


A woman with long dark hair and round glasses is looking down at a smartphone. The background is a perforated metal surface, possibly a window or a wall, with a warm, orange-red light source creating a glow. The image is framed by white curved shapes in the top-left and bottom-left corners.

COVID-19 China Energy Impact Tracker

A recap of 2020

ANALYSIS

APRIL
2021 #3

Agora
Energiewende 

Preface

During the COVID-19 pandemic and the Sino-U.S. trade tensions, China was the only major economy that grew in 2020. While the global economy shrank by 3.3 per cent year-on-year (YOY), China's economy grew by 2.3 per cent. After the first quarter (Q1) of 2020, during which the Chinese economy contracted for the first time in more than four decades, China mounted a speedy recovery. Unfortunately, however, this recovery brought about particularly high levels of emissions. In 2020 as a whole, China accounted for 31 percent of global carbon emissions and 18 percent of global gross economic product (GDP).

In December 2019, the European Union (EU) pledged climate neutrality by 2050. In September 2020, China announced its own 2060 carbon neutrality pledge. Since then, more and more countries have followed suit with their own net-zero targets. Together, they cover at least 61 per cent of global carbon emissions and 68 per cent of global GDP.

The International Monetary Fund (IMF) has projected that the Chinese economy will expand by 8.4 per cent YOY in 2021. By contrast, China's 14th Five-Year Plan (FYP) does not include a specific GDP target. The State Council of China has set a modest GDP growth target for 2021 of just over 6 per cent. The 21st century is likely to have its own "roaring twenties," so how China's growth model interacts with its 2060 carbon neutrality pledge deserves close attention from the international community.

Agora Energiewende's COVID-19 China Energy Impact Tracker provides regular updates on how the COVID-19 pandemic has affected China's energy sector, from energy supply and consumption to carbon emissions and other key indicators. It aims to better inform the international community and Chinese audiences alike about the impact of COVID-19 on the Chinese energy economy.

Dr. Patrick Graichen,
Executive Director, Agora Energiewende

Key findings:

- 1** China's carbon neutrality pledge sent positive shock waves through the international climate community and has boosted its clean-energy transition efforts.
It remains to be seen how China will balance its short-term interest in economic stimulus through carbon-intensive investment with its medium-to-long-term interest in peaking national emissions as soon as possible.
- 2** All forms of energy demand, including coal, grew last year, which does not bode well for China's ambitious international climate commitment.
While the rest of the world experienced economic contraction in 2020, China's economy grew, increasing its share of global carbon emissions by two percentage points. China must urgently downsize its gigantic national coal consumption, which makes up more than half of the global total.
- 3** While the COVID-19 economic contraction in China is likely to be short-lived, the pandemic's profound impact on China's energy sector and global geopolitics is expected to be felt for many years to come.
In the post-COVID-19 world, China is likely to face a much more contentious geopolitical environment. Beijing could stabilize its role in the world by becoming a leader in the global transition to clean energy.

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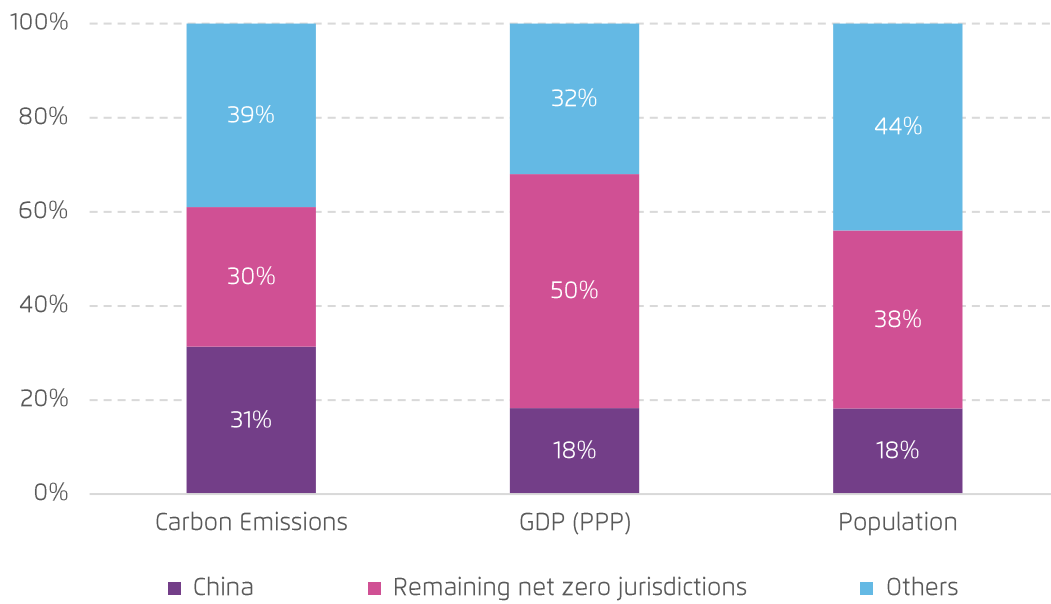
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1 | Background

China boosted global net-zero pledges ahead of a “roaring twenties” for the 21st century

Figure 1 | China’s share in global net-zero pledges



Source: ECIU (2021), World Bank, IEA, and an estimation by the authors.

- ▶ On September 22, Chinese President Xi Jinping’s pledged peak national carbon emissions before 2030 and carbon neutrality by 2060. The announcement sent positive shock waves through the climate policy world.
- ▶ The only major economy that saw economic growth in 2020, China’s share of global carbon emissions rose from 29 per cent in 2019 to 31 per cent in 2020.
- ▶ As the net-zero pledge has come to take center stage in efforts to halt climate change, jurisdictions with net-zero targets now represent at least 61, 68, and 56 per cent of global emissions, GDP (PPP), and population, respectively. In particular, China’s carbon neutrality pledge has significantly boosted the global climate agenda ahead of the COP 26 summit in Glasgow in 2021.

A “roaring twenties” for the 21st century?

Figure 2 | The roaring twenties: the U.S. in the 1920s vs. China in the 2020s

	The U.S. in the 1920s	China in the 2020s
Geopolitics	The heated Anglo-German rivalry contributes to the outbreak of World War I (1914–1918)	In the Atomic Age, the rising U.S.-China rivalry has fortunately given rise only to a trade war instead of military confrontation (2018 – present)
Public health	The Spanish Flu lasts from Feb 1918 to Apr 1920. The first confirmed case originates in the United States.	The COVID-19 outbreak started in Dec 2019. The first confirmed case originated in China.
Culture	Mass consumerism; the cultural civil war: Harlem Renaissance vs. Ku Klux Klan.	Online shopping and virtual meetings; globalization vs. deglobalization.
Regulation with characteristics	Nation-wide prohibition goes into effect on Jan 16, 1920.	The Great Firewall of China becomes increasingly sophisticated.
Infrastructure	Rise of the highway and telephone network.	Rise of high-speed trains and next-generation mobile networks.
Milestone event	Great Depression (1929–1939); end of prohibition (1933); World War II (1939–1945).	Trump presidency (Jan 2017 – Jan 2021); BT (before Trump presidency); DT (during Trump presidency); PT (post-Trump era, 20 Jan 2021 –).
Period	World War I (1914–1918); interwar period (1918–1939); World War II (1939–1945)	BC: before corona; DC: during corona; AC: after corona.
Lessons learnt	The U.K. and Germany are left exhausted by the two world wars; the U.S. rises to become the global hegemon.	Neither the U.S. nor China has been exhausted by bilateral frictions. China faces an increasingly contentious geopolitical environment.

Source: Tu (2021a).

- ▶ Against the backdrop of the ongoing COVID-19 pandemic and a prolonged Sino-U.S. trade war, China’s energy and climate policies face rising uncertainties.
- ▶ The history of the Roaring 1920s may shed light on what may unfold in the next decade and beyond.
- ▶ The Roaring Twenties in 1920s was a period of dramatic social and political change in the United States. It is a pivotal period before America’s global hegemony.
- ▶ A brief comparison between the U.S. situation in the 1920s and the Chinese situation in the 2020s reveals many similarities and differences. The lessons that America and China learn from experience will be key not only for stabilizing a rule-based world order but also for advancing the global climate agenda and the clean-energy transition at a crucial juncture of world history.

Energy statistics revisions in China

Figure 3 | Historical revisions of China's national coal production

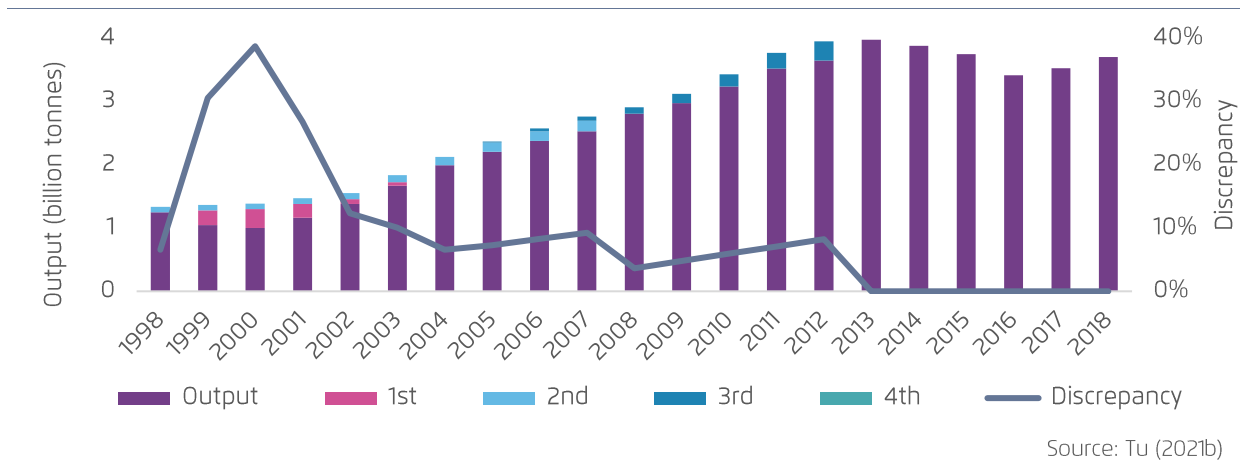
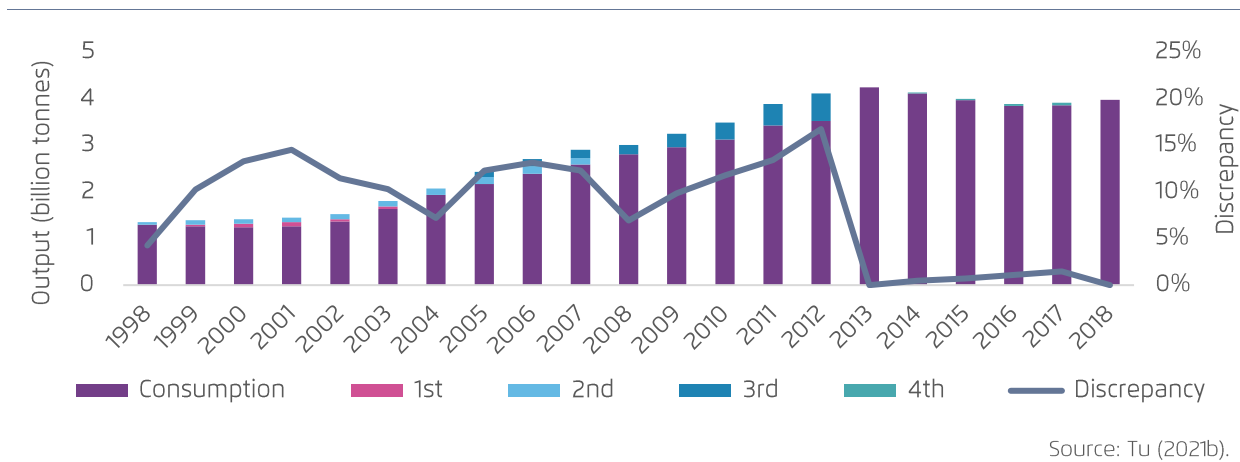


Figure 4 | Historical revisions of China's national coal consumption



► China's system for collecting energy statistics was initially developed under a planned economy. As China became more market-oriented, the system stumbled. China's national coal output in 2000, originally reported as 998 Mt, was eventually adjusted upward by 39 per cent, which hurt China's energy policy planning.

► Following the first three rounds of the National Economic Census (in 2004, 2008, and 2013), China repeatedly made substantial statistical adjustments, especially for coal. But the fourth round in 2018 improved drastically: no adjustments to the national coal output were required. The "REAL" consequences of higher-quality energy statistics are expected to be profound and long-lasting.

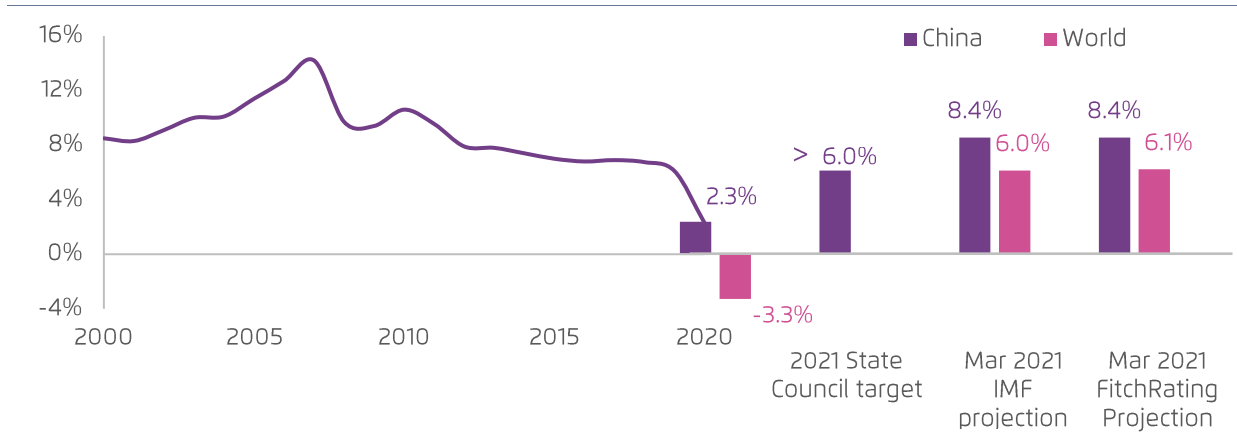


2 | Economy and the power sector

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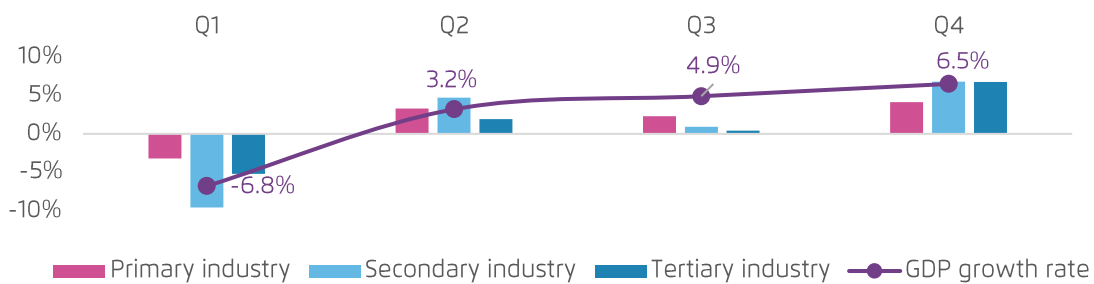
Economy: China shifts its growth model

Figure 5 | Annual GDP year-over-year (YOY) growth



Source: National Bureau of Statistics (NBS 2021a), IMF (2021), and Fitch Ratings (2021).

Figure 6 | Quarterly GDP YOY growth by industry in 2020

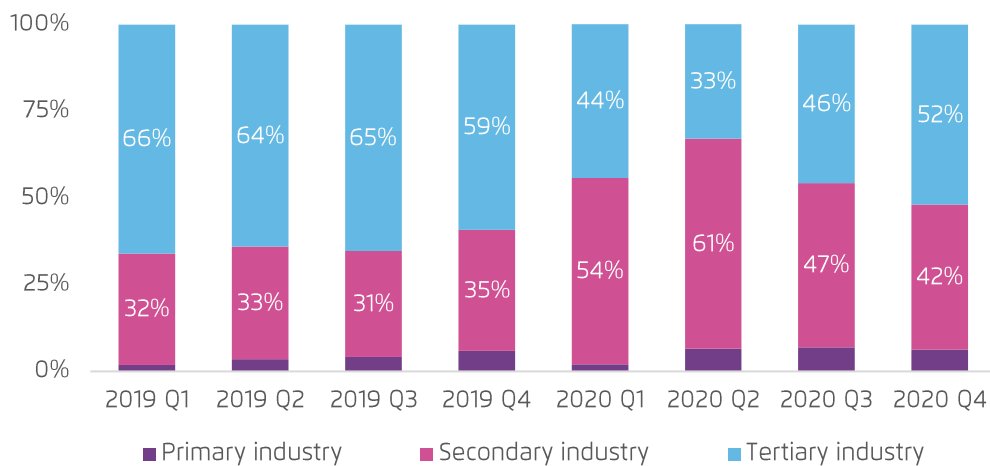


Source: NBS (2021a).

- ▶ As projected, China was the only major country to expand its economy in 2020.
- ▶ The Chinese economy has been steadily recovering since Q2 2020.
- ▶ The State Council of China set a modest GDP growth target for 2021 at just over 6 per cent. By comparison, the IMF projected a much stronger recovery rate, i.e., 8.4 per cent YOY. A less ambitious growth target indicates that China plans to focus more on the quality of growth.
- ▶ The GDP growth rate returned to pre-pandemic levels in Q4 2020 and exceeded the previous year's level.
- ▶ The tertiary industry recovered strongly in Q4 2020. Hospitality and catering saw positive growth for the first time in the same period, largely driven by a surge in tourism.
- ▶ The continued rebound in the secondary industry was largely driven by the manufacturing and construction sectors.

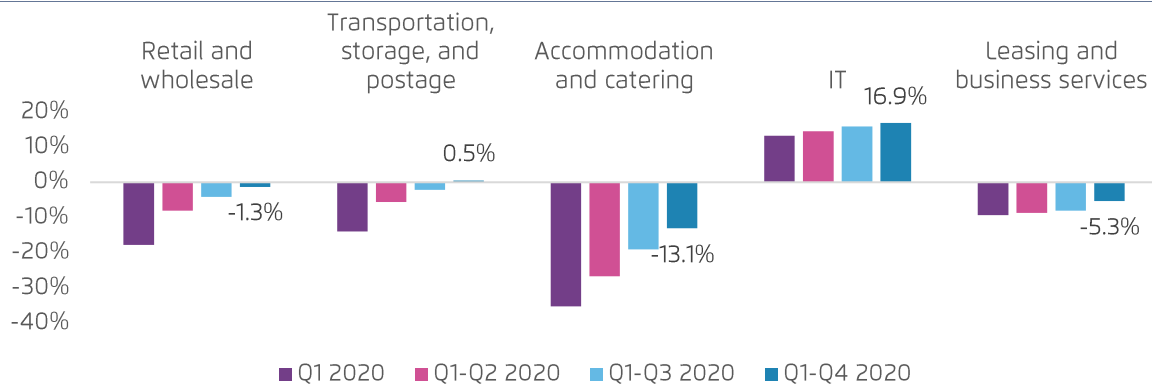
Economy: industrial growth comes at the expense of service sectors

Figure 7 | Contribution to GDP by industry: 2019 vs. 2020



Source: NBS online database.

Figure 8 | YOY growth of GDP in selected service sectors in 2020



Source: NBS online database.

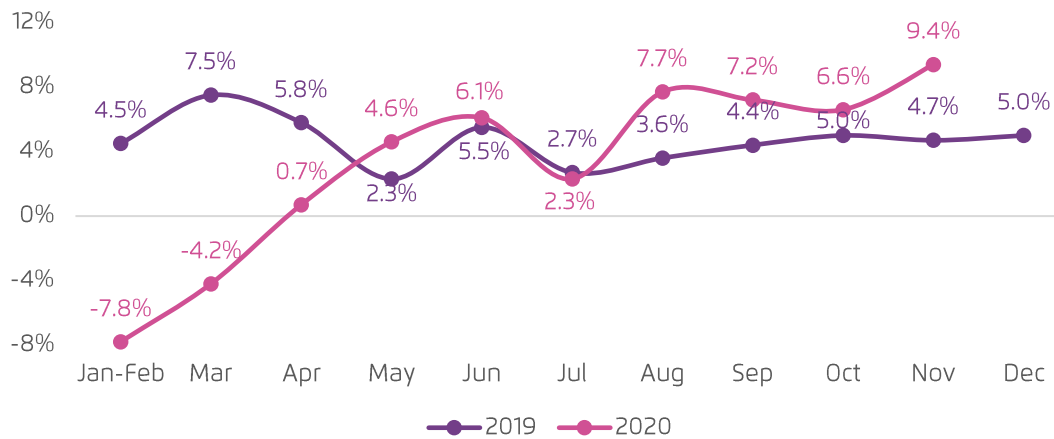
- ▶ Generally, secondary industry was the primary driver of economic recovery in 2020. The contribution to GDP by the secondary industry exceeded pre-pandemic levels.
- ▶ Even with steady recovery in 2020, the Chinese energy economy has yet to recover.
- ▶ The contribution of the secondary industry had decreased steadily before

the outbreak of coronavirus, with its share in GDP reaching 33 per cent in 2019. However, by the end of 2020, the share was 10 percentage points higher due to the industry-led economic recovery.

- ▶ The shrinking share of the tertiary industry indicates that the service sector has not fully recovered.
- ▶ Despite the positive growth of key service sectors in Q4 2020, all but IT and transport saw an annual revenue contraction.

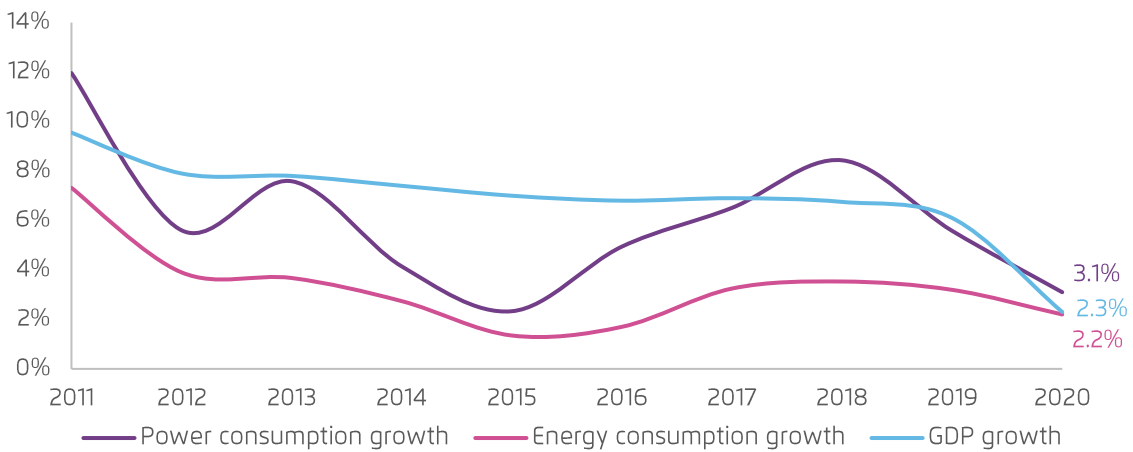
The power sector: national energy and power demand as the economic barometer

Figure 9 | YOY growth of monthly power consumption, 2019 vs. 2020



Source: China Electricity Council (CEC).

Figure 10 | YOY growth of annual national power consumption, energy demand, and GDP

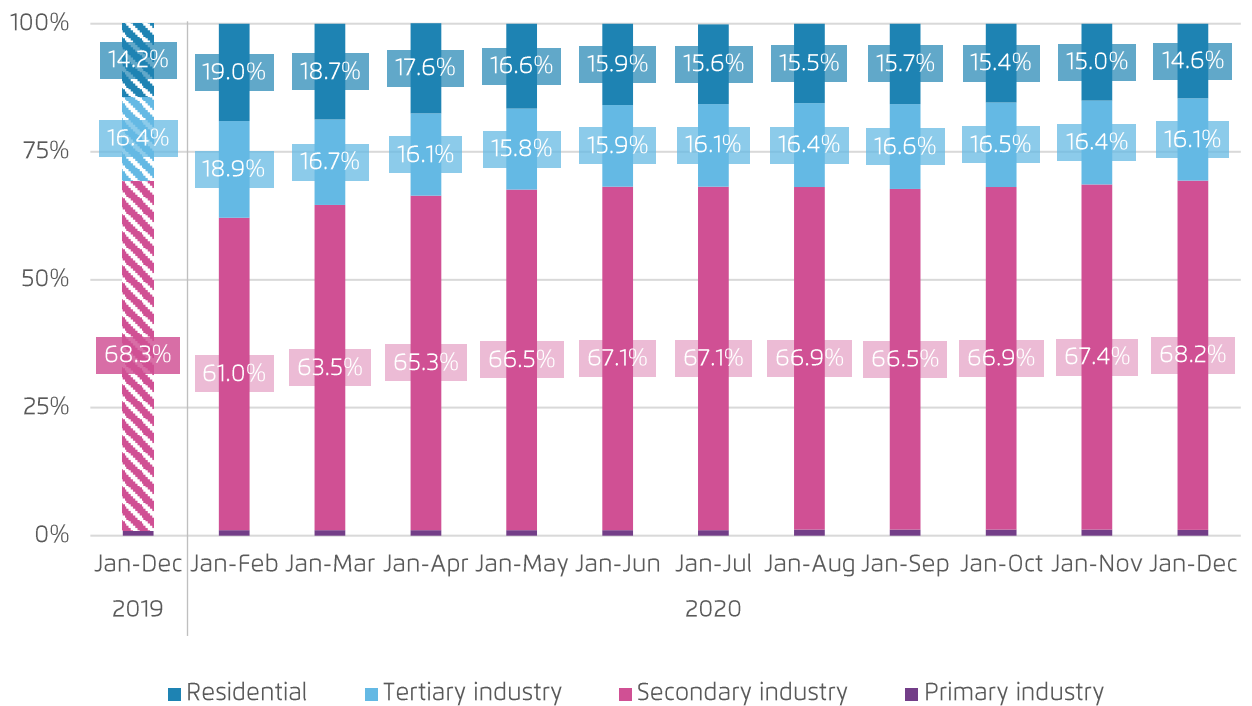


Source: CEC and NBS online database.

- ▶ Monthly power consumption rebounded strongly in the second half of 2020, following the general economic recovery.
- ▶ Monthly power consumption grew continuously in the second half of 2020, reaching a record high at the end of 2020.
- ▶ In the winter of 2020, a few Chinese provinces encountered power shortages and had to implement restrictions on power usage.
- ▶ The YOY growth rate of GDP decreased faster than national power and energy consumption, indicating that China's economic recovery in 2020 was largely driven by energy-intensive activities.

The power sector: the secondary industry dominates national power consumption in China.

Figure 11 | Contribution to national power consumption by industry, 2019 vs. 2020



Source: NBS online database.

- ▶ The secondary industry dominates national power consumption in China.
- ▶ The coronavirus outbreak severely interrupted industrial activities, causing a sharp contraction of power demand in the secondary industry in Q1 2020.
- ▶ The rapid pickup of industrial activities beginning in Q2 2020 resulted in a rebound of power consumption in the secondary industry.
- ▶ Lockdown policies directly increased the time people stay at home, leading to a 6.9 per cent of YOY growth in power consumption in the residential sector. After restrictions were lifted, the residential sector's share of power consumption shrank, returning to 2019 levels by the end of 2020.

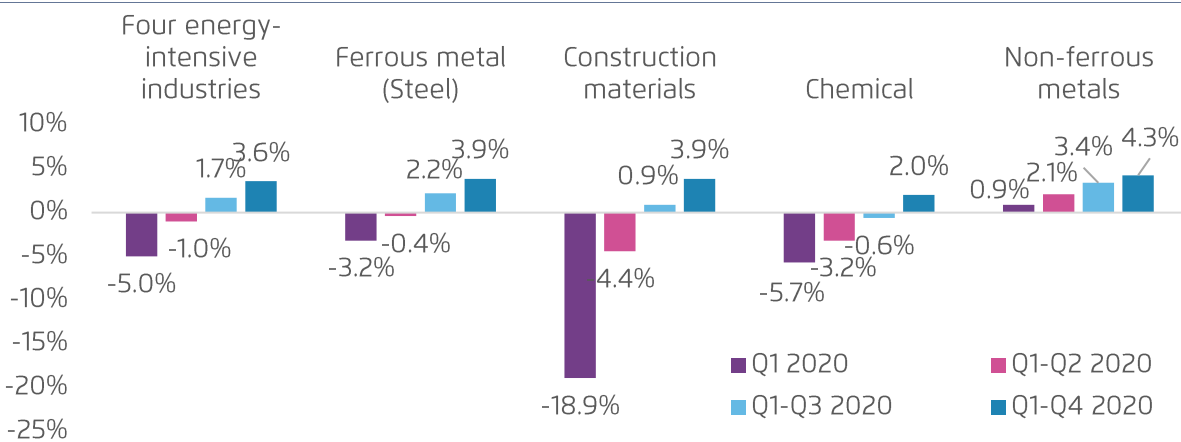
The power sector: manufacturing is still king

Figure 12 | Breakdown of power consumption by sector in 2020



Source: CEC.

Figure 13 | Power consumption growth by key industrial sector in 2020

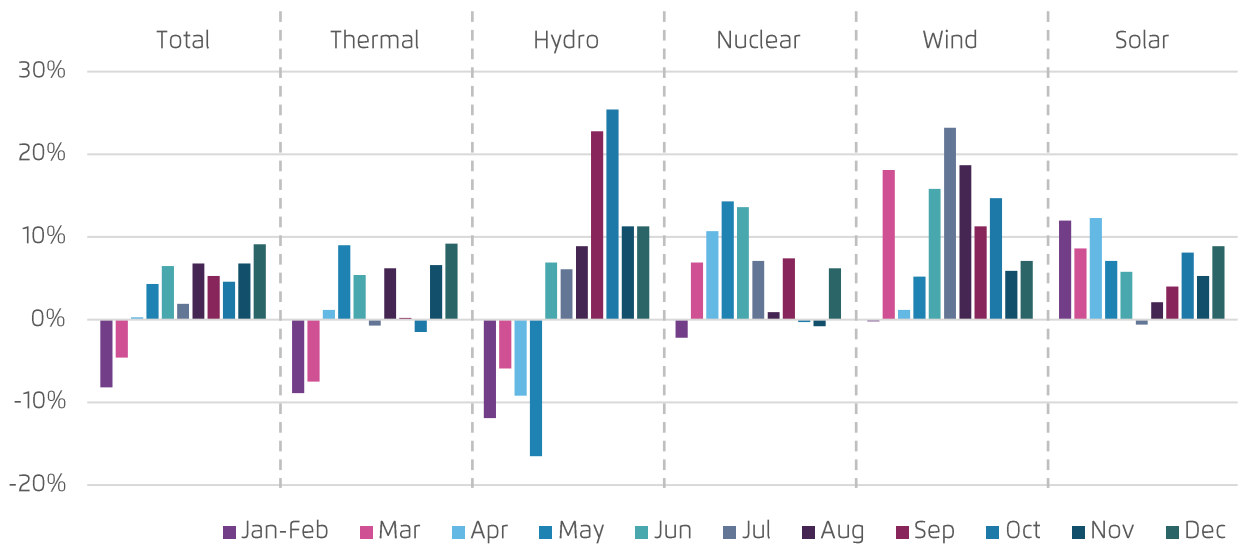


Source: NBS online database.

- ▶ The two largest power consuming sectors – manufacturing and power generation – saw positive growth in 2020.
- ▶ Although many sectors in the tertiary industry (transport, hospitality, tourism, etc.) were hit hard, lockdown measures encouraged a surge of remote work and online shopping, causing power demand in IT industry to skyrocket.
- ▶ The four key energy-intensive industries – ferrous metal (e.g. steel), construction materials (e.g. cement), chemicals, and non-ferrous metals – make up a third of national power consumption. By the end of 2020, the YOY growth rates of power consumption had turned positive in all four industries.

The power sector: output levels increased for all generation technologies

Figure 14 | Monthly growth of power generation by technology in 2020

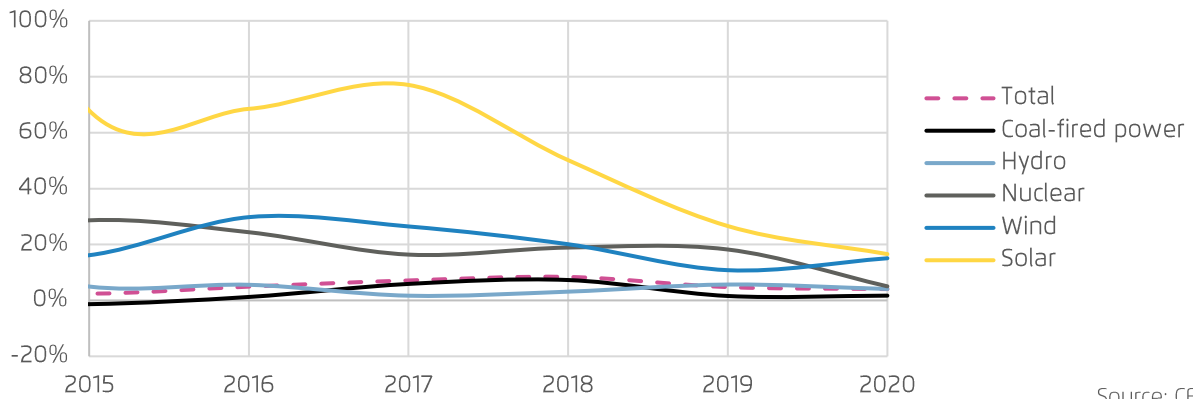


Source: CEC.

- ▶ In 2020, national power generation grew by 4.0 per cent YOY.
- ▶ Thermal and hydro power generation were impacted the hardest during the pandemic.
- ▶ Wind and solar generation achieved double-digit growth in 2020.
- ▶ Notably, wind and hydro performed even better in the second half of 2020 thanks to the rainy and windy summer and fall.
- ▶ Thermal power generation grew strongly in November and December due to the unexpected power shortages during the winter.
- ▶ The problem is that coal-fired power generation also grew by nearly 2 per cent YOY in 2020. The output increases for all generation technologies may not bode well for China's ambitious climate pledge of achieving carbon neutrality by 2060.

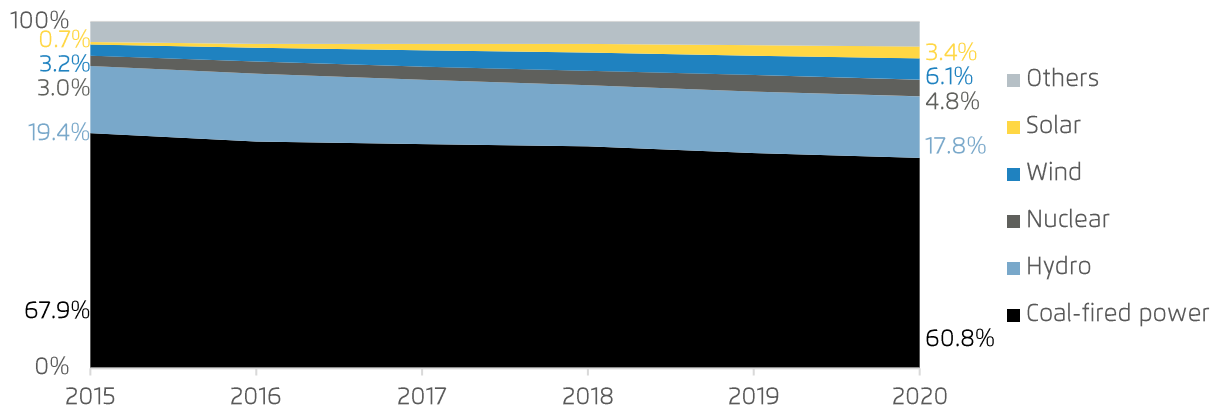
The power sector: the ascendance of low carbon generation comes at the expense of coal power

Figure 15 | Annual YOY growth of power generation by fuel type, 2015–2020



Source: CEC.

Figure 16 | Breakdown of power generation by fuel type, 2015–2020



Source: CEC.

- ▶ In spite of output fluctuations, all major types of power generation increased in 2020.
- ▶ Generation was affected by the lockdown measures in early 2020 but picked up once the pandemic was largely contained. The strong economic recovery in the second half of 2020 soon returned China's power generation to previous levels.
- ▶ The share of coal power in the overall generation mix has been declining. However, coal still dominates China's power sector, accounting for more than 60 per cent of national output. To further the clean transition in the power sector, China must decrease its enormous coal-fired power capacity, which in 2020 amounted to 1,095 GW, more than half of the global total.

The power sector: the pandemic did not slow down the addition of greenfield power capacity

Figure 17 | Added thermal and renewable capacity by month, 2019 vs. 2020

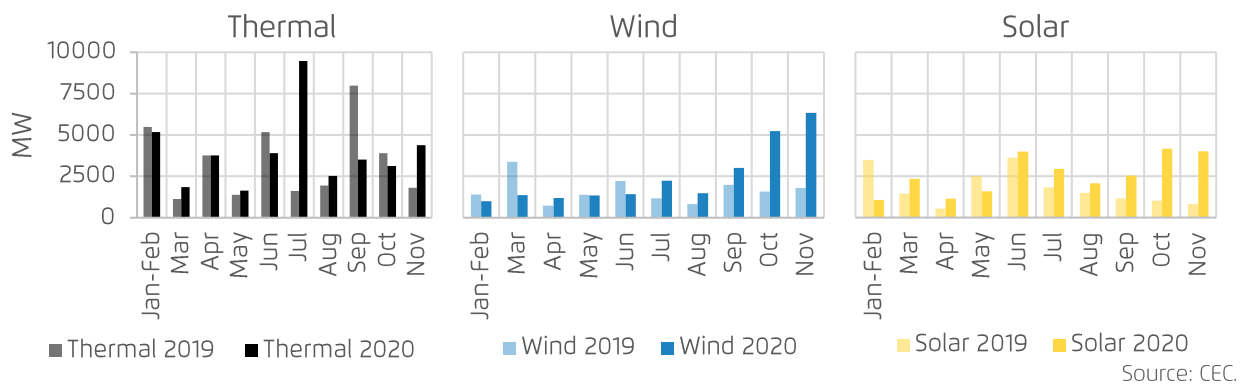
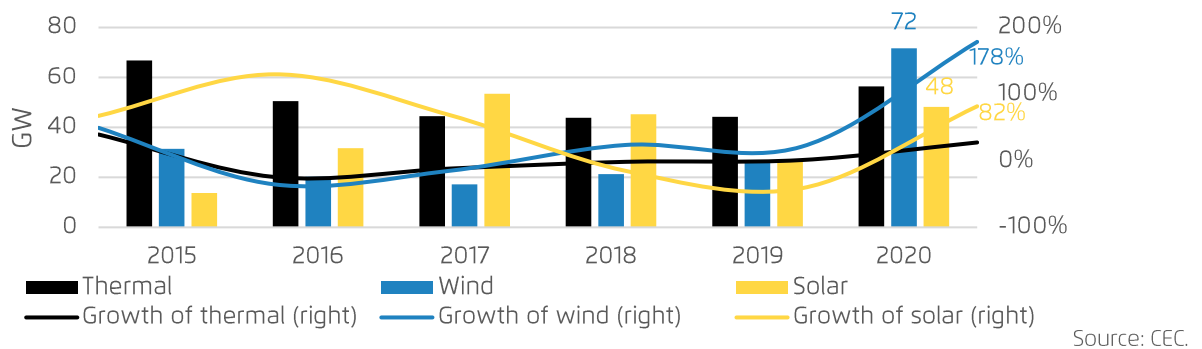


Figure 18 | Added thermal and renewable capacity during the 13th FYP period



- ▶ Despite the supply chain disruptions in the renewables sector during early 2020, China has made great strides with wind and solar capacity installations. In particular, the added wind capacity in 2020 achieved a record YOY growth rate of 178.7 per cent, exceeding the total added wind capacity from 2017 to 2019.
- ▶ According to the Global Wind Energy Council (GWEC), China is also the global leader in added offshore wind capacity for the third year running. In 2020, China built more than half of the world's added offshore wind capacity.

- ▶ One of the main driving forces behind the surge of added renewable capacity in China is the planned phasing out of subsidies. The National Development and Reform Commission announced that wind farms commissioned after 2020 would not be eligible for subsidies.
- ▶ While the renewable market witnessed record-breaking growth, coal-fired power capacity has continued to increase, undermining China's climate neutrality pledge. In 2020, 38.4 GW of coal-fired power capacity was commissioned in China, more than three times the amount built elsewhere around the world.

The power sector: the long construction frenzy in coal power must come to an end

Figure 19 | The world's top ten countries for coal power, by operational capacity

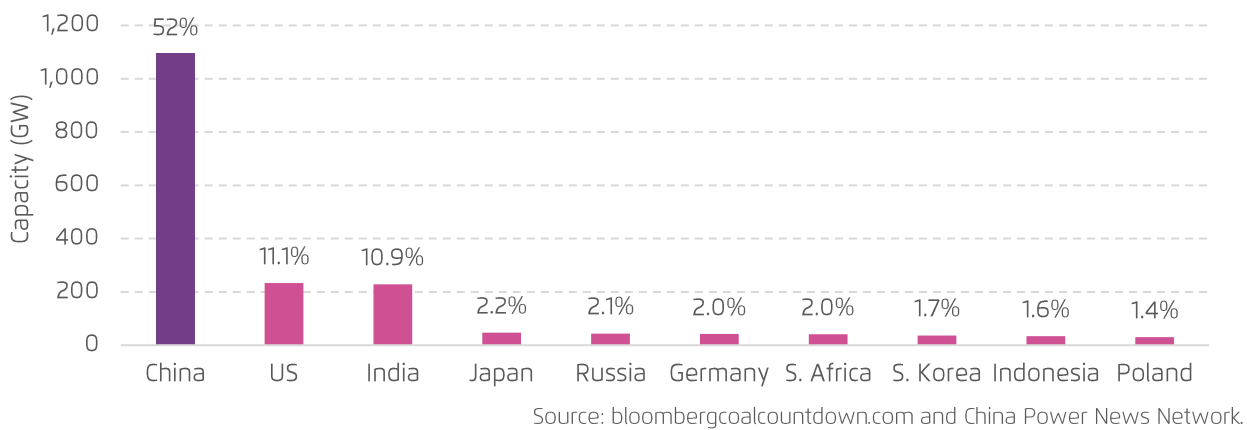
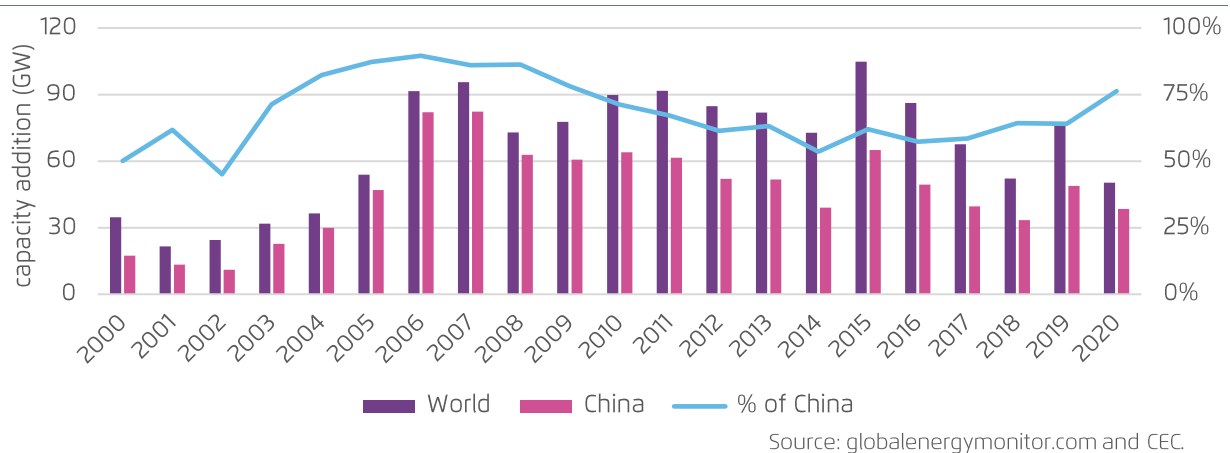


Figure 20 | The golden era of coal power: a two-decades-long construction frenzy in China



► By the end of 2020, operational coal power capacity in China stood at 1,095 GW, accounting for about 52 per cent of the global total. China's dominance in global power capacity is the direct outcome of a two-decades-long construction frenzy of coal-fired power plants. Except for the year 2002, China's share of added global coal capacity has exceeded 50 per cent in every year since 2000. In 2006 alone, China made up

90 per cent of added global coal power capacity.

- Despite China's carbon neutrality pledge last September, China still accounted for more than three-quarters of the world's added coal power capacity in 2020.
- In order to accelerate the peaking of China's national carbon emissions, the construction frenzy in the coal power sector must come to an end during the 14th FYP (2021–2025).

Economy & the power sector

Despite 2020 being an extremely challenging year, China made some impressive strides with its economy and the transition to clean energy, with the caveat that Beijing shows no signs of ending its decades-long expansion of coal power.

The Chinese economy expanded by 6.5 per cent YOY in Q4 2020, lifting the full-year GDP growth rate to 2.3 per cent. China was the first major economy to recover from the coronavirus pandemic thanks to the country's stringent but effective containment measures. After experiencing an unprecedented economic contraction of 6.8 per cent YOY in Q1 2020, the Chinese economy steadily rebounded in the remaining three quarters with 3.2 per cent YOY growth in Q2 and 4.9 per cent YOY growth in Q3.


Consistent with its economic recovery, China's national power generation and power consumption also saw positive growth at 4.0 per cent and 3.1 per cent YOY, respectively. Solar and wind power performed strongly, with significant growth in both generation levels and added capacity.

As the country completes its V-shaped recovery, some challenges remain. Even though the GDP growth rate in Q4 2020 returned to pre-crisis levels, it does not mean that the country's economic structure is back to normal. The data from both the economy and the power sector indicate that the rapid rebound was

largely driven by the secondary industry, especially energy-intensive manufacturing. The carbon-intensive economic recovery recalls China's achievement after it joined the World Trade Organization in 2001: by 2010, China had become the world's second largest economy. Nevertheless, due to its reliance on coal, China surpassed the United States as the world's largest carbon emitter as early as 2006.

China has already started to adjust its economic growth model in view of its climate neutrality pledge. Putting more emphasis on the quality of economic growth and productivity will inevitably mean slower economic growth. In 2021, the State Council of China set a modest annual growth target of just over 6 per cent, less ambitious than the IMF's most recent projection of 8.1 per cent YOY. Besides meeting GDP growth target, another policy challenge is how to formulate a recovery pathway increasingly oriented toward services and decarbonization.

The ongoing elephant in the room is the continued construction frenzy of coal-fired power plants. Though China leads the world in renewable development, it shows no signs of ending its decades-long expansion of coal power. In 2020, coal power capacity in China increased by 3.8 per cent YOY. The added capacity made up more than three-quarters of the global total. In view of global calls to phase out coal and China's own carbon neutrality pledge, the continued construction frenzy in coal power is not only financially risky but also politically dubious.

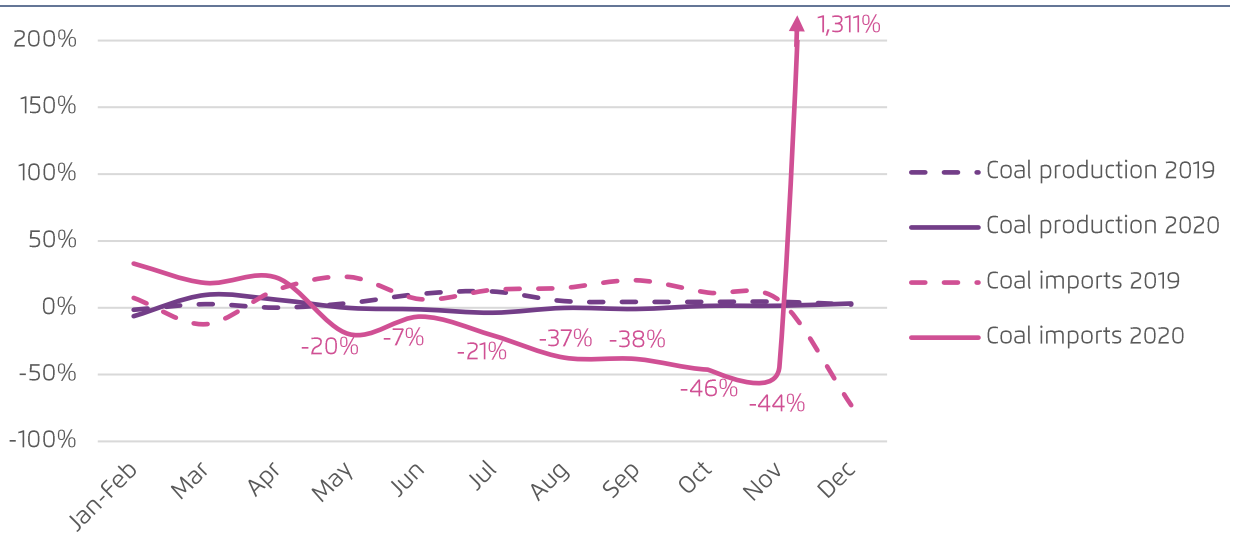


3 | Fossil energy & carbon emissions

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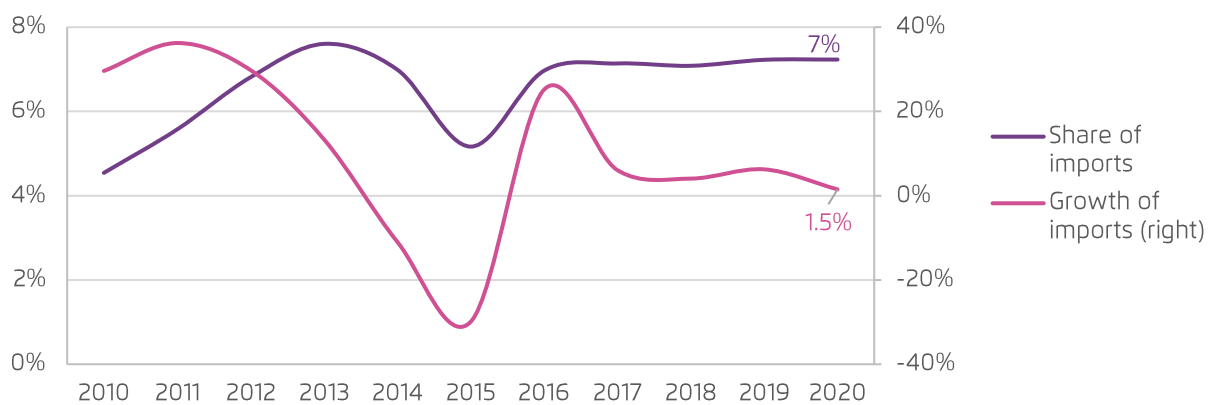
Coal supply: the addiction to coal imports is hard to break

Figure 21 | YOY growth of monthly coal production and imports, 2019 vs. 2020



Source: NBS (2021b), IMF (2020)

Figure 22 | YOY growth of annual coal imports and share of imports in total coal supply

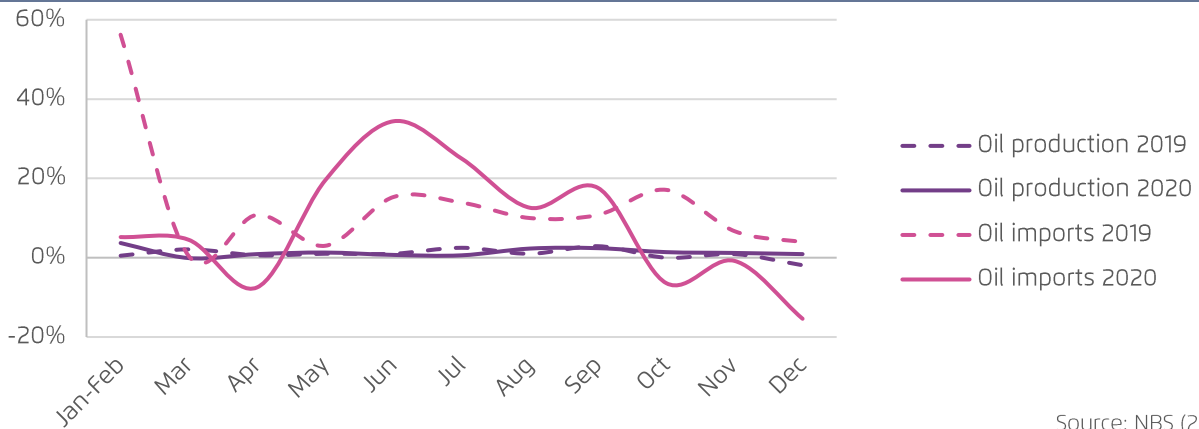


Source: NBS online database, NBS (2021b))

- ▶ The seven-month decline of coal imports that began in May 2020 ended in December of 2020, when they jumped more than 13-fold YOY.
- ▶ The recovery of economic and industrial activities and the prolonged cold weather in early winter led to a surge in coal demand.
- ▶ While the fluctuation in coal demand has significantly affected monthly imports, annual coal imports in 2020 remained relatively stable. The surge of imports in December 2020 largely offset the contraction of import volumes caused by various import restrictions in the previous months.

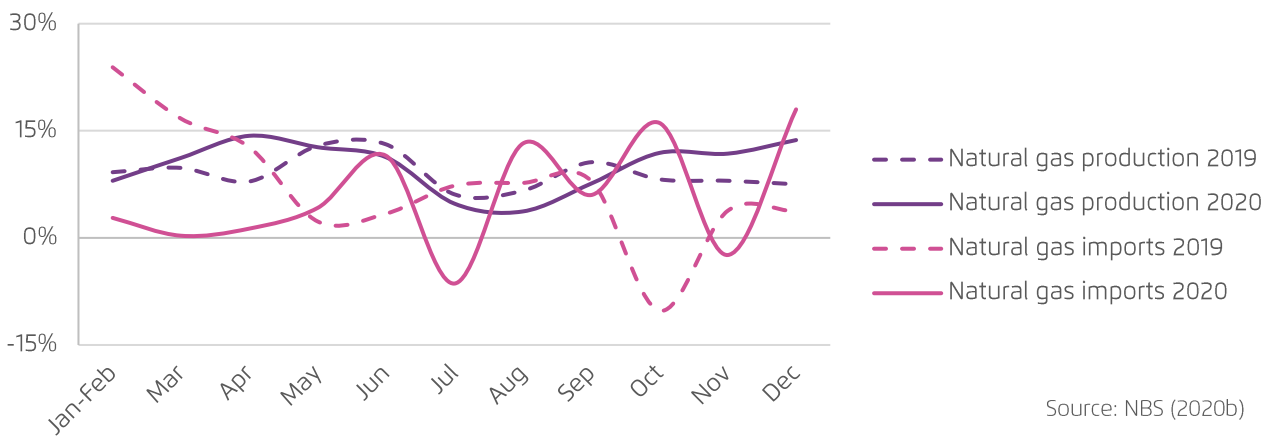
Oil and natural gas supply: rising energy security anxiety matters

Figure 23 | YOY growth of monthly oil production and imports, 2019 vs. 2020



Source: NBS (2020b)

Figure 24 | YOY growth of monthly natural gas production and imports, 2019 vs. 2020



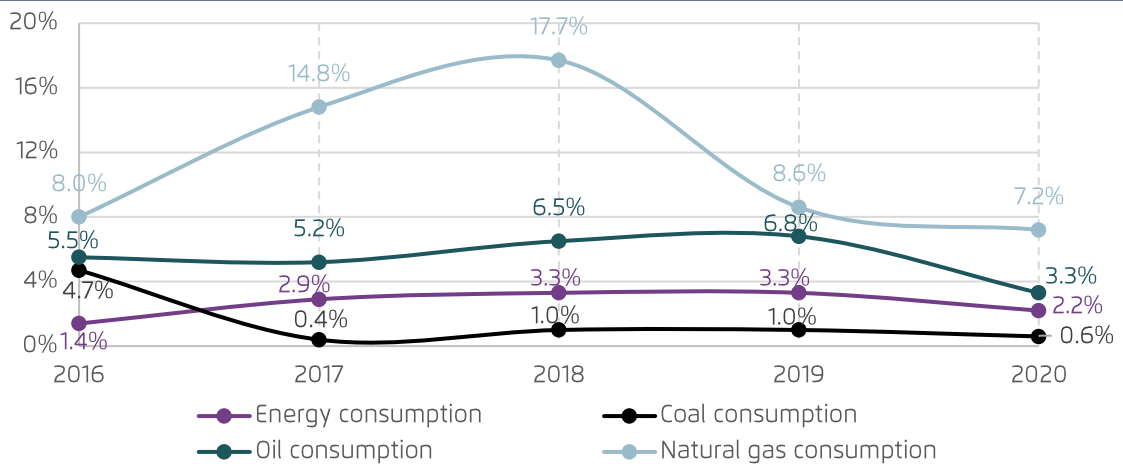
Source: NBS (2020b)

- ▶ Oil and natural gas production in 2020 increased by 1.6 and 9.8 per cent YOY, respectively, largely driven by the greater emphasis on national energy security as part of China's response to an increasingly contentious geopolitical environment.
- ▶ China's oil consumption increased by 2.3 per cent YOY in 2020, while production and imports grew at 1.6 and 7.3 per cent

- YOY, respectively.
- ▶ 73.5 per cent of China's crude oil demand was sourced from overseas suppliers in 2020. The total for natural gas was 42 per cent. Though oil demand growth was undermined by the pandemic, Chinese national oil companies took advantage of the collapse of global oil prices and imported record amounts of crude oil last year.

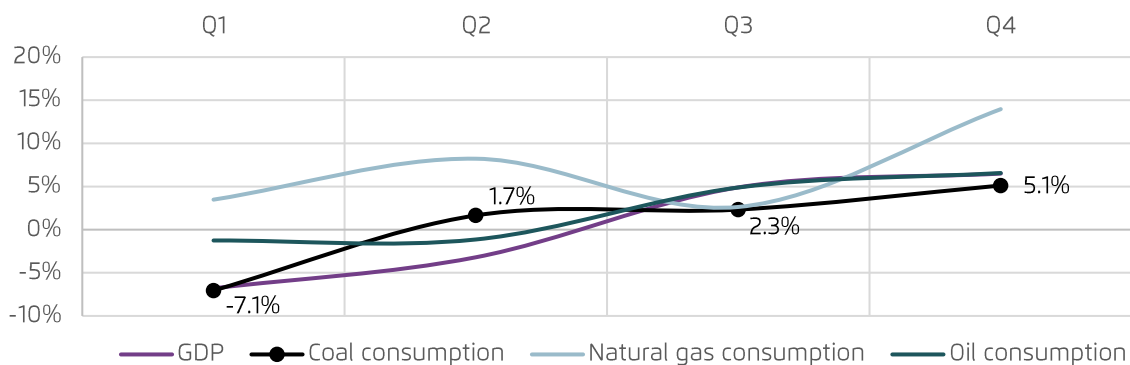
Fossil fuel consumption: demand grew for coal, oil, and gas

Figure 25 | YOY growth of national energy consumption by fuel type during the 13th FYP, 2016–2020



Source: NBS (2020c)

Figure 26 | YOY quarterly growth of GDP and consumption of coal, natural gas, and oil of 2020

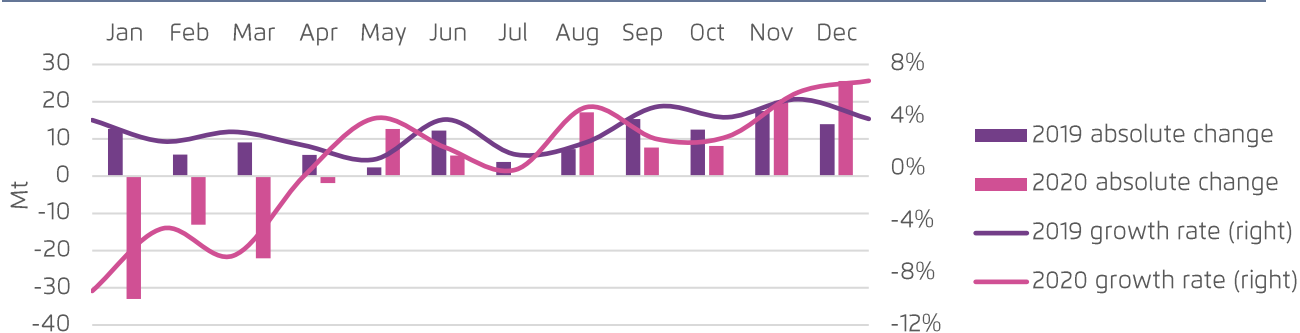


Source: NBS online data base and authors' calculation and estimation

- ▶ Generally, China's national consumption for the three major fossil fuels all increased to various degrees.
- ▶ The global transport sector saw the largest contraction of activities. Oil demand was hit hardest by the pandemic because of long-lasting disruptions of road and aviation traffic. Similarly, oil consumption in China recovered more slowly than coal and natural gas.
- ▶ Coal consumption closely followed the economic trend: its only decline occurred in Q1 2020. Coal consumption steadily picked up during the rest of the year, offsetting the reduction in Q1.
- ▶ Natural gas consumption was least affected by the pandemic and saw steady growth throughout the year.

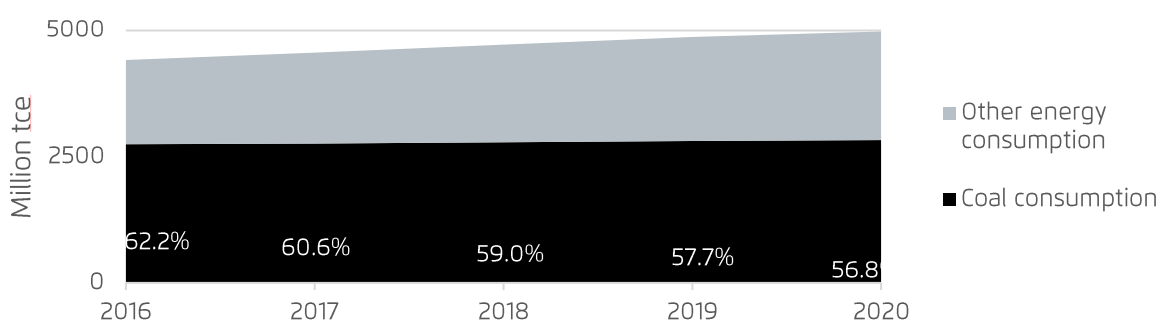
Fossil fuel consumption - coal: king coal declined relatively but not in absolute terms

Figure 27 | YOY growth of monthly coal consumption, 2019 vs. 2020



Source: Authors' calculation and estimation based on data from NBS

Figure 28 | Coal demand and its share in the national energy consumption mix during the 13th FYP, 2016–2020

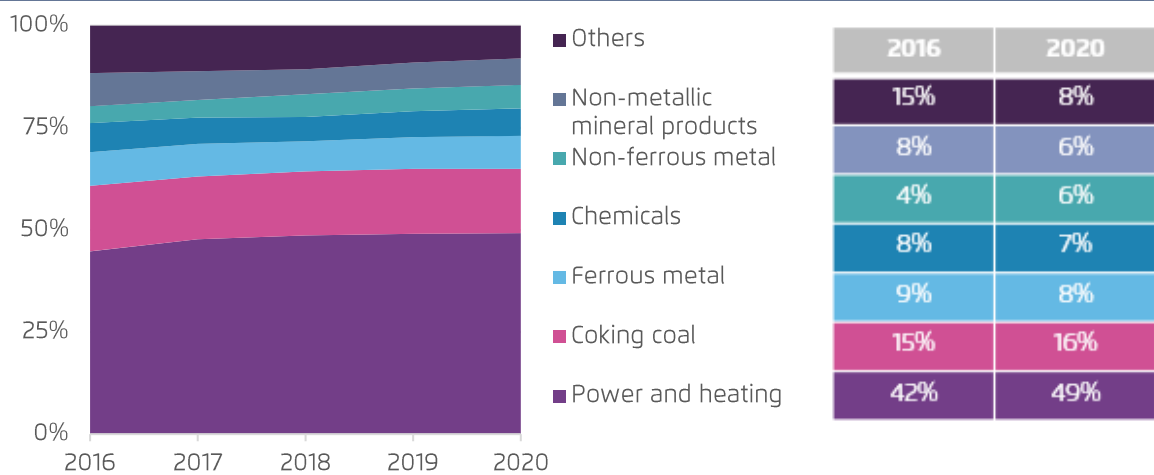


Source: NBS online database

- ▶ Due to stringent lockdown measures, China's coal consumption fell sharply in Q1 2020.
- ▶ As the economic activities picked up, coal consumption started to rebound strongly in Q2, thanks in large part to the strong recovery of the energy-intensive sectors once the coronavirus was mostly contained. In August 2020, coal consumption began to increase again. In November and December, YOY growth of coal consumption exceeded the levels of the same period in 2019. This was mainly caused by the early arrival of very cold weather in winter 2020, leading to strong heating demand across China.
- ▶ The strong rebound of coal demand in the last three quarters more than offset the reduction in Q1 2020. As a result, annual national coal consumption in China still saw positive growth last year.
- ▶ 2020 was the last year of the 13th FYP. By the end of 2020, China lowered coal's share in its national energy consumption mix to 56.8 per cent, meeting the 13th FYP target of 58 per cent. However, absolute coal consumption still increased during the same period.

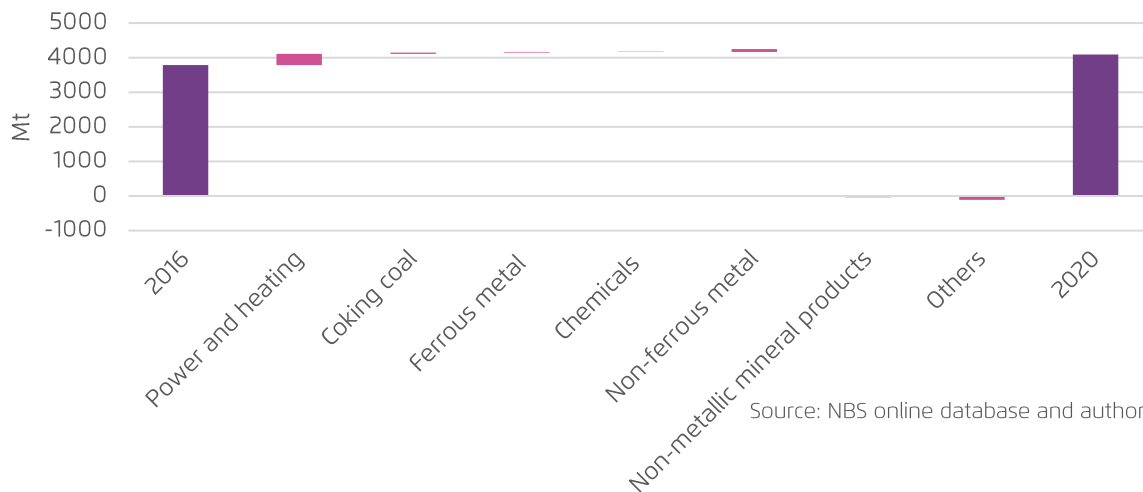
Fossil fuel consumption - coal: the future of coal in China hinges on the power sector and heavy industry especially coal chemicals

Figure 29 | National coal consumption by sector in the 13th FYP, 2016–2020



Source: NBS online database and authors' estimation.

Figure 30 | Absolute change in national coal consumption by sector in the 13th FYP, 2016 vs. 2020

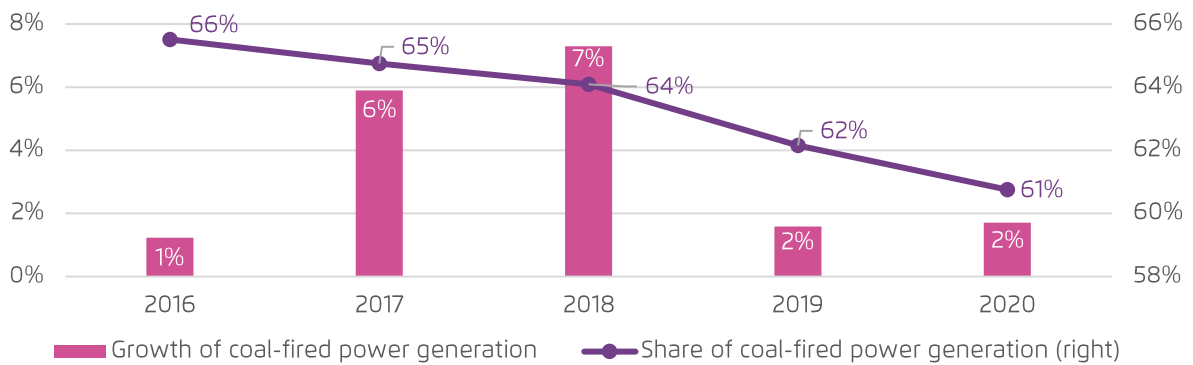


Source: NBS online database and authors' estimation.

- ▶ Power and steel industries are the largest coal-consuming sectors. The share of coal consumption by the two industries (including coking) increased from 66 per cent in 2016 to 73 per cent in 2020.
- ▶ Except for a slight decline in non-metallic mineral products, the other major coal-consuming sectors all saw positive demand growth, with power and heating acting as the main drivers.
- ▶ The clean-energy transition in the coal sector should focus on actively decreasing national coal consumption growth, especially in the areas of coal power, coal chemicals, iron and steel, cement, and distributed coal combustion.

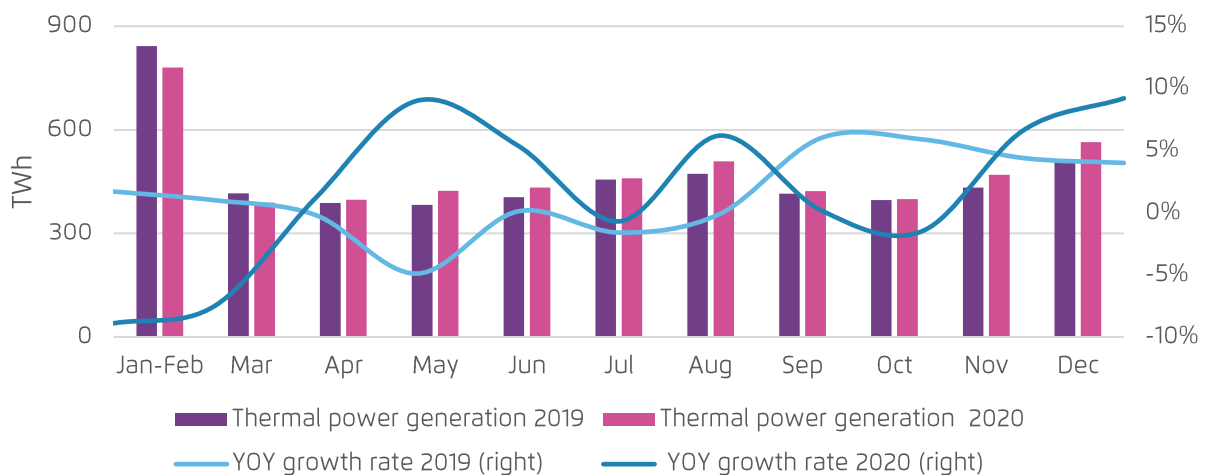
Fossil fuel consumption - coal: coal power generation declined relatively but not in absolute terms

Figure 31 | YOY growth of national coal-fired power generation and its share in the national generation mix during the 13th FYP, 2016–2020



Source: NBS online database.

Figure 32 | Monthly thermal power generation, 2019 vs. 2020



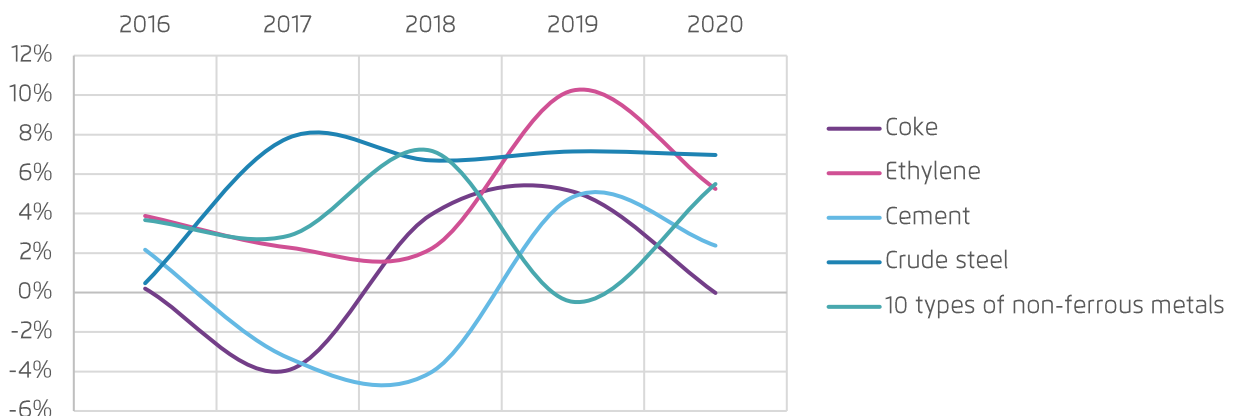
Source: NBS online database.

- ▶ As the largest coal consumer, the Chinese power sector saw similar developments to those of national coal consumption – the share in the overall mix decreased while the absolute amount kept growing.
- ▶ The development of renewables in China would have been more impressive if

- more had been done for the grid integration of variable renewables.
- ▶ The added coal-fired power capacity not only led to a consistent decline of operating hours at coal power plants but also suppressed renewable development across China.

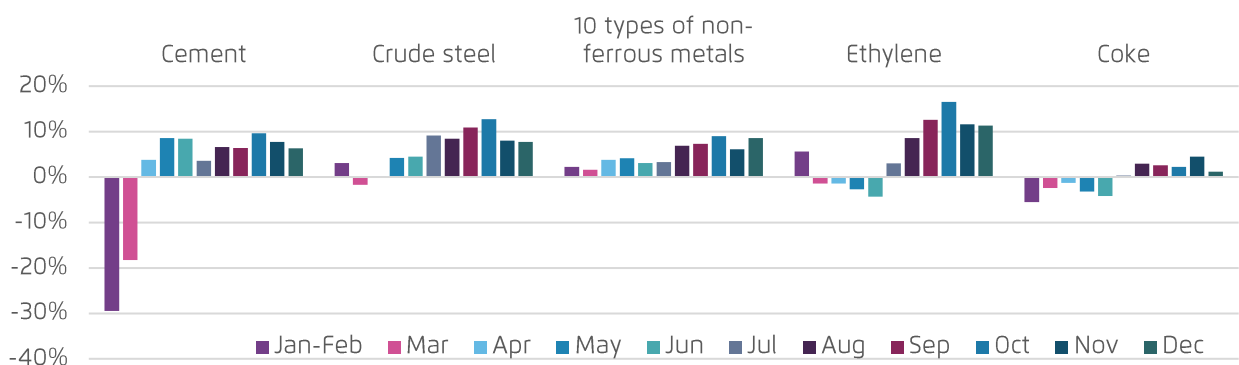
Fossil fuel consumption – coal: coal-intensive heavy industries are hard-to-abate sectors that require concerted effort

Figure 33 | Annual YOY output growth of selected coal-intensive industrial products during the 13th FYP, 2016–2020



Source: NBS online database.

Figure 34 | Monthly YOY output growth of selected coal-intensive industrial products in 2020

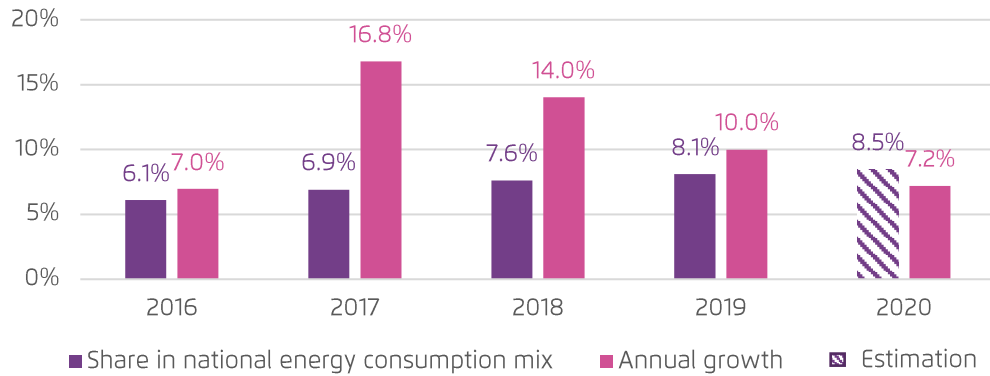


Source: NBS online database.

- ▶ The steel, cement, and coking industries have reduced excess capacity during the period of the 13th FYP. Impressive progress has reportedly been achieved.
- ▶ Meanwhile, coal consumption in these industries continued to grow in 2020. It appears that decarbonizing the coal-intensive heavy industries, closing backward capacities, and consolidating smaller ones are still not enough to move the sustainability agenda forward.
- ▶ The manufacturing industry is one of China’s key economic strengths. To achieve high-quality development and climb the value chain in energy-intensive industries, technological breakthroughs and product innovation are increasingly important. Otherwise, a heavily industry-oriented economic recovery will always come with large carbon footprint.

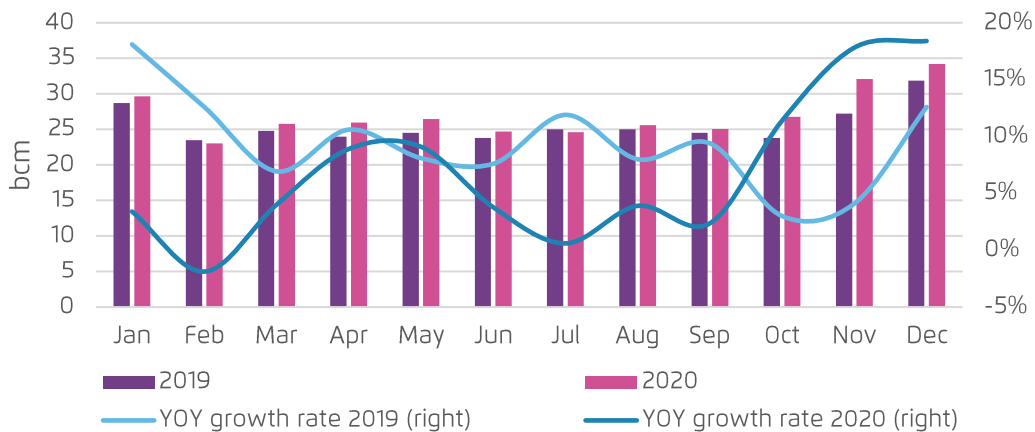
Fossil fuel consumption – natural gas: the cleanest fossil fuel performed well in the 13th FYP period

Figure 35 | The growth of natural gas consumption and its share in national energy consumption mix during the 13th FYP, 2016–2020



Source: NBS online database and the authors' estimation.

Figure 36 | Estimated monthly apparent natural gas consumption, 2019 vs. 2020

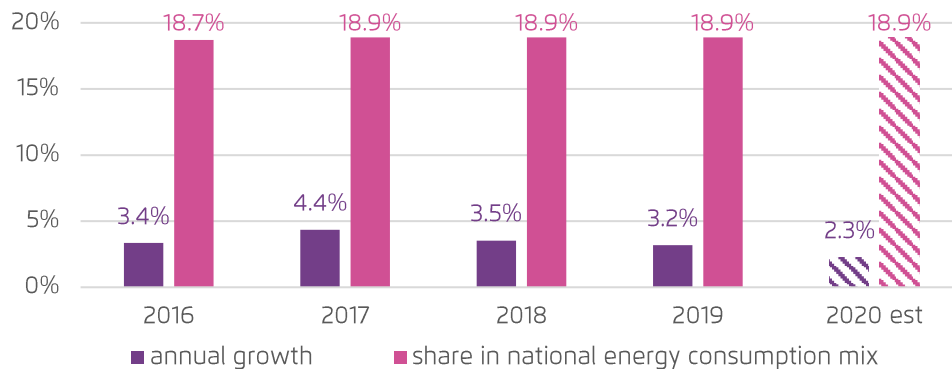


Source: NDRC (2019 & 2020), authors' calculations based on NDRC data

- ▶ The impressive growth of natural gas consumption in the past several years continued to slow in 2020. Nevertheless, natural gas is still the fastest growing fossil fuel in the Chinese energy economy.
- ▶ Gas power capacity in 2020 increased by 8.6 per cent YOY, second only to wind and solar.
- ▶ Given its relatively small share in the national energy consumption mix and its potential role in China's energy transition, natural gas consumption in China is widely expected to grow continuously until at least 2030.

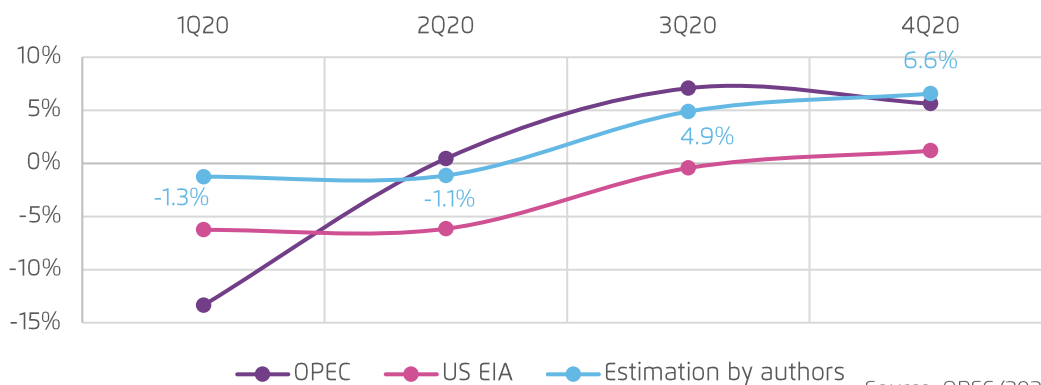
Fossil fuel consumption – oil: the future of oil has become more uncertain

Figure 37 | YOY growth of national oil consumption and its share in the national energy consumption mix during the 13th FYP, 2016–2020



Source: NBS online database and the authors' estimation.

Figure 38 | Estimation of the YOY growth of quarterly oil demand in 2020

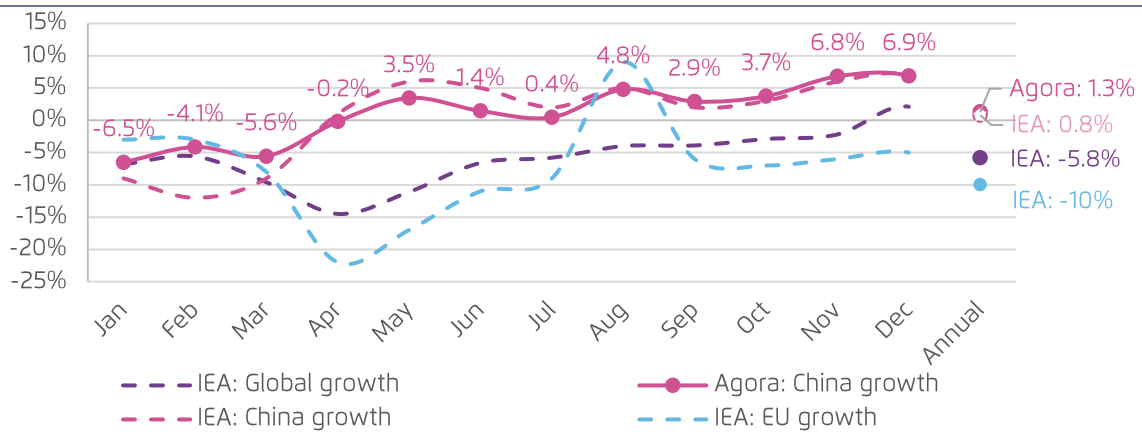


Source: OPEC (2021), US EIA (2021).

- ▶ China's oil consumption increased by 2.3 per cent YOY in 2020, a significant slowdown compared with previous years, but it was nevertheless enough to lift the share of oil to more than 19 per cent in the national energy consumption mix.
- ▶ Given the slump in road transport and aviation activities, the growth in oil demand last year corresponds with the three per cent uptick of throughput in the refinery sector.
- ▶ In recent years, China has become the global leader in refining capacity expansion. China has rapidly increased its refined oil exports and dominates Asia-Pacific markets.
- ▶ China's unexpected oil consumption growth last year occurred against the backdrop of a 5.6 per cent YOY growth of crude oil apparent consumption and a 6.6 per cent YOY slump of refined oil product apparent consumption.

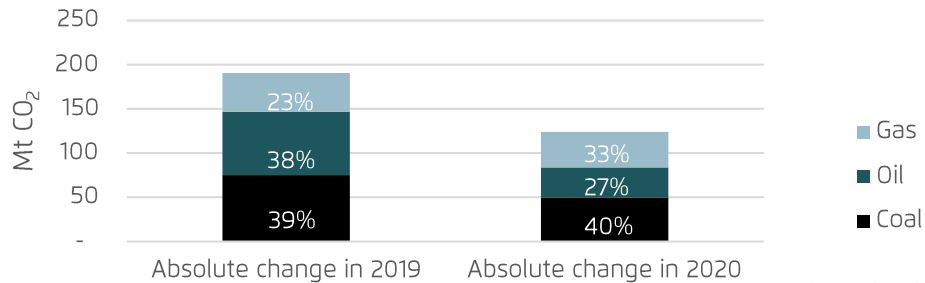
Energy-related carbon emissions: China accounts for nearly one-third of global carbon emissions

Figure 39 | YOY growth of energy-related monthly carbon emissions in 2020



Source: IEA (2021) and the authors' estimation.

Figure 40 | Change in China's energy-related carbon emissions by fuel, 2019 vs. 2020

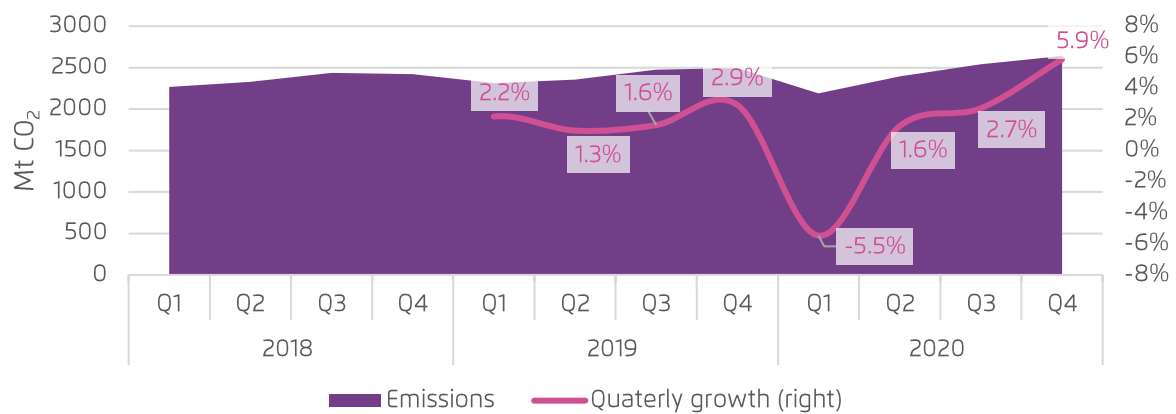


Source: the authors' estimation

- ▶ The pandemic-induced economic crisis dented global energy demand, especially for fossil fuel, resulting in a drop in global carbon emissions by 5.8 per cent YOY.
- ▶ As the first country to report confirmed COVID-19 cases, China experienced a drop of carbon emissions in Q1 2020. Nevertheless, as the first country to recover from the pandemic, China's carbon emissions rebounded while global emissions were still falling.
- ▶ The IEA estimates that China's energy-related emissions in 2020 were 0.8 per cent above 2019 levels. Agora's own assessment indicates a 1.3 per cent uptick YOY, with the caveat that China's energy statistical reporting is assumed to be reasonably accurate.
- ▶ The strong economic recovery has lifted the growth rates of coal, oil, and natural gas consumption above 2019 levels. Carbon emissions from the three major types of fossil fuels rose accordingly.
- ▶ Compared with the pre-coronavirus situation, coal's contribution to incremental annual carbon emissions increased in 2020. Oil demand was hit hardest so it followed a slower recovery path. The oil sector's contribution to incremental carbon emissions growth in 2020 was 10 percentage points less than in 2019.

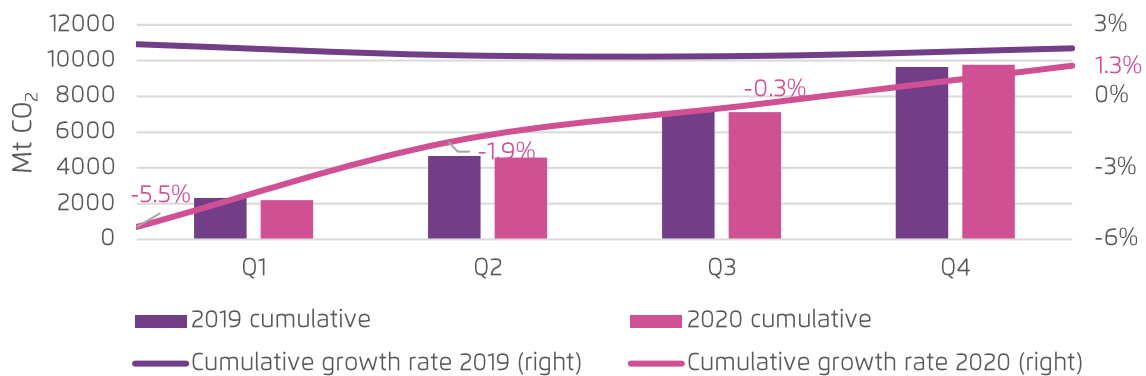
Energy-related carbon emissions: it is difficult to tell whether Chinese coal consumption has already peaked

Figure 41 | Quarterly carbon emissions from fossil fuel combustion in China, 2018–2020



Source: The authors' estimation

Figure 42 | Quarterly carbon emissions from fossil fuel combustion in China, 2019 vs. 2020



Source: The authors' estimation

- ▶ Agora's estimates that China's national carbon emissions growth became positive in Q2 2020 and accelerated thereafter.
- ▶ In Q4 2020, China's national carbon emissions recorded a six per cent YOY surge, increasing annual national emissions 1.3 per cent YOY despite a five per cent YOY decline in Q1 2020.
- ▶ The strong rebound of energy-related carbon emissions indicates that China's emissions-intensive recovery could be a double-edged sword, promoting short-term economic development but undermining efforts to make good on the country's long-term climate neutrality pledge.

Fossil energy

In view of the increasingly contentious geopolitical environment – especially the frictions in Sino-U.S. relations – Beijing is expected to put more emphasis on energy security, which will benefit its vast fossil-fuel industry. Nevertheless, the ambitious climate pledge that China announced in September 2020 is at odds with the country's continued reliance on fossil fuels.

Cumulative national coal output during the first three quarters of 2020 has already returned to 2019 levels. Moreover, amid rising concerns about national energy security, Chinese authorities have increasingly favored domestic oil and natural gas production, leading to a 1.7 and 8.7 per cent YOY increase of their respective output. Given its abundant resources and low prices, pollution-prone and carbon-intensive coal is also expected to benefit from Beijing's emphasis on energy security. For example, China's newly released 14th FYP includes the creation of strategic energy bases for coal-to-oil and coal-to-gas production.

In energy trading, monthly coal imports declined for seven consecutive months beginning in May 2020, leading to a 10.8 per cent YOY reduction of cumulative coal imports during the first 11 months of 2020. Nevertheless, coal imports saw a 13-fold increase in December 2020, putting annual coal imports into positive territory, for an increase of 1.5 per cent YOY. Lured by depressed international oil prices, China also imported a record 540 Mt of crude oil last year, the equivalent of 7.3 per cent YOY growth. Meanwhile, annual natural gas imports reached 102 Mt, 5.3 per cent more than in 2019.

Announced in May 2020, China's "dual circulation" strategy is meant as a hedge against the ongoing deglobalization and the worldwide economic slowdown. Generally speaking, China aims to strike a better balance between the export-driven model that has worked in past decades and a domestic consumption-oriented model so as to strengthen its resilience to external risks. For the energy sector, the "dual circulation" strategy means more emphasis on energy self-reliance and a careful selection of trading partners.

In the demand segment, continuous growth in coal consumption accompanied the economic uptick in Q2-Q4. During the first three quarters of 2020, cumulative national coal consumption exceeded the level of 2019. According to Agora's estimate, national coal consumption increased by 0.7 per cent YOY in 2020.

With a 5.6 per cent YOY uptick in crude oil consumption and 6.6 per cent YOY slump of refined oil product consumption, China's national oil consumption increased by 2.3 per cent YOY in 2020. The failure of various international institutions to accurately forecast China's oil consumption reveals an urgent need to improve the transparency of China's energy statistical reporting, especially when it comes to oil stockpiling.

Finally, demand for natural gas – the cleanest fossil fuel – remained robust during the COVID-19 pandemic, recording 7.2 per cent YOY growth in 2020.



4 | Concluding remarks

Concluding remarks

For the Chinese energy economy, 2020 entailed both perils and promises. While the all-inclusive energy growth track record last year may not bode well with China's long-term interest, the unexpected carbon neutrality pledge announced in September 2020 is nevertheless expected to advance the country's clean energy transition agenda, though there are likely to be bumps in the road ahead.

2020 was a turbulent year for China's energy economy, and the outcomes were mixed. After the first economic contraction in more than four decades, a strong economic recovery put China's annual GDP growth in positive territory at 2.3 per cent YOY. At the same time, demand for all fossil fuels grew, and national energy and power consumption increased by 2.2 per cent and 3.1 per cent YOY, respectively.

In the policy arena, several positive moves by the central government in 2020 and early 2021 are worth noting. In September 2020, China announced its intention to reach peak national carbon emissions before 2030 and achieve carbon neutrality before 2060, sending positive shock waves across the global climate community. This is an ambitious but achievable goal for the world's largest carbon emitting economy. As 2020 is both the final year of the 13th FYP and the benchmark year for the 14th FYP, the timing of the unexpected announcement was perfect and will reshape China's 14th FYP targets for energy and climate and its long-term development strategies.

In late 2020, China's Central Environmental Inspection team examined the National Energy Administration (NEA) and released a report in early 2021. It criticized the NEA for not prioritizing environmental protection and failing to restrict the development of greenfield coal power capacity. The inspection is expected to have profound implications

for China's energy and climate governance in the years to come.

This is the first time that the inspection team has publicly shamed a central government authority. The criticism is expected to create new impetus for the clean-energy transition.

On March 12, 2021, the State Council of China released the 14th FYP. In this comprehensive plan for China's economic and social development, China set mandatory targets to lower energy intensity per unit of GDP by 13.5 per cent (15 per cent in 13th FYP) and carbon emissions intensity per unit of GDP by 18 per cent (identical to the 13th FYP target). While strongly encouraging renewable development, the 14th FYP is nevertheless rather ambiguous about the future of coal, especially coal-fired power plants, for the 2021–2025 period.

On March 15, the Ninth Meeting of the Central Finance and Economics Committee of the Communist Party of China stressed that the 14th FYP period is pivotal for China's plan to reach peak national carbon emissions by 2030. The committee stated that the country should focus on lowering national fossil-fuel consumption and establishing a new renewable power system. The directive from the ruling party indicates a clear preference for clean energy and carbon neutrality.

The most exciting aspect of China's energy transformation is the impressive expansion of renewables. In 2020, China's newly installed wind and solar capacity increased by 178 and 92 per cent YOY, respectively. Indeed, China's added wind capacity in 2020 was its highest ever. The rest of the world also had a record year for added wind power. Bloomberg New Energy Finance (BNEF) reported that global wind capacity grew by 50 per cent YOY in 2020. The strong performance of renewables across the world clearly indicates that investors are

confident in green development, even as the coronavirus pandemic continues.

For all that, China's growing coal power capacity is at odds with its climate ambitions. In 2020, China added nearly 40 GW of coal-fired power plants, accounting for 76 per cent of the global total. As the world's single largest carbon source, China's power sector accounts for more than 40 per cent of the country's carbon emissions. The first step to reaching peak national carbon emissions by 2030, therefore, must be to reverse the upward trajectory of emissions in the power sector. In particular, the decades-long construction frenzy of greenfield coal-fired power plants in China must come to an end during the 14th FYP period.

Another major source of carbon emissions is the manufacturing sector. China's impressive economic recovery last year was primarily driven by energy-intensive industries, a common practice used by Chinese government to stimulate economic development. Among the three driving forces of the economy – domestic consumption, exports, and gross capital formation – the last one increased by 2.2 per cent YOY, a half a percentage point higher than the 2019 level, while the first two saw only modest changes, dropping by 0.5 per cent YOY and increasing by 0.7 per cent YOY, respectively. Robust demand for steel and cement, combined with rebounding monthly coal power generation, drove up coal usage starting in Q2 2020, resulting in a 0.7 per cent uptick in national coal consumption for the year.

With rising Sino-U.S. frictions, an increasingly contentious geopolitical environment has imposed additional uncertainties on the Chinese energy economy. Though Joe Biden was sworn in as the 46th American president, being tough on China continues to reflect the bipartisan consensus in Washington. Following the Biden administration's embrace of the Paris Agreement, however, the prospects of Sino-U.S. cooperation on climate change mitigation have become more promising. Nevertheless, the extent to which the world's two largest economies and emitters will be able to separate their bilateral relations from their climate diplomacy is still an open question.

China also faces more contentious relations with other countries, a situation that has led to rising concerns about national energy security among its key decisionmakers. As a result, China's fossil fuel imports showed unusually high levels of fluctuation in an effort to restructure fossil fuel imports and implement a "dual circulation" strategy that hedges against external risks.

In sum, the coronavirus pandemic not only triggered a worldwide economic crisis that contracted the global economy by 3.3 per cent; it also threatened the multilateral world order in which China prospered. For the Chinese energy economy, 2020 entailed both perils and promises. Looking forward, China's carbon neutrality pledge is expected to serve as a powerful impetus for advancing the country's clean-energy agenda in the 14th FYP period and beyond, though there are likely to be bumps in the road ahead.



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About Agora Energiewende

Agora Energiewende develops scientifically sound, politically feasible ways to ensure the success of the energy transition – in Germany, Europe and the rest of the world. The organization works independently of economic and partisan interests. Its only commitment is to climate action.



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