

Economic Watch

China | Striving to win the battle against climate change

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The United Nations climate Change Summit, or COP26, finally took place after a year-long delay in Glasgow, where 195 countries convened to strengthen climate actions under the Paris Agreement. Ahead of this critical conference, China's government submitted its updated Nationally Determined Contributions reports (NDCs) to the Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC), titled "China's Achievements, New Goals and New Measures for Nationally Determined Contributions" and "China's Mid-Century Long-Term Low Greenhouse Gas Emission Development Strategy". The documents summarize China's latest contributions and key policy measures in addressing climate change under the Paris Agreement, demonstrating China's determination to honor its commitment to develop a green and low-carbon economy. This report analyses why China's pledge is so important to the world's ongoing campaign against climate change. It also summarizes a number of challenges on the front of battling climate change and stock-takes policy levers which can help China to achieve its ambitious carbon neutrality target.

Never underestimate China's determination to tackle climate change...

The two-week meeting at Glasgow ended with country leaders signing up to the "Glasgow Climate Pact". Not legally binding as the Paris Agreement, the Pact sets the global agenda on climate change for the next decade. The main achievements of the deal include the first ever inclusion of a commitment to limit coal use, re-visiting carbon dioxide emissions-cutting plans next year to keep the 1.5 °C target attainable and the increasing climate-related financial support for developing countries. A series of additional announcements were made by different countries around the time, including an unexpected US-China declaration vowing to boost bilateral cooperation in the areas of limiting methane emissions, facilitating clean energy usage, protecting forests and improving technology and information exchanges.

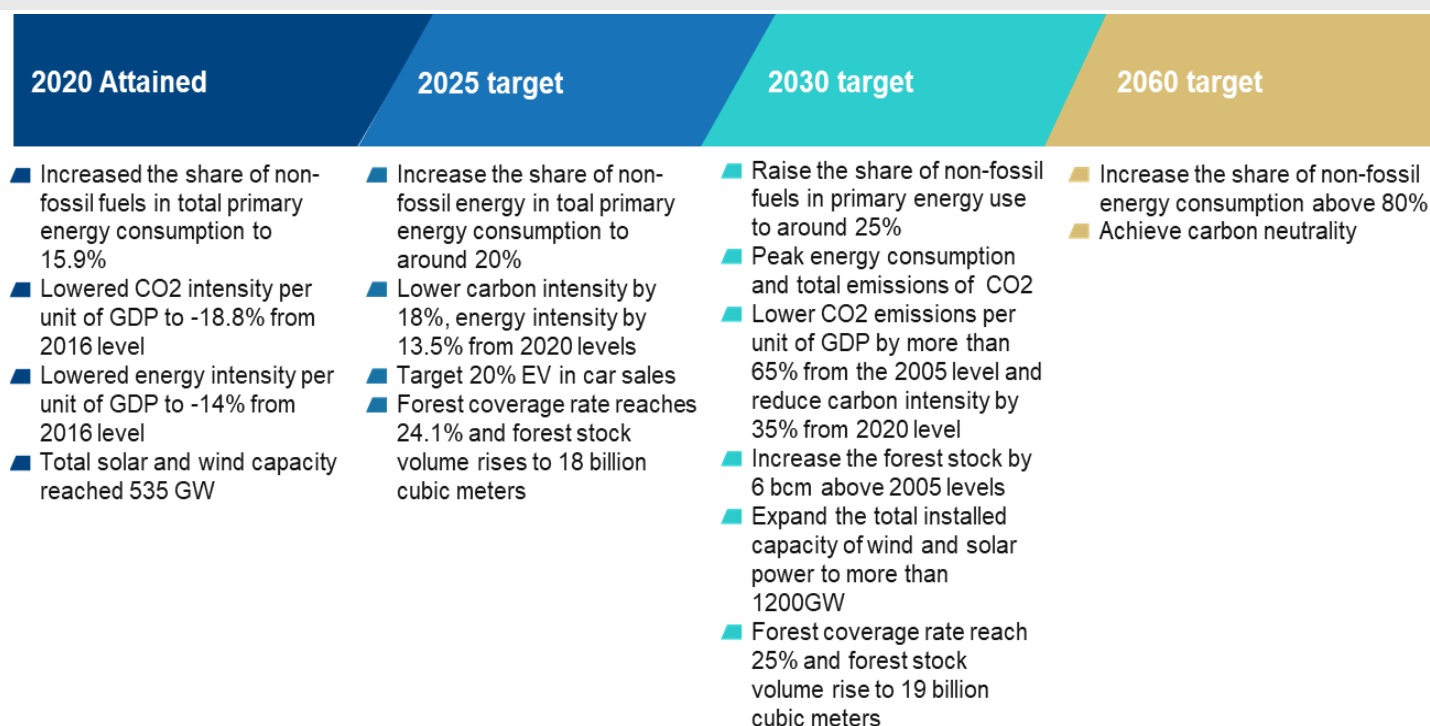
As the world's biggest CO₂ emitter, China was criticised during the COP26 because its latest climate commitments failed to improve on the previous pledges. Although China announced that its carbon emission peak target (before 2030) and carbon neutrality target (before 2060) last year, the timeline and the peak emission level are still unclear. Moreover, along with the India, the US and Australia, China declined to join dozens of other countries in the "Coal-to-Clean" promise to end its reliance on coal-fired electricity by the 2040s.

Despite the noises around the COP26, China's determination to tackle climate change is unquestionable (Figure 1). The Chinese authorities released a white paper and a master working guideline just a few days ahead of the COP26, laying out a more detailed plan to meet the country's previous pledge of fighting climate change. In line with the principles of the "Glasgow Climate Pact", these Chinese policy papers set strict controls on coal consumption growth and urge profound restructuring of industries during the "14th Five-Year Plan" (FYP) period (2021 – 2025). According to the policy papers, the authorities will curb the projects with high energy consumption

and high carbon emissions in the areas such as steel, cement, flat glass, and electrolytic aluminum, and will substantially reduce the use of coal in the “15th Five-Year Plan” period (2026 - 2030).

The policy papers indicate that the new installed capacity of coal-fired power plants will be strictly controlled and the existing coal power generators will be upgraded to reduce carbon emissions. In addition, the policy papers pledge to stop building and financing coal-fired power projects overseas from now on. In addition, China’s petroleum consumption is expected to reach a plateau during 2026-2030 before it starts to fall. Relatedly, the new construction of oil refinery operations will be strictly limited in the future.

Figure 1. **TARGET INDICATORS CHINA HAS DECLARED TOWARDS ACHIEVING CARBON PEAK AND CARBON NEUTRALITY**



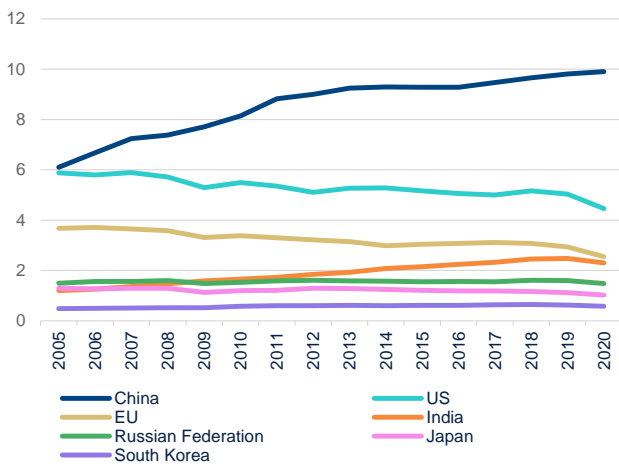
Source: 14th FYP and BBVA Research

...because its failure means the failure of humankind

China has ample reasons to be serious about its campaign against climate change. China is the world’s largest emitter of greenhouse gases (GHG), which consists of 76.1% CO2 and 23.9% non-Co2, and could play a critical role in climate change mitigation. According to data released by the International Energy Agency (IEA) and BP, China’s GHG emissions amounted to approximately 13 gigatonnes CO2 eq in 2020, accounting for around 25% of GHG emissions and about 31% of global CO2 emissions. (Figure 2) In China, the energy sector and industrial processes make up almost 90% of its total GHG emissions (in comparison with below 60% for the rest of the world), reflecting China’s heavy reliance on fossil fuels in the large industry sectors. In terms of the total primary energy supply, fossil fuels account for 85% of total primary energy supply in 2020. In particular, coal alone accounted for about 60% and oil accounted for about 20%. (Figure 3)

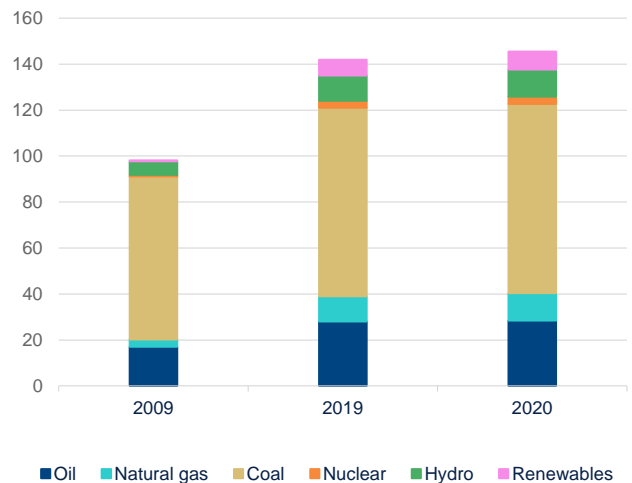
By industry, China's power generation and heating industry accounted for 41.6% of the country's total GHG emissions while manufacturing industries accounted for 23.2%. In addition, the transportation and agriculture sectors accounted for 7.5% and 6.1% of total carbon emissions respectively. Compared with the global data, China has a larger share of carbon emissions in the power and heat generation industry, manufacturing and industrial sectors while the share is relatively lower in transportation, construction and agricultural sectors. (Figure 4 and 5) Therefore, China's authorities should focus on promoting the use of clean energy on its way to achieving carbon neutrality, as well as accelerate the decarbonisation process in transportation and manufacturing sectors.

Figure 2. **CHINA HAS THE LARGEST AMOUNT OF CARBON DIOXIDE EMISSIONS IN THE WORLD (BILLION TONES OF CARBON DIOXIDE)**



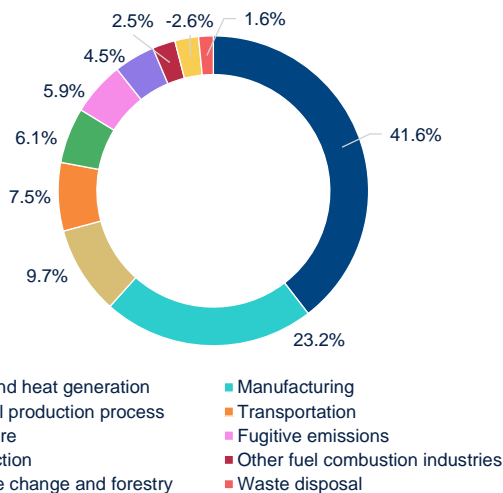
Source: BP statistical review and BBVA Research

Figure 3. **CHINA'S TOTAL PRIMARY ENERGY SUPPLY STRUCTURE IS DOMINATED BY COAL (UNIT: EXAJOULES)**



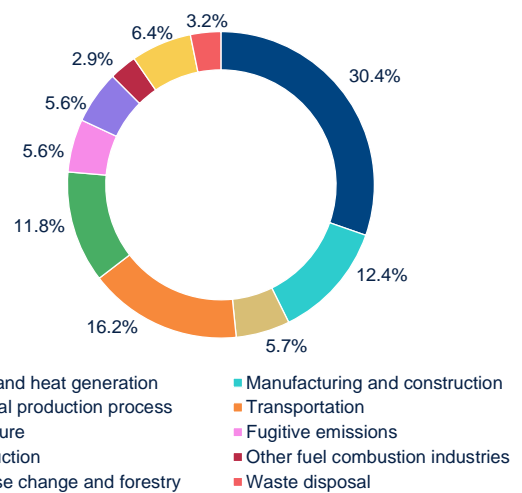
Source: International Energy Agency and BBVA Research

Figure 4. **CHINA'S CARBON EMISSIONS BY SECTORS**



Source: World Resource Institute and BBVA Research

Figure 5. **GLOBAL'S CARBON EMISSIONS BY SECTORS**



Source: World Resource Institute and BBVA Research

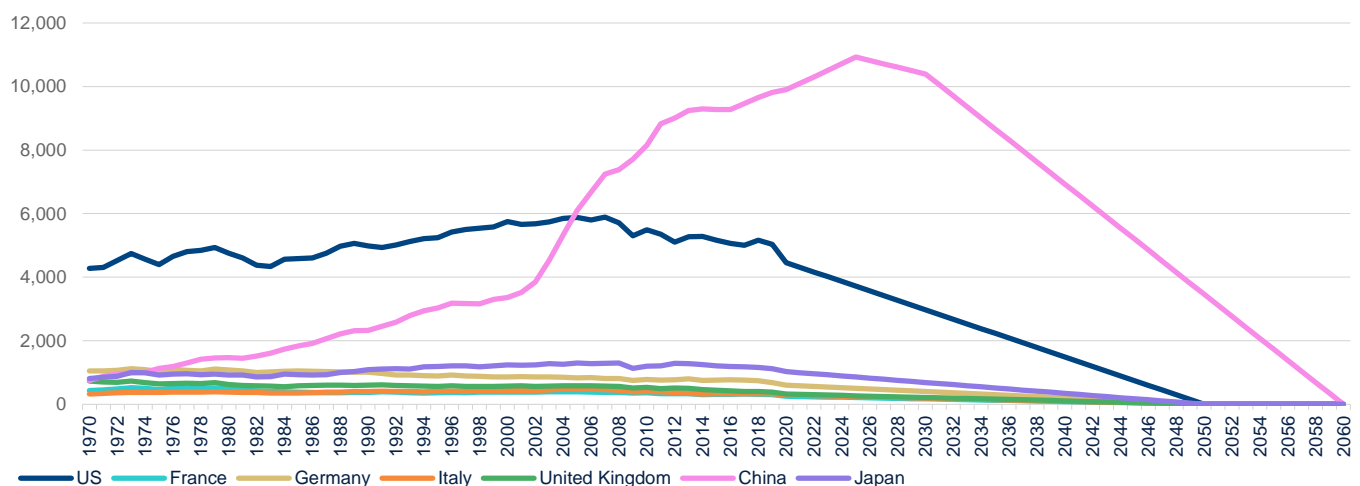
Achieving carbon neutrality is a challenging task...

China faces multiple challenges in achieving carbon neutrality. Firstly, China's economy is still growing strongly. Its GDP expanded at an average rate of nearly 6% over the past five years even including the episodes of the COVID-19 pandemic. Economic growth will naturally go hand-in-hand with increasing demands for energy consumption. The authorities need to find a way to efficiently reduce carbon emission while maintaining a decent growth rate. China's recent shortage in electricity has illustrated the tension between maintaining growth and achieving carbon neutrality well. The authorities at last bowed to the demand of short-term economic stability at the cost of a slower pace of phasing out traditional energy. We envisage that such tensions will repeatedly appear on the way to carbon neutrality, which is to test China's authorities' policy skills.

Secondly, China has a shorter time frame to transit from carbon emission peak to carbon neutrality in comparison with its peers of advanced countries. For example, France, Germany and the UK were among the first group of countries to achieve their peak in energy-related Co2 emissions during the 1970s, while Italy, the USA and Japan reached their emission peak in 2005, 2007 and 2013 respectively. Taking into account their pledged timetable of zero emission, these advanced countries at least have 40-50 years to finish their transition of peak-to-zero emission. By contrast, carbon emissions are still rising in China nowadays, which means that the country needs to finish the peak-to-zero emissions transition within approximately 30 years. (Figure 6)

Lastly, China's economic structure is highly tilting towards heavy industries with high energy consumption, such steel, nonferrous metals, chemicals, and building materials. The prospective reduction in carbon emissions requires large-scale deployments of low-carbon alternative technologies in these industries. However, it remains a question whether China's R&D capacity is able to provide these necessary technologies in a timely way.

Figure 6. **IT IS MORE CHALLENGING FOR CHINA TO ACHIVE CARBON NEUTRALITY (MILLION TONNES OF CARBON DIOXIDE)**

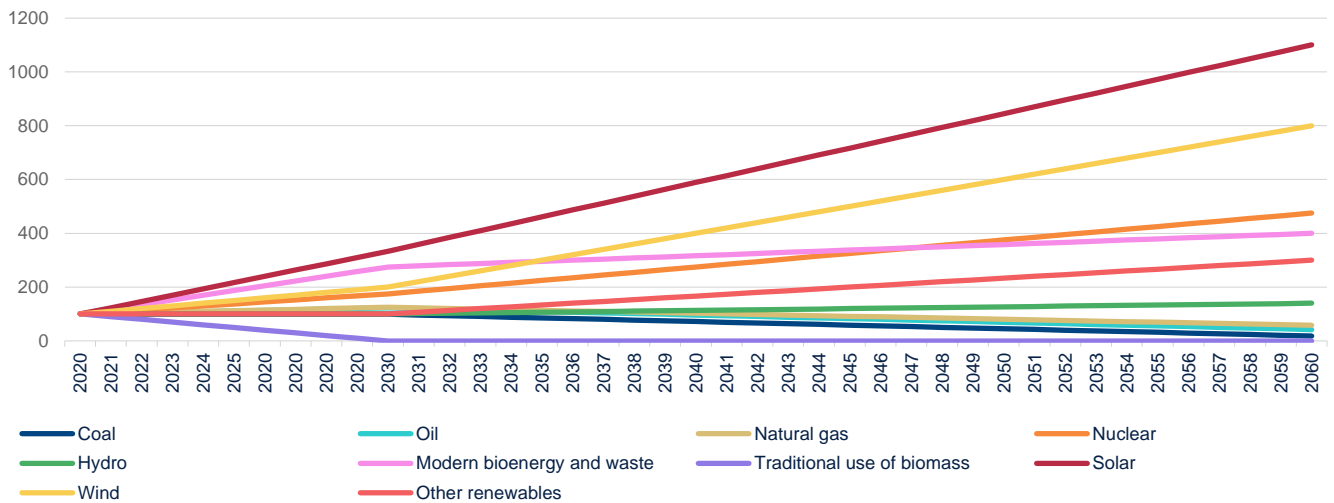


Source: BP statistical review, IEA and BBVA Research

...but China still has a chance to win

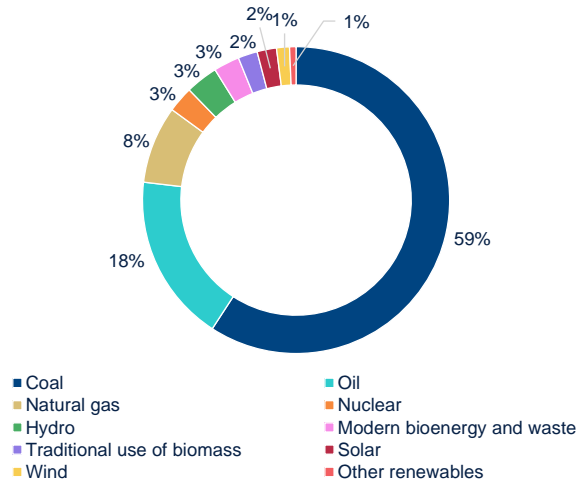
The International Energy Agency (IEA) provided a projected pathway of achieving carbon neutrality in China's energy sector. According to its Announced Pledged Scenario (APS), China's primary energy demand continues to rise by 18% to 2030; it then falls by 26% by 2060. Over the same period, China's economic activities will more than double. Primary energy intensity-energy consumption per unit of GDP will fall by 75% between 2020 and 2060, or 3% per year on average, due to both significant gains in energy efficiency and a shift away from heavy industries towards less energy-intensive economic activities. Accordingly, the share of low-carbon energy in the total energy consumption, including solar, wind, hydropower, bioenergy, other renewables and nuclear power, will jump from 15% currently to 74% by 2060. In particular, solar energy is expected to become the largest primary energy resource by around 2045, accounting for around a quarter of demand in 2060. In the meantime, the use of fossil fuels will fall rapidly over the projection period. The carbon emissions relating to fossil fuels consumption will be entirely offset by negative emissions by the use of bioenergy, in conjunction with carbon capture, utilization and storage (CCUS), and direct air capture of CO2 with storage (Chart 7-9).

Figure 7. **SOLAR AND ENERGY AND WIND ENERGY WILL BE THE PRIMARY ENERGY RESOURCE IN THE FUTURE** (2020 =100)



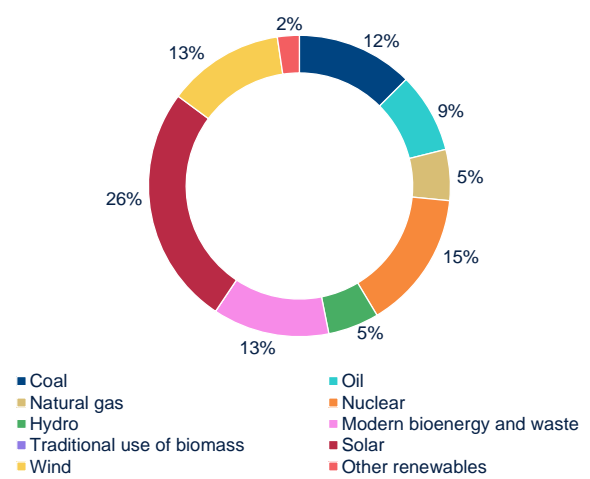
Source: IEA APS and BBVA Research

Figure 8. **PRIMARY ENERGY DEMAND BY FUEL IN CHINA IN 2020**



Source: IEA APS and BBVA Research

Figure 9. **PRIMARY ENERGY DEMAND BY FUEL IN CHINA IN 2060**

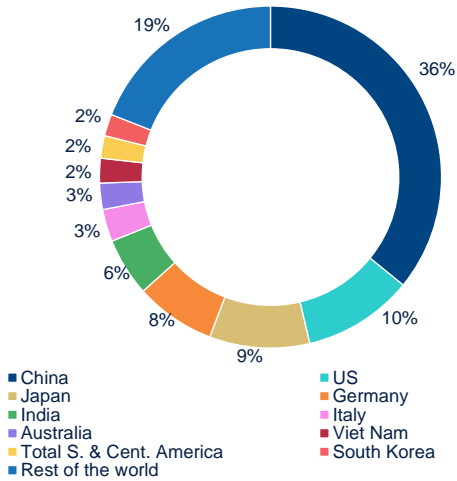


Source: IEA APS and BBVA Research

The projected trajectory provided by IEA implies a fast development of China’s clean energy sector so as to achieve the energy structure transformation key to meeting the carbon neutrality target. Encouragingly, China happens to be the global leaders in some key sub-sectors of clean energy. In the areas of wind power and solar photovoltaic (PV) power generation equipment, China has established one of the most complete industrial chains in the world. (Figure 10 and 11) The total installed capacity of wind and solar power reached 238 GW in 2020, a year-on-year increase above 50%. In particular, China accounted for 39% of the global total increase of installed solar power capacity, followed by Japan (4.3%), India (3.3%) and South Korea (3.2%).(Figure 12) Moreover, Chinese installed wind power capacity in 2020 registered a historical record of 72GW, accounting for 65% of the total global increase, more than half of which are onshore wind turbines.(Figure 13) At the company level, 7 out of top 10 Wind turbine manufacturers are based in China now (including Goldwind, Envision, MingYang, Shanghai Electric, Windey, CRRC, Sany) while 8 out 10 top Solar manufacturers are in China (including Jinko Solar, JA Solar, Trina Solar, Longi Solar, GCL, Risen Energy, Astronery, Suntech Power).

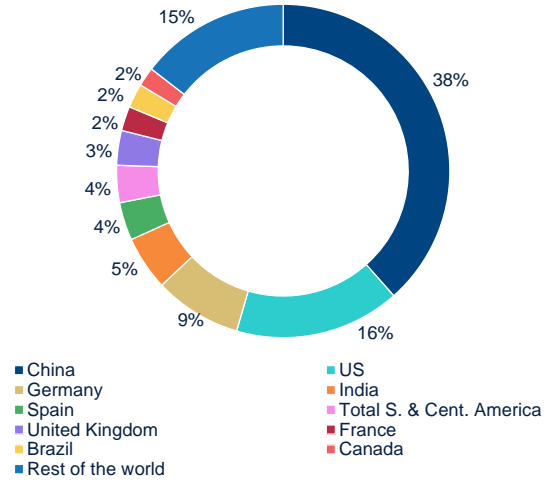
Moreover, China has seen a strong growth in new energy vehicles (NEV) over the past several years, thanks to the fast progress in relevant technologies. Indeed China’s NEV has topped the world in production and sales for the last six years in a row. China is by far the largest electric vehicle battery producer with 70% of global manufacturing capacity. China also controls a large portion of the lithium reserves, a key battery metal, accounting for 16% of global share. Now the country has 55% of global processing and refining capacity for lithium. Coupled with its huge domestic auto market, these factors are expected to help China to expand its NEV sector at a stunning pace.

Figure 10. **TOP 10 COUNTRIES BY SOLAR POWER CAPACITY IN 2020**



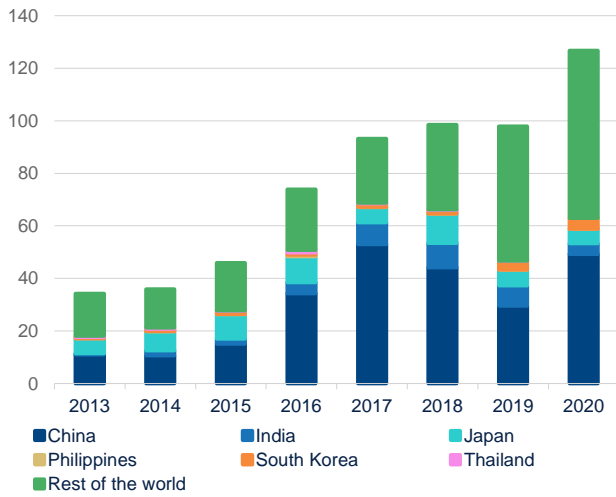
Source: BP statistical review and BBVA Research

Figure 11. **TOP 10 COUNTRIES BY WIND CAPACITY IN 2020**



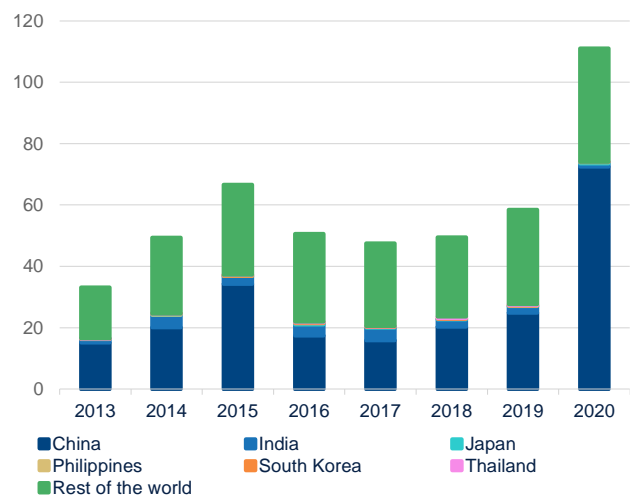
Source: BP statistical review and BBVA Research

Figure 12. **SOLAR POWER CAPACITY ANNUAL CHANGE (ANNUAL CHANGE, GW)**



Source: BP statistical review and BBVA Research

Figure 13. **WIND POWER CAPACITY ANNUAL CHANGE (ANNUAL CHANGE, GW)**



Source: BP statistical review and BBVA Research

The real trump card is China's government

China's advantages in clean energy and NEV can provide material and technology basis for the country to achieve its carbon neutrality target. However, to meet its ambitious target the country needs to profoundly transform not only its energy sector but also the way people live, which requires the government's intensive engagement. Fortunately, China has its edge on this front as well. China's government is famous for the abundance of its possessed resources and the enormous power of its mobilization capability, which enable it to allocate adequate resources to the transition of clean energy consumption and to enact the measures to reduce carbon emissions.

Importantly, China's national electricity grid is under tight control of China's government. The state capital also dominates in the sector of electricity generation. The largest five state-owned power plants generate around half of total electricity in China. The large-scale adoption of clean energy will require the necessary upgrade of the existing electricity grid and the nationwide deployment of energy storage systems. In this respect China's government's direct control in its energy sector, which has long been criticized for lack of competition and efficiency, can become a big advantage because the central government can better plan and coordinate the sector-wide transformation within the entire country.

In addition to its control of the energy sector, there are a number of policy levers to which China's government can resort.

- **Government's long-term plan includes some binding targets for carbon emissions.** In March 2021, China's authorities released the 14th Five-Year Plan (FYP) for 2021-2025, which sets binding targets to reduce energy intensity (energy consumption per unit of GDP) by 13.5% and carbon intensity by 18%. Moreover, the share of non-fossil fuel consumption in primary energy use will reach 20% by 2025. At the same time, several sectoral FYPs have provided detailed guidance regarding energy development and climate actions. For example, the preliminary targets of carbon emissions in the iron, aluminum and steel sectors were reported to peak before 2025 with a subsequent reduction of 30% (estimated at around 0.42 Gt CO₂) by 2030. Growth in coal use is only allowed before 2025. The inclusion of these binding targets regarding the carbon emissions indicates that the government will take great efforts to meet them. It will give incentives to different government agencies and the corporate sector to reduce their carbon emissions.
- **China has established a national carbon emission trading market.** China has just launched a domestic carbon emission trading system (ETS) in July 2021, whose objective is to contribute to the effective control and gradual reduction of carbon emissions. The ETS initially covers a total of 2,162 companies of coal and gas-fired power plants, representing 4.5 billion tons of carbon dioxide emissions. The scope will be gradually expanded to cover seven other sectors in future, including petrochemical, chemical, building materials, steel, nonferrous metals, paper, and domestic aviation. The quota allocation is initially through free allocation, but will be auctioned at a later phase. In fact, the main duty of the ETS system is to price the environmental cost of carbon emissions through a market mechanism. It not only encourages companies to take the initiative to reduce carbon emissions and get a return from the market, but also promotes a deeper transformation in the company level. China also promotes the establishment of a global carbon emission trading market under the COP26 agreement.
- **China's central bank decides to play an active role in de-carbonization.** The People's Bank of China (PBoC), recently launched a re-lending tool to provide lower funding to financial institutions that operate nationwide, in order to channel low-cost loans to firms working on China's energy transition and support the carbon neutrality goal. The central bank will lend 60% of the required loan principals to banks at a one-year lending rate at 1.75% so that they can be re-lent to the firms actively participating in "Green" activities. Taking into account that the benchmark lending rate, or the loan prime rate (LPR) stands at 3.85%, this program will

give firms more incentives to reduce carbon emissions and adopt clean energy by lowering their financing cost. Moreover, the PBOC will require financial institutions to publicly disclose the use of the loans and quantify the emissions reduction relating to the loans. This move indicates that the central bank of China will play an active role to help the economy to reduce its carbon emissions. We expect that the PBoC will unveil more targeted policy tools to incentivize various sectors to accelerate their de-carbonization process.

- **The government takes the lead in propelling technology advancement.** The ambitious carbon neutrality target calls for important breakthroughs in cutting-edged low-carbon technologies such as carbon capture, utilization and storage (CCUS), high-efficiency solar batteries, hydrogen production from renewable energy sources, controlled nuclear fusion etc. Moreover, how to reserve the electricity generated by wind and solar and to transmit it to the end-users are also the great challenges which need to be overcome by technological progress. In addition, China is also working on nanomaterial and magnetic confinement. Any breakthrough in these disruptive technologies in the energy sector will promote smart energy use. To advance technical progress in the field, the Chinese government has formed a domestic technological alliance of different research institutions and enterprises focusing on cutting-edge technologies of carbon capture, utilization, and storage (CCUS). Moreover, the Chinese government has adjusted their industrial policies in line with de-carbonization, which directs the enterprises in various sectors to develop with less energy consumption and carbon emissions. The Chinese government also invests a lot in the R&D to develop all the de-carbonization technologies through the government investment funds, state owned enterprises (SOEs), government-controlled universities and research institutions.

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