



Wilfried
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Evaluating China's Energy Outlook

The Reds Are Far From Green

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Summary

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The direction of China's energy policy has become a conundrum. On the face of it, Beijing presents itself as an exemplar of the clean energy transition and a responsible global actor breaking its long-standing fossil-fuel addictions. China's stellar roll-out of renewable infrastructure and its recent international pledges on decarbonisation lend support to such a narrative. However, the reality is different. The Asian country remains the world's largest energy consumer with an incredibly energy-intensive industrial sector. More than 80% of its energy mix comes from fossil fuels, and the country is the major producer and consumer of coal globally. China is the world's biggest polluter and its carbon footprint is only set to increase. Worse still, China's reliance on coal remains a consciously built-in feature of its future energy policy.

This policy brief has three main objectives. First, it analyses China's current energy mix and the likely future trends for both its fossil and clean energy sectors. A special focus is placed on China's growing reliance on coal, as well as on the direction of the country's oil and gas imports, both of which have serious repercussions for global markets and the Sino-Russian relationship. China's clean energy sector is then analysed and put into perspective. Second, the brief explores the unique characteristics of Chinese energy policy and the goal of energy security as its guiding principle. China's economic and energy outlook is not just a product of technocratic deliberations but follows the dictum of the Chinese Communist Party, which remains the nucleus of the country's political life. Finally, the paper closes with an overview of the most important considerations for EU policymakers and puts forward a number of policy recommendations.

Keywords Energy policy – Coal – Decarbonisation – Sino-Russian relationship – Energy markets



China's energy mix at a glance

The People's Republic of China has become an increasingly assertive, ambitious and belligerent actor on the global stage. Both economically and industrially, the country is a force to be reckoned with as it takes up a central role in international trade. One of the foundational pillars of Chinese economic prosperity has been the utilisation of immense energy resources. In 2009 China overtook the US to become the world's largest energy consumer,¹ and much of its industrial and manufacturing success is tied to abundant, affordable and secure energy flows. The Asian country's needs equate to close to 25% of global energy demand and their scale requires a specific energy policy which has no equivalent in any other nation on the globe. The daily consumption of billions of kilowatt hours of electricity and millions of barrels of oil signals not only China's voracious energy appetite but also its immense impact on the international energy markets. China's energy outlook is navigated by policymakers in Beijing but has a direct bearing on the interests of many other international capitals.

This section provides an overview of China's energy mix and proceeds with an analysis of its main fossil and clean energy sources. It notes the most important trends in each field and tries to map the future direction of China's energy outlook.

Coal: the undisputed champion

Coal is the backbone of the Chinese economy. Similar to many of the major global powerhouses, more than 80% of China's energy comes from fossil fuels (Figure 1). The unique feature of China's energy mix is its staggering dependence on coal—60% of its total power needs are covered by this heavily polluting fossil fuel.² The Asian country is the world's biggest consumer and producer of this fossil fuel, with thermal coal used for power generation, while coking (also known as 'metallurgical') coal is utilised for steel blast furnaces and heavy industry.³ Much of the country's stellar track record in manufacturing and industrial production since the 1980s has been powered exclusively by coal.

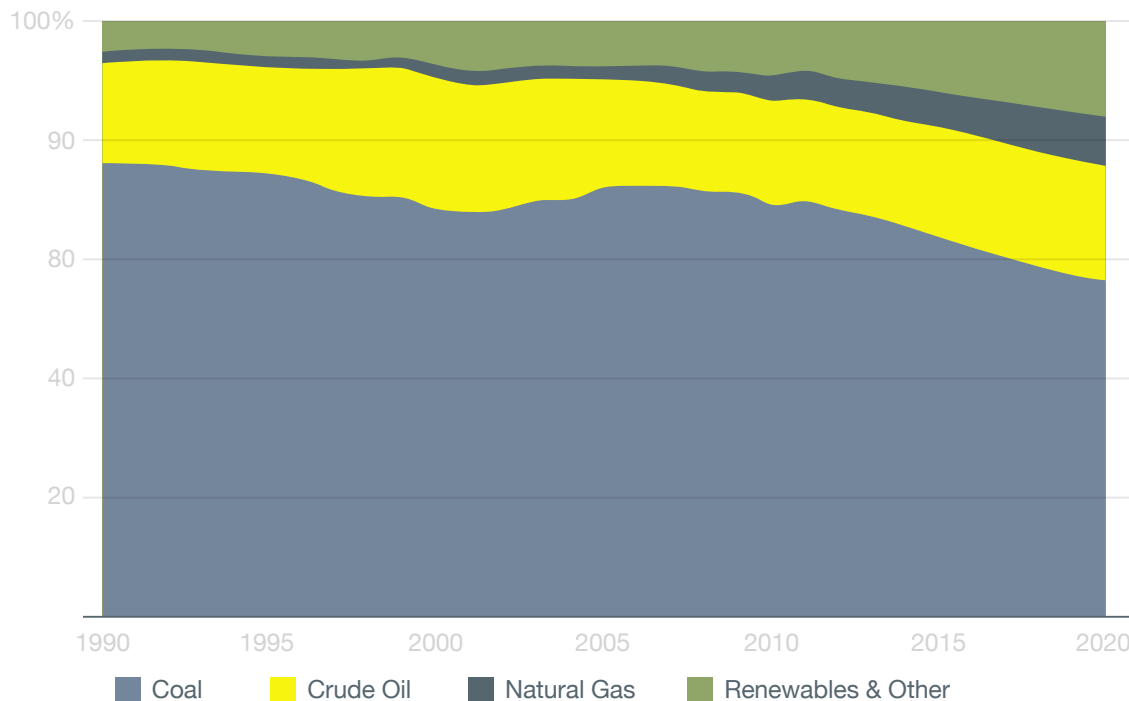
¹ D. Yergin, *The New Map: Energy, Climate, and the Clash of Nations* (New York: Penguin, 2020), 155.

² IEA, *Coal 2022: Analysis and Forecast to 2025* (December 2022), 19.

³ A. Mullen, 'China Coal: Why Is It So Important to the Economy?', *South China Morning Post*, 13 February 2021.



Figure 1 China's energy consumption by source



Source: Data from Centre for Strategic & International Studies, *How Is China's Energy Footprint Changing?*

In the last decade, the share of coal in China's overall energy mix has dropped due to a state-led attempt to diversify its energy sources. The absolute figures for coal consumption, however, tell a different story. Between 2011 and 2021 China registered an average rate of additional coal consumption per annum of close to 1%.⁴ Coal production within the country has hit even more pronounced upward figures, with 2022 expected to register record growth of about 8%.⁵

These figures are one of the main reasons for China's continuously rising emissions (Figure 2). As the world's largest producer and consumer of coal, the Asian hegemon is responsible for more greenhouse gas (GHG) emissions than the US, India and the EU combined.⁶ In the period 2011 to 2021, the country's carbon footprint from energy sources increased by an average of 1.8% per annum.⁷ Every year China is burning more coal than the rest of the world combined and this trend is only set to increase.⁸ Not only has China not made any tangible progress in limiting coal usage in absolute numbers, but the country is also set on expanding its coal power plants. In 2021 alone China started building 33

⁴ BP, *bp Statistical Review of World Energy* (June 2022), 39.

⁵ IEA, *Coal 2022*, 18.

⁶ *BBC News*, 'Report: China Emissions Exceed All Developed Nations Combined', 7 May 2021.

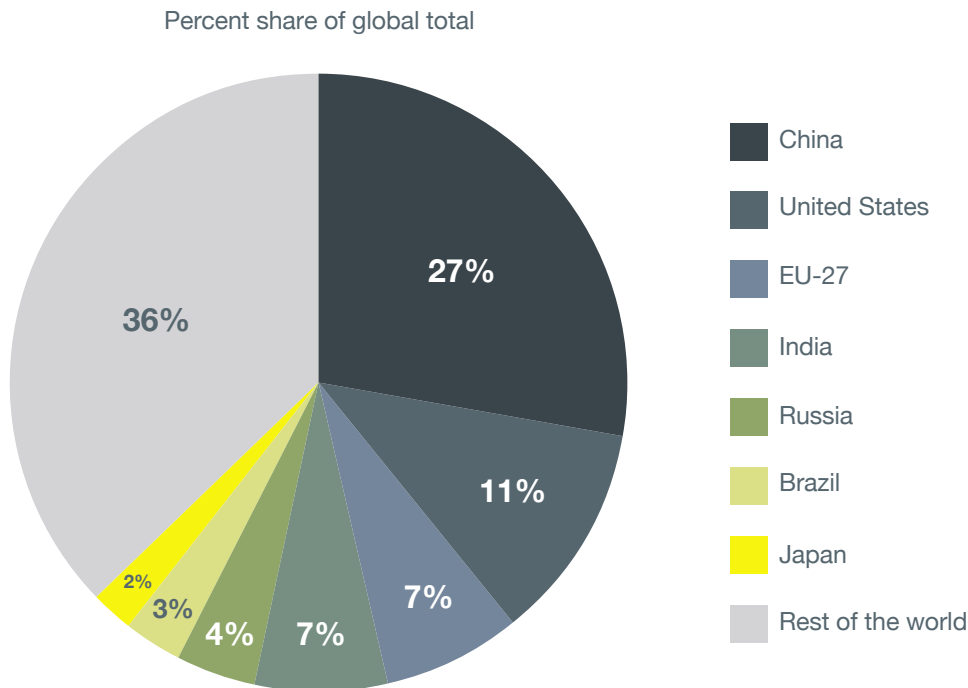
⁷ BP, *bp Statistical Review of World Energy*, 12.

⁸ IEA, *Coal 2022*, 17.



gigawatts (GW) of new coal-based power generation capacity.⁹ What is even more concerning is that Beijing is planning to expand this trajectory well into the current decade. China's top energy engineering conglomerate has recently reported that the country might add up to 270 GW of new capacity by 2025.¹⁰

Figure 2 Net GHG emissions from the world's largest emitters (2021)



Source: Data from A. Rivera et al., 'Global Greenhouse Gas Emissions: 1990–2020 and Preliminary 2021 Estimates'.

This staggering projection means that in the next few years the Asian country could add more coal-fired power capacity than currently exists in countries such as the US or India (Figure 3). These are expensive, long-term projects. The average lifespan of coal plants globally is 46 years, with the current younger Chinese plants averaging 24 years.¹¹ In parallel, Beijing has ramped up coal imports from abroad, with Russian deliveries up 20% and the Mongolian supply registering a fivefold increase in 2022.¹² On top of this, China has also reinstated coal imports from Australia, which was historically China's reservoir for metallurgical coal.¹³

⁹ D. Stanway, 'China Starts Building 33 GW of Coal Power in 2022', *Reuters*, 24 February 2022.

¹⁰ *Bloomberg News*, 'China Is Doubling Down on Coal Despite Its Green Ambitions', 31 October 2022.

¹¹ Y. R. Cui et al., 'Quantifying Operational Lifetimes for Coal Power Plants Under the Paris Goals', *Nature Communications* 10/4759 (2019), 3.

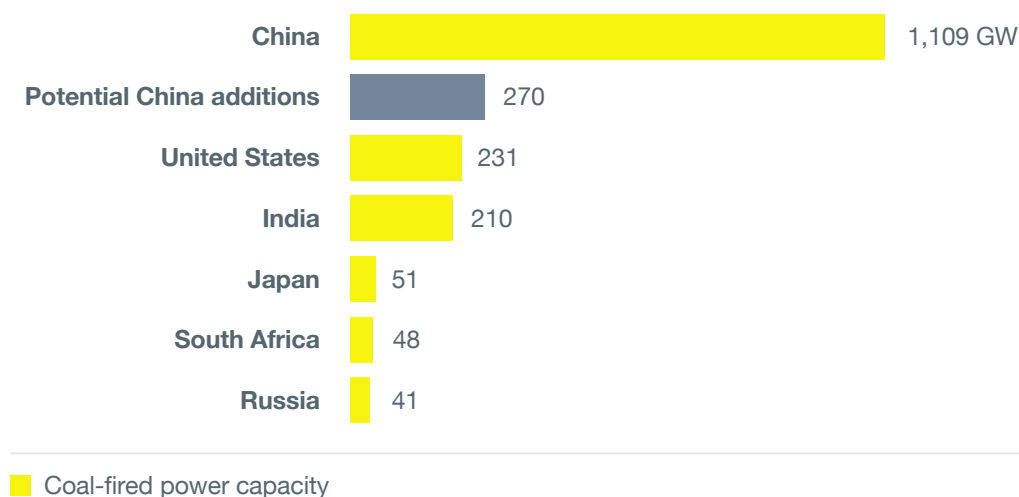
¹² *Reuters*, 'China's Coal Imports From Russia Fall in Dec, but up 20% in 2022', 20 January 2023.

¹³ *Ibid.*



It is thus clear that China's coal addiction is not just a remnant of historical path-dependencies, but a conscious, built-in feature of its future energy outlook. None of the recent factual developments corresponds with Beijing's official pledges to reduce its fossil-fuel reliance. In early 2021 Secretary General of the Chinese Communist Party (CCP) Xi Jinping stated that 'China will strictly control coal-fired power generation projects, and strictly limit the increase in coal consumption over the 14th Five-Year Plan period' (2021–5).¹⁴ This statement was followed by a pledge that emissions would peak before 2030 and that China would not build new coal-fired projects abroad.¹⁵ While the international community applauded these aspirations, Beijing has no problem implementing policies which go directly against its own official commitments. It must also not be forgotten that during the highly anticipated COP 26 climate meeting in Glasgow, China led a coalition of countries that vehemently opposed the commitment to 'phase-out' coal usage due to their entrenched national interests.¹⁶

Figure 3 Planned additions to coal-powered capacity in China



Source: Data from Bloomberg News, 'China Is Doubling Down on Coal Despite Its Green Ambitions'.

Neither international commitments nor pressing climate concerns will drastically change China's plans for coal extraction and exploitation. China's centralised economy operates on the prerogatives of energy security and economic stability at all costs. Both of these overriding principles were under strain throughout 2022. Russia's barbaric invasion of Ukraine threw the international

¹⁴ B. Girard, 'How China's Coal Commitment Went up in Smoke', *The Diplomat*, 31 August 2022.

¹⁵ *UN News*, 'China Headed Towards Carbon Neutrality by 2060; President Xi Jinping Vows to Halt New Coal Plants Abroad', 21 September 2021.

¹⁶ D. Lilkov, 'COP26 in Glasgow: A Climate Cup Half Full for the International Community', *Wilfried Martens Centre for European Studies*, 25 November 2021.



energy market into disarray and made many countries re-evaluate their energy import dependencies and domestic supply. Beijing was no exception, and the Communist leadership immediately hedged its bets by producing plans for additional thermal power plants and boosting the coal supply.

Another crucial factor has been the widespread power shortages and blackouts, which negatively impacted a large number of households and businesses in various parts of China in 2021 and 2022.¹⁷ The combination of extreme weather events, low hydropower output and insufficient coal generation resulted in a breakdown in the electricity supply within the country. In addition, a number of policy missteps and sloppy market interventions from state planners led to insufficient coal output and one of the biggest energy shortages in a decade.¹⁸ This turbulence, combined with the uncertainties of the rocky reopening of the economy after the Covid-19 pandemic, means that the state planners will need to prioritise secure and abundant energy flows, regardless of environmental concerns.

In a nutshell, coal is the undisputed past and future champion; the dirty fuel will continue to be China's main energy source well into the 2030s. In its global forecast, the International Energy Agency (IEA) concludes that coal consumption in China will continue to rise at a steady pace, reaching a new high by 2025 (Figure 4). In its current Five-Year Plan (2021–5) for the energy sector, Chinese state planners have not included any targets for the phasing out of coal and have removed all previously set limits on coal consumption.¹⁹ Coal is the great stabiliser of the country's energy system and will remain a constant feature in any long-term design.

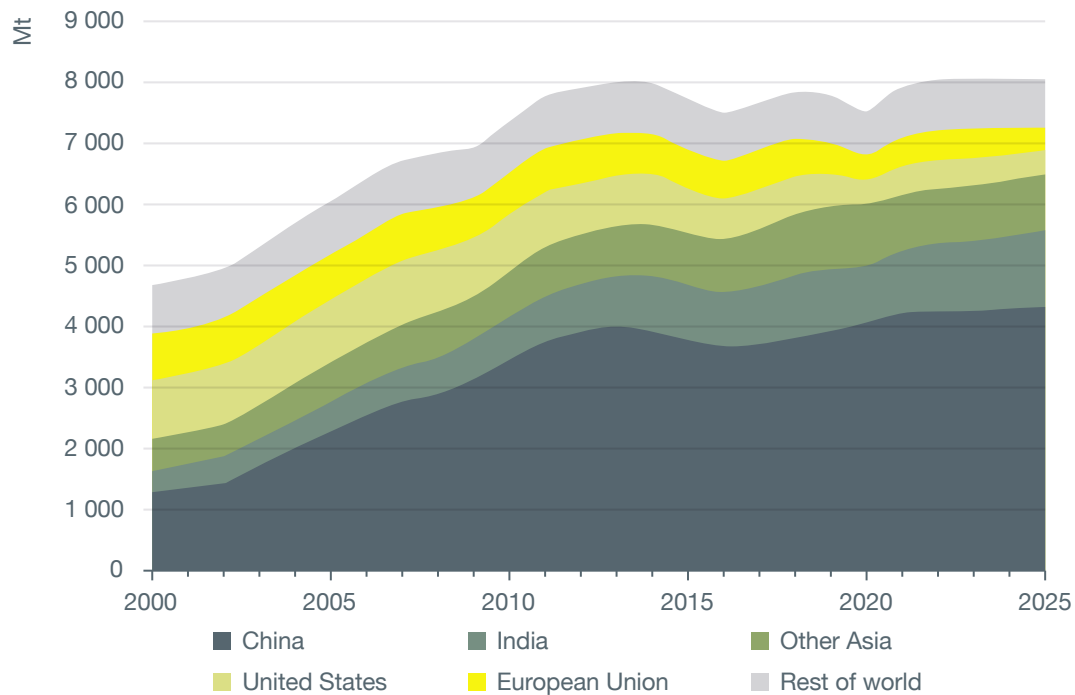
¹⁷ P. Hoskins, 'China Power Cuts: What Is Causing the Country's Blackouts?', *BBC News*, 30 September 2021.

¹⁸ L. Myllyvirta, 'The Real Reasons Behind China's Energy Crisis', *Foreign Policy*, 7 October 2021.

¹⁹ J. Yifan, G. Baiyu and S. Geall, 'China's Five Year Plan for Energy: One Eye on Security Today, One on a Low-Carbon Future', *China Dialogue*, 23 June 2022.



Figure 4 Global coal consumption, 2000–25



Source: Data from IEA, *Coal 2022: Analysis and Forecast to 2025*.

Oil and petroleum products: steady from many

For many global economies, oil is king and dominates the energy mix. Not so in China, where crude is the little brother of coal and contributes to *circa* 20% of the country's overall energy consumption. During Mao's reign, the young People's Republic pursued a course of self-reliance, mostly due to the discovery of the Manchurian oil field in Daqing, which managed to satisfy internal demand, and even exported surplus volumes to Japan.²⁰ When China opened up to the global economy, spurring economic growth, oil demand surged and the country became a net importer of oil and petroleum products. China's oil consumption has been constantly on the rise since the 1990s, making it the world's largest importer of oil, with more than 70% of its demand covered by foreign shipments.²¹ With domestic production showing little potential, China will remain dependent on oil imports in the long run, potentially totalling as much as 80% of its overall oil needs by 2040.²²

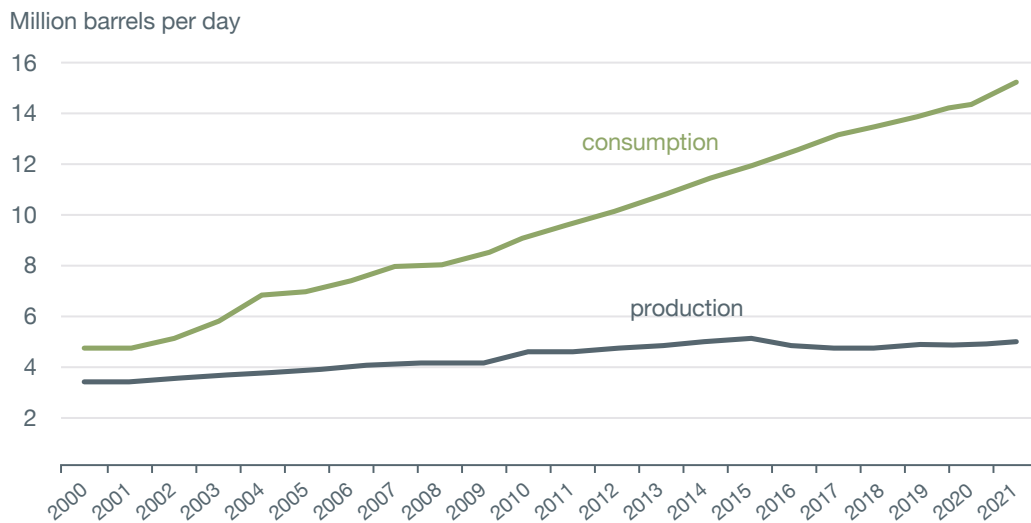
²⁰ H. C. Ling, *The Petroleum Industry of the People's Republic of China* (Palo Alto: Hoover Institution Press, 1975), 47.

²¹ Yergin, *The New Map*, 156.

²² T. Paraskova, 'China Set to Become More Dependent on Oil Imports', *Oil Price*, 5 December 2017.



Figure 5 Production and consumption of petroleum and other liquids in China, 2000–21



Source: Data from US Energy Information Administration, *Country Analysis Executive Summary: China*.

When it comes to oil suppliers, Saudi Arabia tops the list with a 17% share in China’s overall imports.²³ In total, countries in the Middle East provide 50% of all oil imports, with Iraq, the United Arab Emirates, Kuwait, Qatar and Oman joining Saudi Arabia on the list of suppliers (Figure 6).²⁴ These Persian Gulf states have been China’s main oil reservoir and have compensated for global import volatilities. Beijing has even hinted that its involvement in the region is not only about increased imports from the Gulf states, but could also involve joint exploration and production, as well as joint investment in refineries.²⁵ Some observers have interpreted China’s actions as a deliberate effort to promote the use of the yuan in energy deals, and limit the influence of the US dollar.²⁶ Even if this goal remains elusive for the time being, China is firmly set on cementing its position in the Middle East to guarantee its political and energy needs. The latest diplomatic breakthrough in relations between Saudi Arabia and Iran, brokered by Beijing, highlighted China’s increased presence in the region.²⁷

Crucially, all of these oil shipments need to pass certain geographical choke-points before they safely reach the South China Sea. The potential blockade of shipping routes through the Strait of Malacca is a major vulnerability for

²³ US Energy Information Administration, *Country Analysis Executive Summary: China*, 5.

²⁴ Ibid.

²⁵ R. Foroohar, ‘A New World Energy Order Is Taking Shape’, *Financial Times*, 3 January 2023.

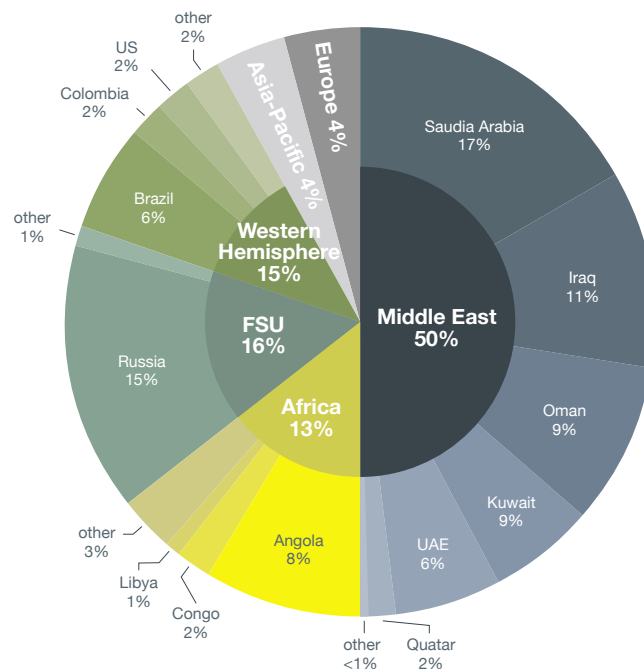
²⁶ A. Kimani, ‘Why We Shouldn’t Underestimate China’s Petro-Yuan Ambitions’, *Oil Price*, 5 January 2023.

²⁷ P. Baker, ‘Iran–Saudi Pact Is Brokered by China, Leaving U.S. on Sidelines’, *New York Times*, 11 March 2023.



securing vital oil supplies. Thus the diversification of seaborne oil deliveries has been high on the agenda of the Chinese state planners, given the national security implications during a potential import crisis. Another important avenue pursued by the Chinese to secure their crude supply is the accumulation of a strategic reserve. Beijing has been meticulously working on this goal since the early 2000s, even though the government has been extremely cryptic in its official communications about infrastructure developments and specific volumes. Expert assessments suggest that by the end of 2021 China had most likely achieved its goal of having 90 days of crude oil stocks available to cover a sudden drop in imports.²⁸

Figure 6 China's crude oil imports by source, 2022



Source: Data from US Energy Information Administration, *Country Analysis Executive Summary: China*.

The second biggest exporter of oil to China, Russia, deserves specific attention. In the last decade, oil and petroleum products have been at the heart of the Sino-Russian trade relationship, comprising close to 70% of overall Russian exports.²⁹ Improved pipeline and transmission infrastructure has resulted in the importation of even more barrels from Russia, with oil trade doubling in volume between 2015 and 2020.³⁰ In early 2022, weeks before Russian soldiers invaded

²⁸ M. Meidan, *China's SPR Release: A Test of Mechanisms Rather Than a Show of Market Might*, The Oxford Institute for Energy Studies (September 2021), 4.

²⁹ V. Milov, *Ambitions Dashed: Why Sino-Russian Economic Cooperation Is Not Working*, Wilfried Martens Centre for European Studies (November 2021), 5.

³⁰ Ibid.



Ukraine, the China National Petroleum Corporation and Moscow's Rosneft committed to an extended partnership.³¹ As many countries severely cut their oil and gas shipments from Russia, Beijing was quick to take advantage of the situation. By late 2022, the amount of crude oil China was importing from Russia had almost doubled compared to shipments in February of the same year.³² In early 2023, Russia even started providing China with specific grades of Arctic oil, a product which is not usually destined for Eastern markets.³³ Beijing sees the war and its disruptions as an excellent opportunity to tap into discounted Russian shipments and prepare its oil stocks for the expected rebound of the Chinese economy in the wake of its post-Covid reopening. If this pace is kept up, Russia might become China's biggest oil supplier by the end of this year.

More worryingly, China is not just refilling its oil reserves with cheap Russian oil, but is potentially reselling it. In early January 2023, China raised its refined-oil export quotas by 50%, suggesting that it anticipates expanding its Russian purchases and selling them internationally.³⁴ This also opens the door for 'independent' Chinese refineries to become involved in the rebranding of Russian oil in order to confuse potential buyers about the country of origin. There are already reports of such incidents happening under the radar, which is helping Moscow to manoeuvre around international sanctions and the EU/G7 price cap on Russian crude.³⁵

Ironically, these two countries will have the biggest sway on the oil market in the short term. The IEA concludes that Russia and China will be the two wild cards in the 2023 oil outlook.³⁶ Nearly half of the global growth in demand will come from China, which will also be the biggest driver of oil prices internationally.³⁷ Much will depend on the actual growth of the Chinese economy and how much further Beijing is willing to exploit Moscow's weakened position on energy exports. It is evident that China will need more oil in the short term, but it is also intent on ensuring that its import mix remains geographically diversified at all costs. More problematically, this expanded partnership might turn China into a clandestine middleman for the international shipping of embargoed Russian oil.

³¹ V. Sokolov, N. Sharushkina and N. Sladkova, 'Russia Signs Oil and Gas Deals With China', *Energy Intelligence*, 4 February 2022.

³² N. Kaya, 'Russia's Crude Exports to India up 14-Fold, Exports to China Double', *Anadolu Agency*, 12 December 2022.

³³ F. Tan and N. Verma, 'Russia Sends More Arctic Oil to China, India After Sanctions', *Reuters*, 5 January 2023.

³⁴ *The Economist*, 'How Russia Dodges Oil Sanctions on an Industrial Scale', 29 January 2023.

³⁵ C. Aizhu and J. Lerh, 'China Boosts Imports of Fuel Oil Blended From Russian Barrels', *Reuters*, 3 February 2023.

³⁶ IEA, *Oil Market Report – January 2023* (January 2023).

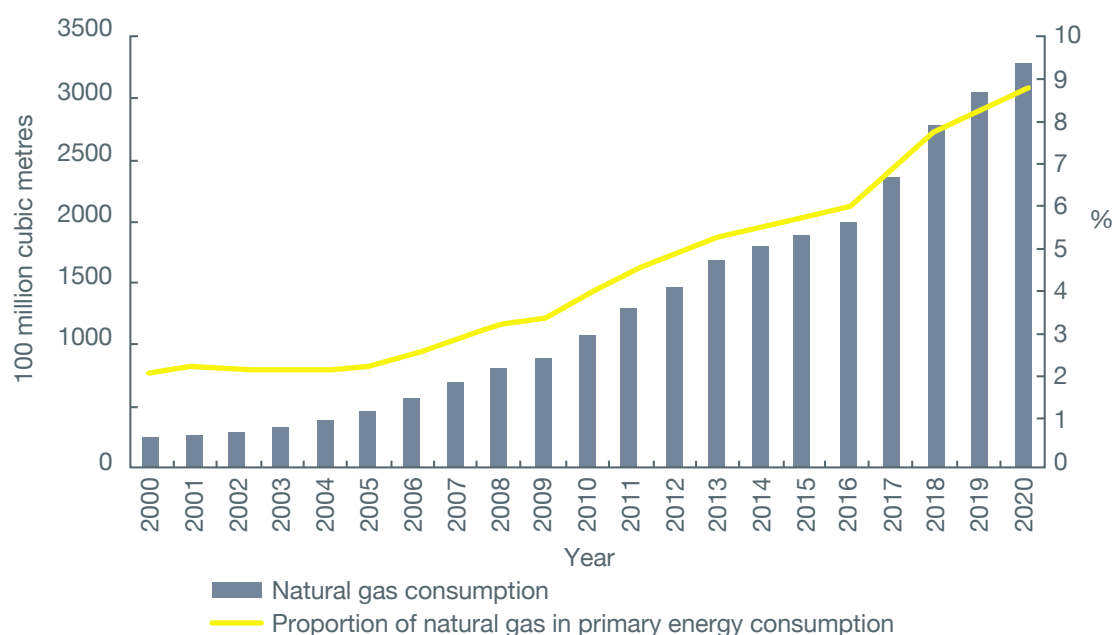
³⁷ Paraskova, 'China Is Still the Biggest Driver of Oil Prices'.



Natural gas: the rising star

The role of natural gas in China's energy mix is deceptive. Traditionally, gas has been the most underused fossil fuel in China's energy system. However, this changed in the 2010s when the sector expanded rapidly. In a decade, China doubled its consumption of natural gas, which now provides close to 10% of its primary energy demand (Figure 7).

Figure 7 Natural gas production and consumption in China, 2000–20



Source: Data from F. Cai, Y. Ma and Z. Jin, *Annual Report on China's Petroleum, Gas and New Energy Industry*.

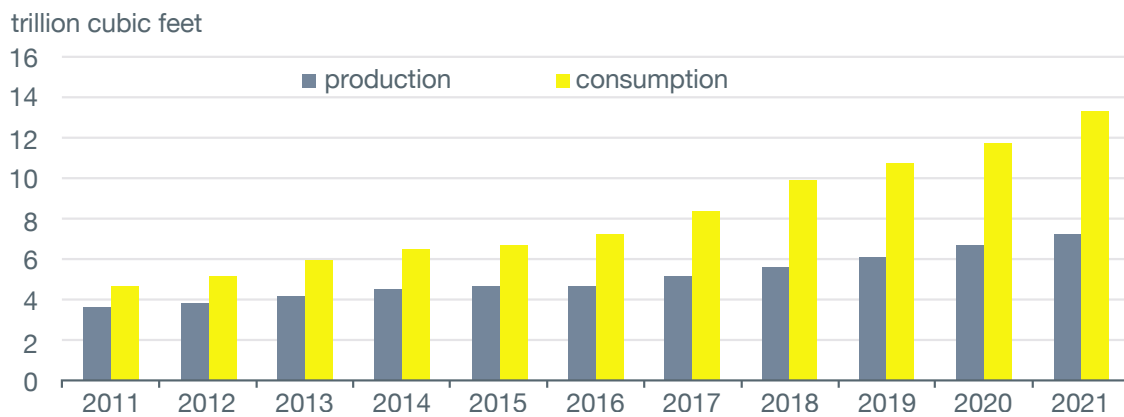
There are two main reasons for this increase. First, heavy pollution in north-east China (acutely felt in the capital Beijing) necessitated a push to switch from coal to gas to clean up the toxic air. Note that it was air-quality concerns that pushed the Chinese authorities to start reducing coal usage, not the urgent climate appeal of the international community. Second, a harsh winter and the unpreparedness of the grid for this led to major power shortages in 2017, which jeopardised China's energy security.³⁸ Disruptions also recently occurred in the winter of 2022–3, resulting in many citizens feeling the harsh temperatures.³⁹ The Chinese state planners have recognised that natural gas has a bigger role to play in the diversification of the overall energy mix.

³⁸ Yergin, *The New Map*, 158.

³⁹ K. Bradsher, 'Natural Gas Shortages Hit China as Temperatures Plunge', *New York Times*, 25 January 2023.

Currently, natural gas meets just one-tenth of China’s energy needs. This small percentage should not minimise the importance of gas for China’s economy nor the role of the country in the international gas market. With natural gas consumption racing past pre-pandemic levels, China is expected to use approximately 384 billion cubic metres (bcm) of natural gas by the end of 2023—a 6% jump compared to 2022.⁴⁰ For reference, in 2021 the whole of the EU27 received 337 bcm in net imports of natural gas for the whole year.⁴¹ Chinese domestic production has taken great strides but remains insufficient to satiate the country’s natural gas needs. A preliminary estimate by the IEA indicated that by 2030 over 60% of China’s gas demand would need to be covered by foreign imports.⁴²

Figure 8 China’s natural gas domestic production and consumption, 2011–21



Source: Data from BP, *bp Statistical Review of World Energy*.

In 2021 China became the biggest importer of both conventional natural gas and liquefied natural gas (LNG).⁴³ The majority of its gas imports are provided through LNG deliveries, while only a third comes from conventional pipeline imports. When it comes to the latter, Turkmenistan is China’s most important partner, providing natural gas through the land-based pipeline infrastructure. Ashgabat is set to expand this partnership and to try to double the amount of natural gas it exports to China through the Central Asia–China pipeline in the near future.⁴⁴ Turkmenistan’s biggest competitor in this market is the Russian Federation, which is steadily increasing the amount of gas pumped to China.

⁴⁰ S&P Global, ‘Commodities 2023: China’s Natural Gas Demand May See Modest Recovery Amid Uncertainty’, 14 December 2022.
⁴¹ European Commission, DG Energy, Market Observatory for Energy, *Quarterly Report on European Gas Markets*, 14/4 (2021), 3.
⁴² J. Lu and Y. Qi, ‘U.S. Gas to China: Positive Energy for Bilateral Relations’, *Brookings*, 31 May 2018.
⁴³ V. Zaretskaya and F. Aloulou, ‘As of 2021, China Imports More Liquefied Natural Gas Than Any Other Country’, *US Energy Information Administration*, 2 May 2022.
⁴⁴ A. Musaev, ‘Turkmenistan to Double Natural Gas Exports to China’, *Caspian News*, 18 October 2022.



For several years now, there has been a lot of fanfare around the ‘Power of Siberia’ pipeline, which has signalled Beijing’s growing interest in cheap flows from the frosty Russian tundra. The pipeline provided 15 bcm of natural gas to China in 2022, with plans to deliver up to 22 bcm in 2023.⁴⁵ The Russian side has pushed for an expanded pipeline infrastructure, including the ‘Altai’ pipeline and a gas link from Sakhalin, but China remains unenthused about these options.⁴⁶ Moscow is coming under more and more pressure to open new export markets for its natural gas production, given both that it is no longer pumping the same volumes to the EU and that the industry is suffering from a lack of investment.

Some analysts have seen this dynamic as a confirmation of Moscow’s near-vassal status vis-à-vis China.⁴⁷ This would be an ironic reversal of the roles during the Cold War era, when the Soviet Union was dominant in almost all economic sectors compared to Mao’s agrarian China. Beijing’s cunning will ensure it stays out of any formal commitments to the Kremlin until it manages to secure vital concessions from Putin. The Chinese state planners closely followed the folly of the many European countries who gambled their energy security for increased natural gas deliveries solely from Gazprom.

China’s LNG sector, on the other hand, is the one keeping the global market on edge. After massive investment in regasification terminals and related infrastructure, China’s coast is dotted with more than 20 LNG terminals with expanding capacities. Official estimates show that the import volumes of LNG could surge by up to 20% by late 2023 and China could be the leader in regasification capacity across Asia for years to come.⁴⁸ Due to its geographic proximity, the biggest proportion of tanker imports come from Australia, but Beijing is set on having more options. The recent \$60 billion, 27-year deal for LNG between China and Qatar⁴⁹ was a warning shot and is indicative that China will try to dominate the market. To reach this deal Beijing outbid the likes of Germany and, as a result, further expanded its growing presence in the

⁴⁵ *Interfax*, ‘Gas Supplies via Power of Siberia Pipeline to China Planned at 22 bcm in 2023’, 13 October 2022.

⁴⁶ Milov, *Ambitions Dashed*, 7.

⁴⁷ A. Gabuev, ‘China’s New Vassal: How the War in Ukraine Turned Moscow Into Beijing’s Junior Partner’, *Foreign Affairs*, 9 August 2022.

⁴⁸ *Global Data*, ‘China to Lead LNG Regasification Capacity Additions in Asia Through 2026’, 2 November 2022.

⁴⁹ J. Dargin, ‘What’s at Stake in the Massive China–Qatar Gas Deal’, *Carnegie Endowment for International Peace*, 29 December 2022.



Gulf States. Such deals are highly valuable, given that the global LNG supply remains limited and new production volumes are added slowly.

This is the crux of the issue with Chinese natural gas usage. The combination of growing demand and the state-led push to switch from coal to gas in the household and industrial grids will inevitably lead to a surge in LNG demand. The global supplies from Australia, Qatar and the US might struggle to satiate the growing global appetite for LNG in 2023. The EU benefited from lower than expected demand from China in 2022 and managed to secure sufficient emergency tankers from the global market. This will be a major vulnerability for the EU in the seasons to come. While the EU is paying top prices for emergency energy shipments, Beijing has expanded both its domestic LNG infrastructure and its international reach for long-term supply partnerships. This should be a glaring red light for policymakers in Brussels.

Renewables: China's cunning achievement

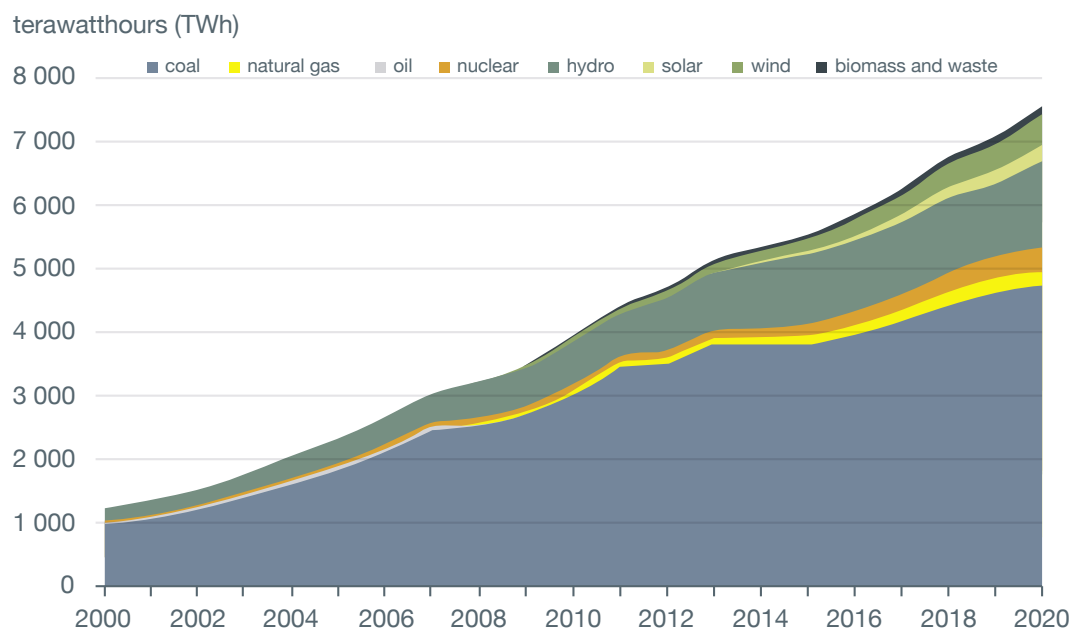
In the last two decades, most of China's renewable power generation has come from hydroelectricity. Hydropower covers 8% of China's total primary energy consumption and has traditionally generated more electricity than the combined output of solar and wind (Figure 9). Notably, the Asian country tops the global charts with 390 GW of installed hydropower capacity, which is more than the capacities of Brazil, the US and Canada combined.⁵⁰ The Three Gorges dam and the recently constructed Baihetan dam are global juggernauts in terms of the annual production of clean electricity. The biggest issue for the sector has been the severe droughts in some river basins, including the Yangtze, which have led to drastic drops in the power generated.⁵¹ The huge related cost of investment in hydropower, coupled with severe environmental concerns and the inevitable population displacement are additional headaches for the future planning of such infrastructure. The hydropower sector will most likely only expand modestly in the next five to seven years but will continue to serve as a sizeable proportion of China's overall clean energy output.

⁵⁰ International Hydropower Association, *2022 Hydropower Status Report: Sector Trends and Insights*, 7.

⁵¹ H. Davidson, 'China Drought Causes Yangtze to Dry up, Sparking Shortage of Hydropower', *The Guardian*, 22 August 2022.



Figure 9 China's net electricity generation by fuel type



Source: Data from US Energy Information Administration, *Country Analysis Executive Summary: China*.

If the past and present of renewable energy in China is mostly about hydroelectric dams, its future will be about solar photovoltaics and wind energy. In 2022 most of the progress in installed renewable energy came from photovoltaics, as China installed a record 87 GW of solar and moved its cumulative solar capacity to close to 400 GW.⁵² New governmental regulations and market reforms are expected to further increase solar expansion in the years to come. When it comes to wind power, China has taken serious strides to become the global leader in capacity deployment. China's wind turbines are expected to reach a capacity of around 430 GW by the end of 2023, adding close to 60 GW of additional power compared to 2022.⁵³ Overall, China's efforts in renewable deployment are formidable. The IEA estimates that 90% of renewable energy growth in the next five years in China will come from solar and wind, with the country on track to surpass its own target of 1,200 GW of combined solar/wind by 2030.⁵⁴

However, the Chinese renewable 'success story' must be put in perspective. Even if China surpasses its ambitious 2030 goals for clean energy, it will remain the dirtiest economy globally for years to come. Coal continues to be the most important grid stabiliser, balancing the unreliability and occasionally low power

⁵² V. Shaw, 'China Added 87.41 GW of Solar in 2022', *PV Magazine*, 18 January 2023.

⁵³ I. Yin, 'China to Maintain Renewables Growth Pace in 2023 Despite Uncertainty', *S & P Global Commodity Insights*, 1 February 2023.

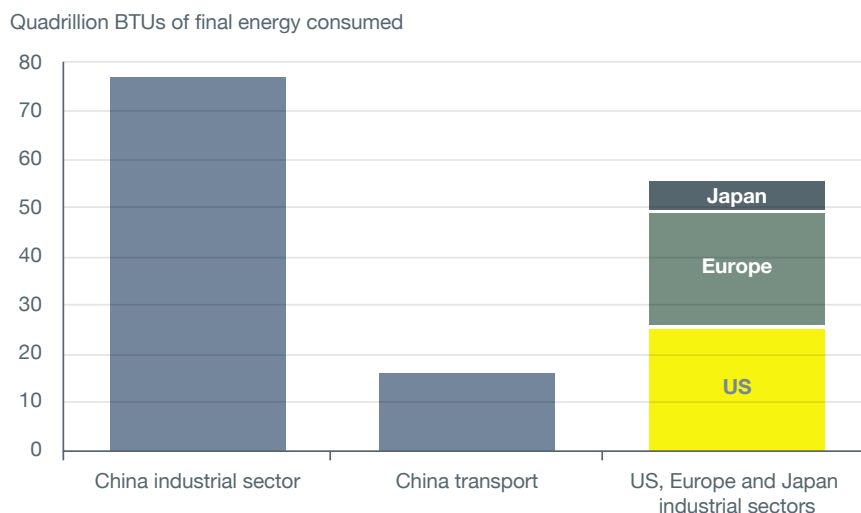
⁵⁴ IEA, *Renewables 2022 Analysis and Forecast to 2027* (January 2023), 28.



output of renewable sources. To this day, China continues to produce more electricity from coal than from solar, wind, hydropower and natural gas combined (Figure 9).

The positive scenarios for China's 'net-zero' transition rely on a set of very complex assumptions related to the rapid electrification of huge sectors of the economy, as well as the accelerated decarbonisation of its industrial processing.⁵⁵ A staggering 35% of Chinese GDP is derived from the industrial sector, which is the economic heart of the Asian hegemon (Figure 10). How do you aggressively decarbonise such industry with renewables, which remain far from reliable and less capable of huge power output than coal or natural gas? Consider heavy manufacturing, blast furnaces and steel production, to name just a few instances where replacement with renewable energy sources would be close to impossible.

Figure 10 Energy needs of China's industrial sector (2021)



Source: Data from M. Cembalest, *2022 Annual Energy Paper*, J. P. Morgan.

There is the further issue that deploying renewable capacity does not automatically mean that there is a guaranteed power output where it is most needed. Most of the utility-scale onshore wind and large-scale solar farms are located in the Gobi Desert, Xinjiang and inner Mongolia. The transfer of this energy to the rest of the country requires a nationwide 'super-grid' that employs cross-country ultra-high-voltage power lines and sufficient storage capacity—without this massive amounts of electricity are lost in transit.⁵⁶ China has started to roll out ultra-high-voltage lines but only in limited parts of the country. Some regions might also suffer from

⁵⁵ M. Cembalest, *2022 Annual Energy Paper*, J. P. Morgan (May 2022), 40.

⁵⁶ N. Feldman, 'Advancing Climate Goals With Ultra-High Voltage Power Lines', *Next Trends Asia*, 8 August 2022.



photovoltaic overcapacity due to the implementation of aggressive state subsidy schemes, which have caused an investment frenzy. A major portion of the state subsidy schemes expires in 2022–3; it remains to be seen whether these installed capacities actually bring any new electricity to the grid.

China's track record in renewables deployment is undeniable, but it is also a product of enormous state subsidies and a conscious state-led effort to monopolise renewable components' processing and final production. In 2013 a European Commission investigation showed that Chinese companies were selling solar panels to Europe at nearly half their normal market value and also receiving illegal subsidies from the state.⁵⁷ Embarrassingly, the EU failed to unite behind a forceful common anti-dumping response due to Chinese threats to retaliate with its own tariffs on French wine and German cars.⁵⁸ For more than a decade, China has been nurturing its own solar industry and has pushed most European solar producers into bankruptcy. Currently, the EU holds a microscopic share of global photovoltaic panel production, even though in 2007 it dominated the solar supply chain with a 30% global share.⁵⁹ The EU has naively lost pole position by allowing China to nurture its own solar champions and cannibalise the efforts of European manufacturers who played by the rules.

China's global dominance in renewables also stems from its abundant access to rare earth elements and specific materials vital to the production of renewable technologies. China is the top producer of rare earth elements, as well as the biggest market for the processing of copper, nickel, cobalt and lithium. And beyond this, there is the abundant supply of polysilicon in the Xinjiang region, which is shamefully produced by the slave labour of the Uyghur minority.

All of this means that China has the biggest global share of manufacturing capacity for key clean-energy technologies and their components (Figure 11). Beijing is leading a conscious effort to dominate the manufacturing and export of modern renewables, which guarantees sizeable profits and growing sway in terms of economic and political influence. The recent Chinese export bans on key solar panel technologies is a case in point.⁶⁰ Beijing wants to monopolise this key sector and is ready to choke off international competition.

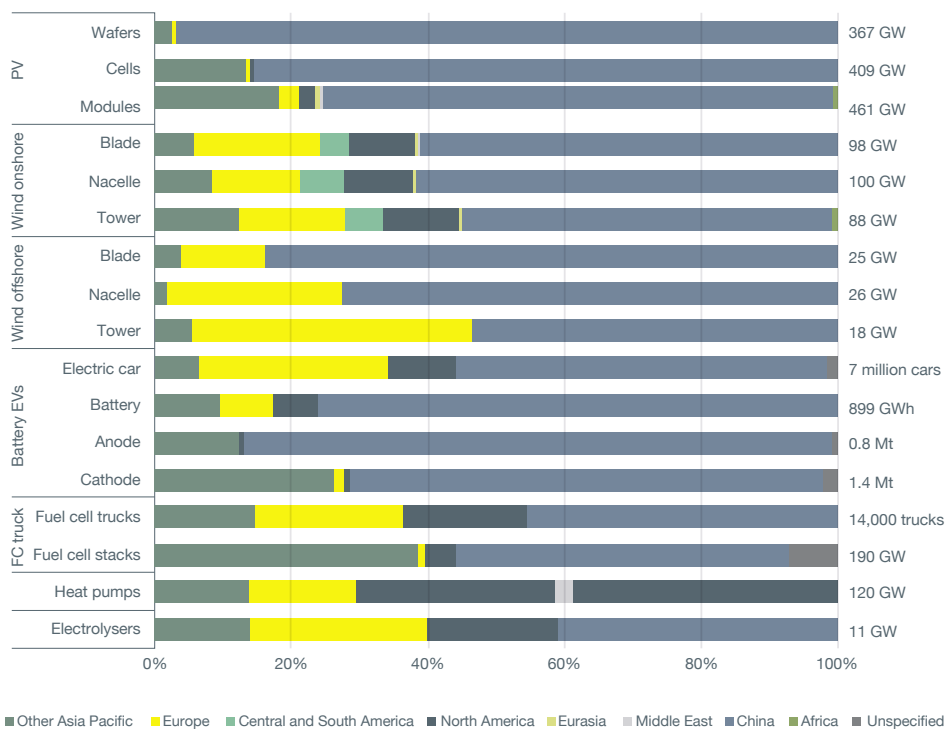
⁵⁷ K. van Wieringen and J. Hüntemann, *Making Solar a Source of EU Energy Security*, European Parliamentary Research Service, Strategic Foresight and Capabilities Unit (July 2022).

⁵⁸ Ibid.

⁵⁹ T. Osmundsen, 'Solar Consumption and Manufacturing: Can Europe Re-Take the Lead?', *Energypost.eu*, 21 March 2019.

⁶⁰ J. Pao, 'China Bans Export of Core Solar Panel Technologies', *Asia Times*, 1 February 2023.

Figure 11 Regional shares of manufacturing capacity for selected mass-manufactured clean energy and components, 2021



Source: Data from IEA, *Energy Technology Perspectives 2023*.

To conclude, modern renewables represent a double win for the Communist leadership as the country is slowly increasing its access to clean energy, while also profiting from its near monopoly within global export supply chains. China's progress on renewable roll-out is undeniable, but it would be naive to think that clean energy will replace coal and other fossil fuels any time soon. Recent geopolitical events, as well as energy market volatility, have convinced the Chinese leadership that the country should decarbonise at its own pace and not jeopardise its own energy security by rushing to use alternatives that are not fully developed. Xi Jinping recently summarised China's unapologetic future approach: '[W]e will advance initiatives to reach peak carbon emissions, in line with the principle of getting the new before discarding the old'.⁶¹ China's fossil fuel addiction is here to stay.

⁶¹ *Bloomberg News*, 'China Won't Rush Its Clean Energy Transformation, Xi Says', 17 October 2022.



Nuclear power: modest but promising

China's nuclear power sector is a booming industry. Even though its contribution to the overall energy mix is modest, Beijing has identified it as an important sector for boosting reliable clean electricity within the country. Currently, nuclear accounts for around 2% of China's primary energy consumption and about 5% of total electricity generation.⁶² Its operable reactors have an overall capacity of 53 GW, which is a threefold increase compared to a decade ago.⁶³ Globally, Beijing remains the most ambitious actor in terms of planned nuclear power expansion. The government aims to expand overall nuclear capacities to 70 GW by mid-decade and aims to reach an output of between 120 and 150 GW by 2030.⁶⁴ Of course, more than doubling China's current nuclear fleet in less than seven years remains ambitious, to say the least. Building and operating nuclear power plants remains an elaborate, costly and time-consuming endeavour. Still, Beijing remains committed to nuclear power as an essential component in improving air quality and generating almost non-stop electricity which does not suffer from renewables' infamous intermittency and low power output. The recent trip of Xi Jinping to Kazakhstan, which is the prime uranium explorer globally, is linked with China's growing ambition in nuclear power.

Even though China still ranks below the US and France in terms of nuclear power generation, it is approaching self-sufficiency in reactor design and construction. The country has traditionally relied on foreign technology for its reactors but has made serious advancements in improving it to its own gain. Given these trends, China is on track to become a major player, both in domestic nuclear expansion and in exporting its nuclear technology to third countries. Beijing might even see itself as a potential competitor to Moscow's Rosatom and try to expand its involvement in nuclear power plant construction abroad.

All in all, the Asian hegemon is heavily investing in improving its nuclear reactor capacities and exploring novel uses of nuclear energy. The news about China's breakthrough 'artificial sun' as a stepping stone towards a viable fu-

⁶² US Energy Information Administration, *Country Analysis Executive Summary: China*.

⁶³ *World Nuclear Association*, 'Nuclear Power in China' (March 2023).

⁶⁴ S. Tabeta, 'China Greenlights 6 New Nuclear Reactors in Shift Away From Coal', *NikkeiAsia*, 22 April 2022.



sion reactor should not be underestimated.⁶⁵ China is aware that the great geopolitical powers of the mid- and late twenty-first century will need to rely on abundant, affordable and secure sources of energy. This means record-breaking investment and sufficient audacity to explore new scientific frontiers. The advancement in nuclear capacity and overall willingness of China to dedicate increasing resources to breakthrough research and development shows that the country is far from complacent when it comes to its energy vision. Beijing understands that dotting your lands with wind turbines and solar panels is a good start, but that the ultimate clean energy race will be won by patents and technologies which do not yet exist. Here, China is willing to invest heavily. European policymakers should take note.

The unique characteristics of Chinese energy policy

‘Political power grows out of the barrel of a gun’ is one of the most famous quotations of Mao Zedong.⁶⁶ What is often omitted is the rest of the statement and thus the full implication of the Communist despot’s words: ‘Our principle is that the Party commands the gun, and the gun must never be allowed to command the Party.’⁶⁷ This concept is one of the keys to a basic understanding of Chinese political life, which often remains a black box. The party is the country’s sovereign, has the monopoly on violence and is the ultimate conduit of state power. The CCP is the nucleus around which society and the economy revolve and this design is imprinted on everyday policymaking. For decades now, the direction of Chinese policy has been a composite of ideology and national interest.⁶⁸ The party, ardent nationalism and pragmatic self-interest have been the defining features of the Chinese Communist credo, and have shaped most of the country’s domestic and foreign policy.

China’s energy policy is no exception to this blueprint. Given the huge socio-economic impact of the energy sector, its design is much more than a product of technocratic deliberations: it is a vital tool for the CCP to pursue its long-

⁶⁵ E. Xie, ‘China’s “Artificial Sun” Hits New High in Clean Energy Boost’, *South China Morning Post*, 1 January 2022.

⁶⁶ J. Spence, *The Search for Modern China* (New York: W. W. Norton & Company, 1990, 1st edn.), 563.

⁶⁷ *Ibid.*

⁶⁸ H. Kissinger, *On China* (New York: Penguin, 2011), 274.



term goals. After all, the CCP draws its legitimacy from the promise of continuous economic growth and social stability. Concerns about CO₂ emissions, international pledges or climate diplomacy count for next to nothing for the CCP when societal interest is at stake. The Communist leadership is acutely aware that only an effective energy policy can provide the necessary basis for China's long-term growth. China is the world's biggest energy consumer and its industrial sector provides one-third of its overall GDP. The Covid lockdowns, the disruption to the global energy market and the severe electricity shortages within China have all had a negative impact on industrial production and living conditions. All of these factors have prompted Xi Jinping and his inner circle to chart a course for energy self-sufficiency.

'Energy security' is a key term that permeates many relevant state documents and official positions. The Party work report for the 20th National Party Congress of the CCP refers at length to the importance of energy security and improved self-reliance.⁶⁹ The issue is elaborated in more technical detail within the recent *14th Five Year Plan for a Modern Energy System*, which warns that the coming years will be critical for China's energy security, given the overlap of old and new risks.⁷⁰ This has been aptly summarised by Xi Jinping himself: 'Our energy rice bowl must be held in our own hands'.⁷¹ This priority resonates not only with the recent domestic power shortages and industrial needs but touches on the very essence of the Chinese people's struggle towards a better life.

The current outlook hints that the Chinese energy sector will aim for forceful expansion in the next five to seven years, in a final push in the quest for economic growth and industrial development. The promised goal of the Communist leadership to 'peak carbon emissions by 2030' is more an admission that China will likely reach its economic limits by then. Worsening demography, property market bubbles and financial sector volatility will substantially cripple the Chinese economy. The country's emissions will peak due to pure economic slowdown, not a revolutionary decarbonisation effort. Until then China will be poised to diversify its energy deliveries in an attempt to secure its energy security via an expanded portfolio of energy importers, emergency oil stockpiling and expanded LNG infrastructure. After all, the better prepared and more energy

⁶⁹ Ministry of Foreign Affairs of the People's Republic of China, *Full Text of the Report to the 20th National Congress of the Communist Party of China* (25 October 2022).

⁷⁰ Yifan, Baiyu and Geall, 'China's Five Year Plan for Energy'.

⁷¹ J. Kynge, S. Yu and L. Lewis, 'Fortress China: Xi Jinping's Plan for Economic Independence', *Financial Times*, 14 September 2022.



resilient China is, the better its chances during an active conflict in the Indo-Pacific over Taiwan (Republic of China).

It is important to reiterate that China remains an oppressive, authoritarian state with a heavily centralised economy. Beijing continues to be troubled by some of the problems facing a still-developing nation—lack of basic infrastructure, food supplies and access to clean water remain a challenge in some regions. The country is plagued by widespread corruption, administrative inadequacy and the burdensome centralisation of power. Furthermore, we are yet to witness the unintended consequences of the decade-long aggressive state subsidy of the renewable sector, the oversupply of potentially obsolete infrastructure and energy grid inefficiencies. Neither China’s long-term leadership in clean energy technologies nor its accomplishment of a balanced energy mix are guaranteed; far from it.

For these reasons, China will not bind its own feet and limit the use of fossil fuels in its energy mix. The abundant supply of affordable energy remains the paramount goal. Beijing will continue to weave a promising narrative about its clean energy achievements in a Janus-faced attempt to improve its international image for a Western audience, while fully siding with the concerns of the developing world. China’s ‘decarbonisation agenda’ is a pragmatic state-led effort to improve air quality and environmental conditions, while keeping its industrial advantages and maximising economic output. This uniquely Chinese energy policy is, first and foremost, concerned with energy self-sufficiency and economic dominance. In the minds of the Chinese policymakers, the Middle Kingdom needs to shine bright and project power, not be preoccupied with its carbon footprint.



Considerations for EU policymakers

Chinese energy policy should be of serious concern for European policymakers. Brussels needs to get to grips with the fact that Beijing will continue to rely on coal in the pursuit of dirty growth and as a cheap back-up to intermittent solar and wind. While the EU is fixated on disincentivising investment in fossil-fuel infrastructure, China has no such restraint when it comes to commissioning new coal plants or gas infrastructure. In parallel, the Chinese leadership is actively pursuing its future dominance in renewable design, patenting and manufacturing. It is obvious that Beijing's plan is not only to benefit from the advantages of clean energy but also to profit from them. The EU extracts or produces less than 5% of global critical raw materials, while our industries require around 20% of the global supply.⁷²

More problematically, China is dealing a double blow to European interests when it comes to the international oil and gas market. First, China is becoming a growing recipient for Russia's hydrocarbons and is directly subsidising Moscow's war efforts. Moreover, China's refineries are blending different types of oil to disguise the country of origin of the fuel. China might therefore covertly become one of the biggest enablers in the international trade of Russian oil, circumventing international embargos and the EU/G7 oil price cap.

Second, Beijing's attempt to dominate the LNG import market directly jeopardises the EU's energy security, as Europe will continue to rely on foreign LNG shipments. The EU overcame its winter 2022 gas crunch through a combination of exorbitant spending on LNG shipments, unexpectedly warm temperatures and low demand from Asian competitors. This was a one off. Many EU member states are aggravating the situation by refusing to commit to long-term LNG contracts due to the bloc's climate agenda. International gas developers are already turning their focus to potential buyers in China, South Korea and India, where the demand for natural gas will grow.⁷³ The EU's knee-jerk response to the energy crisis has been a vocal commitment to an expanded

⁷² Committee of the Regions, 'Strengthening European Supply of Critical Raw Materials', Press Release, 17 March 2021.

⁷³ J. Jacobs, 'US Companies Say EU Climate Goals Are Deterring New Gas Deals', *Financial Times*, 5 February 2023.



decarbonisation effort within its borders. This is laudable, but should never come at the expense of our collective energy security.

The hard truth is that, currently, the EU has no comprehensive energy policy. For years, certain national capitals have neglected their growing energy dependencies and were unprepared for the sudden gas crunch. While the European Commission is betting on a promising post-2030 outlook guaranteed by green hydrogen, boosted renewables and energy efficiency gains, the bloc's short-term energy needs remain in jeopardy. Major European industrial actors are already questioning their long-term strategies given the constant risks, rising costs and rigorous regulatory burden within the EU. The biggest threat here is having the majority of EU national capitals pursuing different or even conflicting goals, while the Commission remains doggedly fixated on its 2019 Green Deal, which was drafted in a completely different global setting. This should not be considered a call to abandon the EU's monumental goal of carbon neutrality and a true circular economy. Rather, it is an honest assessment that a realistic recalibration is necessary given that the EU is operating in a new global environment.

Given all of the above, the following set of policy recommendations should be considered:

- I. The EU needs to increase its own efforts in energy security through a combination of diversifying its import mix from trusted partners and ramping up its own domestic energy production. It is somewhat ironic that so much institutional ink has been spilt on drafting new initiatives to strengthen our industry or 'net-zero manufacturing' while our core European businesses have been experiencing reduced access to abundant and affordable energy. You cannot outcompete the US or China without an adequate energy strategy that provides the fundamentals for successful industrial performance.
- II. The EU must pool additional shared resources into research and development for renewables and support European companies' efforts to create clean energy breakthroughs. The EU cannot match China's illicit state subsidies nor its cheap labour, but it needs to bet on its own comparative advantages when it comes to human talent and scientific excellence. There are huge opportunities for strategic investment in novel photovoltaic design, carbon capture and storage, and next-generation nuclear capacity. Europe needs to make sure that its clean energy



transition makes a compelling business case; its products and patents need to be competitive internationally.

- III. China's dominance in renewable technology exports and critical raw materials is a direct threat to Europe's long-term interests. Brussels needs to consider strategic autonomy seriously. The EU needs to de-risk its supply chain where possible and decouple from China where necessary. Shifting our imports to trusted third-country partners or expanding Europe's own mining operations should become a priority. Anti-dumping tariffs and retaliatory measures should also feature in the EU's arsenal. North-western European capitals have already committed a grave mistake by sacrificing our collective energy independence in return for cheap gas from Russia. The same mistake should not be repeated with China on clean energy.
- IV. Beijing's dubious decarbonisation agenda directly impinges on Brussels' own efforts to limit climate change. The new Chinese coal-powered thermal plants, being commissioned until 2025, will simply wipe out all of the positive progress on GHG emissions by the EU in the last decade. Unfortunately, there are obvious limits to climate diplomacy and international panels on climate change. The EU needs to have more effective tools for disincentivising third countries' exorbitant use of fossil fuels. An expanded transatlantic Carbon Border Adjustment Mechanism (CBAM)⁷⁴ or other tools used within a Climate Club or any future partnership with the US remain options.
- V. Ultimately, European leaders needs to shift towards pragmatic realism. Climate change cannot be the only driver of Europe's energy policy. The immediate priorities should be energy sufficiency and making energy resources affordable for households and industry. In parallel, a revamped effort is needed to complete the European Energy Union by ensuring the common purchase of natural gas by groups of member states, improved joint energy storage and the better interconnectivity of the power infrastructure. A truly functional European energy market is the only solid foundation for accomplishing the EU's long-term net-zero goals.

⁷⁴ J. Pietras, *Navigating the Carbon Border Adjustment Mechanism: The Dangers of Non-Compliance and Circumvention*, Wilfried Martens Centre for European Studies (15 November 2022).



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The Wilfried Martens Centre for European Studies is the political foundation and think tank of the European People's Party (EPP), dedicated to the promotion of Christian Democrat, conservative and like-minded political values.

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