

Does 2020 mark a critical juncture in China's low-carbon energy transition?

1. Introduction

The COVID-19 pandemic has created what can be termed a critical juncture from the perspective of the low-carbon transition.¹ Nations have the opportunity to use their economic recovery plans to accelerate this transition. Whilst some countries, generally the more developed economies, are putting forward green recovery plans, governments of many lower income countries are more concerned about short-term issues such as employment and livelihoods. As an upper-middle-income country, China might be expected to build on its recent successes and accelerate the pace of its low-carbon energy transition.

Like most countries, China has faced serious economic and social challenges in the wake of the COVID-19 pandemic. These challenges include economic growth, employment and poverty alleviation. The sources of these challenges are both domestic and international. The trade conflict with the United States is prominent among the latter. China continues to be the largest emitter of carbon dioxide from energy in the world. Until recently, the government has been relatively successful in constraining the rise of these emissions through a mix of economic, energy and technology policies. This trend appeared to be under threat in October 2019 when Prime Minister, Li Keqiang, argued that China should make better use of its domestic resources of coal, oil and natural gas to enhance national security of energy supply,² presumably in response to the trade conflict. In contrast, almost one year later, in September 2020, President Xi Jinping announced that China would achieve carbon neutrality by 2060.³ These two, apparently contradictory policy announcements, bracketed the launch and delivery of the national economic recovery plans.

In this context, the paper addresses the question of whether the year 2020 marks a critical juncture in China's management of the low-carbon energy transition. A critical juncture is a period of uncertainty, often caused by an exogenous shock, which creates the opportunity for significant institutional change. In their analysis of how junctures become critical, Rinscheid et al. argued that the conditions before a potentially disruptive event are an important determinant of the likelihood of significant change after the

¹ Sovacool BK, Del Rio DF, Griffiths S. Contextualizing the COVID-19 pandemic for a carbon constrained world: insights for sustainability transitions, energy justice, and research methodology. *Energy Research & Social Science* 2020; 68: 101701; Kuzemko C, Bradshaw M, Bridge G, Goldthau A, Jewell J, Overland I, et al. Covid-19 and the politics of sustainable energy transitions. *Energy Research & Social Science* 2020; 68: 101685.

² State Council. Premier calls for high-quality energy development. 11 October 2019, http://english.www.gov.cn/premier/news/201910/11/content_WS5da08a3fc6d0bcf8c4c14e92.html [accessed 2 October 2020].

³ Farand C, Darby M. Xi Jinping: China will aim for carbon neutrality by 2060. *Climate Change News*, 22 September 2020, <https://www.climatechangenews.com/2020/09/22/xi-jinping-china-will-achieve-carbon-neutrality-2060/> [accessed 12 October 2020].



event.⁴ Of particular relevance is the degree of conflict among powerful actors over the issues at stake before the event. The greater the degree of pre-existing conflict, the more likely that the event will result in a critical juncture.

In simple terms, the events of 2020 could yield one of three medium- to long-term trends. The juncture could become critical in a positive way. In this case, the pandemic, along with Xi Jinping's announcement, would trigger an acceleration of country's low-carbon energy transition, as it appears to have done in some other countries.⁵ Conversely, a focus on economic growth, employment and security of energy and material supply might render the juncture critical in a negative way by undermining recent achievements and boosting carbon emissions. Finally, the juncture may not become critical in which case trends in the energy sector would continue as before.

To address the question, this paper carries out a document analysis of the economic recovery plans and the energy policies announced in the first ten months of 2020 and of some critiques of these plans and policies, as well as specific economic and energy trends. The main analysis falls into two parts. Section 2 summarises the main elements of the government's economic policy responses to COVID-19 and presents some key economic trends. This reveals that the economic recovery plan has few distinctly green features. Section 3 shows how these priorities are reflected in the energy sector, favouring fossil fuels and self-reliance. The following section contrasts these policy approaches with President Xi's goal of carbon neutrality by 2060. The paper concludes that whilst the preceding policies did not reflect a critical juncture, the President's bold call may do so, but the challenges ahead will be formidable.

2. How Green are China's Economic and Fiscal Recovery Policies?

2.1 Key elements of the economic and fiscal policies

China was one of the first countries to start rolling out an economic recovery plan. Though early, the scale of the stimulus package was modest at an estimated 7 per cent of annual GDP; much smaller than those of some OECD nations that exceed 10 per cent and the country's response to the 2008 global financial crisis that reached 12 per cent.⁶ Two sets of slogans underpinned the government's approach to the 2020 recovery plan: the "Six Stabilities" announced in March 2020 and the "Six Guarantees" announced in April 2020 (Table 1).⁷ The slogan "Six Stabilities" has underpinned national economic policy since 2018, whilst the "Six Guarantees" reflect the need to address the challenges posed by the COVID-19 pandemic. Environmental protection and climate change mitigation are not among these priorities.

The recovery package, as presented by the Prime Minister in the government's Work Report on 22 May 2020, was explicitly aimed to address these priorities.⁸ The recovery package comprised two distinct elements: short-term relief and longer-term stimulus. The relief effort was financed through an increase of the budget deficit by one trillion RMB as well as by one trillion RMB of special treasury bonds for city and county governments to safeguard employment, provide for basic needs and protect small

⁴ Rinscheid A, Eberlein B, Emmenegger P, Schneider V. Why do junctures become critical? Political discourse, agency, and joint belief shifts in comparative perspective. *Regulation and Governance*, <https://onlinelibrary.wiley.com/doi/pdf/10.1111/rego.12238>; 2019 [accessed 10 June 2019].

⁵ Eurasia Group. Contrary to media narrative, governments have delivered a green stimulus, Eurasia Group Climate Monthly, 12 August 2020.

⁶ Wong C. Uncovering China's fiscal stimulus policies in the budget report, <https://research.nus.edu.sg/eai/wp-content/uploads/sites/2/2020/07/EAIC-16-20200706.pdf>; 6 July 2020 [accessed 20 July 2020]; Alberola E, Arslan Y, Cheng G, Moessner R. The fiscal response to the Covid-19 crisis in advanced and emerging economies. *Bank of International Settlements, BIS Bulletin* 23, 17 June 2020.

⁷ People's Daily Overseas Edition. Xi Jinping: Do a solid job in ensuring "six stabilities" and fully implement the task of "six guarantees", http://paper.people.com.cn/rmrbhwb/html/2020-04/24/content_1983578.htm; 24 April 2020 (in Chinese) [accessed 3 August 2020].

⁸ Li K. Report on the work of government. Delivered at the Third Session of the 13th National People's Congress of the People's Republic of China on May 22, 2020, http://www.xinhuanet.com/english/2020-05/29/c_139099211.htm; 29 May 2020 (English translation) [accessed 28 June 2020].



enterprises. Measures included the reduction of taxes, fees, pension payments, rents, energy tariffs and interest rates on loans. The funds were also to be used to boost employment by creating opportunities for the 8.74 million new college graduates, demobilised military personnel and several hundred million rural workers in flexible employment.

Table 1: The Six Stabilities and Six Guarantees

Six Stabilities	Six Guarantees
Employment	Job security
Financial sector	Basic livelihoods
Foreign trade	Protection of business entities
Foreign investment	Food and energy security
Domestic investment	Stability of domestic and international supply chains
Market expectations	Grassroots government operations

Source: State Council, Ministry of Finance

The stimulus plan was intended to boost investment. This has been financed by 3.75 trillion RMB of local government bonds as well as by part of the one trillion RMB of special treasury bonds mentioned above. The targets for this investment range from poverty reduction and agricultural production to healthcare and environmental management. Of greatest relevance to this study are the plans for “new infrastructure”, urban renewal, traditional infrastructure and energy security.⁹

The plans to promote investment in new infrastructure date back to the Central Economic Work Conference in 2018 and draw on elements of the Made in China 2025 policy.¹⁰ The new infrastructure strategy has three main components: information infrastructure, integrative infrastructure and innovation infrastructure.¹¹ Information infrastructure includes developing a new generation of information networks, expanding fifth generation infrastructure, building data centres and developing new technologies such as artificial intelligence. Integrative infrastructure involves applying such technologies to existing infrastructure such as ultra-high voltage (UHV) power transmission, charging stations for electric vehicles (EVs) and smart energy technologies. Finally, innovation infrastructure is needed to support the required scientific and technological advances.

The priority for urban renewal builds on the earlier National New Urbanization Plan (2014-2020), the objective of which was to promote migration from the countryside to cities.¹² The new strategy has the same objective but prioritises upgrading existing urban communities, particularly those built before 2000.¹³ Tasks include: renovating buildings, including fitting lifts where necessary and improving energy saving properties; improving municipal infrastructure such as local water, gas and power supply, heating, roads and internet; and enhancing the quality of community areas and facilities.

Whilst investment in traditional infrastructure does not feature prominently in most formal documents relating to the recovery plan, the government’s Work Report briefly mentions an increase of 100 billion RMB for railway construction.¹⁴ This would be on top of already ambitious plans in place before the

⁹ Li K. Report on the work of government; Ministry of Finance. Report on China’s fiscal policy implementation in the first half of 2020, http://www.gov.cn/xinwen/2020-08/06/content_5532865.htm; 6 August 2020 (in Chinese) [accessed 15 August 2020].

¹⁰ Liao Y. The challenges to the power industry brought by the new infrastructure. *China Power Enterprise Management* 2020; 4: 36-8; State Council. Notice of the State Council on issuing “Made in China 2025”. *State Development* (2015) No. 28, http://www.gov.cn/zhengce/content/2015-05/19/content_9784.htm; 8 May 2015 (in Chinese) [accessed 3 August 2020].

¹¹ National Development and Reform Commission. Record of the April press conference of the National Development and Reform Commission, https://www.ndrc.gov.cn/xwdt/xwfb/202004/t20200420_1226031.html; 20 April 2020 (in Chinese) [accessed 12 August 2020].

¹² Xinhua News Agency. National new urbanization plan (2014-2020), http://www.gov.cn/zhengce/2014-03/16/content_2640075.htm; 16 March 2014 (in Chinese) [accessed 20 August 2020].

¹³ State Council. Guiding opinions on the reconstruction of old residential districts in cities and towns, No. 23 (2020), http://www.gov.cn/zhengce/content/2020-07/20/content_5528320.htm; 20 July 2020 (in Chinese) [accessed 12 August 2020].

¹⁴ Li K. Report on the work of government.

outbreak of the pandemic.¹⁵ In June 2020, the Ministry of Finance clarified that the one trillion RMB of special treasury bonds should also be devoted to investment in infrastructure. In addition to areas such as health care, food supply, emergency response and environmental protection, such projects could also include the construction of transportation and municipal infrastructure and the upgrading of industries and supply chains.¹⁶

In line with Li Keqiang's proposal in October 2019, key documents also emphasised the need to enhance energy security.¹⁷ Priorities included fossil fuel production, clean coal use, renewable energy, electric vehicles and strategic reserves. Also relevant to this analysis is the government's announcement of a three-year plan to further reform state-owned enterprises (SOEs) through restructuring, promoting mixed ownership, and removing social obligations so that the enterprises can focus on their core commercial objectives.¹⁸ Though how the removal of social obligations is consistent with the requirement to hire more people was not explained.

2.2 Consequences and critiques of the economic and fiscal policies

Data for the first two quarters of 2020 showed the short-term economic effect of the return to work that began in the second quarter and the early phases of the recovery package (Table 2). The economy as a whole moved from negative to positive growth, though the first half saw an overall contraction of 1.6 per cent. The largest change was in the secondary sector, manufacturing, which swung from a decline of 9.6 per cent in the first quarter to a rise of 4.7 per cent in the second quarter. The tertiary sector, services, showed the lowest growth in the second quarter. Growth for all sectors was significantly lower than seen in the first half of 2019.

Table 2: Data on economic growth

		2019		2020		
		1H2019	2019	1Q2020	2Q2020	1H2020
Economy Change y-o-y	GDP growth	+6.3%	+6.1%	-6.8%	+3.2%	-1.6%
	Primary	+3.0%	+3.1%	-3.2%	+3.3%	0.9%
	Secondary	+5.8%	+5.7%	-9.6%	+4.7%	-1.9%
	Tertiary	+7.0%	+6.9%	-5.2%	+1.9%	-1.6%

Source: National Bureau of Statistics, monthly and annual data <http://data.stats.gov.cn/> (in Chinese)

The government's economic recovery plan relies heavily on the country's energy-intensive raw materials processing industries. The output of metal smelters remained relatively undisturbed by the pandemic, most probably because of the high cost of halting production (Table 3). Modest growth of steel, copper and aluminium output in the second quarter took production for the first half of 2020 to levels marginally above those for the first half of 2019. Imports of iron ore and refined metals showed sharp increases in June and July, reflecting growing requirements from the infrastructure strategies.¹⁹ Cement is a vital ingredient to traditional infrastructure and the urban renewal strategy. In contrast to metal smelting, the production of cement fell dramatically in the first quarter of 2020, but then soared to bring the output for the first half of the year very close to the figure for the first half of 2019.

¹⁵ Zhou S. China's top 10 infrastructure projects for 2020 and beyond will help boost its slowing economy, <https://www.scmp.com/economy/china-economy/article/3047305/chinas-top-10-infrastructure-projects-2020-and-beyond-will>; South China Morning Post, 28 January 2020 [accessed 13 August 2020]

¹⁶ Ministry of Finance. Notice on revising the categories of government expenditure and revenue for 2020, http://ysss.mof.gov.cn/zhengcequizhang/202006/t20200622_3536929.htm; 18 June 2020 (in Chinese) [accessed 14 August 2020].

¹⁷ Li K. Report on the work of government; Ministry of Finance. Report on China's fiscal policy implementation in the first half of 2020.

¹⁸ Li K. Report on the work of government.

¹⁹ Dyer G. China iron ore imports touch new high in July, <https://www.sharecafe.com.au/2020/08/10/china-iron-ore-imports-touch-new-high-in-july/>; 10 August 2020 [accessed 31 August 2020]; Home A. China's booming metal imports an echo of the last crisis, <https://www.reuters.com/article/china-metals-ahome/column-chinas-booming-metal-imports-an-echo-of-the-last-crisis-andy-home-idUSL8N2FE2H7>, Reuters, 12 August 2020.

Table 3: Output of selected energy-intensive industrial products

	Output, thousand tonnes					Output ratios	
	1H2019	2019	1Q2020	2Q2020	1H2020	2Q2020/ 1Q2020	1H2020/ 1H2019
Steel	492,169	996,342	234,450	264,561	499,011	1.128	1.014
Copper	4,524	9,784	2,288	2,534	4,884	1.108	1.080
Aluminium	17,413	35,044	8,843	9,046	17,889	1.023	1.027
Cement	1,044,691	2,350,121	299,065	699,162	998,227	2.338	0.956

Source: National Bureau of Statistics, monthly and annual data

Whilst this recovery plan is proving successful at boosting economic growth, at least in the short term, it is far from being green.²⁰ Although the amount of funds directed at green projects is almost double that devoted to brown projects, the Eurasia Group has estimated that life-cycle carbon emissions from the aggregate of all the projects will be positive.²¹ A further critique is that the excessive focus on major infrastructure projects will benefit large companies but may fail to improve employment opportunities and living conditions across much of the country.²²

Commentators have been especially critical of the new infrastructure programme, not least because most types of project will require substantial amounts of electricity, which remains dominated by fossil fuels.²³ Specific criticism has been directed at the plans for UHV transmission, high-speed rail and electric vehicles (EV) charging stations. Not only may they not be particularly green, but the first two are also not “new”. The principal aim of ultra-high voltage (UHV) transmission in China is to bring renewable energy generated in remote areas to distant demand centres. However, the level of use of some of the existing lines has been low. This is due to the capacity of thermal power at both ends of each UHV line being inadequate to maintain grid stability. As a result, more thermal capacity will have to be built to support existing and planned UHV lines. Yet there is already an overcapacity of thermal power. In 2019, average utilisation hours were 4,293 hrs, or just 49 per cent, far below what is technically and commercially efficient.²⁴ This situation implies a distinct lack of effective coordination between the grid and generating companies, a deficiency that can be attributed to the government.

China already has 36,000 km of high-speed rail, but only five of the 31 lines can cover all their costs and these are the faster lines that connect major cities. In contrast, eleven lines fail to cover their operating costs, let alone the principal and interest payments on their loans. As a result, the total debt of China State Railway Company is estimated to have been about US\$760 billion in 2019. As more lines are built to regions with lower population densities and lower incomes, the financial losses will almost certainly rise.²⁵ Despite these losses, high-speed rail can yield a number of external benefits such as regional development, reduced road traffic congestion and lower carbon emissions. However, the reduction of carbon emissions is highly dependent on passenger numbers due to the energy requirements for construction, notably for steel and cement.²⁶

More EV charging stations will certainly be needed as the country’s fleet of EVs continues to grow. However, the issue is not the number but the location of the charging stations. A shortage of space in areas that are convenient for users has resulted in many stations being built in locations far from work

²⁰ Gosens J, Jotzo F. China’s post-COVID-19 stimulus: no green deal in sight. *Environmental Innovation and Societal Transitions* 2020; 36: 250-4.

²¹ Eurasia Group. Coronavirus, global macro. Scenarios update: moving into the differentiation phase, 16 July 2020.

²² Han X. “New infrastructure” that needs to create “new demand”, https://www.jiemian.com/article/4214079_foxit.html, 7 April 2020 (in Chinese) [accessed 19 August 2020].

²³ Restarting the economy; the green revival plan is expected to be introduced, how to make 10 trillion investment in green, <http://finance.sina.com.cn/roll/2020-05-20/doc-iirczymk2638560.shtml?cref=cj>; 20 May 2020 (in Chinese) [accessed 13 August 2020].

²⁴ Han X. “New infrastructure” that needs to create “new demand”.

²⁵ Fickling D. China doesn’t need 125,000 miles of track, *Bloomberg*, <https://www.bloombergquint.com/opinion/china-doesn-t-need-another-125-000-miles-of-high-speed-rail>; 18 August 2020 [accessed 18 August 2020].

²⁶ Lawrence M, Bullock R, Liu Z. China’s high-speed rail development. Washington DC: World Bank; 2020.



and living spaces. Underinvestment on local distribution networks and low voltage substations has exacerbated this problem.²⁷

In summary, China's economic and fiscal response to the COVID-19 pandemic has been more modest in scale and sharper in focus than the 2009 stimulus.²⁸ The initial steps were also carried out promptly. By 31st July 2020, all of the planned bonds had been issued - 1 trillion RMB of special treasury bonds and 3.758 trillion RMB of local government bonds.²⁹ Nevertheless, the plans lack a distinctive "green" theme, especially in relation to energy, as will be elaborated on in the next section. Furthermore, a survey of the plans of a number of individual provinces indicate that the number of traditional infrastructure projects far outweighed those for new infrastructure.³⁰ Moreover, in late July 2020 the government responded to the deterioration in its international relations by declaring that the country would need to further enhance its self-reliance in both production and consumption – the so-called "dual circulation" strategy.³¹

As has been the case in many other countries, China's recovery plans will result in the deeper involvement of the state in the economy at both central and local levels. However, unlike a liberal market economy, these plans are likely to enhance the market power of SOEs as they will play leading roles in both much of the new and traditional infrastructure. This trend is likely to be exacerbated by the greater emphasis on self-reliance arising from the trade conflict with the USA. Thus, it is clear that the economic recovery plan and related policies reflect neither a strong preference for environmental protection and climate change mitigation nor a fundamental change in the way that China's economy is governed.

3. Has the Energy Sector Turned Greener in 2020?

3.1 Energy policies and trends before COVID-19

Since the energy supply crisis of 2003-2004, the government has pursued a succession of policies to constrain the rise of energy consumption, promote non-fossil fuel energy and substitute gas for coal that have met with substantial success. The government also set a number of targets relating to energy intensity, coal consumption and the share of non-fossil fuels in the energy mix.

As a result of these measures, there has been a significant divergence between energy consumption and economic growth. Annual primary commercial energy consumption increased by 250 per cent between 2003 and 2019, with China accounting for some 24 per cent of the global total in 2019.³² However, real GDP grew fourfold over the same period. The primary energy mix has also improved. At the Paris Conference of the Parties (COP 21), China's Nationally Determined Contribution included pledges that carbon dioxide emissions would peak by the year 2030 at the latest and that by that time the share of non-fossil fuels in the primary energy mix would reach 20 per cent.³³

Annual coal consumption reached a peak in 2013 and then declined marginally before picking up again in 2017. Since 2007 the share of coal in the primary energy mix has declined from 74 per cent to 57 per cent in 2019. Over the same period, the share of natural gas in the primary energy mix rose from 3 per cent to 8 per cent, and the share of non-fossil fuels (nuclear, hydro and other renewables) increased from 6 per cent to 15 per cent.³⁴ The growth of non-hydro renewable energy is most noticeable in the

²⁷ Han X. "New infrastructure" that needs to create "new demand".

²⁸ Wong C. Uncovering China's fiscal stimulus policies in the budget report.

²⁹ Ministry of Finance. Report on China's fiscal policy implementation in the first half of 2020.

³⁰ Restarting the economy; the green revival plan is expected to be introduced, how to make 10 trillion investment in green.

³¹ Yao K. China pursues economic self-reliance as external risks grow: advisers, Reuters, <https://www.nasdaq.com/articles/china-pursues-economic-self-reliance-as-external-risks-grow-advisers-2020-08-04>; 4 Aug 2020 [accessed 26 August 2020]

³² BP. BP statistical review of world energy, 2020. London: BP; 2020.

³³ Enhanced actions on climate change: China's intended nationally determined contributions, <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/China%20First/China%27s%20First%20NDC%20Submission.pdf>, 30 June 2015 (in Chinese [accessed 25 August 2020]).

³⁴ BP. BP statistical review of world energy, various years. London: BP.

electricity sector where its contribution rose from 1.3 per cent in 2007 to 9 per cent in 2019, helping to boost the share of non-fossil fuels in the electricity mix from 21 per cent to 31 per cent over the same period. This rise was due, in part, to the decline in the curtailment of wind energy from 17 per cent in 2016 to 4 per cent in 2019 and of solar energy from 12.6 per cent in 2015 to 2 per cent in 2019.³⁵

The growing proportion of non-fossil fuels together with the slowing rate of growth of energy consumption resulted in carbon dioxide emissions from energy reaching a temporary peak in 2013 before rising again from 2017.³⁶ Other steps relating to energy intended to constrain air pollution have included reducing sulphur dioxide and nitrous oxide emissions from thermal power stations and promoting the development and use of vehicles using cleaner fuels such as electricity and natural gas. These achievements have relied on the deployment of administrative and financial policy instruments and the dominance of SOEs in the energy sector that bear non-commercial objectives.³⁷

Despite the growth of different forms of clean energy, fossil fuels continued to dominate the primary energy mix and much of this is produced domestically. Coal production reached a temporary peak in 2013 but started rising again from 2017. Crude oil production peaked in 2015, and imports now provide nearly 80 per cent of annual demand. Natural gas production has been growing at annual rates above 7 per cent for more than a decade, yet imports provide about 40 per cent of the rapidly rising demand.³⁸ In order to constrain the rising import dependence, the government has been supporting the opening of new coal mines, and encouraging the development of unconventional gas and oil resources, as well as coal liquefaction and gasification.³⁹

These and other strategies reflect an energy policy paradigm that is state-centric with high priority placed on security of energy supply through maximising self-sufficiency, and with pollution control being a further concern. Nevertheless, the government has also embarked on two market reform programmes that affect the energy sector components.⁴⁰ The first involves the revitalisation of energy industry and market reforms that were abandoned in the early 2000s. This has two main strands: the introduction of market mechanisms in power generation, distribution and retail; and the creation of a national oil and gas pipeline company along with a third-party access regime that is especially aimed at creating competition in the gas industry. The second initiative took the form of a number of regional pilot carbon emissions trading schemes that formed the basis for the development of a national emissions trading scheme that is in the final stages of preparation in 2020.

3.2 What does the energy data show for January – June 2020?

Data from the first half of 2020 reveal the continued dominance of fossil fuels. Coal and crude oil production in the first half of 2020 were marginally higher than in the first half of 2019 (Table 4). However, the level of crude oil production barely changed from the first to the second quarter of 2020, whilst coal output rose dramatically as mines where production was suspended reopened. In contrast, natural gas production declined in the second quarter as the requirement for district heating declined, though output for the first half of 2020 was significantly up on the same period of 2019.

³⁵ Tu KJ. COVID-19 pandemic's impacts on China's energy sector: a preliminary analysis, <https://www.energypolicy.columbia.edu/research/commentary/covid-19-pandemic-s-impacts-china-s-energy-sector-preliminary-analysis>, Columbia University, Center on Global Policy Analysis, 4 June 2020 [accessed 28 July 2020].

³⁶ BP statistical review of world energy, 2020.

³⁷ Andrews-Speed P, Zhang S. China as a Global Clean Energy Champion. Lifting the Veil. Singapore: Palgrave Macmillan, 2019; Yu H. Reform of state-owned enterprises in China: The Chinese communist party strikes back. *Asian Studies Review* 2019; 43: 332-51.

³⁸ BP statistical review of world energy, 2020.

³⁹ Andrews-Speed P, Zhang S. China as a Global Clean Energy Champion.

⁴⁰ Zhang S, Andrews-Speed P. State versus market in China's low-carbon energy transition: an institutional perspective. *Energy Research & Social Science* 2020; 66: 101503.

Table 4: Primary fossil fuel production in different periods of 2019 and 2020

	unit	Output				Output ratios	
		1H2019	1Q2020	2Q2020	1H2020	2Q2020/ 1Q2020	1H2020/ 1H2019
Coal	mt	1,794,642	829,911	975,499	1,805,410	1.175	1.006
Crude oil	mt	95,526	48,565	48,585	97,150	1.000	1.017
Natural gas	bcm	85,222	48,320	45,680	94,000	0.945	1.103

Source: National Bureau of Statistics, monthly and annual data

The total quantity of electrical power generated in the first half of 2020 was almost identical to that for the same period of 2019. As would have been expected, output in the first quarter was about 12 per cent lower than that in the second quarter (Table 5). This should have provided an opportunity for wind and solar power to significantly increase their share of the mix in the first quarter, as has happened in some other countries.⁴¹ The low level of hydroelectricity production in the first quarter due to seasonal factors should have provided additional opportunity for solar and wind power to be dispatched had they received priority.

Table 5: Power generation by fuel in different periods of 2019 and 2020, and ratios between different periods

Fuel	Output TWh						Output ratios	
	1Q2019	2Q2019	1H2019	1Q2020	2Q2020	1H2020	2Q2020/ 1Q2020	1H2020/ 1H2019
Thermal	1266	1183	2449	1175	1259	2434	1.071	0.994
Hydro	215.9	297.9	513.8	196.3	280.6	476.9	1.429	0.928
Nuclear	77	83	160	78	93.6	171.6	1.200	1.073
Wind	104.1	110.4	214.5	114.9	123	237.9	1.070	1.109
Solar	44	62.7	106.7	52.8	75	127.8	1.420	1.198
Total	1707	1737	3444	1617	1831.2	3448.2	1.132	1.001
Non fossil	441	554	995	442	572.2	1014.2	1.295	1.019

Source: China Electricity Council. National Power Industry Statistics, various quarters, <https://cec.org.cn/> (in Chinese); National Energy Administration. Quarterly photovoltaic power generation construction and operation, various quarters, <http://www.nea.gov.cn/> (in Chinese)

However, this does not seem to have been the case. The share of wind and solar energy rose by only a modest amount in the first quarter of 2020 compared to the same quarter in 2019 (Table 6). Nevertheless, the combined share of wind and solar energy in the first half of 2020 reached 10.6 per cent, up from 9.3 per cent in the same period of 2019. This suggests that the dispatch rules favouring clean energy are having some effect,⁴² although not as great as might be hoped. The share of fossil fuels declined only marginally from 71.1 per cent to 70.6 per cent.

Myllyvirta noted that China's carbon dioxide emissions in May 2020 were 4-5 per cent higher than in the same month of 2019.⁴³ Our own estimates supported this observation.⁴⁴ Whilst emissions in the first

⁴¹ Carpenter C. Renewables building power market share during COVID-19: IRENA, <https://www.spglobal.com/platts/en/market-insights/latest-news/electric-power/062420-renewables-building-power-market-share-during-covid-19-irena>; S&P Platts, 24 June 2020 [accessed 24 June 2020].

⁴² Tu KJ. COVID-19 pandemic's impacts on China's energy sector.

⁴³ Myllyvirta, L. China's CO₂ emissions surged past pre-coronavirus levels in May, <https://www.carbonbrief.org/analysis-chinas-co2-emissions-surged-past-pre-coronavirus-levels-in-may>; 29 June 2020 [accessed 8 July 2020].

⁴⁴ We used data from the following sources: [41] Wind Economic Database, <https://www.wind.com.cn/en/edb.html> [accessed 3 September 2020]; Zhuo Chuang Information Database, <https://oil.chem99.com/news/s3951-1-CFFBB7D1C1BF.html> (in Chinese) [accessed 3 September 2020]; China National Statistical Bureau. National data, <https://data.stats.gov.cn/> (in Chinese) [accessed 3 September 2020]. We applied conversion factors from China Carbon Emissions Trading Network. Various energy carbon emission reference coefficients and calculation methods and formulas, <http://www.tanpaifang.com/tanjiiliang/2014/0914/38053.html> (in Chinese) [accessed 3 September 2020]; Zhao J, Wei D. Carbon emissions coefficient for cement plants in China. Resource Science 2013; 35(4): 800-8 (in Chinese).

quarter of 2020 were down about 5 per cent on the same period in 2019, in the second quarter they were about 5 per cent higher than in the same quarter of 2019.

Table 6: Shares of different fuels for power generation in different periods of 2019 and 2020

Fuel	1Q2019	2Q2019	1H2019	1Q2020	2Q2020	1H2020
Thermal	74.2%	68.1%	71.1%	72.7%	68.8%	70.6%
Hydro	12.6%	17.2%	14.9%	12.1%	15.3%	13.8%
Nuclear	4.5%	4.8%	4.6%	4.8%	5.1%	5.0%
Wind	6.1%	6.4%	6.2%	7.1%	6.7%	6.9%
Solar	2.6%	3.6%	3.1%	3.3%	4.1%	3.7%
Non-fossil	25.8%	31.9%	28.9%	27.3%	31.2%	29.4%

Source: China Electricity Council. National Power Industry Statistics, various quarters, <https://cec.org.cn/> (in Chinese); National Energy Administration. Quarterly photovoltaic power generation construction and operation, various quarters, <http://www.nea.gov.cn/> (in Chinese)

3.3 How green were the energy policies during January – September 2020?

As discussed in section 2, the economic recovery package contained two components directly related to energy policy. The first promoted the accelerated deployment of new infrastructure such as UHV transmission and charging stations for EVs. The second called for steps to boost energy security through increasing strategic storage and enhancing the self-sufficiency of energy supply. This is consistent with the “dual circulation” strategy. Further, the focus on infrastructure, both traditional and new, has lifted energy demand. Taken together, these measures are resulting in increased investment across much of the energy sector, in fossil fuels as well as non-fossil fuels, though the former seem to be receiving greater emphasis.

Coal, oil and gas have all been the subject of calls to boost domestic supply. Thermal power generating companies are being encouraged to purchase coal from domestic producers rather than cheaper supplies from Indonesia and Australia.⁴⁵ As the demand for domestic supplies of coal increases, the pressure to close the old, unsafe and inefficient mines appear to be easing. There is also talk that annual coal mine capacity could rise from 4.1 billion tonnes in 2020 to 4.9-5.0 billion tonnes by 2025.⁴⁶ At the same time, the government wants to increase production of all feasible sources of liquid fuels and gas. The annual output of crude oil is to rise by 1 per cent to 193 million tonnes in 2020, though still well down on the 214 million tonnes achieved in 2015. Gas production, including from unconventional sources, is to rise by 4.5 per cent to 181 billion cubic metres. The government also wants to see higher output of fuel ethanol and of liquids from coal.⁴⁷ Investment is also needed in new infrastructure to support the growing demand for natural gas. This includes pipelines, storage capacity and LNG liquefaction plants.⁴⁸

This focus on fossil fuels can also be seen in the power sector. Early in 2020 the government relaxed the restrictions on the construction of new coal-fired plants that were introduced in 2016 to curb a surge of construction. As of May 2020, a reported 46 GW of new coal-fired capacity was under construction and a further 48 GW were in early stages of planning and development. This surge of investment has been assisted by historically low interest rates. Most of the projects involve local state-owned companies, mostly acting alone and in a few cases in partnership with central government-owned

⁴⁵ Ma J, Li C. Asia seaborne coal faces strong headwinds as China’s 2020 import quotas dry up, <https://www.sp.global.com/platts/en/market-insights/latest-news/coal/061120-asia-seaborne-coal-faces-strong-headwinds-as-chinas-2020-import-quotas-dry-up>; S&P Platts, 11 June 2020 [accessed 26 August 2020].

⁴⁶ Bloomberg. China likely to ease coal mine closures to meet surging demand, <https://www.bloomberg.com/news/articles/2020-06-15/china-likely-to-ease-coal-mine-closures-to-meet-surging-demand>, 16 June 2020 [accessed 16 June 2020].

⁴⁷ Reuters. China targets rise in oil, natural gas output this year, <https://www.reuters.com/article/us-china-energy/china-targets-rise-in-oil-natural-gas-output-this-year-idUSKBN23T1NW>, 22 June 2020 [accessed 24 June 2020].

⁴⁸ National Energy Administration. Transcript of online press conference of the National Energy Administration for the third quarter of 2020, http://www.gov.cn/xinwen/2020-07/17/content_5527868.htm; 17 July 2020 (in Chinese) [accessed 12 August 2020].

enterprises.⁴⁹ The Five-Year Plan for 2016-2020 set a cap for coal-fired capacity of 1,100 GW for the end of 2020. Whilst this cap may not be breached in 2020, the State Grid Corporation and the China Electricity Council are calling for capacity to reach 1,200 GW and 1,300 GW respectively in order to support system stability and provide reserve.⁵⁰ How much of this increased capacity would be utilised will depend greatly on the rate of economic growth and its structure. In 2019, most thermal plants were operating at less than 50 per cent capacity, resulting in financial losses for some generating companies.⁵¹ Therefore, the current surge of construction risks creating excessive thermal generating capacity, increasing financial losses and reinforcing the inflexibility of the power system.⁵²

Policy support for non-fossil electricity has continued. Notable official documents published in the first half of 2020 included a new draft *Energy Law* and a draft *Guiding Opinion on Establishing a Clean Energy Consumption Long-Term Mechanism*.⁵³ Renewable energy, including hydro-electricity is targeted to supply 28.2 per cent of the electricity supply in 2020, with non-hydro renewables amounting to 10.8 per cent of the total.⁵⁴ Non-fossil fuel power generating capacity is set to increase from 820 GW at the end of 2019 to 900 GW by the end of 2020.⁵⁵ The budget for renewable energy subsidies has increased by 7.5 per cent, though the targeted recipients have undergone some change. Subsidies for wind power have shifted to offshore installations. Subsidies for utility scale solar PV have declined sharply as many projects attain grid parity.⁵⁶ The number of subsidised solar PV projects fell from 3,291 in 2019 to 434 in 2020.⁵⁷ Subsidies for rooftop solar PV continue, though at a lower level.⁵⁸ Technologies for hydrogen use and grid-scale battery storage do not appear to have featured prominently in official documents relating to new infrastructure.

The 13th Five-Year Plan set a target of 340 GW for hydroelectricity capacity by 2020. By the end of 2019, aggregate capacity had reached 326 GW after additions of 3.9 GW, excluding pump storage. At that time, an estimated additional 52 GW of capacity was under development.⁵⁹ Of this additional capacity, the 10.2 GW Wudongde hydroelectric dam in south-west China went into operation in June 2020.⁶⁰ Investment in nuclear power will continue. Whilst the industry will marginally fail to meet the target of 52 GW by the end of 2020, the government has set a goal of 70 GW by 2025.⁶¹

Policies on the demand side are rather more varied and ambiguous. The government set a target of reducing national energy intensity by 15 per cent over the period 2016-2020. However, the decline was

⁴⁹ Greenpeace China. With full force! From January to May this year, a new 48 GE coal-fired project was promoted, <https://www.greenpeace.org.cn/low-carbon-development-policy-2020/>; 9 June 2020 (in Chinese) [accessed 7 August 2020].

⁵⁰ Myllyvirta L, Zhang S, Shen X. Analysis: will China build hundreds of new coal plants in the 2020s?, <https://www.carbonbrief.org/analysis-will-china-build-hundreds-of-new-coal-plants-in-the-2020s>; Carbon Brief, 24 March 2020 [accessed 28 July 2020].

⁵¹ Myllyvirta L, Zhang S, Shen X. Analysis: will China build hundreds of new coal plants in the 2020s?

⁵² Greenpeace China. With full force! From January to May this year, a new 48 GE coal-fired project was promoted.

⁵³ National People's Congress. Energy Law of the People's Republic of China, draft, <https://npcobserver.com/legislation/energy-law/>, April 2020 (in Chinese [accessed 3 June 2020]; National Development and Reform Commission. Opinions on accelerating the establishment of laws and policies for green production and consumption. Central Information 379 [2020], http://www.gov.cn/zhengce/zhengceku/2020-03/19/content_5493065.htm; 11 March 2020 (in Chinese) [accessed 30 August 2020].

⁵⁴ National Energy Administration. Circular on the results of the tender for 2020 national-level subsidies for PV power generation projects, <https://chinaenergyportal.org/en/circular-on-results-of-the-tender-for-2020-national-level-subsidies-for-pv-power-generation-projects/>; 23 June 2020 [accessed 1 July 2020].

⁵⁵ Reuters. China targets rise in oil, natural gas output this year.

⁵⁶ Hove A. Current direction for renewable energy in China, Oxford Institute for Energy Studies, Oxford Energy Comment, June 2020.

⁵⁷ National Energy Administration. Circular on the results of the tender for 2020 national-level subsidies for PV power generation projects.

⁵⁸ Gosens J, Jotzo F. China's post-COVID-19 stimulus: no green deal in sight.

⁵⁹ REVE. The global hydropower installed capacity is 1,150 GW, <https://www.evwind.es/2020/07/07/the-global-hydropower-installed-capacity-is-1150-gw/75616>; 07 July 2020 [accessed 27 August 2020].

⁶⁰ CGTN. China's new mega hydropower station put into operation, <https://news.cgtn.com/news/2020-06-29/China-s-new-mega-hydropower-station-put-into-operation-RIVM2owUUg/index.html>, 29 June 2020 [accessed 27 August 2020].

⁶¹ Enerdata. China plans to increase its nuclear capacity to 70 GW in 2025, <https://www.enerdata.net/publications/daily-energy-news/china-plans-increase-its-nuclear-capacity-70-gw-2025.html>, 10 July 2020 [accessed 17 July 2020].



only 13.2 per cent by the end of 2019. Whether or not the 15 per cent goal will be achieved, or even whether it is important to the government, is not clear. Nevertheless, the objective of reducing the carbon emissions intensity by 40-45 per cent between 2005 and 2020 has already been exceeded.⁶² Energy efficiency has not featured prominently in COVID-19 recovery policies. The topic was mentioned in the context of urban renewal and may be implied in the aim of upgrading industries, but was not at the forefront of these policies. Neither does the topic of demand-side management appear to have received much attention. Electricity and gas tariffs have been reduced until at least the end of 2020 for most consumers, with the exception of energy intensive industries.

3.4 How were the energy industries and markets faring in mid-2020

State-owned enterprises will continue to have a key role to play in China's economic recovery, including in the energy sector. Not only will they have to carry on investing in domestic infrastructure as described in the previous section, much of which may be of marginal commercial value, but they are also being required to hire more employees at the same time as absorbing financial losses. For example, the State Grid Company is to hire a total of 46,000 people in 2020, up 40 per cent on 2019. Of these, 23,000 will be new university graduates, a 25 per cent increase over 2019. The company will also hire more high school students in poor areas of the country as well as employing more migrant workers. Extra effort will be devoted to Hubei Province where the COVID-19 outbreak began as well as in remote and poorer parts of the country.⁶³ PetroChina will recruit an additional 8,000 new staff, up from 5,000 in 2019.⁶⁴

Meanwhile some of the country's core energy industries are struggling financially. The low level of coal prices is forcing consolidation, one example being the merger of Yangkuang Group and the Shandong Energy Group announced in July 2020.⁶⁵ The net profits of both the State Grid and the Southern Grid for the first half of 2020 were down 81.4 per cent and 60.6 per cent respectively compared to the same period the previous year. Four of the big five state-owned power generators saw a rise of net profits year-on-year, despite revenues falling by about 5 per cent; Guodian was the one exception, experiencing a 72.5 per cent decline in net profits. However, the debt to asset ratio on these generators remains relatively high at between 61 per cent and 71 per cent.⁶⁶ Some renewable power generators are also losing money due to the failure by the government to pay subsidies promised, forcing them to sell off projects.⁶⁷ Both manufacturers and project developers in the renewable energy industry are consolidating.⁶⁸ These trends will further favour state-owned enterprises over private companies.

In the oil and gas industry, both PetroChina and Sinopec reported substantial financial losses in the first and second quarters of 2020 and announced substantial reductions in their capital expenditure plans for 2020.⁶⁹ The NOCs are also undergoing a major restructuring as their oil and gas pipeline assets are

⁶² Gosens J, Jotzo F. China's post-COVID-19 stimulus: no green deal in sight.

⁶³ Sina Hubei. State Grid held a special work conference on stabilizing employment, implementing six major measures to expand employment, <http://hb.sina.com.cn/news/zlzx/2020-04-01/detail-iimxyqwa4505542.shtml>; 1 April 2020 (in Chinese) [accessed 10 July 2020].

⁶⁴ 2020 China Petroleum spring recruitment announcement (8000 people), http://www.chinagwy.org/html/zkqg/sydw/202004/40_347279.html; 1 April 2020 (in Chinese) [accessed 10 July 2020].

⁶⁵ Global Times. Two coal producers merge to form China's 2nd-largest coal miner, <https://www.globaltimes.cn/content/1194434.shtml>; 14 July 2020 [accessed 4 August 2020].

⁶⁶ Shi Y. State Grid, China Southern Power Grid, and the five major power generating companies compete in half-year performance: who is the most profitable? who loses the most money? who has the most debt, <http://www.hxny.com/nd-48724-0-15.html>; 3 September 2020 (in Chinese) [accessed 5 September 2020].

⁶⁷ Publicover B. Shunfeng posts \$265.2m loss in 2019, <https://www.pv-magazine.com/2020/04/03/shunfeng-posts-265-2m-loss-in-2019/>, PV Magazine, 3 April 2020 [accessed 20 August 2020].

⁶⁸ Hall M. Analyst expects unprecedented consolidation of Chinese solar industry, <https://www.pv-magazine.com/2020/06/15/analyst-expects-unprecedented-consolidation-of-chinese-solar-industry/>; PV Magazine, 15 June 2020 [accessed 16 June 2020].

⁶⁹ Zhou O. PetroChina to cut capex 30% in 2020 but still sees upstream output rising, <https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/043020-petrochina-to-cut-capex-30-in-2020-but-still-sees-upstream-output-rising>; S&P Platts, 30 April 2020 [accessed 4 August 2020]; Xu M, Chen A. Sinopec's fuel sales rebound, but records biggest quarterly loss in Q1, <https://in.reuters.com/article/china-sinopec-results/update-1-sinopecs-fuel-sales-rebound-but-records-biggest-quarterly-loss-in-q1-idINL4N2C11BE>; Reuters, 30 April 2020 [accessed 4 August 2020]; Hale T. Sinopec pushed into its first half-year loss by pandemic, <https://www.ft.com/content/8d7bb5f4-6aa6-4786-a424->



steadily sold to the new national oil and gas pipeline company, PipeChina.⁷⁰ Whilst this move is intended to enhance third-party access to natural gas infrastructure, success will require robust enforcement to ensure the NOCs do not abuse their market power.⁷¹

Two policy initiatives that appear to be struggling to gain attention during the recovery from the COVID-19 pandemic are the electricity market and the national carbon market. The electricity market was making some progress in 2019, despite market distortions caused by local governments and state-owned enterprises.⁷² The 2020 launch of the national carbon market had already been delayed by the transfer of responsibility from the National Development and Reform Commission to the Ministry of Ecology and Environment.

The pandemic is reported to be creating further delays.⁷³ Nevertheless, the Ministry issued a draft plan for quota-setting for power generators at the beginning of September 2020.⁷⁴ These rules seem to be more lenient than those applied in the regional pilot carbon emissions trading markets.⁷⁵

3.5 What does this tell us about current energy policy?

The evidence presented suggests that policies for China's energy sector lack a distinctive green flavour, rather like the economic recovery plan as a whole. Investment in non-fossil fuel power generation continues, but this seems to be more than matched by that in coal-fired capacity. At the same time, the newly-reinforced self-reliance agenda aims to boost domestic production of coal, oil and gas, as well as liquids from coal. Whilst non-fossil fuels are also domestic sources of energy, the greater emphasis on fossil fuels may reflect the balance of industrial interests. Strong focus on managing energy demand more effectively seems to be absent.

The state-owned energy enterprises continue to be the principal actors in the sector, and are being obliged to shoulder greater non-commercial burdens despite rhetoric to the opposite effect. This combination of fossil fuel dependence, supply side focus, self-reliance and a central role for large SOEs reflects continuity rather than change in the way that China's energy sector is governed. This does not bode well for the effective development of new domestic markets for electricity and carbon trading, nor for an acceleration of the low-carbon transition.

4. How does Xi Jinping's carbon neutrality pledge fit in?

On 22nd September 2020, President Xi Jinping made two pledges concerning China's carbon emissions: first, that emissions would peak before 2030 rather than just "around" 2030 and, second, that the country would strive to achieve carbon neutrality by 2060.⁷⁶ The first target is realistically achievable with a combination of low levels of economic growth, a sustained decline of heavy industry and concomitant expansion of the service sector, as well as a continued rise of non-fossil energy. The second objective is profoundly challenging.

[6f8f2a32e0e6?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8#myft:n%E2%80%A6](https://www.ft.com/content/6f8f2a32e0e6?desktop=true&segmentId=7c8f09b9-9b61-4fbb-9430-9208a9e233c8#myft:n%E2%80%A6); Financial Times, 30 August 2020 [accessed 31 August 2020].

⁷⁰ Zheng X. China's oil giants spin off pipeline assets, <https://www.chinadaily.com.cn/a/202007/25/WS5f1b8f8ba31083481725bffc.html>, China Daily, 25 July 2020 [accessed 27 August 2020].

⁷¹ Downs E, Yan S. Reform is in the pipelines: PipeChina and the restructuring of China's natural gas market. Columbia, SIPA, Center on Global Energy Policy, September 2020.

⁷² Zhang S, Andrews-Speed P. State versus market in China's low-carbon energy transition: an institutional perspective; China Electricity Council. China Electricity Council released the China Electricity Industry Development Report 2020, <https://cec.org.cn/detail/index.html?3-284175>; 12 June 2020 (in Chinese) [accessed 28 August 2020].

⁷³ Temple-West P. China's carbon trading scheme struggles to take off, <https://www.ft.com/content/35a0a860-8eab-11ea-af59-5283fc4c0cb0>; Financial Times, 5 June 2020 [accessed 6 June 2020].

⁷⁴ 2019-2020 National carbon emission trading quota setting and distribution implementation plan (power generation) (draft for comments), <http://www.tanpaifang.com/zhengqefagui/2020/090173623.html>; 1 September 2020 (in Chinese) [accessed 6 September 2020].

⁷⁵ China offers signs for lenient launch of national carbon trading, <https://www.bloomberg.com/news/articles/2020-09-08/china-offers-signs-for-lenient-launch-of-national-carbon-trading>; Bloomberg, 9 September 2020 [accessed 9 September 2020].

⁷⁶ Farand C, Darby M. Xi Jinping: China will aim for carbon neutrality by 2060.

Chinese energy policy commentators have welcomed this new determination to achieve carbon neutrality, but are fully aware this will require a complete overhaul not just of the energy industries but also of the entire industrial sector as well as transportation.⁷⁷ Sources of non-fossil energy such as renewable and nuclear will have to be installed at an accelerated rate. Technologies such as hydrogen, energy storage, fuel cells and carbon capture must be commercialised and deployed at a massive scale. Energy intensive industries should be electrified and efforts to enhance energy efficiency must be intensified. Progressive electrification of the entire economy will require highly sophisticated power management systems. The carbon market should also play a key role in promoting clean energy.⁷⁸ It is also likely that carbon sinks will play a major role.⁷⁹ The first indications of the government's plans will presumably appear in the 14th Five-Year Plan for 2021-2025.

At face value, this pledge to strive for carbon neutrality by 2060 is a bold initiative and one to be welcomed. However, it seems to run counter to the trends we observed in the first nine months of 2020 (see sections 2 and 3 of this paper): namely an apparent preference for energy intensive projects in the economic recovery plan and for fossil fuels in energy policy. These priorities will have already set in motion investments in infrastructure projects that will have lifetimes of decades and will render the 2060 target yet more challenging. Had carbon neutrality been built into the economic recovery plan and energy policy from early 2020, the cost and effort required would have been reduced.

An additional factor that may or may not assist in the achievement of this goal is the State Council's decision in October 2020 to radically overhaul the governance of the nation's SOEs. The stated objective is to create a holding company like Singapore's Temasek Holdings that would more clearly separate the government from the SOEs.⁸⁰ Whether this separation will be as sharp as in the case of Singapore is one question. Regardless, such a move is likely to reduce the government's ability to assign non-commercial objectives to the SOEs, such objectives including addressing climate change and other environmental priorities. In these circumstances, the economic instruments such as the national carbon market will have to play a more important role.

The more fundamental challenge will be to manage and possibly reconcile competing priorities: between environmental protection and climate change, on the one hand, and economic growth, employment and poverty alleviation, on the other; between the priorities of different government agencies and different levels of government; and between government and SOEs.

5. Conclusions

China's government has launched or reinforced a number of policies at the end of 2019 and during the first nine-months of 2020 in response to the trade conflict with the United States and the COVID-19 pandemic. Many of these have direct and indirect consequences for the country's energy sector in general and for the low-carbon energy transition in particular. Whilst the economic recovery plan was more modest in scale and more focused than that of 2009, it retained similar objectives of stimulating economic growth and boosting employment. Despite the emphasis placed on new infrastructure, the recovery plan lacks strong green credentials, and even some of elements of the new infrastructure plan are either not new or comprise aspects that are not especially green. It is also evident that a significant

⁷⁷ Exclusive interview with Zou Ji, Foundation CEO: What profound changes will the proposal of the carbon neutral target bring? 10 October 2020, https://m.thepaper.cn/newsDetail_forward_9506702 (in Chinese) [accessed 11 October 2020]; Liu X. In the next 40 years, China is bound to set off a carbon reduction revolution, 12 October 2020, <http://www.tanjiaoyi.com/article-32078-1.html> (in Chinese) [accessed 12 October 2020].

⁷⁸ AFRY Management Consulting. China announced its efforts to achieve carbon neutrality by 2060. The impact of this commitment. 29 September 2020, <https://mp.ofweek.com/ecep/a556714014037> (in Chinese) [accessed 11 October 2020].

⁷⁹ China's secret to reaching carbon-neutral goal raises questions. Bloomberg News, 12 October 2020, <https://www.bloomberg.com/news/articles/2020-10-12/china-s-secret-to-reaching-carbon-neutral-goal-raises-questions-kq6d82y2> [accessed 13 October 2020].

⁸⁰ The State Council has approved the Temasek-style form of Chinese state-owned enterprises. 11 October 2020, <http://caifuhao.eastmoney.com/news/20201011180928395324290> (in Chinese) [accessed 12 October 2020].



proportion of the recovery package is being directed at traditional infrastructure and is reliant on the cooperation of the SOEs.

A similarly conservative approach is also apparent in policies for the energy sector. Although support for non-fossil forms of energy has been reiterated in formal documents, two strands of policy are in tension with these stated aims. The first was the relaxation of constraints on the construction of coal-fired plants. The second was the government's push to maximize self-reliance by boosting the domestic production of fossil fuels that reinforced Prime Minister Li Keqiang's call a few months earlier. Not only do these strategies have the potential to undermine the country's recent achievements in switching away from fossil fuels, but they also exacerbate threats to the commercial performance of the state-owned energy companies posed by the enhanced employment obligations. This is in direct contradiction with the government's stated aim of relieving the SOEs of their non-commercial obligations, as well as with the new markets for electricity and carbon emissions.

Following the logic of Rinscheid et al.,⁸¹ the failure of COVID-19 to trigger plans to accelerate China's low-carbon energy transition in the first months of 2020 suggests that there was general agreement among the political elites that policy goals other than the low-carbon transition were more important, notably short-term economic growth, employment and social stability. As result, no critical juncture occurred. However, President Xi's goal of striving for carbon neutrality by 2060 stands in dramatic contrast to this more conservative approach. It may also open up the divisions that existed among policy actors before the pandemic. In principle, these conflicts should render a critical juncture in favour of climate change mitigation more likely. However, a wide array of political, industrial and technological obstacles remain to be overcome. We will need to wait to see whether the 14th Five-Year Plan 2021-2025 will signal a dramatic change for the economy and the energy sector, as recommended by Chinese and international expert commentators,⁸² or continued incremental progress.

⁸¹ Rinscheid A, Eberlein B, Emmenegger P, Schneider V. Why do junctures become critical?

⁸² Zhou D. Some understanding and suggestions on 14th five-year energy planning, https://www.cers.org.cn/news_show.aspx?id=8658; China Energy Research Society, 17 March 2020 (in Chinese) [accessed 4 September 2020]; Wu J. Under the background of the epidemic, issues that need to be considered in the 14th five-year energy development, <https://mp.weixin.qq.com/s/qNF5Scvotfp8bu3ZWlSeGw>, China Energy News, 5 August 2020 (in Chinese) [accessed 7 August 2020]; Experts such as Du Xiangwan, Jiang Yi, Zhou Dadi and others offer advice on China's future development in the context of the epidemic, National Energy Information Platform, 8 June 2020 (in Chinese) [accessed 27 July 2020]; <https://baijiahao.baidu.com/s?id=1668926970130924161&wfr=spider&for=pc>; Varro L, An F. Post COVID-19, further reform is necessary to accelerate China's clean energy future, https://www.iea.org/articles/post-covid-19-further-reform-is-necessary-to-accelerate-china-s-clean-energy-future?utm_campaign=IEA, International Energy Agency, 22 July 2020 [accessed 28 July 2020]; Dollar D. China's economy bounces back, but to what growth path? China Leadership Monitor 1 September 2020; 65.