 13.6% to 18.5%, with our country contributing to 45.2% of the increase.

Figure 4: Our Country's Share of Global New Energy Capacity (2019–2023)



Source: 國家能源局 (2024)

IV. International Cooperation

Our country is collaborating with over 100 countries and regions on green energy projects. It has launched some signature energy projects and small local community programmes for clean, safe and reliable energy supply. They effectively solve the problems of accessibility and affordability of electricity supply in those countries and regions.

Examples of international green energy projects

➤ Adama Wind Farm in Ethiopia

It is the first wind power project in Ethiopia and the first inter-governmental new energy cooperation project between China and African countries. It was built by the Chinese enterprises, funded by the concessional loans from the Chinese government. With the total installed capacity of 204 MW, it generates 630 GWh of green energy which substantially improves the local energy supply.

➤ AI Dhafra Solar PV Plant in UAE

It is the world's largest single-site solar power plant built by a Chinese enterprise. With the total installed capacity of 2,100 MW, it can meet the use of electricity of 200,000 homes in UAE. It has also increased the share of green energy used in UAE to 13%.

➤ Cauchari Solar PV Park in Argentina

It is the highest solar power plant in South America with the largest installed capacity. Being built by a Chinese enterprise, the power plant, with its installed capacity of 315 MW, generates 650 GWh electricity annually. It provides clean energy for 250,000 families and enables the local community to be self-sufficient in electricity supply.

V. Conclusion

Our country has formulated long-term energy development plans and targets. By mid-21st Century, our country will establish a low-carbon, clean, safe and efficient energy production system, with a world-class standard of energy production efficiency. Renewable energy will be the major source of energy supply, helping achieve the target of carbon-neutral in 2060.

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