

Chinese president Xi Jinping has put forth a set of significant commitments in response to the threat of global climate change. He has called for China to achieve peak CO₂ emissions by 2030 and carbon neutrality by 2060, to enhance the role of renewable energy in its energy mix, to increase forest cover, and to make use of market mechanisms, such as an emissions trading system, to incentivize industry to decarbonize. Several of these initiatives, however, face design and implementation weaknesses that raise questions about their efficacy. In addition, the international community and the Chinese expert and NGO communities have called on Beijing to provide a more detailed action plan with benchmarks for realizing its climate targets and to end the export of coal plants through its Belt and Road infrastructure initiative. China's climate commitments are notable, but ultimately, its efforts will be judged by the results.

Speaking before the United Nations Climate Ambition Summit on December 12, 2020, Chinese president Xi Jinping called on the world to work together to meet the challenge of global climate change. He reiterated the commitments he had outlined in his UN General Assembly speech in September: to peak emissions of the greenhouse gas carbon dioxide (CO₂) before 2030 and to achieve carbon neutrality before 2060. He also pledged to increase the share of non-fossil fuels in primary energy consumption to about 25 percent and to cut the country's carbon intensity (CO₂ emissions per unit of GDP) by over 65 percent by 2030.¹ While reports of Xi's remarks focused on his promised emissions reductions, he also committed to expand China's forest stock by 6 billion m³ by 2030 over the 2005 level, increasing the country's carbon storage capacity.² Taken together, the targets suggest an impressive sense of purpose and they enhance Xi's burgeoning reputation as a leader in responding to the global threat. Nonetheless, domestic and international experts expressed concern on two fronts: first, the commitment to peak emissions "by 2030" was not sufficiently ambitious; and second, China did not provide any benchmarks to indicate it had a credible plan for realizing its 2060 carbon neutrality goal.

Few countries' climate strategies matter more than those of China. China contributes 28 percent of the world's CO₂ emissions, more than the next three countries (the United States, India, and

¹ "Full Text: Remarks by Chinese President Xi Jinping at Climate Ambition Summit," Xinhua, December 12, 2020, http://www.xinhuanet.com/english/2020-12/12/c_139584803.htm.

² "Full Text: Remarks by Chinese President Xi Jinping."

Russia) combined.³ Since ratifying the Paris Agreement, China has taken steps to mitigate its CO₂ contribution by reducing the share of coal in its primary energy mix, improving its energy and carbon intensities, and increasing the share of renewable energy in its power sector. Moreover, it has significantly increased forest cover in some parts of the country to create new carbon sink capacity (the capacity to absorb CO₂).

Despite these positive measures, questions concerning China's ability to meet its commitments, as well as whether the commitments are substantial enough to help the world realize its Paris Agreement goal of limiting global warming to well below 2 degrees centigrade above pre-industrial levels remain. China is the only G20 country whose coal consumption has increased significantly in the wake of the 2015 Paris Climate Agreement; its share of global coal power has increased from 44 percent in 2015 to 53 percent in 2020.⁴ Its attendant CO₂ emissions have also increased each year since 2017. In addition, China and its large export banks, the China Development Bank and the Export-Import Bank of China, continue to finance coal-fired power plants globally. Moreover, implementation of several of China's carbon reduction strategies have fallen short of expectations.

As Xi prepares for the November 2021 UN Climate Summit in Glasgow, he has put in place climate-friendly policies and regulations to manage coal output and consumption, renewable energy, clean energy vehicles, and the transportation and forest sectors. He has also introduced financial tools to manage emissions, including a large-scale emissions trading system (ETS) and a green bond market. While parts of these policies have achieved success, they are also challenged by flaws in design and implementation. Moreover, international and Chinese climate experts and activists are calling on China to adopt more ambitious targets and to lay out a clear strategy with benchmarks for how it will realize those targets.

It's the Coal, Stupid

The primary source of China's CO₂ emissions is the burning of fossil fuels for energy and industrial production of materials, such as cement and steel. Among fossil fuels, coal is particularly important. It supplies approximately 57 percent of China's energy⁵ and is responsible for more than 75 percent of its CO₂ emissions.⁶ Coal's role in the Chinese economy

³ "Each Country's Share of CO₂ Emissions," Union of Concerned Scientists, July 16, 2008/Updated August 12, 2020, <https://www.ucsusa.org/resources/each-countrys-share-co2-emissions>.

⁴ "China Generated Over Half World's Coal-fired Power in 2020: Study," Reuters, March 28, 2021, <https://www.reuters.com/article/us-climate-change-china-coal/china-generated-over-half-worlds-coal-fired-power-in-2020-study-idUSKBN2BK0PZ>

⁵ "China to Further Cut Coal Use in 2021," Xinhua, April 23, 2021, http://www.xinhuanet.com/english/2021-04/23/c_139899428.htm#:~:text=The%20proportion%20was%2056.8%20percent,28%20percent%2C%20said%20the%20document.

⁶ Hannah Ritchie and Max Roser, "China: CO₂ Country Profile," Our World in Data, 2020, <https://ourworldindata.org/co2/country/china>.

is deeply entrenched. It is plentiful—China boasts the world’s fourth largest reserves—and heavily subsidized.⁷ The industry employs more than 2.5 million people,⁸ and local governments support coal-fired power plants both for economic development and for the consistent baseload power that they provide. As former CPPCC representative Xie Kechang wrote in the *People’s Daily*, coal is China’s “basic energy source” and part of its “economic lifeline.”⁹

In the immediate aftermath of the Paris Climate Agreement, China’s CO₂ emissions flattened, leading some observers to suggest that China would achieve peak CO₂ emissions well before its 2030 commitment.¹⁰ In 2017, however, emissions began to climb again, and in 2018 China lifted its ban on new coal plants.¹¹ Coal consumption and emissions continued to tick up in 2018 and 2019. In 2020, Beijing also brought online more new coal plant capacity than in 2018 and 2019 combined;¹² and its new plant capacity was more than three times that of the rest of the world. It retired 9GW, but it offset that with 38.4GW of new coal capacity. In addition, it approved 46.1GW of new capacity.¹³ China currently has 247 GW of coal power under development—enough to power the whole of Germany and more than the total active capacity in the United States.¹⁴ The China National Coal Association (CNCA) has forecast that China’s coal output will

⁷ Andrew Fawthorp, “Profiling the Top Five Countries with the World’s Largest Coal Reserves,” NS Energy, October 19, 2020, <https://www.nsenergybusiness.com/features/countries-largest-coal-reserves/>.

⁸ “China Number of Employee: Coal Mining & Dressing, 1998–2020,” National Bureau of Statistics CEIC, <https://www.ceicdata.com/en/china/no-of-employee-by-industry-monthly/no-of-employee-coal-mining--dressing>.

⁹ 谢克昌, “让煤炭利用清洁高效起来,” *People’s Daily*, September 22, 2020, <http://env.people.com.cn/n1/2020/0922/c1010-31870590.html>.

¹⁰ Chelsea Harvey, “China Vowed to Peak Carbon Emissions by 2030. It Could Be Way Ahead of Schedule,” *Washington Post*, March 7, 2016, <https://www.washingtonpost.com/news/energy-environment/wp/2016/03/07/china-vowed-to-peak-carbon-emissions-by-2030-these-researchers-think-it-could-already-be-there/>.

¹¹ “China,” Climate Action Tracker, November 30, 2018, <https://climateactiontracker.org/countries/china/2018-11-30/>.

¹² “China,” Climate Action Tracker, September 21, 2020, <https://climateactiontracker.org/countries/china/>.

¹³ Muyu Shu and Shivani Singh, “China’s Coal Consumption Seen Rising in 2021, Imports Steady,” Reuters, March 3, 2021, <https://www.reuters.com/article/instant-article/idAFL3N2L12A9>.

¹⁴ Eric Wesoff and William Driscoll, “How Does the US Retire 236 GW of Coal and 1,000 Gas Peaker Plants?” *PV Magazine*, September 18, 2020, <https://pv-magazine-usa.com/2020/09/18/how-does-the-us-retire-236-gw-of-coal-and-1000-gas-peaker-plants/>.

increase once again in 2021¹⁵ and consumption overall will rise by 6 percent by 2025.¹⁶ In the first quarter of 2021, China's CO₂ emissions posted a 9 percent increase over pre-pandemic levels.¹⁷

The draft Fourteenth Five-Year Plan released in March 2021, which will guide the country's economic development during the 2021–2025 period, provides little indication as to how Beijing plans to achieve its “by 2030” emissions cap given the continued rise in coal consumption. Unlike in the Thirteenth Five-Year Plan, the Fourteenth Five-Year Plan does not provide a target for coal power capacity. The draft plan does establish targets to reduce energy intensity by 13.5 percent and emissions intensity by 18 percent before 2025.¹⁸ (China's energy intensity remains high relative to the rest of the world: only eleven countries in the world use more energy per unit of GDP than China.)¹⁹ These targets do not, however, require a reduction in the amount of coal used; rather, they address the efficiency of coal as it relates to productivity. China's climate experts have argued that Beijing needs to move away from coal and not simply use it more efficiently. This includes reconsidering approved coal projects and limiting coal-sector expansion. Greenpeace's Li Shuo and NRDC's Yang Fuqiang have also called on the Chinese government to adopt “stringent coal caps,” forgo new coal installations,²⁰ and realize peak carbon emissions by 2025.²¹

¹⁵ “China to Cap Annual Coal Output at 4.1B Tonnes by 2025,” China.org.cn, March 4, 2021, http://www.china.org.cn/business/2021-03/04/content_77270274.htm.

¹⁶ “China's Coal Consumption Predicted to Grow 6% by 2025,” *Caixin*, March 4, 2021, <https://www.caixinglobal.com/2021-03-04/chinas-coal-consumption-predicted-to-grow-6-by-2025-101670665.html>.

¹⁷ “China CO₂ emissions 9% higher than pre-pandemic levels in Q1-research,” Reuters, May 20, 2021, <https://www.reuters.com/business/sustainable-business/china-co2-emissions-9-higher-than-pre-pandemic-levels-q1-research-2021-05-20/>

¹⁸ “Select Translations of the Draft China's 14th Five-Year Plan and the Long-Range Objectives Through the Year 2035,” trans. Zichen Wang, <https://www.airuniversity.af.edu/CASI/Display/Article/2533644/select-translations-of-the-draft-chinas-14th-five-year-plan-and-the-long-range/>.

¹⁹ “Guide to Chinese Climate Policy,” SIPA Center on Global Energy Policy, Columbia University, 2019, <https://chineseclimatepolicy.energypolicy.columbia.edu/en/energy-efficiency-0#:~:text=Market%20Report%202016-,Background,more%20than%20the%20United%20States>

²⁰ Li Shuo, Lauri Myllyvirta, and Kaare Sandholt, “Emergency Podcast! Expert Panel Dissects China's 2060 Carbon Neutral Shock,” interview by Anders Hove, *Environment China*, September 25, 2020, <https://www.environmentchinapodcast.com/podcast/episode/3548ecc0/emergency-podcast-expert-panel-dissects-chinas-2060-carbon-neutral-shocker>.

²¹ “专家呼吁：‘十四五’时期应继续实施煤控约束性指标” [Experts Call for Implementing Binding Targets for Coal Control During the ‘14th Five-Year Plan’ Period], *The Paper*, November 25, 2020, https://www.thepaper.cn/newsDetail_forward_10132414.

Despite the lack of specific new commitments to cap coal consumption in the Fourteenth Five-Year Plan, other government statements suggest that Beijing is considering more ambitious targets, including a coal cap. The CNCA has suggested that annual coal output will be capped at around 4.1 billion tonnes and consumption will be capped at around 4.2 billion tonnes by the end of 2025.²² Xi bolstered this claim during his speech at the climate summit hosted by US president Joe Biden in April 2021. He stated that China would “strictly control coal-fired power-generation projects and strictly limit the increase in coal consumption over the 14th Five-Year Plan period and phase it down in the 15th Five-Year Plan period.”²³

The UK-based climate group TransitionZero has indicated that China will have to shutter 364 GW of coal capacity by 2030, roughly one-third of its current capacity,²⁴ if it is to stay on track to realize its 2060 goal. In January 2021, however, the Ministry of Ecology and Environment directly criticized the National Energy Administration (NEA) for failing to control the development of new coal plants. An environmental inspection team found that coal-power capacity was expanding well beyond agreed-upon plans for 2017 to 2020. In addition, random inspections in three provinces revealed that 121 coal mines were exceeding their production targets by 30 percent.²⁵

In addition, China’s heavy-industry sector—long a significant contributor to China’s domestic air quality problems as well as to its CO₂ emissions—remains a mainstay of the Chinese economy. Beijing’s post-pandemic recovery has relied in part on high energy-consuming and -polluting steel, cement, and chemical industries. Steel alone hit a record high output of 1.06 billion tonnes in 2020.²⁶ Government inspection teams found evidence that companies in these sectors were flouting government guidelines regarding emissions and times of operation. One team, for example, discovered that four steel mills that are part of the massive Tangshan steel-

²² “China to Cap Annual Coal Output at 4.1B Tonnes by 2025,” China.org.cn, March 4, 2021, http://www.china.org.cn/business/2021-03/04/content_77270274.htm.

²³ “Full Text: Remarks by Chinese President Xi Jinping at Leaders Summit on Climate,” Xinhua, April 22, 2021, http://www.xinhuanet.com/english/2021-04/22/c_139899289.htm.

²⁴ N. Sönnichsen, “Countries With Largest Installed Capacity of Coal Power Plants Worldwide as of January 2021,” Statista, February 2, 2021, <https://www.statista.com/statistics/530569/installed-capacity-of-coal-power-plants-in-selected-countries/>.

²⁵ Echo Xie, “China’s Energy Watchdog Under Fire Over Pollution Failures,” *South China Morning Post*, February 1, 2021, <https://www.scmp.com/news/china/politics/article/3120111/chinas-energy-watchdog-under-fire-over-pollution-failures>.

²⁶ “Top Chinese Steelmaking City to Punish Firms That Stray From Anti-pollution Plan,” Reuters, March 13, 2021, <https://www.reuters.com/article/us-china-tangshan-steel/top-chinese-steelmaking-city-to-punish-firms-that-stray-from-anti-pollution-plan-idUSKBN2B602G>

producing complex outside of Beijing had failed to curb production during a heavy pollution alert, had falsified their records, and had deleted data.²⁷

The Rise of the Rest: Renewables, Transportation, and Forests

As Beijing moves to reduce the share of coal in its energy mix and electricity sector, it is simultaneously enhancing the share of renewable energy resources. China is the world leader in total installed wind and solar capacity; in 2020 these sources provided approximately 11 percent of all Chinese primary energy consumption.²⁸ China also dominates the global market for solar panels; its global share of solar cell manufacturing is 80 percent.²⁹ Beijing's investment in the renewables sector, including wind, solar, and hydropower, reflects this commitment. In 2020, investment in renewables accounted for 57 percent (\$11 billion) of China's energy infrastructure investment, compared to 27 percent for coal.³⁰ During the Thirteenth Five-Year Plan, Beijing also made important gains in addressing its problems in curtailment (the percentage of electricity from wind or solar that could have been produced but that the grid did not use): From 2016 to 2019, wind curtailment fell from 17 percent to 4 percent and solar curtailment fell from 11 percent to 2 percent.³¹

In 2020, Xi Jinping announced a target of increasing the share of non-fossil fuels in primary energy consumption to 16.6 percent in 2025 and 25 percent in 2030.³² In response to these goals, the NEA has submitted draft implementation plans that include guidance for the responsibility of various administrative divisions (provinces, districts, and cities) to use renewable energy. It also

²⁷ Luo Guoping and Yang Ge, "In Depth: China's Carbon-Reduction Plans Turn Up the Heat on Steel Capital," *Caixin*, April 1, 2021, <https://www.caixinglobal.com/2021-04-01/in-depth-chinas-carbon-reduction-plans-turn-up-the-heat-on-steel-capital-101684803.html>.

²⁸ "国家能源局综合司关于对《关于2021年风电、光伏发电开发建设有关事项的通知（征求意见稿）》公开征求意见的公告" [Notice of the Comprehensive Department of the National Energy Administration on the 'Announcement for Soliciting Public Opinion on Matters Related to the Development and Construction of Wind and Photovoltaic Power Generation in 2021 (Draft for Comments)'], 国家能源局 [National Energy Administration], April 19, 2021, http://www.nea.gov.cn/2021-04/19/c_139890241.htm.

²⁹ Kenneth Rapoza, "How China's Solar Industry is Set Up to be the New Green OPEC," *Forbes*, March 14, 2021, <https://www.forbes.com/sites/kenrapoza/2021/03/14/how-chinas-solar-industry-is-set-up-to-be-the-new-green-opec/?sh=50c6683c1446>.

³⁰ Christian Shepherd, "China Pours Money into Green Belt and Road Projects," *Financial Times*, January 26, 2021, <https://www.ft.com/content/8ec30baf-69e9-4d73-aa25-13668dcb659f>.

³¹ Anders Hove, "Trends and Contradictions in China's Renewable Energy Policy," Center on Global Energy Policy, Columbia/SIPA, August 28, 2020, <https://www.energypolicy.columbia.edu/research/commentary/trends-and-contradictions-chinas-renewable-energy-policy>.

³² "Full Text: Remarks by Chinese President Xi Jinping at Climate Ambition Summit," Xinhua, December 12, 2021, http://www.xinhuanet.com/english/2020-12/12/c_139584803.htm.

has established targets for regional Chinese grid companies to increase the amount of power purchased from clean sources, from 28.2 percent in 2020 to 40 percent by 2030.³³ The State Grid Corporation of China unveiled a plan to realize a 50 percent share of renewables, including wind, solar, and hydropower, in electricity generation by 2025,³⁴ a crucial benchmark for Xi's objective of diminishing coal consumption beginning in that year. According to a group of Tsinghua University researchers, by 2050 non-fossil fuel energy resources could account for more than 90 percent of the country's electricity.³⁵

International experts, however, have expressed some skepticism about China's renewable energy claims. They note that Beijing's reported 72GW of new wind power in 2020 represented more than the anticipated deployment of wind energy for the entire world. Moreover, they assess that this number does not correspond to on-the-ground observations concerning the number of new wind farms or the supply constraints that would have been incurred. These experts have concluded that Beijing changed its accounting practices to include partially completed projects or projects that were previously installed but were not connected to the grid.³⁶ Others have also raised concern that the 2020 draft Energy Law, while clearly placing a priority on the development of a low-carbon energy system, nonetheless does not provide many specifics concerning new initiatives that will enable China to realize its renewable targets.³⁷

China's position as the leading global supplier of solar panels may also be in jeopardy. Human rights concerns have entered the global discourse over China's clean energy manufacturing. There are concerns about China's control over more than 80 percent of the world's polysilicon, a raw material essential for most solar panels. The majority of this material comes from Xinjiang-Uyghur Autonomous Region, and evidence suggests that several companies are using forced labor from Xinjiang's labor and reeducation camps to produce the polysilicon. Debate is underway in the United States, for example, over whether American companies should import solar products made in that region. Chinese solar panel makers are advancing a solution in which

³³ Muyu Shu and David Stanway, "China Plans to Raise Minimum Renewable Power Purchase to 40% by 2030: Government Document," Reuters, February 9, 2021, <https://www.reuters.com/article/us-china-climatechange-renewables/china-plans-to-raise-minimum-renewable-power-purchase-to-40-by-2030-government-document-idUSKBN2AA0BA>.

³⁴ "国家电网公司发布“碳达峰、碳中和”行动方案”

[State Grid Corporation of China Releases "Carbon Peak, Carbon Neutral" Action Plan], State Grid, March 1, 2021. <https://www.yicai.com/news/100963176.html>

³⁵ "Full Slide From Professor He Jiankun's Presentation," October 19, 2020, https://mp.weixin.qq.com/s/S_8ajdq963YL7X3sRJSWGg.

³⁶ Jason Deign, "What Is Going On With China's Crazy Clean Energy Installation Figures?" *Green Tech Media*, February 2, 2021, <https://www.greentechmedia.com/articles/read/what-is-going-on-with-chinas-crazy-clean-energy-installation-figures>.

³⁷ Hove, "Trends and Contradictions."

the United States and other countries will receive their solar panels from plants outside Xinjiang, while those in Xinjiang will supply China's internal market.³⁸

1. *Transportation*

Chinese officials have also targeted the decarbonization of the transportation sector, which contributes 9 percent of the country's emissions, as crucial to their climate strategy. By the end of June 2019, China boasted almost half the world's electric cars and 99 percent of its electric buses.³⁹ In November 2020, the State Council released a policy paper, the "Development Plan for the New Energy Automobile Industry (2021–2035)," that called for new energy vehicles to make up 20 percent of all new car sales by 2025.⁴⁰ (This target represented a less ambitious objective than the 25 percent goal proposed by China's Ministry of Industry and Information Technology.)⁴¹ The plan also mandated that electric vehicles make up 40 percent of all sales by 2030; and by 2035, it wants 1) all new vehicles to be eco-friendly, 2) full electrification of public transportation, and 3) commercialized fuel cell vehicles.⁴²

The State Council followed up in February 2021 with the release of its "Outline of the National Comprehensive Three-Dimensional Transportation Network Planning" that laid out the country's vision for its domestic, regional, and global transportation infrastructure. This plan, however, only briefly touched on environmental issues. It called for ensuring resource efficiency and encouraging the public to "travel green." The overwhelming emphasis was on China's role in designing and helping realize the twenty-first century's global transportation infrastructure needs.⁴³ This dichotomy between China's commitment to address climate change at home and its

³⁸ Ana Swanson and Brad Plumer, "China's Solar Dominance Presents Biden With an Ugly Dilemma," *New York Times*, April 20, 2021, <https://www.nytimes.com/2021/04/20/business/economy/china-biden-solar-panels.html>

³⁹ "Electric Vehicles," Columbia/Sipa Center on Global Energy Policy, https://chineseclimatepolicy.energypolicy.columbia.edu/en/electric-vehicles#/_ftn1.

⁴⁰ "国务院办公厅关于印发新能源汽车产业发展规划（2021—2035年）的通知" [Notice From the General Office of the State Council on Distributing the NEV Industry Development Plan], 中华人民共和国中央人民政府 [Central People's Government of the People's Republic of China], October 20, 2020, http://www.gov.cn/zhengce/content/2020-11/02/content_5556716.htm.

⁴¹ "New Energy Vehicles to Make Up 20% of China's New Car Sales by 2025," Reuters, November 2, 2020, <https://www.reuters.com/article/us-china-autos-electric/new-energy-vehicles-to-make-up-20-of-chinas-new-car-sales-by-2025-idUSKBN27I0W9>.

⁴² "国务院办公厅关于印发新能源汽车产业发展规划（2021—2035年）的通知" [Notice From the General Office of the State Council on Distributing the NEV Industry Development Plan].

⁴³ "The Central Committee of the Communist Party of China and the State Council Issue the 'Outline of the National Comprehensive Three-dimensional Transportation Network Planning'—Xinhua," 6Park News, February 23, 2021, <https://6park.news/en/the-central-committee-of-the>

lack of attention to its importance in its economic policy abroad has become a source of increasing tension in its relations with other countries, as discussed below.

2. Afforestation

China's afforestation and reforestation efforts have the potential to help the country as it decarbonizes; forests serve as a carbon sink that can absorb CO₂ emissions. China's Fourteenth Five-Year Plan aims to increase national forest coverage by 1.06 percent to achieve 24.1 percent coverage.⁴⁴ Recently, a group of international researchers concluded that the carbon capture from China's forests had been underestimated, determining that China's mean land-based carbon sink from 2010 to 2016 was equal to about 45 percent of its annual emissions during that period.⁴⁵ In addition to these gains, nevertheless, much of China's new coverage stems from commercial farms, which are harvested to produce timber or paper products—many of which degrade quickly and ultimately release their sequestered carbon.⁴⁶ While China has immense potential to expand the benefits of its forestry programs and nurture similar initiatives abroad, the efficacy of these efforts depends on their longevity.

The Role of the Market

China's financial markets are rapidly taking center stage in Beijing's efforts to decarbonize the economy and meet the country's climate pledges. One of the top ten priorities established at the People's Bank of China (PBOC) 2021 Work Conference is: "improving the policy framework and incentive mechanism for green finance" in order to meet the government's targets of peaking CO₂ emissions before 2030 and achieving carbon neutrality by 2060. The PBOC's priorities include promoting the carbon emissions trading system (ETS) and improving the green finance market and products, among other initiatives.⁴⁷

communist-party-of-china-and-the-state-council-issued-the-outline-of-the-national-comprehensive-three-dimensional-transportation-network-planning_xinhua.html.

⁴⁴ "Select Translations of the Draft China's 14th Five-Year Plan."

⁴⁵ Wang Jing, et al., "Large Chinese Land Carbon Sink Estimated From Atmospheric Carbon Dioxide Data," *Nature*, October 28, 2020, https://www.nature.com/articles/s41586-020-2849-9.epdf?sharing_token=AmrB5iy_ncWNqni0JNma2dRgN0jAjWel9jnR3ZoTv0M114HTHRPhJ5mLnoFvxh5I_bdoJTYaT2dCDKppBMvJ0gg2oca9q2cGi4VAZWT31pj7bnDg_C8BLahPMYkcF-wuWVpRIST_budXgHAajtYjHnzLK93AHFCsSSyN9bLi97XW-b8Yn3ZjklrXwKcCjf6Ax5GKhaYpg7JeFIPggEvpw%3D%3D&tracking_referrer=www.bbc.com.

⁴⁶ Feng Hao, "Can China's Afforestation Knowledge Green the World?" *China Dialogue*, August 30, 2019, <https://chinadialogue.net/en/climate/11480-can-china-s-afforestation-knowledge-green-the-world/>.

⁴⁷ "PBC Holds 2021 Work Conference," The People's Bank of China, January 12, 2021, <http://www.pbc.gov.cn/en/3688110/3688172/4157443/4161755/index.html>.

China's ETS could emerge as one of the most significant elements of Xi's emissions reduction and carbon neutrality targets. On February 1, 2021, China launched a national-level carbon trading market, or ETS, for the power sector. In an ETS, the market puts a price on emissions that will encourage the participants to take action to reduce their emissions, buy permits from others, or invest in offsets. Beijing began experimenting with carbon emissions trading a decade ago. Over time, it has developed a system of eight pilot projects—in Shenzhen, Shanghai, Beijing, Guangdong, Tianjin, Hubei, Chongqing, and Fujian⁴⁸--each with a different approach.

The results of the original pilot projects were underwhelming. A team of Beijing University of Technology researchers have found that in four of the pilots—Beijing, Shanghai, Guangdong, and Hubei—the markets were weak and underdeveloped, with poor information transparency, high investment risks, and vast differences in market efficacy from one region to the next.⁴⁹ They noted: “Empirical results show that the carbon price level of each domestic carbon market differs significantly, and the development of domestic carbon market is uneven; there are more days with zero carbon trading volume. ...”⁵⁰ Other Chinese studies found that official data on emissions were “incomplete and inconsistent” and that “noncompliance was widespread.”⁵¹

The just-launched national ETS is limited to China's power sector, but the sector represents roughly 50 percent of the country's total emissions and 14 percent of the world's total emissions.⁵² A total of 2,225 entities and operators have registered in the market. (The original pilot projects will continue to operate in parallel and will gradually be integrated.) The government will initially grant the allowances for free, although experts anticipate that prices will eventually settle at approximately \$10 /cte and eventually will rise to almost \$12 by 2030.

⁴⁸ Jonathan Shieber, “China Launched its National Carbon Trading Market Yesterday,” TechCrunch, February 2, 2021, <https://techcrunch.com/2021/02/02/china-launched-its-national-carbon-trading-market-yesterday/>.

⁴⁹ Zhao Lixiang and Wang Lili, “中国碳交易二级市场有效性研究——以北京、上海、广东、湖北碳交易市场为例” [Research on the Efficacy of China's Carbon Trading Secondary Market: Taking Carbon Trading Markets in Beijing, Shanghai, Guangdong, and Hubei as Examples], Science and Technology Progress and Policy, 2018, <http://www.kjjb.org/fileup/HTML/2018-13-34.htm>.

⁵⁰ Zhao and Wang, “中国碳交易二级市场有效性研究” [Research on the Efficacy of China's Carbon Trading Secondary Market].

⁵¹ Pu Wang, Zhu Liu, Xianchun Tan, and Lei Liu, “Key Challenges for China's Carbon Emissions Trading Program,” Analysis & Opinions, Wiley Interdisciplinary Reviews: Climate Change, May 2019, <https://www.belfercenter.org/publication/key-challenges-chinas-carbon-emissions-trading-program>

⁵² Dan Murtaugh, “China Targets National Carbon Trading Online by End of June,” Bloomberg, February 28, 2021, <https://www.bloomberg.com/news/articles/2021-03-01/china-targets-national-carbon-trading-online-by-end-of-june>.

(For comparison, the EU's carbon trading price is about \$54,⁵³ whereas the California Quebec carbon auction in February 2021 had a clearing price of \$17.80.)⁵⁴

Some Chinese experts have expressed qualms about the prospects for the ETS to contribute in a meaningful way to reduce CO₂ emissions. First, the plan is unique among major ETS's in that it targets carbon intensity as opposed to emissions. Thus, a power plant could become more efficient but actually consume more coal and produce more emissions. As Refinitiv analyst Yan Qin stated, "in the short term, it's not going to drive emissions reductions."⁵⁵ Xiamen University Professor Zhang Caiping has also criticized the project for its narrow focus on the power sector. She argues that the legal framework needed to ensure strong supervision over the allocation process is missing as is a system of strict penalties for violators. She also notes that there is not enough assurance that companies will report their emissions accurately.⁵⁶ Some of Zhang's concerns may be addressed in the future: over time, for example, the system is slated to expand to cover 80 percent of emissions,⁵⁷ including heavy industries, such as cement, aluminum, chemicals, and oil and gas.

Morgan Stanley analyst Simon Lee has identified a serious shortcoming in the allocation process: The state is issuing permits based on how much electricity a plant produces, compared to a state-determined efficiency benchmark. Because the benchmark is very low, most large power plants already meet the target. Lee determined that all Chinese coal plants larger than 300MW will meet the intensity targets without having to buy new quotas; in fact, their emissions intensity was already lower in 2018 and 2019.⁵⁸ Finally, numerous Chinese analysts have commented on the inability of the financial industry to engage in the trading process. In other ETS's, participation by financial institutions enables the emergence of a vibrant market. Sun

⁵³ Nina Chestney, "EU Carbon Price Hits Record High Above 45 Euros a Tonne," Reuters, April 20, 2021, <https://www.reuters.com/business/energy/eu-carbon-price-hits-record-high-above-45-euros-tonne-2021-04-20/>.

⁵⁴ "Carbon Market: Results of February 17th Auction Held Between Québec and California," Cision, February 24, 2021, <https://www.newswire.ca/news-releases/carbon-market-results-of-february-17th-auction-held-between-quebec-and-california-835100243.html>.

⁵⁵ Chloé Farand, "China Launches World's Largest Carbon Market for Power Sector," Climate Home News, January 7, 2021, <https://www.climatechangenews.com/2021/01/07/china-launches-worlds-largest-carbon-market-power-sector/>.

⁵⁶ Zhang Caiping and Wu Yanbing, "中国碳交易市场发展现状、市场数据分析及未来展望" [Development Status, Market Data Analysis and Future Prospects for China's Carbon Trading Market], Polaris Power Network, March 16, 2020, <https://shoudian.bjx.com.cn/html/20200316/1054384.shtml>.

⁵⁷ "千亿级碳市场可期 十四五时期钢铁、化工等八大重点能耗行业有望全部纳入" [The 100 Billion Level Carbon Market can be Expected to Include All Eight Major Energy Consumption Industries Such As Steel and Chemical Industry in the 14th Five-Year Plan Period], *China Securities Journal*, January 13, 2021, http://www.cs.com.cn/cj2020/202101/t20210113_6129737.html.

⁵⁸ Farand, "China Launches World's Largest Carbon Market."

Mingchun, chief economist of Haitong International, argues that if Chinese financial institutions were permitted to enter the carbon market, they could account for 10–15 percent of trading volume, improving the market-activity level and its ability to optimize pricing.⁵⁹

In addition to the ETS, China has adopted other green finance initiatives. Most notable is the government’s commitment to develop a green bond market. China’s banks hold nearly \$1.85 trillion in green loans, more than any other banking system in the world.⁶⁰ To reach the 2060 carbon neutrality goal, however, estimates are that China will need to invest an additional \$16 trillion in new energy and pollution-control projects over the next twenty years.⁶¹

Numerous pilot projects exploring aspects of green finance are well underway. Local banks and other financial entities throughout the country are issuing green or climate bonds to support “green” infrastructure. Huzhou City in Zhejiang province, for example, became the first city to use green finance to support sustainability in the building sector.⁶² In early February 2021, six Chinese state-owned utilities and infrastructure companies issued the nation’s first batch of carbon-neutral bonds, totaling \$985 million. Proceeds from the borrowings will be used to fund projects that reduce greenhouse gas emissions, including photovoltaic solar panels, wind power, hydropower, and green buildings.⁶³ On March 1, 2021, Shenzhen became the first province to establish green finance regulations, “Green Gold regulations,” that require financial institutions to develop a range of departments and products exclusively devoted to green finance. Among other requirements, any investment project with annual greenhouse gas emissions that exceed 3,000 tons annually must undergo a special level of green supervision.⁶⁴

Despite the enthusiasm and energy around the potential for green finance to help realize China’s climate ambitions, some critics have noted that investment products that are marketed as environmentally friendly are often “misleading or hyped.” Moreover, while the bond issuers exclude clean coal projects, oil and gas projects including highly polluting shale and tar sands are

⁵⁹ Wang Liwei and Peng Qinqin, “In Depth: How China Plans to Harness Market Forces for Carbon Neutrality,” *Caixin*, March 5, 2021, <https://www.caixinglobal.com/2021-03-05/in-depth-how-china-plans-to-harness-market-forces-for-carbon-neutrality-101670771.html>.

⁶⁰ Wang and Peng, “In Depth: How China Plans to Harness Market Forces.”

⁶¹ Wang and Peng, “In Depth: How China Plans to Harness Market Forces.”

⁶² “湖州市获批全国首个绿色建筑和绿色金融协同发展试点城市” [Huzhou Was Approved as the First Pilot City of Coordinated Development of Green Building and Green Finance in China], Sina News Center, March 27, 2020, <https://www.caixinglobal.com/2021-03-05/in-depth-how-china-plans-to-harness-market-forces-for-carbon-neutrality-101670771.html>.

⁶³ Liang Hong and Denise Jia, “Chinese Companies Borrow \$992 Million in 1st Issue of Carbon-Neutral Bonds,” *Caixin*, February 10, 2021, <https://www.caixinglobal.com/2021-02-10/chinese-companies-borrow-992-million-in-1st-issue-of-carbon-neutral-bonds-101662677.html>.

⁶⁴ “The Country’s First Green Finance Regulations Are Promulgated and Will be Officially Implemented on March 1 Next Year,” YQQLM, <https://www.yqqlm.com/2020/11/the-countrys-first-green-finance-regulations-are-promulgated-and-will-be-officially-implemented-on-march-1-next-year/>.

allowed in green bond issuances. There is also a lack of transparency around how the money can be used. As much as 30 to 50 percent can be used for general operations as opposed to supporting actual implementation of the projects.⁶⁵

Xi also has balked at the idea of putting a price on carbon. In April 2021, trilateral discussions on climate change among France, Germany, and China ended on a sour note when France and Germany broached the idea of a carbon border tax: a tax that the EU would put on imports of carbon-intensive products from countries that have not put a price on carbon. The objective is to prevent industries from moving to parts of the world with weaker standards and enforcement. Xi rejected the EU proposal directly: “Tackling climate change should...not become an excuse for geopolitics, attacking other countries or trade barriers.”⁶⁶

Nonetheless, China’s top finance officials continue to advance new ideas on how to integrate the sector more directly with the country’s effort to address climate change. In March 2021, China’s Central Bank Governor Yi Gang stated that climate change would be one of the factors taken into consideration in the formulation of policies for financial stability, monetary policy, and foreign-exchange reserves investment.⁶⁷ The PBOC has also undertaken a series of studies on how to set up a nationwide carbon accounting system to enable companies and banks to measure and disclose their climate-related activities. In addition, in evaluating banks, climate will gradually be considered as a factor, alongside bad debts, exposure to credit risk, and capital adequacy.⁶⁸

China’s Global Carbon Footprint

While Beijing focuses most of its attention on reducing its emissions inside China, the international community increasingly emphasizes the climate implications of China’s financing and investment in projects outside its borders. China’s global infrastructure plan, the Belt and Road Initiative (BRI), receives particular scrutiny. The BRI is seeded with carbon-intensive projects: More than 40 percent are energy-related, and an additional 30 percent are tied to the transportation sector. Overall, China is financing one-quarter of the world’s coal plants,⁶⁹ equivalent to more than 200 plants. According to a September 2019 report by a group of Chinese

⁶⁵ Gao Baiyu, “China’s New Green Bond Catalogue Could be Greener,” *China Dialogue*, July 9, 2020, <https://chinadialogue.net/en/business/chinas-new-green-bond-catalogue-could-be-greener/>.

⁶⁶ Karl Mathiesen, “China’s Xi Slams EU Carbon Border Levy Plans,” *Politico*, April 16, 2021, <https://www.politico.eu/article/chinas-xi-seeks-macron-merkel-climate-change-co2-cop26-emissions/>.

⁶⁷ Peng Qinqin and Han Wei, “PBOC Drafts More Financial Tools to Support Carbon Neutrality Goal,” *Caixin*, April 2, 2021, <https://www.caixinglobal.com/2021-04-02/pboc-drafts-more-financial-tools-to-support-carbon-neutrality-goal-101684909.html>.

⁶⁸ Peng and Han, “PBOC Drafts More Financial Tools.”

⁶⁹ Tim McDonnell, “The Problem With China’s New Carbon Trading Market,” *Quartz*, February 13, 2021, <https://qz.com/1971281/the-problem-with-chinas-new-carbon-trading-market/>.

and international experts, if environmental standards are not improved in the 126 BRI countries, global temperature could rise by 2.7°C, even if other countries meet their climate commitments.⁷⁰

China's export of coal-fired power plants engenders criticism from an array of international actors. Within host countries, there are protests by environmental activists and local citizens. In Kenya, where China supported construction of the country's very first coal plant, for example, local residents demonstrated for over five years. A Kenyan court ruled in 2019 that the project managers would be required to provide an environmental and social impact assessment before the regulators will consider reauthorizing the plant.⁷¹ Ultimately, in November 2020, the Kenyan government canceled the project after the Industrial and Commercial Bank of China, its main financial backer, pulled out.⁷² Other countries have also experienced protests against Chinese-backed coal plants. In Vietnam, violent protests erupted in 2018 when farmers complained that pollution from the Chinese-backed plants had ruined their crops.⁷³ In some cases, as in Bangladesh and Pakistan, the economics of the plants also led to their cancellation.

Pressure on China extends beyond the host countries, however. The United States and the EU have also called on China and its large development banks, the Export-Import Bank of China and China Development Bank, to cease financing the plants. China places no restrictions on its development banks around lending for fossil fuel projects.⁷⁴ By 2019, 90 percent of Beijing's special Silk Road Fund energy projects were fossil-fuel-based investments.⁷⁵ In addition, international environmental organizations have pressured Beijing to discontinue its financing of fossil fuel intensive projects. As the pandemic took its toll on the economies of many BRI countries, they lobbied Beijing to refinance many of the loans for their projects. More than 260 environmental organizations sent a letter to China's Finance Minister demanding that he not bail

⁷⁰ Ma Jun and Simon Zadek, "Decarbonizing the Belt and Road," Tsinghua PBC School of Finance, September 2019, <https://www.vivideconomics.com/wp-content/uploads/2019/09/Decarbonizing-the-Belt-and-Road-%E2%80%93Final-Report-English.pdf>.

⁷¹ Tom Wilson and Christian Shepherd, "Kenyan Court Blocks China-backed Power Plant on Environment Grounds," *Financial Times*, June 27, 2019, <https://www.ft.com/content/9313068e-98dc-11e9-8cfb-30c211dcd229>.

⁷² "Kenyatta Pulls the Plug on Centum and Rubis' Lamu Power Project," Africa Intelligence, November 25, 2020, https://www.africaintelligence.com/eastern-and-southern-africa_business/2020/11/25/kenyatta-pulls-the-plug-on-centum-and-rubis--lamu-power-project,109623422-ar1.

⁷³ Murray Hiebert, *Under Beijing's Shadow: Southeast Asia's China Challenge* (Washington, DC: Center for Strategic and International Studies, 2020), p. 226.

⁷⁴ Jane Nakano, "Greening or Greenwashing the Belt and Road Initiative?" Center for Strategic and International Studies, May 1, 2019, <https://www.csis.org/analysis/greening-or-greenwashing-belt-and-road-initiative>

⁷⁵ Nakano, "Greening or Greenwashing."

out the fossil fuel projects.⁷⁶ Even within China, the Minister of Environment and Ecology, in conjunction with a group of international NGOs, issued a report in December 2020 that called for a negative list of polluting BRI projects and encouraged the country's banks to avoid coal and other environmentally harmful investments abroad.⁷⁷

In response to international criticism, at the second Belt and Road Forum for International Cooperation in 2019 Beijing pledged to green the BRI. It increased substantially its commitment to renewable projects. Wind, solar, and hydropower made up 57 percent (\$11 billion) of China's international investment in energy infrastructure in 2020, an increase from 38 percent the year before. At the same time, however, China increased the share of coal-based projects in its overseas investments, from 15 percent in 2018 to 27 percent (\$5.4 billion) in 2020.⁷⁸

In its December 2020 white paper, "Energy in China's New Era," the government articulates a new effort to promote green and sustainable energy infrastructure through the BRI. It also has changed how it frames the efforts from "greening the BRI" to advancing a "green Silk Road." The distinction signals that China is no longer adopting measures to improve a flawed BRI, rather it is helping the world by deploying its green technology and knowledge through a green silk road, much as it does through its Health Silk Road and Digital Silk Road. At a press conference during the March 2021 Two Sessions, State Councilor Wang Yi further discussed the "Green Silk Road" as China's effort to make the BRI a "robust engine for low-carbon transformation and green recovery in the post-COVID world."⁷⁹

The Bumpy Road Ahead

As the world readies for the Glasgow Climate Summit in November 2021, there is much to celebrate in terms of China's growing commitment and ambition. Xi has put in place a number of the necessary building blocks for a credible climate policy and has responded to international pressure by gradually increasing the robustness of China's commitments. Nonetheless, moving forward he faces several challenges. There are ongoing questions about the efficacy of some of China's initiatives, such as its emissions trading system. Implementation, transparency, and accountability regarding coal plant closures and operations remain a challenge. And China has not addressed international concerns about its export of coal-fired power plants via the BRI. New challenges are also emerging. China's human rights abuses threaten its global market for solar panels. In addition, European officials have suggested that Chinese exports may face a carbon

⁷⁶ Christopher Shepherd, "China's Belt and Road Urged to Take Green Route," *Financial Times*, June 5, 2020, <https://www.ft.com/content/e00426f4-8ead-11ea-af59-5283fc4c0cb0>.

⁷⁷ "Green Development Guidance for BRI Projects (Baseline) Study Report," BRI International Green Development Coalition 2020 Policy Study Series, December 2020, http://en.brige.net/Reports/Report_Download/202012/P020201201717466274510.pdf.

⁷⁸ Christian Shepherd, "China Pours Money into Green Belt and Road Projects," *Financial Times*, January 26, 2021, <https://www.ft.com/content/8ec30baf-69e9-4d73-aa25-13668dcb659f>.

⁷⁹ "State Councilor and Foreign Minister Wang Yi Meets the Press," Ministry of Foreign Affairs of the People's Republic of China, March 8, 2021, https://www.fmprc.gov.cn/mfa_eng/wjdt_665385/zyjh_665391/t1859138.shtml.

border tax if China does not put a price on carbon. Ultimately, China's position as climate leader or climate laggard will be determined by its record of success in helping to meet the targets of the Paris Climate Agreement. Its efforts to date suggest it is moving in the right direction, but many impediments remain before it can be considered successful.

About the Contributor

Elizabeth Economy is Senior Fellow at the Hoover Institution at Stanford University and Senior Fellow for China studies at the Council on Foreign Relations. Economy's forthcoming book, *The World According to China* (Polity Press, 2021), explores China's foreign policy ambitions and their impact on the international system. Her most recent book, *The Third Revolution: Xi Jinping and the New Chinese State* (Oxford University Press, 2018) was shortlisted for the Lionel Gelber Prize, a prestigious literary award for foreign affairs books. She is also the author of *By All Means Necessary: How China's Resource Quest is Changing the World* (Oxford University Press, 2014), co-authored with Michael Levi, and the award-winning *The River Runs Black: The Environmental Challenge to China's Future* (Cornell University Press, 2004; 2nd edition, 2010). Economy has published articles in policy and scholarly journals, including *Foreign Affairs*, *Foreign Policy*, and the *Harvard Business Review*; and op-eds in the *New York Times*, *Wall Street Journal*, and *Washington Post*, among others. In June 2018, she was named one of the "10 Names That Matter on China Policy" by *Politico Magazine*. Economy serves on the board of managers of Swarthmore College, the board of trustees of the Asia Foundation, and the board of directors for the National Committee on U.S.-China Relations. She is a member of the Aspen Strategy Group. Economy received her BA with Honors from Swarthmore College, her AM from Stanford University, and her PhD from the University of Michigan. In 2008, she received an honorary doctor of laws degree from Vermont Law School.

Photo by ConexiónCOP Agencia de noticias - 9-COP21_Xi Jinping, Presidente de China, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=63386139>