Chapter 7
China and Renewables: The Priority of Economics over Geopolitics

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7.1 Introduction

As a result of the rapid growth in its economy since the 1980s, China has in a short time become a major global economic and political actor, and has emerged at the center of the world energy stage. China's rise, especially in economic terms, has made it one of the most important actors in the global geopolitics of energy. From the international perspective, China constitutes a list of energy superlatives: as a state it is the world's single largest consumer and producer of energy, the biggest consumer and importer of oil, the largest producer, consumer and importer of coal, and by consequence also the biggest emitter of CO_2 (EIA 2015). Thus, its direct global impact across a broad range of resource, environmental and economic and political problems, including energy geopolitics, is huge. Within China itself, discussion of the geopolitics of energy has focused on access to fossil fuel resources, primarily oil and gas from the Middle East, Central Asia and Russia, although it is also considered as a factor in the disputed claims to sovereignty in the East and South China Seas. While China by dint of its energy demand resulting from economic growth has come to be a major actor in the traditional geopolitics of global fossil fuel resources, its role in renewable energy sector is if anything even more overwhelming. China is currently the biggest investor in renewables, the largest deployer of wind, solar photo voltaic (PV) and hydro power, its companies are among the leading producers of wind turbines, solar modules and equipment for hydro power stations, and they are increasingly active not only within China but also in global trade and investment in these sectors, as well as in related industries such as power distribution infrastructure, electricity storage, electric or new energy vehicles and even the digital economy (REN 2016). More than any other state, the

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D. Scholten (ed.), *The Geopolitics of Renewables*, Lecture Notes in Energy 61,
https://doi.org/10.1007/978-3-319-67855-9_7

geopolitics of renewables will become manifest through the actions of China, although how this occurs is likely to be unique to its own circumstances. Given its leading role in renewables, the importance of China as an actor will be demonstrated in the renewable energy sector itself, but also by its impact on other related sectors, especially fossil fuels, in which the geopolitical dimension will be determined by the policy priorities of the Chinese government.

Almost nothing that China does in the area of renewables is without global impacts, which are complex, and extend well beyond the simple problem of production and consumption of energy. After the election of Donald Trump as president of the US and his apparent rejection of a global system in favor of putting America First, including in the area of climate and energy policy through withdrawal from the Paris Agreement, the administration adopted a slogan of "energy dominance" through revival of fossil fuels. The EU has reaffirmed its commitment to the Paris Agreement, and continues with its Energy Union. President Xi Jinping asserted China's claim to a leading global role in a speech to the World Economic Forum in Davos in 2017 that was in part based on its leadership on climate change, and which also follows from Xi's earlier call in 2014 for an "energy revolution" in China (Xi 2017; Xinhua 2014). Thus, even if the share of renewable energy production and consumption in China may still be relatively small compared to traditional fossil fuels, it is now one element in how the Chinese government conducts international relations.

Within China, the distribution of wind, solar and hydro-power already poses challenges to their exploitation, as the location of their most abundant and efficient sources in the interior is generally distant from the areas of greatest demand in the coastal regions. Nevertheless, outside the borders of China, the geopolitics of renewables has little meaning in the sense of territorial control of energy resources. As yet, the transport of renewable energy to China is not a feasible proposition nor is its export. This does not mean that China is not willing to be a global actor, and apart from its huge role in trade in solar PV and wind power equipment it is also already a major investor in renewable energy generation projects, although unlike fossil fuels extraction, these serve local markets rather than domestic Chinese energy demand. China's gains will be through the returns on investment in such projects and trade in technologies in the sector. Nevertheless, such trade and investments raise questions of control and security that may invoke a geopolitical dimension. Trade disputes in the renewable sector involving China and the US and EU have been frequent. There is an increasing tendency to securitization of foreign direct investment in the US, especially that from China which is now the leading target for review on security grounds (Reuters 2017). In 2017 the EU set out a similar policy goal for "strategic industries, infrastructure and key future technologies" (European Commission 2017).

Until now, however, China has given almost no attention to the geopolitics of renewables as it has been traditionally construed in the fossil fuel era. Neither in official or academic discussion has the development of renewables been viewed as geopolitical problem. The Chinese government recognizes the fundamental importance of energy. As the Strategy for an Energy Production and Consumption

Revolution published by the National Development and Reform Commission said, "Energy is the material foundation of the development of human society, and energy security is a major element in national security" (NDRC 2016e). While renewables are central to the revolution, this has not given them the same geopolitical dimension as traditional energy sources. The Chinese government views the development of renewables as first an energy supply issue, and in wider domestic policy terms it is related to the problems of environment and climate change, which extended internationally through actions such as China's commitment to the 2015 Paris Agreement. For the Chinese government, however, a core issue is not exploitation of renewable energy resources in themselves, although this is important, but rather the technologies, industrial processes, markets, trade and investment that enable this to occur. This has international consequences, but they are not equivalent to those for fossil fuels. Unlike in the case of fossil fuels, no country has yet invaded another to annex control of solar or wind resources, but what the media like to refer to as "trade wars" have already occurred in these sectors, as governments seek to control the industrial growth potential of renewable energy. In China, with its own renewable energy resources at least in theory sufficient to meet its needs, the geopolitics of renewable energy ranks far behind the economics or industrial policy of renewable energy as a priority.

7.2 Resources

After almost four decades of rapid, though uneven over both time and space, economic growth, calculated on a Purchasing Power Parity (PPP) basis China's Gross Domestic Product (GDP) is the largest in the world (IMF 2017). Access to sustainable energy supplies is vital to China maintaining its economic development, even as the energy intensity of the Chinese economy has declined significantly since the 1980s (NDRC 2016a). China's economic growth since the late 1970s has been based to a considerable extent on plentiful domestic energy resources, although supply imbalances have occurred when energy production has failed to keep up with rapidly growing demand. Energy production and consumption in China has been based on coal, which at its recent peak share in 2007 supplied 72.5% of energy consumption, although by 2015 this had declined to 64% (China Statistical Yearbook 2016). China, which has the world's largest coal reserves, produces and consumes over half of coal mined globally (EIA 2015). China produces domestically 85% of its energy consumption, and its import dependence is thus relatively low compared to many economies, although it is rising (IEA 2017). In particular, China's oil demand can only be supplied in large part by imports, as in the 1990s it became a net oil importer, which raises problems of strategic vulnerability. As part of its energy transition in order to reduce coal consumption, China has increased reliance on gas, much of which is also imported. This increasing import-dependence for oil and more recently gas has placed China at the center of energy geopolitics both in terms of its policy and as an object of analysis.

Discussion of energy geopolitics in China has traditionally concentrated on the key question of supply of oil, and more recently gas, and has been concerned with both sources and supply lines in critical regions such as the Middle East, Africa, Central Asia and Russia (Yang 2009; Chen 2012; Zhang 2014; Dong and Cheng 2015; Yang et al. 2015). From this perspective, energy is a question not just of energy security but also of national security. This focus has also been adopted in many analyses of China's energy geopolitics from the non-Chinese perspective (Ebel 2009; Jaffe et al. 2015; Petersen and Barysch 2011; Rosenberg et al. 2016).

In contrast to oil and gas, China's renewable energy resources are relatively abundant. Although the degree to which they may actually be exploitable is the subject of debate, China's renewable energy resources are in theory at least sufficient to meet foreseeable future demand (Hoogwijk and Graus 2008; McElroy et al. 2009; Moriarty and Honnery 2012; He and Kammen 2016). Hydro, solar and wind renewable energy resources are widely distributed within China, but their distribution is far from ideal from the point of view of effective exploitation, as there is a significant disparity between the location of the most abundant resources and the regions of greatest energy demand. Whether they are wind, solar or hydro, all these resources tend to be concentrated in the interior in the west or north of China, distant from the main concentrations of population and economic activity in coastal provinces in the east and south.

This distribution of resources presents a significant challenge for the domestic deployment of renewables. While China has gained recognition for its huge domestic investment in renewables, and its rapidly increasing installed capacity, it has faced serious difficulties in actually bringing this online. Curtailment has been a significant problem for China's renewable sector. One of the main causes of the curtailment it the lack of grid connection and capacity linking solar and wind farms in the main generating regions to the consuming provinces. While curtailment is a general problem in China, it is severe in those provinces with the highest capacity. According to government statistics, in 2016, in Inner Mongolia, which has 17.2% of China's grid-connected wind capacity, the curtailment rate was 21%, while in Xinjiang, which has 11.9% of capacity, it was 38%, and in Gansu, with 8.6% of capacity, it was 43% (NEA 2017). Investment in generating capacity has run ahead of transmission infrastructure, although ambitious plans for expanded grid are being implemented. But, infrastructure is only one part of the problem, as policy failures, especially to ensure that electricity generated from renewables is taken up by power companies, are also a cause of curtailment.

Up until now, China's exploitation of renewable resources by electricity generation and distribution has been entirely a domestic problem. To a considerable degree it is similar to that which has in the past affected the exploitation of coal, for which the main deposits are also in the interior in regions that generally correspond to the wind and solar resources. One solution, the physical transport of the energy source by road and rail, is not available for renewables. The national Ultra High Voltage grid infrastructure that has been developed has been intended for long-distance transmission of electricity from the main coal and renewable bases to consuming regions, and will in future increasingly serve the latter (NDRC 2016c).

Although the policy direction of reducing the role of coal and increasing that of renewables is clear, distribution infrastructure will continue to serve both, but place limitations on the domestic exploitation of renewable energy. Similarly, the policy problems of take up by energy providers, although they are being addressed (NDRC 2016d), will continue to slow the growth in utilization of renewable resources.

Unlike for key fossil fuels, China's renewables sector is not directly dependent on energy imports. Nevertheless, it is not entirely free from import dependence. The renewable sector has been dependent on technology imports in the past, indeed in the early 2000s foreign companies dominated the market for wind turbines in China. China's industrial policy has attempted to reverse this situation, and create an industry based on domestic technology (SETC 2000). The sector also requires raw materials inputs for which in some cases it is largely dependent on imports. One such case is polysilicon, the key raw material for solar cells. Although China has some polysilicon producers, the industry remains dominated by Western companies for its raw materials. There have been periods of overproduction in the polysilicon sector, resulting in low prices, which has benefited Chinese solar panel producers, but shortages have also created severe supply difficulties and high prices for them in other periods, placing cost pressure on China's manufacturers and causing them losses. The raw material has also been the subject of trade disputes, as in 2014 China imposed anti-dumping and anti-subsidy duties on imports from the EU, the US and South Korea.

The reverse situation has occurred with rare earth elements, which are an important input for wind turbines, and for which China is the dominant producer. The strategic question arises because China has the largest reserves of rare earth elements, an estimated 44 million tons out of a world total of 120 million tons, but even more importantly, dominates global production. In 2016, China's official production quota was 105,000 tons out of a global total output of 125,000 tons (USGS 2016). The concern for non-Chinese consumers focused not only on the use of rare earths in wind turbines, but in many other strategic sectors. The question goes beyond China's mine production of rare earths, and includes government industrial policy concerning their use, which in effect seeks to ensure that downstream processing and application also occurs in China (Humhries 2012; Massari and Ruberti 2013; Gholz 2014; Golev et al. 2014). Hence, the key question is not only control of rare earth metal resources, but also of their application in technology, production and markets. A case brought against China by the US, EU and Japan at the World Trade Organization resulted in China having to remove its export quotas on rare earth metals in 2014. Other inputs for wind turbines and their towers, such as steel, present less of a problem for Chinese producers. China's steel output is by far the largest in the world, although steel prices vary depending on output from the sector and market demand. In periods of high demand for steel costs for turbine producers and consequently for investors in wind power projects have risen. In general, the key material inputs for the renewables sector are supplied on domestic and global markets in which Chinese companies are a major force both as buyers and sellers, and where they have considerable market power.

Although wind and solar attract the most attention, hydropower has long been the largest source of renewable energy in China. In the 1990s the construction of the Three Gorges Dam on the Yangtze River was a manifestation of the strategic importance of hydropower in the development strategy of the Chinese government. While China has constructed the largest hydropower fleet in the world, in recent years, increasing policy attention has been given to wind and solar PV, and indeed these sectors have grown more rapidly than any other in terms of their contribution to renewable energy production. Nevertheless, hydropower is one sector where geopolitics is arguably significant in China's international relations. The control of rivers has been a subject of disputes between China and neighboring states over many years and the increase in dam building in China, with many large projects planned, has added to the concerns of downstream states, most notably India. The problem concerns not only hydropower, but also other problems, which may be even more fundamental, such as water access and irrigation. The Chinese government's ambition to use rivers as a major source of renewable energy brings traditional geopolitical concerns over the control of water resources to the fore. In this case, however, there is a considerable history of dealing with such issues (Biba 2012; Ho 2014). However, the increasing demand for energy, and the use of hydropower as a source of green energy, will create greater pressure on the traditional systems in place for dealing with cross border issues related to water resources.

7.3 Policy

The history of renewable energy development in China is long, and in the case of solar PV and wind power dates back to the 1980s, but its current prominence is relatively new. Policy on renewables in China is not only related to energy supply itself, but concerns climate and environmental policy, and also industrial policy and economic development priorities.

The modern development of wind and solar energy in China dates back to initial strategic R&D programs launched by the Chinese government in the 1980s (Li et al. 2007). In the 1990s small-scale experiments in deployment took place, but it was only in the years after 2000 that large-scale industrial application began with government policy support for deployment developed on a wide scale. Detailed policy on their deployment began to be adopted in the early 2000s, and renewables were included in the 10th (2001–2005) and 11th (2006–2010) Five Year Plans. China's energy policy in the 2000s was first driven by the necessity to improve the security and sustainability of energy supply, which gave impetus to broad initiatives in areas such as energy efficiency and also alternative sources to traditional reliance on coal, especially for electricity generation. Later environmental and climate change considerations also began to figure strongly as a factor in China's energy policy and support for renewables.

Renewable energy development has become central to China's response to the challenges of climate change and environmental degradation. The problem of environment and climate change began to reach the top of the policy agenda under the leadership of Chinese Communist Party Secretary General Hu Jintao and Premier Wen Jiabao in the decade after 2004. Although China was heavily criticized at the Copenhagen Summit in 2009, the government had already begun significant investment in the deployment of renewables, moving beyond previous focus on hydro power to deployment of wind and a lesser extent solar PV (State Council 2008). Under the new leadership of President Xi Jinping since 2013, the government has pushed these goals even more strongly. Xi Jinping himself has called for an energy revolution (Xinhua 2014), and has entered into international commitments such as the joint announcement with President Obama in 2014 (Whitehouse 2014). The Chinese government has ratified the Paris Agreement of 2015, and despite the threat of the US under President Trump to withdraw from it and his steps to favor fossil fuels over clean energy, has shown no signs of altering its policy direction.

Beyond the increased concern for the environment and climate change, the deployment of renewables in China is closely related to industrial and development policy. Unlike in much of the West, where the subject is still debated, especially in the US under the Trump administration, the Chinese government from early on adopted the position that support for climate change mitigation and for renewables was a positive economic development opportunity (Freeman 2010). This is related to the long-held Chinese government position that climate change itself is primarily an economic development problem, and policy to deal with climate change is an opportunity to transform the structure of the Chinese economy and develop new industrial sectors where China can become a global leader. At a Politburo meeting in 2010, Hu Jintao, the Chinese Communist Party Secretary General, asserted the principle that, "tackling climate change was a key strategy for China's social and economic development and a major opportunity accelerate the transformation of the economic development model and adjust its economic structure" (Xinhua 2010). This view was embodied in policy documents such as the Medium- and Long Term Renewable Energy Plan adopted in 2007 which set goals not just for deployment of renewables but also for the establishment of a domestic industry in the sector (NDRC 2007). Subsequently, renewable energy became central of China's economic planning in both the 12th Five Year Plan (2011–2015) and 13th Five Year Plan (2016–2020), where renewables were designated as industrial sectors in which government support for growth will be concentrated. According to one estimate, in 2014 6.9% of central government expenditure was related to climate change adaptation and mitigation, much of which goes directly to industrial supports for renewable energy (Su 2015).

The Chinese government, more than any other major international actor, has recognized the potential of the renewable energy sector as a driver of economic development and incorporated it into a forceful industrial strategy. China's commitment to what has come to be called "green growth" has placed renewables at the center of industrial as much as energy or environmental policy. Thus, from an early stage development of renewables, energy and industrial policy have been closely

linked, but the geopolitical dimension of renewables has been absent from the government's strategy. Chinese policy documents concerning renewable energy focus on climate and environmental issues, and also economic and industrial policy, but geopolitics do not figure in the discussion. For instance, in a speech on green and sustainable development in 2012 at the global energy summit, Premier Wen Jiabao focused on sustainability and renewable energy, and although he addressed the international dimension of the question, he ignored geopolitics, discussing the need for global cooperation instead (Wen 2012). More recently, in a domestic setting, Li Keqiang, Wen's successor as Premier, discussed renewable energy in the same terms at a meeting of the National Energy Commission in 2016. While he emphasized the importance of energy for China's development, his reference to renewables focused on energy transformation and sustainable development. Li's discussion of the international dimension of energy also focused on cooperation, and the need to create diversified supply, but he did not refer to renewables as having any specific role in this problem (Li 2016).

While they may have been important for China in fossil sectors, strategic geopolitical concerns of security of supply have not been central to government support for renewables, and this remains the case. Import dependence has given fossil fuels an explicit geopolitical dimension for China, notably in the oil and gas sectors, where control of resources and transport routes has been a central geopolitical concern. But renewables have no traditional geopolitical dimension in China's policymaking for the sector (NEA 2016a, b, c, d; NDRC 2016a, b, c, e). The Strategy for an Energy Production and Consumption Revolution published in 2016 discusses the international dimension of renewables, and focuses on the possibilities of cooperation rather than geopolitical competition (NDRC 2016e). Still, it also argues that the revolution will increase China's capacity to guarantee energy security and raise the overall level of national security. Furthermore, an energy revolution will enable China to have greater influence in the field of international energy.

From the Chinese perspective, technology, production and markets are equally as important, if not more so, than development of renewable energy resources themselves. Industrial policy and economic development are fundamental to Chinese approach to renewables. Thus, the global distribution of renewable energy resources is less important than the development and control of technology, production and markets. The key dimension for China has not been control of wind and solar energy resources themselves. International trade and investment flows in the wind, solar PV and hydro power sectors are as important as flows and distribution of energy.

Beyond China's borders the key battles have not been for control of renewable resources themselves, but over trade and investment, and reflect the wider economic significance of renewables as industrial sectors. Both exports of solar modules and wind turbines from China have been targets for trade defense measures in the EU and US. Thus, the use of trade defense measures by the EU and US against China's renewable sectors have shown that the belief that wind and solar are key industries is shared among all major economies. The potential economic rather than

geopolitical threat posed by China in the renewable sector was clearly recognized by the Obama administration, which argued that sectors such as renewables could not be left to its competitors to dominate: "The path towards sustainable energy sources will be long and sometimes difficult. But America cannot resist this transition, we must lead it. We cannot cede to other nations the technology that will power new jobs and new industries, we must claim its promise" (Obama 2013). The advent of the Trump administration demonstrates that such a position can be reversed in favor of support for fossil fuels, possibly ceding domination of renewables to competitors.

Although geopolitics have not featured in policymaking on renewables in China this does not mean that policy is entirely free of geopolitics, even if it is only indirectly engaged. The secondary effect of renewable development on fossil energy consumption and production, which has been at the core of energy geopolitics, will be important. Even if the China's energy transformation is not yet sufficient to free it from the constraints of dependence on fossil energy sources, including those that are imported, the development of renewables will have an impact to the extent that it reduces reliance on them, especially coal, where China dominates global production and markets. Oil, by contrast, is not directly impacted by renewable replacement, which primarily impacts electricity generation, i.e. coal and gas, but it will, however, be affected by parallel developments such as increased use of electric vehicles.

The outcomes of China's policy will be far from straightforward. The Chinese policy system is complex and uncertain in its outcomes. As already noted in the case of deployment of renewables, the complexity of Chinese government policy environment has had a considerable effect on the domestic development and deployment in the sector, but this also feeds through to the international impacts of China's renewable sector. While China has placed increasing domestic emphasis on the deployment of renewables, despite clear policy priorities set by the central government, the development of renewables remains in a state of flux. Competition between renewables and coal is intensified by the structure of China's political system, where both central and local government authorities are significant actors, with priorities that often conflict. Thus, while central government policy may target the expansion of non-fossil fuel energy and the reduction of coal in particular, there are conflicting interests where local governments do not follow policy laid down in Beijing.

7.4 Strategic Considerations and the Future

The strategic question of energy security has been a focus of Chinese government policy with regard to fossil fuels. The Chinese government recognizes that renewables may have an impact on energy security and even national security, but policy does not directly address strategic geopolitical considerations of the development of renewable energy. China has focused on domestic renewable energy

development, with economic development and industrial priorities being given as much emphasis as purely energy considerations. These priorities are have also previously been reflected in the Chinese government's resistance to efforts mainly by developed Western states to securitize climate change as a national security issue (Freeman 2010). The Chinese government has insisted that securitization is a distraction from the real problems of climate change mitigation, which is an economic development problem. However, despite the lack of explicit geopolitical content, the development of renewable energy in China is not without impacts in these areas.

Prior to the conclusion of the Paris Agreement in 2015, most states had come to the conclusion that renewables were not just central to climate change mitigation, but were also key to future economic growth. The idea of "green growth", while not accepted unanimously, had become part of the consensus on which the Paris Agreement could be built. Global competition for the best technological solutions at lowest cost would push forward climate mitigation and economic growth. China has been at the forefront of this thinking. Not only in domestic markets, but also globally, it has been a key factor in the declining cost curves for renewables. As already noted, renewables have not only been central to China's climate and energy policy, but also industrial policy. The result is that China seeks to capture the economic as much as the purely energy or environmental benefits of the development of the sector. By means of China's domestic developments in renewables, their global impact through trade and investment also creates the possibility for other states to benefit from a move away from fossil fuels. Although not all the technological foundations are yet in place for generation, transmission and storage, China, based on its past performance in creating industrial capacities, is likely to play a central role in making this possible.

Chinese government policy on renewables has largely been domestic in focus, but the renewable energy sector is global. International trade and investment is a central feature of the sector, but unlike traditional fossil fuel sectors it is not the fuels themselves but the means of production that are traded, especially in the solar PV sector (trade in the wind power sector is much less important, as high transport costs of wind turbines generally force manufacturers to locate close to their markets), where Chinese companies have come to dominate the global industry and have been the target of trade defense measure in the EU and US in an attempt to preserve domestic industries from competition from China. More recently, outward investment by Chinese companies has emerged, as they invest in renewable energy projects. Chinese investment in renewable energy is increasing, and is global in reach (Buckley and Nicholas 2017). For instance, China accounted for 30% of all investment in the power generation sector in sub-Saharan Africa between 2010 and 2015. Of this, 56% was in the renewables sector, and 49% was hydropower (IEA 2016). The objective is different from the traditional competition for resources that has been central to fossil fuels. Chinese companies have invested in wind and solar PV projects that supply energy to local markets. Their motivation has often been the higher economic returns that are available compared to domestic markets.

The Strategy for an Energy Production and Consumption Revolution argues that development of renewables in China, Europe and other locations increases the diversification of global energy supply (NDRC 2016e). In this argument, increasingly competitive markets including renewables bring global benefits by advancing the shift away from fossil fuels controlled by a limited number of suppliers. China, by supplying the means of producing renewables at low cost strengthens this diversification of competition. However, against this runs a counter current of concerns in other major economies such as the US and EU that China's dominance of renewables and other related sectors may be as problematic as that posed by dominant fossil fuel suppliers. Thus, trade defense and other measures, as well as domestic supports, to counter Chinese competition may increase, especially at a time when economic nationalism is a growing political force in many countries. The renewable sector has competitive and cooperative dimensions in relations between states, but it is increasingly the field of industrial competition. This is likely to bring continued friction not just in trade and investment in key technologies, but also in raw materials such as polysilicon and rare earth metals where China is a dominant producer or consumer.

In China, the focus on electrification of the energy system in order to deploy renewables has focused on large-scale projects for production and distribution of electricity. One of the greatest challenges to the deployment of renewables has been the provision of infrastructure and policy environment to ensure the uptake of electricity generated. While renewables have been used to provide energy off-grid in isolated areas in China, by far the largest resources have been invested in generation and transmission through large-scale grid-connected projects. Investment has not been confined to within China, and Chinese investors have invested in renewables capacity in solar PV, wind and hydro power on a large scale in many countries. One company, State Grid, which controls about 80% of China's domestic grid, has also made investments, in grid networks in many countries, often through investment through minority holdings in existing companies. This has so far had little wider impact on the grids themselves, even though holdings in several EU member states suggest the possibility of China playing a role in national and regional integration outside its borders.

The rise of China brings to the fore wider strategic interests that may increasingly encompass those that impact on renewable energy. The current strategic vision of China formulated in the Belt and Road Initiative (BRI) which was launched by Xi Jinping in 2013 is based on the idea of building connectivity, primarily through the construction of infrastructure. As yet, renewable energy has not been specifically addressed by the Chinese government as part of the BRI. At the Belt and Road Forum for International Cooperation held in Beijing in May 2017, which was attended by 28 heads of government or state, a list of deliverables was promulgated, among which were the Vision and Actions on Promoting Energy Cooperation on the Belt and Road (National Energy Agency 2016c). This document, which again does not specifically mention renewables, seeks to portray the initiative related to energy in non-geopolitical terms, and focuses on cooperation. Nevertheless, even if it does not include renewables, the BRI will raise geopolitical

concerns in those regions which it incorporates, especially Central Asia, where China's energy interests are already significant. Another Chinese initiative, while still distant possibility, may raise renewable energy to a real geopolitical issue: the proposal from China for the creation of a global energy grid (China Daily 2016) which has been espoused by State Grid and also by President Xi Jinping at the United Nations (Xi 2015). This proposal for a global grid network, which would allow for regional balancing of renewable energy sources, would raise questions over control and distribution of renewable energy resources that have in the past been the focus of the geopolitics of oil and gas.

7.5 Conclusion

Geopolitical analysis of energy in China has generally been framed in similar terms to those used in the West, and focused on problems of securing access to fossil fuels. The emergence of renewables as a significant factor in energy systems raises new questions not just for China, but also globally. Until now, China has not sought to give an explicit answer to these questions. However, the policy adopted by China on renewables provides some implicit answers. First, and foremost, China's policy on renewables has been domestic in focus, and while energy supply and security, climate change and environmental degradation are key considerations, renewable energy is framed as an economic and industrial development priority. The energy resources and the means to exploit them are equally important in advancing economic development. The existing limits on transport of renewable energy mean that traditional energy geopolitical approaches have been largely redundant. Thus, while China's renewable energy companies have a global impact, the traditional geopolitical aim of providing energy supplies to the home country has been almost entirely absent. China has focused on a strategy of creation of domestic national technology, production and markets. The external impacts have been by-products rather than the focus of its strategy. However, in trade and investment in technologies, China is key. The result in economic terms has been competition in renewables and also with fossil fuels.

The fact that hitherto traditional geopolitics of energy have been absent from China's policy, does not mean that they will remain so. The potential integration of China into renewable energy networks beyond its borders raises the possibility that concerns for security of supply will become a question of geopolitics. In strategic projects such as the BRI, which include an energy dimension, China's government has been careful to avoid rhetoric that could be interpreted as demonstrating designs on domination of participating countries, preferring instead to speak the language of partnership and cooperation. The centrality of domestic development priorities leads to growth of renewables in China itself, and has also made it a leading global force in the renewable sector. However, this raises the possibility of international conflicts that are primarily economic rather than geopolitical, and which are already manifested in so-called trade wars. As yet the economic and even security interests

manifested in the renewables sector have yet to give rise to traditional geopolitical calculations.

More broadly, China has sought to present its rise as being outside the parameters of traditional paths of rising powers as they are interpreted in the West. While China has to a significant extent escaped the limits of development paths prescribed in the West, its economic success manifested by GDP growth has opened it to dependence, especially in the area of oil and gas. Energy policies such as the development of renewables give China the possibility to escape some of the existing geopolitical constraints, although it may in the longer term bring new challenges. Although it is not spelled out by the Chinese government, the focus on economics in development of renewables has a potential geopolitical dimension, helping China to liberate itself from some of the existing energy constraints which it faces. The lack of any explicit geopolitical element in China's consideration of renewables does not mean that the implications are absent. Renewables present a challenge to traditional geopolitics of energy and China will be central to how this develops. China's approach to date suggests that the economics and industrial exploitation of the R&D, production capacities and markets for technologies will be as important as the geopolitics of renewable energy.

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