



November 2021

China's current power crisis could represent an opportunity for the wind industry

Introduction

In a context of skyrocketing prices for raw materials and energy prices, the wind sector has been an exception in China, with tender prices reaching new record low prices for onshore and offshore wind. High coal prices have caused a number of power shortages in China, and in response, the Chinese government has moved to both accelerate coal production in the short term, while further deregulating China's electricity system. The power shortages, representing a threat to China's energy security, have led some voices to question the energy transition. However, the government has indicated its determination to continue to increase the share of renewables in the energy mix, while a liberalised market also represents opportunities for the wind sector as it continues to become more competitive. In a market where it is now successfully competing without support against coal, China's wind industry is truly at the forefront of the battle to decarbonise energy.

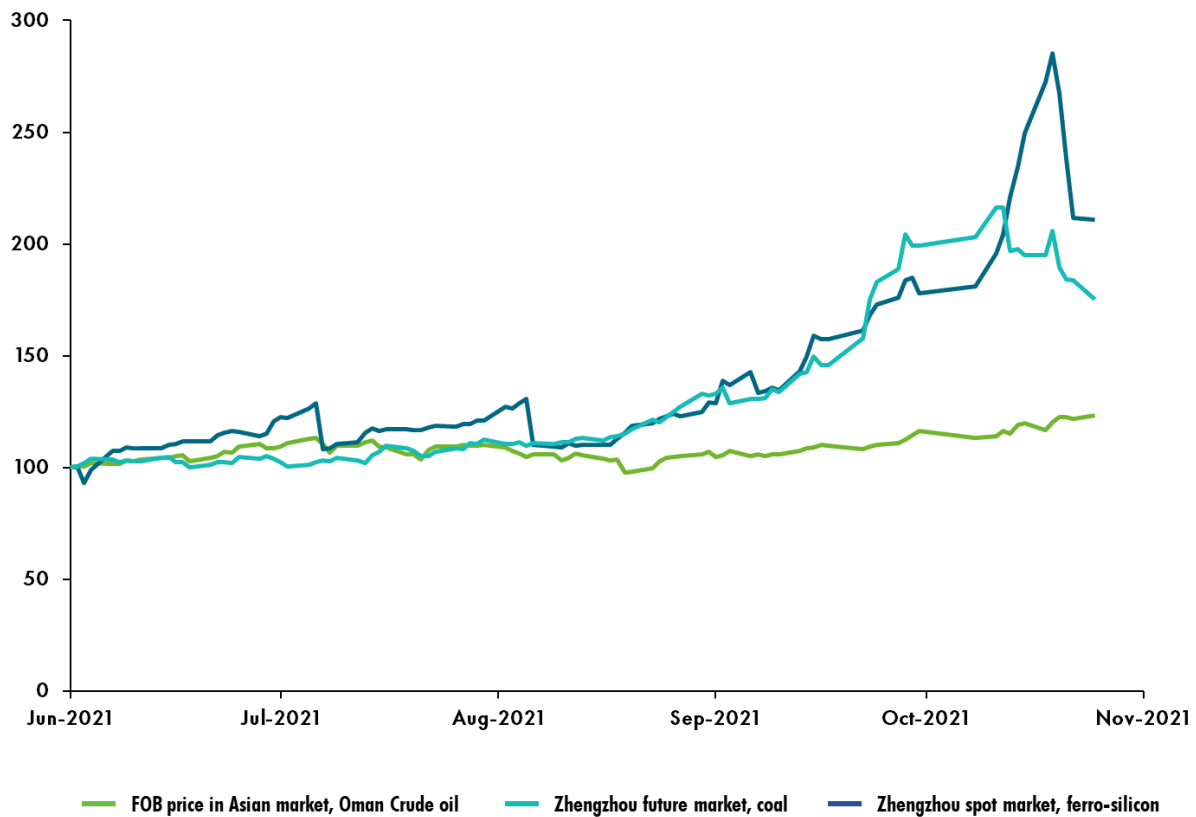
1. The wind sector is stronger than ever as inflation hits markets

As the world's economies reopen and recover from Covid-19 lockdowns, raw material and energy prices have skyrocketed in recent months. China has been particularly badly hit, with coal prices more than doubling from June to October. Other industries are also suffering from high prices, such as the PV sector, for which polysilicon prices have risen 50 % since August. Even China's beloved soy sauce has not been spared, as one of China's leading producers recently announced a 7 % price hike for its soy and oyster sauce products.

One exception to these price increases has been the wind industry. As prices of many sectors were rising, wind turbine prices in China have been continuously reaching new price records in the last two years. Indeed, while the price for onshore wind turbines reached 4000 CNY / kW in early 2020, the latest tenders broke the 2000 CNY / kW milestone. The same trend has been verified for offshore wind, where wind turbines bid prices have gone from 7000 CNY / kW early 2020 to less than 4000 CNY / kWh in the latest tenders.



Figure 1: Energy and raw material prices have risen sharply since June (%)



Source: China Ministry of Commerce

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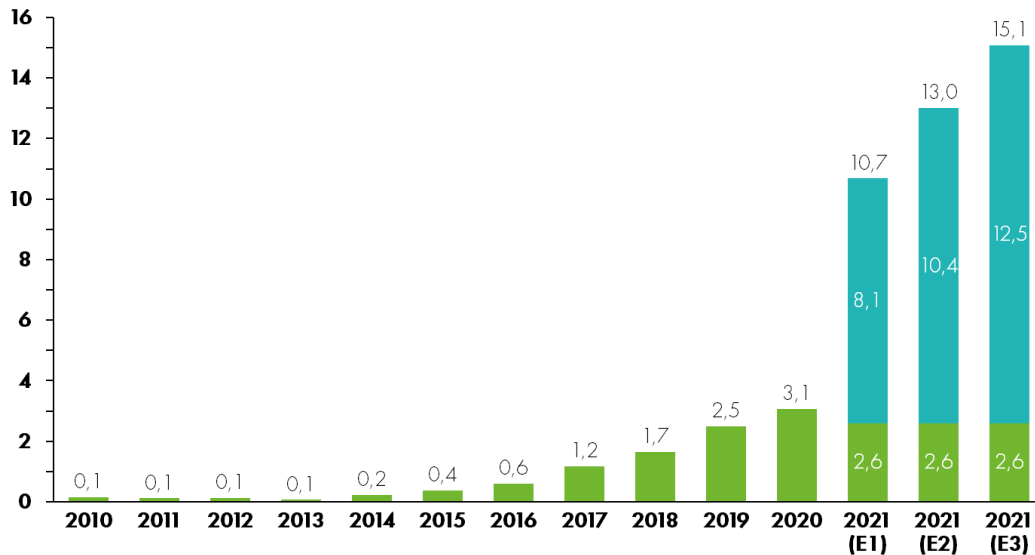
New wind capacity installations have also been exceptionally strong. China completed a record 70 GW of new grid-connected wind capacity in 2020, according to China's National Energy Administration (NEA), consisting mostly of onshore wind. This year the momentum is shifted to offshore wind projects which are facing grid-connection deadlines. According to some industry insiders, China could install a staggering 13 GW of new offshore wind capacity in 2021, equivalent to a third of the world's total offshore wind capacity at present and more than quadruple what China installed in 2020. According to our data, 2.6 GW of offshore projects have already been completed in 2021, while 8.1 GW of projects in China's offshore wind pipeline are close to completion and a further 4.4 GW have already installed their first turbine. A part of this last group of projects should reach completion before the end of 2021. We thus estimate that China will install between 10.7 and 15.1 GW of new offshore wind capacity in 2021.



Figure 2: China yearly installed capacity

Offshore Wind Installed Capacity
GW

● Completed ● To be completed before end of 2021



* Note: E1: Low-range Azure estimate; E2: Insider estimate; E3: High-range Azure estimate.

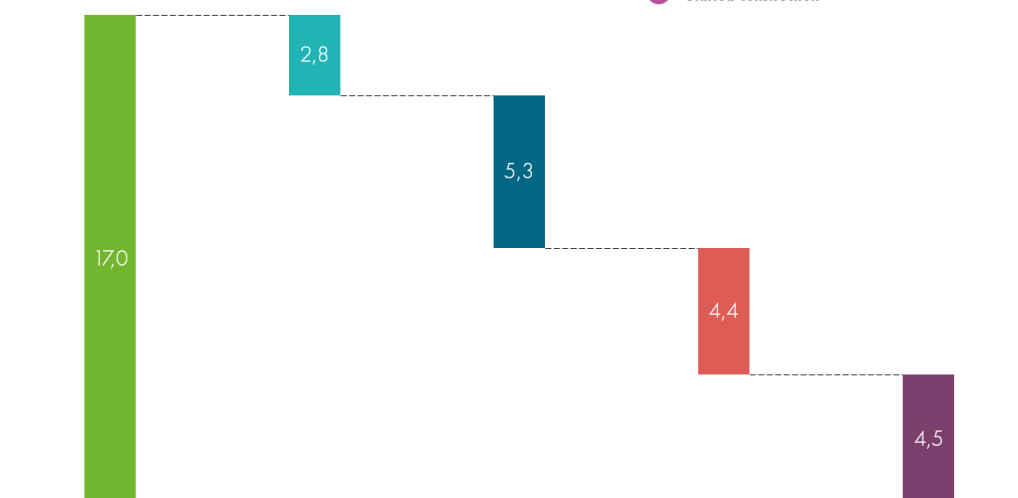
Source: NEA, CWEA, Azure International

Figure 2: China could install a staggering 13 GW of offshore wind capacity this year

Figure 3: China offshore wind projects by construction stage

Capacity
GW

● Offshore wind projects under construction
● All turbines up and partly grid connected
● All turbines up but not grid connected OR turbines partly up and grid connected
● First turbine up
● Started construction



Source: Azure International

Figure 3: In addition to the 2.6 GW already installed in 2021, 8 to 12 GW of offshore wind projects could be fully grid-connected before the end of the year



2. The price decreases are led by industry development and subsidy schemes

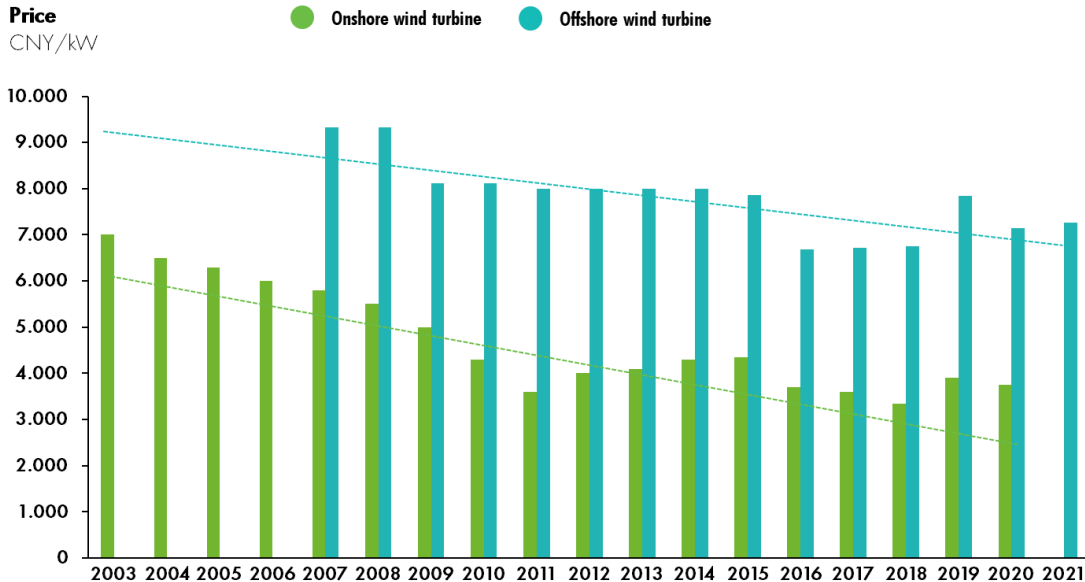
Thanks to generous subsidy schemes and long-term planning, China was able to develop one of the most advanced wind industries in a bit more than a decade. A number of elements make China's wind market particularly competitive:

- **Competitive and localized supply chain.** China has been able to build a fully localized supply chain, from turbine components to the development of wind farms. Nowadays, it is estimated that over 80% of turbine components are locally manufactured and a research institute controlled by China's State Grid suggests that localization could reach 95% by the end of the 14th FYP. This helps companies take advantage of China's relatively low labour costs, reduce transport costs and increase efficiency. Bottlenecks do remain for the production of some few key components such as bearings, pitch systems, etc.
- **Economies of scale.** China installed more than half of the world's onshore and offshore new capacity in 2020 and the Chinese government continues to encourage the development of large-scale projects to take advantage of economies of scale. China's first GW-scale offshore wind project started construction in October. China's ambitious 2060 targets¹ and regulatory support also give long-term guidance to the industry, enabling Chinese actors to invest in large production capacity.
- **Technical innovation.** Among many technical innovations, the size of wind turbines has received the most attention. A number of Chinese turbines manufacturers are vying to develop the largest wind turbines. Onshore and offshore wind turbine sizes have now reached 7MW and 16MW, respectively, with increasingly larger rotor diameters, as these help reduce costs and increase energy production. Currently, at least seven Chinese turbine manufacturers are developing wind turbines of 10 MW or more. In parallel, strong efforts are being made to reduce the total weight of turbines and therefore their cost, by, for instance, developing semi-direct drive products.

¹ China has committed to hit peak emissions by 2030 and carbon neutrality by 2060.



Figure 4: Wind turbine price trends in China



Note: Prices are based on grid-connection year of wind turbine.

Source: China bidding centre, Azure International

Figure 4: Technical innovation and capacity expansion have enabled Chinese turbine manufacturers to reduce costs substantially

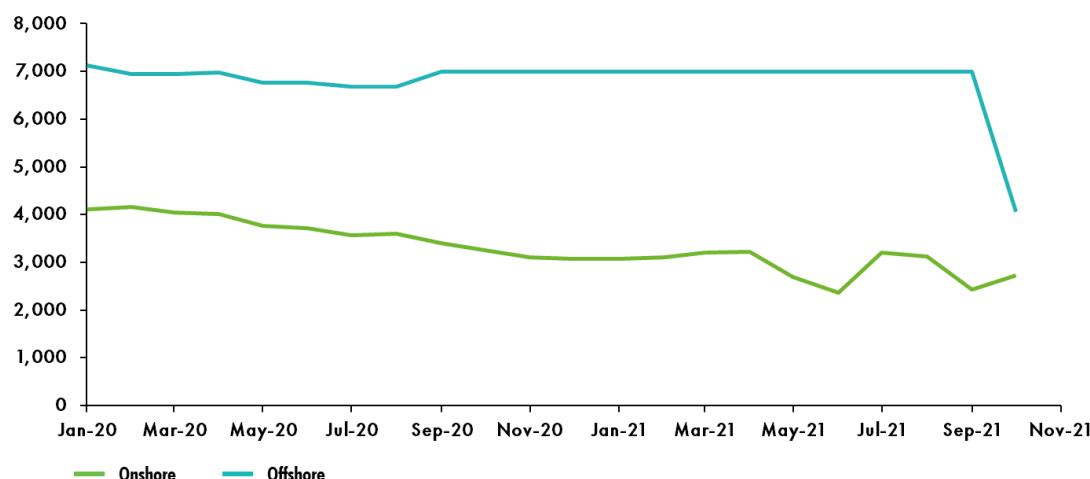
While China's growing wind industry has enabled a steady decrease in prices across the last decade, the recent sharp decrease in prices is mostly due to the short-term effect induced by the phasing out of onshore Feed in Tariffs (FiT) at the end of 2020, and the forthcoming expiration of offshore FiTs at the end of 2021.

The end of FiTs resulted in a rush of demand as developers and utilities scrambled to complete their projects ahead of the expiry, and this in turn led to further investment in production capacity and an increase in the number of active Chinese suppliers in the market. Following the rush, there has been a sudden reduction in demand, obliging manufacturers to strongly compete on prices, to the extent that their bottom-lines are being tested, as the cost of onshore wind turbines is considered to be around 2000 CNY/kW nowadays. The same forces are at play in the offshore wind sector, as the recent bidding results of two competitive allocation projects owned by CGN and Huarun were below 4000 CNY/kW (not including wind towers), more than 40 % lower than the bids obtained a few months earlier.

What is notable, however, is that despite the end of FiTs, the rate of onshore installations remains strong, with the industry expected to install fully 40GW in 2021. This is a real sign of the resilience of China's wind sector and the impact that a lower cost base has had on its overall competitive position.



Figure 5: Average tender prices for wind turbines in China (CNY/ kW)



Note: Prices are based on date of tender and include wind towers; If tender price was unavailable for a given month, price from previous month was used.

Source: China Bidding Centre

Figure 5: Subsidy deadlines have led to strong price drops in recent months

3. High coal prices are threatening China's energy security, an opportunity for renewable energy projects?

While high coal prices are impacting the profits of coal electricity power plants, they are most importantly impacting China's energy security. Indeed, most of the power shortages that China has experienced in the last few months are due to coal power companies refusing to produce electricity, as they cannot recover the cost of coal. But coal is not the only culprit. In China's Northeast, low winds in September produced a gap in electricity production that other power sources could not fill fast enough, causing severe power shortages. Additionally, to reach the environmental targets set by the central government, power cuts have been implemented in a number of provinces.

This underlines the harsh reality that the Chinese government faces: its traditional and centrally supervised energy system is unable to keep up with its aggressive energy transition campaign.

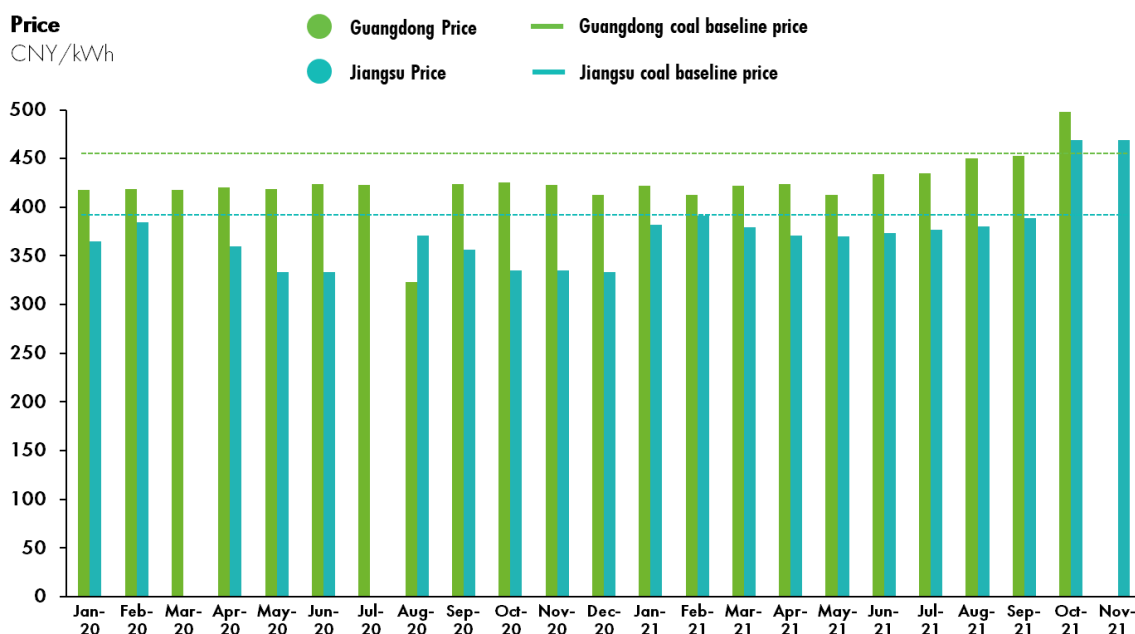
It demonstrates the delicate balance that has to be found between energy transition and energy security. The Chinese government's immediate reaction to the crisis seems to show that it is not willing to abandon either. In order to reduce supply constraints, Inner Mongolia's Energy Bureau ordered 72 mines in the region to increase coal output by 100 M tons, representing 3 % of China's annual coal consumption. At the same time, the National Development and Reform Commission (NDRC) released a notice ordering all coal plants to participate in the electricity market, where coal electricity prices can now vary up to 20 % compared to the baseline price. Although such policies will somehow help coal-fired power plants survive, it underlines China's determination to continue with its electricity market reform, which will, on the long run, help renewable energy projects compete against coal. China has also officially reiterated its commitment to its energy transition. Ahead of COP26, the government



restated its 2060 commitments and released its “1 + N” policy, a top level policy framework to implement such objectives.

On the whole, the latest policy measures promoted by the Chinese government are positive for the wind industry, but challenges remain. With wind projects reaching grid parity and electricity prices being liberalized, wind power will become more and more competitive with respect to coal power. Furthermore, deregulated energy prices can drive the coal sector to reposition itself as ancillary service provider, by selling electricity when wind and solar production is low. However, the power grid is partially shifting the responsibility of grid stability to wind farm developers. Many Chinese provinces have required renewable energy projects to be accompanied by peak shaving capacity, thus obliging them to internalize the cost of grid flexibility. In the years to come, such energy storage bundling requirements should be replaced with ancillary services driven by market mechanisms. For companies, while technical innovation and price reductions are the first steps towards China’s energy transition, those that are able to offer low electricity prices while ensuring stable and predictable electricity supply will come out in front on the long run.

Figure 6: Guangdong and Jiangsu monthly bidding power price



Note: Data of Jiangsu monthly bidding prices of Mar. and July of 2020 are not available. Guangdong has not released results of November 2021.

Source: Guangdong and Jiangsu Power Exchanges

Figure 6: Relative price liberalization has enabled monthly power bidding prices in the power market to surpass the coal-fired baseline prices

China should continue deregulating its energy markets. Moving forward, China will have to further liberalize coal energy prices, to make renewable energy even more competitive and increase system flexibility. When the market-based power average price level becomes more attractive than the current



coal fired baseline price (which is the grid off-taking price for most of the wind and solar projects in China), corporate PPA (or power brokerage) business models may provide a better offer for renewable projects in China, enabling to de-risk investment for the Chinese renewable market. Once inter-provincial and intra-provincial power spot markets and ancillary service market mechanisms are well developed, grid flexibility solutions could represent a new revenue stream for renewable energy projects.

Conclusion

With wind turbine prices and new installations reaching new records, China's wind industry has shown its resilience and capacity to take over an increasing share of China's electricity mix. While the Chinese government has long controlled the coal industry by capping prices in order to maintain social stability and high economic growth, the latest coal prices and power shortages have shown the urgent need for a more flexible energy system. The cost of energy production should be better reflected in electricity prices, and flexibility solutions should be properly rewarded. While it might be tempting on the short term for China to relapse into its old coal habit, its energy security and energy transition do not have to be incompatible if the latter is carried out effectively. Wind energy has shown itself to be increasingly competitive, and the steps China has taken to fight the power shortages show that it is not ready to give up on its energy transition. However, in order to supplant coal as a main electricity source, the wind industry will have to demonstrate that it can provide electricity that is not only cheap but also flexible and reliable.

In parallel, the rest of the world is facing challenges in its energy transition, with governments worldwide realizing that reducing reliance on fossil fuels will be a hard-fought battle. In this context, the ability of the Chinese wind sector to compete with coal and continue to grow its market share offers a breath of fresh air for wind energy markets worldwide and reminds us that China has a key role to play in the global energy transition.



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About Azure International

Azure International is a leading renewable energy consultancy, providing market entry, market strategy, due diligence and engineering services in the wind, solar and energy storage space in China. Azure has taken part in the naissance of the Chinese wind industry for over 18 years with unparalleled expertise and networks in both onshore and offshore wind. As such, it has been recognized as the number one advisor for foreign players in the Chinese renewable energy sphere. Find out more: [here](#)

About Global Wind Energy Council (GWEC)

Global Wind Energy Council (GWEC) is a member-based organisation that represents the entire wind energy sector. The members of GWEC represent over 1,500 companies, organisations and institutions in more than 80 countries, including manufacturers, developers, component suppliers, research institutes, national wind and renewables associations, electricity providers, finance and insurance companies. Find out more: [here](#)

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