

Chapter 4. Nexus between Energy and Environment:

Perspectives from China's Energy Development and Transition

Shunji Cui

Abstract

Environmental sustainability cannot be achieved meaningfully without appropriate energy policies. The nexus between energy and environment was well demonstrated by China's experiences in energy development and transition. By examining China's energy development between 1949 and 2017, this paper argues that its energy development has experienced a transition from a national security-oriented mode to environmental security-oriented direction. The watershed came in 2005, the year of Kyoto Protocol came into force and China became the world's largest carbon emitter in terms of annual emissions. Importantly, behind such transition is the growing sense of urgency over environmental issues both domestically and internationally. Domestically, China faces enormous pressure from recurring pollution crises, as the scale and scope of protests against pollution are on the rise in the 21st century. Internationally, the securitization of the environment and the associated normative change in global international society (GIS) has had significant impact on China's energy transition. Environmental ideas and norms have now so deeply embedded into the normative structure of international society, thus if any country wants to be considered as a responsible player, one cannot ignore such changes. It has been against such background that in responding to both internal and external pressures, the Chinese government stepped in to make radical changes even to its economic policy, in which environmental sustainability has become crucial part of its development, and even talking about reform of the "eco-civilization" system. The urgency of China to tackle environmental problem and energy transition, have sparked China to search for greater cooperation with variety of state and non-state actors. Thus, observing China's experiences in energy transition, it is clear how energy and environment are so closely connected with each other. The energy transition becomes the prerequisite for environmental protection, and the calls for environmental sustainability from both domestic and international levels have become major driving forces behind China's energy transition. The situation is probably the same in East Asia and the whole world. Indeed, China continues to face

difficulties and challenges in this process of clean energy, but one thing can be sure, that is, in order to achieve environmental sustainability, China has to strive for clean and sustainable energy path. To achieve such a goal, China would search even greater cooperation with its East Asian neighbors and beyond.

Keywords: China's energy transition; energy environment nexus; global normative structure; environmental responsibility

Introduction

China's energy development has experienced important transition in the 21 century, one from a national security-oriented mode of development to an environmental security-oriented direction. The watershed came in 2005, the year of Kyoto Protocol came into force and China became the world's largest carbon emitter in terms of annual emissions. Previously, meeting the booming demand for energy consumption for its rapid economic growth and to secure channels for energy supply have become crucial tasks for China's energy development. However, increasingly in the 21 century, especially after 2005, China has to shift or attempt to change its energy policies to meet the environmental sustainable goals.

Questions arise as how and why China has followed such transition or has to go through such transition? To answer both the *how* and *why* questions, this paper first examines the historical evolution of China's energy development between 1949 and 2017, and mainly answers the question as how China made such transition in its energy development. It then followed by discussions of the reasons behind China's energy development from both domestic and international dimensions. It argues that environmental pressures coming both from domestic and international levels have become extremely high, particularly the global securitization of the environment and the associated normative change in global international society (GIS) has had significant impact on China's energy transition. Finally drawing on these analyses, the conclusion part looks to some policy implications as how issues of energy and environment are so closely linked together. The energy transition becomes the prerequisite for environmental protection, and the calls for environmental sustainability both from domestic and international levels have become major driving forces behind China's energy transition. It also demonstrates that environmental sustainability issue is so comprehensive, and that environmental

sustainability cannot be achieved through single sector efforts, but multi-sector or cross-sector approaches are imperative. To achieve such a goal, multi-stakeholders cooperation is also necessary.

1 China's Energy Development and Transition (1949 to 2017)

1.1 National Security Oriented Energy Development before 2005

Traditionally, energy in China was linked closely to a concept of national security that was largely understood in military terms. Indeed, before the end of the Cold War, the concept of national security in China was largely confined to the military domain, which was overemphasized the importance of military security, and rendered states as the major actor involved. From this narrow conception, providing sufficient oil supplies for its army to defend itself became one of the important parts of guaranteeing its national security (Graf 2010, 333). Thus, energy supply—as well as raw materials—has always been a major concern for China's national security.

In the wake of the civil war, which ended in 1949, only to be followed by the Korean War, China emerged with ambitions of industrialization and modernization but with a very low base of oil production and technologies. Although China had abundant coal reserves at that time, it lacked the necessary equipment to exploit them. With the worsening relations with the Soviet Union in the 1960s and the embargo led by the U.S. from 1950 to 1970, China devoted much of its energy resources to preparing for war with major powers and thus pursued a policy of energy self-sufficiency. Oil and technological assistance provided by Soviet Union were critical for China's energy needs and progress toward energy self-sufficiency, but the Soviet aid program was terminated in July 1960, and since then, China spared no effort to achieve energy self-sufficiency through its own technology.

However, it was not until 1963 that China ended the dependence on imported oil and oil products, and during the same year, the Daqing oil field produced 4.3 m tons of crude, making up the bulk of the 6.48 m tones of nationally produced oil (Zha 2006, 179). Accordingly, from the 1950s to the early 1970s, China had gradually achieved self-sufficiency in energy. However, the fact that the oil fields were under military control, and given its relations with other states were tense, thus prevented its policy of energy self-sufficiency from serving the goal of economic and social development.

However, things has changed since the beginning of the 1970s. The awareness of threats to national security other than military attacks rose in response to the economic

crises in the 1970s had broadened China's conception national security. In particular, the Arab oil embargo and OPEC's oil price increase in 1973/74 illustrated the impossibility of guaranteeing national security by military means alone (Graf 2010, 340). Indeed, in the 1970s, economic stability and growth became essential elements of national security concerns. As noted by the democratic Senator and later U.S. Vice President Walter F. Mondale, 'the risk that the operation of the international economy may spin out of control' even overshadowed the dangers arising from nuclear armaments and superpower confrontation (Mondale 1974).

For China, although it was not seriously affected by the first oil crisis, its perception of national security was gradually moved beyond military discourse. Protecting and developing the economy became one the priorities of national security. In that case, China's energy and particularly oil supply was not only related to military ability and strength but also to national economic development as a whole. On basis of the surprisingly increased oil production in the 1960s, China had some energy surplus, and the improvements in China's international relations in the early 1970s led to an expansion of the Chinese economy. Energy, particularly oil and coal, became a primary export commodity in exchange for industrial plant and technology from developed countries, and served a valuable strategic purpose for China in renewing its links to the world's industrialized economies at the expense of self-sufficiency. For instance, from 1973 to 2004, China exported crude oil to Japan, according to negotiated annual quotas, in order to earn the hard currency needed to import the necessary equipment and technology to develop an export-oriented economy (Zha 2006). China also took advantage of the first international oil crisis in 1973 by exporting crude oil to Southeast Asian countries, such as Thailand and the Philippines, to cultivate a favorable regional environment for its economic development and modernization (Hamer and Barnett 1976).

The tendency toward the widening of the concept of national security and its tight connection with the national economy became apparent in the late 1970s, when the new technological revolution and a new wave of economic globalization were unfolding with great momentum (Zheng 2005). China grasped the trend and tried to reverse the erroneous policies of the Cultural Revolution. In 1978, with the motto of 'development is the only hard truth', Deng Xiaoping, the chief architect of the Chinese economic reform and opening up, sought to increase the CCP (Communist Party of China)'s legitimacy of leadership by improving economic growth and the standards of living. Successive leaders consistently maintained the goal of economic growth as the top priority of China's development. Under such circumstances, the overall energy policy served as a tool to

promote China's economic development, including reforms of the energy market, energy price system and energy management system.

However, rapid economic growth and the associated energy consumption have posed a real threat to China's energy security. What has gradually occurred since the late 1970s was an involuntary but nonetheless clear shift away from self-sufficiency to a reliance on imports. Oil imports began in the late 1970s and surpassed oil exports in 1993, making the overall energy balance negative (François 2007, 391). In 1993, China became a net importer of oil products, and in 1996, it became a net importer of crude. Domestic production was increasingly insufficient for consumption (François 2007, 392).

In light of the perceived sharp rise in demand for energy resource in global markets, starting from the early 1990s, the Chinese central government has adopted an external oriented energy policy called 'going out' policy, which encouraged national oil companies (NOCs), mainly China National Petroleum Corporation (CNPC), China Offshore Oil Corporation and China Petroleum and Chemical Corporation (Sinopec Corp.), to 'fully exploit domestic and foreign resources and markets' (Cheng 2008, 313). Since then, China has developed a series of diplomatic measures to strengthen China's energy security by deepening political and commercial relations with all energy producing countries and taking a neo-mercantilist approach to acquiring direct control of overseas energy production and supplies by the state-owned companies.

It is no doubt that this 'going-out' strategy is state-centered; as Lieberthal and Herberg argue, "China's energy strategy currently appears rooted in a statist, mercantilist mentality among political leaders in Beijing... Beijing is acting according to the principle that energy security is too important to be left to the markets. China has thus decided to adopt the going-out strategy" (Lieberthal and Herberg 2006, 11).

As China entered the 21st century, with its continuous economic growth, it faced more acute energy shortage. In order to meet the booming demand for energy consumption, the objective of expanding the channels for supply of imported energy has become a crucial task for China's energy development. In a regime designed to meet the energy demand for rapidly developing economy, the Chinese government began to step up national oil security supply system centering on national oil reserves and diversify sources of imported oil (Xu 2007). The main purpose of these efforts was to reduce China's dependence on a single oil producing region and a single oil transport route. Consequently, energy diplomacy has become an important part of China's overall diplomacy. As evident, China's state visits abroad in the 21 century have, more often than not, coincided with energy diplomacy. For example, as François points out, those contracts signed between

China and Indonesia, Myanmar, Saudi Arabia and others have often at great direct and indirect cost of others, while China has finally been able to replace a Canadian investor in Kazakhstan (François 2007, 391-397). Backed up by Chinese government, China's main drive for energy is gradually accomplished by pushing its companies abroad in terms of acquiring local subsidiaries and gaining exploitation rights.

However, it is also true that when China struggles for energy self-sufficiency, it also faces increasingly serious environment crises. After two decades of rapid economic growth through adopting the energy-extensive growth model that features lowering the efficiency of energy use and the guidelines of 'growth at all costs', as well as 'pollute first, clean up later'. China began to face an extensive array of environmental challenges in the 21 century, mainly rooted in China's mammoth appetite for fossil energy use, particularly the intense use of coal directly burned to produce energy. This low technology has led to serious air pollution in major cities producing acid rain, sulfur dioxide and dust (Cheng 2008, 301). In addition, China has one of the worst cases of water pollution in the world. Pollution accidents occur frequently, causing serious damage to human health and the environment.

Therefore, as China faces enormous pressure from recurring pollution crises and the scale and scope of protests against air pollution are on the rise, the treatment of traditional pollutants became imperative for China. As such, China would need to prioritize the reduction of traditional pollutants within its emission reduction initiatives to not only mitigate climate change but more importantly to ensure the sustainability of its environmental and societal well-being. In fact, the Chinese government's awareness of environmental problem and ecological damage resulting from excessive economic growth came much earlier, at the second National Environment Conference in 1983, for the first environmental protection was officially labeled as a fundamental national policy, to which the country must adhere in the long term (Weng 2015). However, most of the attention focused on the 'end-of-pipe' pollution control where cleanup technology is added to a production or management system, rather than changing the fundamental process itself (Weng 2015).

In the 1990s, the 9th Five-Year Plan (FYP, 1996-2000) called for implementation of a sustainable development strategy and the transformation of the economic growth model for the sake of alleviating the environmental and ecological impacts caused by economic development based on an energy-extensive model. This Plan stipulated a goal for improving energy efficiency by 5% annually, partly by acquiring modern technology (Zhao 2008, 209). However, China has for a long time wrestled with balancing

environmental protection and economic growth, which had led to the government's disregard for its own environmental regulations in its haste to secure economic growth. The Chinese government has shown its inefficiency and hesitation in making decisions on policies aims at encouraging energy conservation. For example, in 1996, the government-controlled media endorsed calls for a fuel tax. After nearly a decade of academic and public discussion, including debates in the National People's Congress, Beijing is still waiting for the 'opportune' time to establish such a tax (Zha 2006, 187). As a result, despite efforts to conserve energy and achieve environmental protection, pollution has been worsening. When the Hu administration came into power, the level of pollution in China had been continuing to worsen. The watershed of energy transition came in 2005.

1.2 Urgency of Environmental Security: Energy Development Moving Beyond National Security?

There are many different definitions of environmental security. Some scholars refer to environmental security as a general situation where the environment is threatened, either on a national scale or a global scale; others imply that it refers to the capacity of the environment to sustain existing and desired levels of human civilization (Buzan, Waeber, and Wilde 1998, 75-76); and some think it may be defined as the intersection of environmental and national security considerations at a national policy level (Allenby 2000, 5). This paper does not intend to discuss about those definitional disagreements, but to use the first definition as its working definition.

As argued earlier, since China entered the 21st century, it has been facing acute environmental crises. The ancient Chinese ideal of harmony between man and nature resurfaced and, in 2002, was integrated into the slogan of building a 'well-off society' (Weng et al. 2015). In 2003, the Chinese government announced its overall development strategies would be guided by the concept of scientific development – a concept that refers to the need for China's development to be 'people-oriented', comprehensive, coordinated and sustainable. The scientific development concept goes beyond the need for efficiency while taking into consideration of human development with emphasis on enabling a harmonious relationship between various stakeholders, as well as between stakeholders and the environment. This initiative was a proof of the significant transformation that had occurred, both in principle and in practice, with regard to energy conservation and environmental protection in China (Zheng and Jamil 2012, 79-98).

A significant change occurred in 2005 when the Kyoto Protocol, the first international

law for enacting limitations on greenhouse gas emissions in human history, formally went into effect. As the international community has raised serious concerns about the surge in fossil energy use and the resulting global warming, there is no disagreement that China's business-as-usual energy-intensive growth pattern is highly likely to exacerbate the unsolved global energy and climate problem (Jin and Zhang 2014). In the same year, China had gravely fallen far behind its pollution and energy reduction targets of the 10th FYP (2001-2005). China's global CO₂ emissions soared to nearly 20% in 2005; thus, it became the world's largest carbon emitter in terms of annual emissions.

In view of these developments, although the Kyoto Protocol does not stipulate the obligation of developing countries for containing greenhouse gas emissions, China has received considerable pressure from the international community to address its environmental challenges and be a responsible actor in combating global warming, which has strengthened the Chinese government's determination to mitigate its environmental impacts by adopting a more sustainable energy policy. In the following years, energy has been closely linked to the discourse of environmental security, and China's economic development strategy has also begun to place considerable emphasis on being resource-efficient and environmentally friendly.

The year 2005 was a remarkable year. In February 2005, the National People's Congress approved the 'Renewable Energy Law', offering a package of regulations and incentives in support of the development of renewable energy (Cheng 2008, 302). In May 2005, the government announced the establishment of a State Energy Leading Group headed by Prime Minister Wen Jiabao, which was to formulate the country's energy policies. It was decided at the first meeting that the focus should be on developing and implementing a medium- to long-term energy development program which would coordinate and rationalize the distribution of energy resources, promote the development of domestic energy resources, promote alternative or renewable energy resources, increase energy efficiency levels, and promote reforms in the energy sector and companies (Dadwal 2007, 892). Before that time, China was one of the few countries that did not have a national government agency coordinating energy development.

Environmental concerns were also highlighted in the energy security policies of China's 11th FYP (2006-2010), released in October 2005. The Plan made a specific goal of reducing the energy consumed for each unit of GDP by 20% at the end of 2010 compared with the end of 2005 (Cheng 2008, 302). At the same time, the National Development and Reform Commission (NDRC) initiated ten major energy-conservation projects to implement the 'Medium and Long-Term Energy Conservation Plan for China'. Moreover,

in 2005, Hu Jintao advanced the idea of promoting a circular economy and building a resource-saving and environmentally-friendly society (also known as Two-Type Society) (Weng et al. 2015, 8).

Later, increasingly numerous environmentally friendly energy policies have been formulated. For example, the NDRC issued China's national climate change program in 2007. The program specified energy-related policies and measures to mitigate climate change by reducing CO₂ emissions. The energy sector was the major target for environmental improvement. The 12th FYP (2011-2015) features an entire chapter on green development, clearly proposing the idea of green and low carbon development (Weng et al. 2015, 2).

Furthermore, the term 'ecological civilization' first appeared at the 17th National Congress of the Communist Party in 2007 as part of the process to construct an affluent society. The concept received unprecedented political attention at the 18th National Congress in 2013 and was injected into the national development process (Weng et al. 2015, 9). In March 2016, China unveiled its 13th FYP (2016-2020), which contains a set of climate and energy related targets, including an energy consumption cap and a 15% goal for the share of non-fossil-based energy in the country's primary energy mix¹.

More recently, the Report of the 19th National Congress of the Communist Party also stresses the importance of promoting green development and clean energy in order to solve the environmental issues and, more importantly, to participate in environmental governance. In December 2017, a national five-year plan was announced to convert northern Chinese cities to clean heating during the winter by 2021. This plan is an unprecedented government campaign to switch millions of households and thousands of businesses from coal to natural gas in northern China, by claiming that half of northern China would have converted to clean heating by 2019 and reduce bulk coal burning by 74 million tons.²

The energy transition is not limited to internal policy. China has actively participated in the cooperation with the international community in order to conserve energy and address climate change, either through building up bilateral relations or taking part in multilateral mechanisms. For instance, the 2009 U.S.-China Joint Presidential Statement emphasizes the importance for the two countries to cooperate in exploring clean energy

¹ Ma Tianjie. "China's Ambitious New Clean Energy Target". The Diplomat, 2017-01-14. Retrieved from: <https://thediplomat.com/2017/01/chinas-ambitious-new-clean-energy-targets/>

² "China unveils 2017-2021 winter clean heating plan". ET Energyworld, 2017-12-18. Retrieved from: <https://energy.economictimes.indiatimes.com/news/power/china-unveils-2017-2021-winter-clean-heating-plan-media/62112427>

and the transfer of technology. Thereby, at the same time, a joint U.S-China Clean Energy Research Center was launched by the two governments in order to support renewable energy competitiveness. Then, the historic moment came in November 2014, a year before the Paris Summit, when China and the U.S. announced an ambitious new deal on climate change and clean energy cooperation. In the agreement, China, for the first time agreed to have its CO₂ emissions peak approximately 2030, with the intention to try to have it peak early and to increase the non-fossil fuel share of all energy to approximately 20 percent by 2030 (NDRC 2014).

Energy cooperation has also been an important aspect of the Sino-European Union (EU) Comprehensive Strategic Partnership. A Sino-EU Energy Co-operation Task Force has been established, and a number of conferences have been held (Cheng 2008, 316). The EU has advanced technology in such areas as environmental protection, renewable energy, clean energy, efficient fuel use, and energy conservation, which is needed in China. The EU, therefore, is an important source of advanced technology for China in the energy field. In October 2015, the UK and China signed an agreement to establish a clean energy partnership and work together in the transition a low carbon economy.³

As for the multilateral cooperation mechanism, as early as in 2005, China signed on to the Asia-Pacific Partnership on Clean Development and Climate along with five other countries, namely, Australia, Canada, India, Japan, and South Korea, as well as the United States, which aims at developing cost-effective clean technologies. China hosted an important conference of major energy consumers on December 16, 2006, including the United States, India, Japan and Korea. These major countries consume 45.2 percent of the total oil consumed by the world and face common challenges. This conference proved very successful and conveyed a distinct signal to the international community that major energy consuming countries will strengthen mutual dialogue and cooperation to maintain common energy security (Chen and Ni 2008, 53).

In 2010, China also started to participate in the Clean Energy Ministerial (CEM), which is an important global forum initiated by the U.S. to promote policies and share best practices to accelerate the global transition to clean energy. More recently, China has started to become an initiator of global energy conservation. For example, at the General Assembly of the United Nations on Sept. 26, 2015, President Xi Jinping proposed a plan for a new global energy internet which, as Prof. Zhang Xiao-ping (Director of Smart Grid at the Birmingham Energy Institute) argues, would change the method of energy trade,

³ “UK and China sign the Clean Energy Partnership”. GOV.UK. 2015-10-23. Retrieved from: <https://www.gov.uk/government/news/uk-and-china-sign-the-clean-energy-partnership>

sharing of energy resources and developing of new collaborative business models to address climate change effectively and efficiently, while energy resources could be shared globally and locally.⁴ In 2015, China showed its regional strength by establishing the Asia Infrastructure and Investment Bank and pouring money into the BRICS' New Development Bank, which made its first loans, all for renewable energy.

Indeed, after 2005, China's efforts to transcend the old model of energy development as well as address climate change have borne some fruit. Internally, in 2009, China's energy consumption per unit GDP fell by 15.61 percent from the 2005 level, carbon dioxide emission decreased by 1.13 billion tons, chemical oxygen demand (COD) shrank by 9.66 percent, and the total sulfur dioxide discharge was down by 13.14 percent.⁵ This marks a reverse in the increase in energy consumption per unit GDP and emissions of major pollutants of previous years.

In 2017, China's use of power per unit of gross domestic product decreased 3.7 percent, beating the government target of a 3.4-percent decrease amid the upgrading of the energy structure. Over 80% of China's 39 key energy-consuming industrial companies cut energy use in 2017, with their steel use per unit of production losing 0.9%, and coal consumption per unit of production having been reduced 0.8% annually.⁶

Externally, in 2016, China increased its foreign investment in renewables by 60% to reach a record \$32 billion.⁷ At the beginning of 2017, China was poised to leap ahead of the U.S. with regards to clean energy to become the most important player in the global market.⁸ Looking at the entire economy, not just foreign investment, China regularly outspends the U.S. on renewable energy. It invested more than \$100 billion in clean energy in 2015, more than double of U.S. investment, which spurred robust job growth in the renewable energy sector.⁹ Thus, although China is still the world's number one polluter, which wrecked the Copenhagen deal, it also has become the world's biggest investor in – and hottest market for – renewable energy, which is making great contributions to tackling climate change.

⁴ "Interview: Global energy internet will make world sustainable energy village: expert". Xinhua, 2017-05-10. Retrieved from: http://news.xinhuanet.com/english/2017-05/10/c_136269569.htm

⁵ "China's targets and achievements in emission reduction". 2010-07-29. Retrieved from: http://www.china.org.cn/environment/2010-09/29/content_21036736.htm

⁶ "China proved to be more efficient on the use of energy". 2018-01-19. Retrieved from: <https://www.shine.cn/biz/economy/1801199251/>

⁷ Ibid.

⁸ "China is Leaving the US Behind on Clean Energy Investment". Renewable Energy World, 2017-01-09. Retrieved from: <http://www.renewableenergyworld.com/articles/2017/01/china-is-leaving-the-us-behind-on-clean-energy-investment.html>

⁹ Ibid.

2 China's Energy Transition: An Analysis

By exploring the main strategies and policies of China's energy development from 1949 to 2017, this paper finds that China's energy development has experienced a transition from national security oriented to environmental security oriented. Energy self-sufficiency has always been related to national security and thus becomes a top priority in China's energy development, but now achieving environmental security is as important as pursuing self-sufficiency in China's energy development. This watershed came in 2005 when the Kyoto Protocol came into force and China became the world's largest carbon emitter in terms of annual emissions. Then, how shall one to understand such transition, what are the main driving forces behind such development? We need to investigate both its domestic and international factors.

2.1 Domestic Factors behind the Transition

In the 21 century, China faces enormous pressure from recurring pollution crises as the scale and scope of protests against pollution are on the rise. For example, in late February 2004, a combination of synthetic ammonia and nitrogen from the No 2 Chemical Fertilizer Plant under the Sichuan General Chemical Group leaked into the Tuojiang River, the sole water source in Sichuan Province. The water has become yellowish-black color, smelled badly and caused skin allergy. The density of ammonia and nitrogen in the affected section of the river was 152 times higher than the national standard, forcing more than 1 million people to leave without potable clean water.¹⁰ The serious pollution killed about 500,000 kilograms of fish in the river and the direct economic loss is estimated to have surpassed 100 million yuan (US\$12 million).¹¹ The investigation found that the No 2 Chemical Fertilizer Plant under the Sichuan General Chemical Group should hold the greatest responsibility for this accident. The plant upgraded its equipment late last year, but the new equipment, which treated the chemical wastes with a high concentration of synthetic ammonia and nitrogen, did not function well¹². The plant did not pay much attention to this problem and solve it immediately, leading to the chemical waste being directly dumped into the Tuojiang River. This accident seriously affected local people's health and life, therefore aroused some dissatisfactions towards local government. In that case, after

¹⁰ "Chemical spill in river cleaned up". China Daily, 2004-04-01. Retrieved from: http://www.chinadaily.com.cn/english/doc/2004-04/01/content_319586.htm

¹¹ Ibid.

¹² Ibid

Tuojiang accident, Sichuan government claimed that operations would be suspended in all the factories along the rivers that did not meet environmental standards.¹³

Another typical example is the Songhua River spill of in 2005. On November 13, 2005, an explosion at a petrochemical plant in China's northeastern Jilin Province resulted in the release of 100 tons of toxic substances released into the Songhua River comprised a mix of benzene, nitrobenzene and aniline, with nitrobenzene dominating most samples¹⁴. Five people were killed in this blast, and more than 70 people were injured.¹⁵ The decision to cut off Harbin's water supply sparked people's panic and instantly people bought up bottled water and soft drink in supermarkets. Government blamed the state-run China National Petroleum Corp for the accident. Some believe that the Songhua River spill did not occur by accident. Long known as the "industrial cradle of China," the northeastern region centered on the Songhua watershed produced much of the country's first steel, machine tools, locomotives and airplanes following the founding of the People's Republic of China in 1949 (ADB 2005). The industrial firms established in the 1950s have been hard pressed to stay competitive under China's market reforms, and as a result the region's industries rely on outdated facilities with little or no pollution controls or clean processes¹⁶. The Songhua spill suggested some drawbacks in China's environmental stewardship, including weak local enforcement of environmental laws, poor communication between state agencies and officials, and poor emergency response capacity. Among the policy consequences of the spill were a revision of the Water Pollution Control Act and an enhanced focus on emergency response.¹⁷

Apart from the Tuojiang accident and the Songhua River spill, there are many other environmental pollution incidents. Historically in China, public awareness of environmental protection has not been a strong point. It was taken for granted that where there were people, there would also be pollution, and if compare between development and environment, people would prioritize the former. In other words, people would turn their concern for environmental protection only after they were adequately fed and clothed.¹⁸

¹³ Ibid.

¹⁴ "Positive Spillover? Impact of the Songhua River Benzene Incident on China's Environmental Policy". China Environment Forum, 2011-07-07. Retrieved from:

<https://www.wilsoncenter.org/publication/positive-spillover-impact-the-songhua-river-benzene-incident-china-s-environmental>

¹⁵ "100 tonnes of pollutants spilled into Chinese river". The Guardian, 2005-11-25. Retrieved from:

<https://www.theguardian.com/news/2005/nov/25/china.internationalnews>

¹⁶ Ibid.

¹⁷ "Positive Spillover? Impact of the Songhua River Benzene Incident on China's Environmental Policy". China Environment Forum, 2011-07-07. Retrieved from:

<https://www.wilsoncenter.org/publication/positive-spillover-impact-the-songhua-river-benzene-incident-china-s-environmental>

¹⁸ "China's Environmental NGOs". 中国网, 2012-07-13. Retrieved from:

However, the environmental accidents mentioned above have seriously threatened people's life and thus greatly promoted the public awareness of environmental protection. The 2005 China's Public Environmental Protection Index Report admitted that the government's efforts to deal with environmental problems were not enough, especially the innovation of environmental protection ideas and system were far from meeting the public demands. About 80% of Chinese population people thought the state should increase the investment in environmental protection, and 75.7 % people thought the environmental protection was imperative.¹⁹ Interestingly, the report also showed that most people agreed with the idea that states should give priority to environmental protection even at the expense of economic development.²⁰ Thus, indicating how people's attitudes are shifting in concerning the relationship between economic development and environmental protection.

With the rising public awareness of environmental protection, environmental activists and NGOs, such as Green Peace, Friend of Nature and China Environmental Culture Promotion Association (CECPA), have played active and important roles on the front line of environmental protection. Their actions have made a significant contribution to preventing deterioration in the environment and they have facilitated the state's enforcement of environmental policies by raising public awareness and providing professional advice. For example, the first Green Book of Chinese Environment written by Friend of Nature was published in 2005. It was the first time for Chinese environmental NGOs to write annual report about Chinese environmental protection from the perspective of civil society²¹. It records China's important environmental changes, problems, challenges, experiences and lessons in 2005 with relatively simple and concise expression. The Green Book also shows that since 2003, environmental NGOs has participated in many important public events, and has had some positive effect on government's decisions. In this way, Chinese environmental NGOs have become important source of power in popularizing environmental education and advocating people to engage in environmental protection, which in turn had positive impact on pushing government's determination for fighting against environmental pollution. Of course, it is true that many Chinese NGOs do often face many difficulties and constrains, including have limited funding and facing complicated registration procedures. However, given their unique place and positive in between the government and the enterprises, as well as between the government and the

<http://www.china.org.cn/english/2002/Jul/36833.htm>

¹⁹ “中国公众环保民生指数 2005 年度报告概述”. Retrieved from: <http://finance.sina.com.cn/g/20060120/18382294960.shtml>

²⁰ Ibid.

²¹ “首部环境绿皮书发布 2005 中国环保的民间记录”. 人民网, 2006-03-02. Retrieved from <http://env.people.com.cn/GB/1072/4157275.html>

people, they can play positive and constructive roles. In recent years, Chinese government has gradually been supporting NGOs in the field of environmental protection. In January 2015, the Supreme People's Court announced that social groups that work to fight polluters judicially would gain special status and have court fees reduced.²² The new rules were issued in response to the increased public dissatisfaction that has unnerved the ruling Communist Party. At the same time, Chinese environmental NGOs have begun to “go abroad,” setting up agendas in Africa and Southeast Asia.²³ Some of them are funded by Chinese state-owned enterprises and also by the Chinese government.

2.2 International Factors behind the Transition

At the international level, the securitization of the environment and the associated normative changes to GIS have had significant impact on China's energy transition. Thus, it is necessary to examine the emerging global securitization of environment and climate change. Environment has emerged as part of security issue since the 1960s and 1970s (Buzan and Hansen 146), and the 1972 Stockholm Conference and the Rio summit of 1992 can be seen as particular landmarks (Falkner 2012). However, the real sense of urgency about global environment came in the 21 century. In 2005, after years of negotiations, the Kyoto Protocol finally went into force. Nearly all nations ratified the treaty, with notable exception of the United States, and hence, greatly enhanced the global awareness of the urgency of tackling greenhouse-gas (GHG) emissions. Then, two years later, in 2007, the UN Security Council even held the ‘first-ever debate on impact of climate change’, and the heads of states and their representatives agreed on many policy declarations that most urgently needed (Refernce?). Thus, global environmental issues and climate change have now truly become security issues (Brauch and Oswald Spring 2009, 1297).

Behind this global securitization is the growing new sense of urgency, especially the shared recognition about the anthropogenic climate change and its accelerating impacts. For example, between 1990 and 2007 the global total CO2 emissions related to the use of fossil fuel and cement production increased by about 34 percent, and by 2007 China now the top CO2 emitting country, had about a quarter share in global CO2 emissions (24 percent), followed by the US (21 percent) and the EU-15 (12 percent) (PBL, 2008). The level of securitization of environment was further heightened thereafter, particularly after the

²² “China encourages environmental groups to sue polluters”. The Guardian, 2015-01-07. Retrieved from: <https://www.theguardian.com/environment/2015/jan/07/china-encourages-environmental-groups-to-sue-polluters>

²³ “China's Environmental NGOs”. 中国网, 2012-07-13. Retrieved from: <http://www.china.org.cn/english/2002/Jul/36833.htm>

failure of the Copenhagen climate summit in 2009.

The global securitization of environment has generated great impact even pressure on countries, especially on great power as how they should play responsible roles in international society. China as a rising great power, and as the largest GHG emitter, received particular pressures and criticisms as a great irresponsible power in environmental governance. This is because environmental ideas and norms have now been ‘woven into the normative fabric of the states system’ (Falkner 2012: 503). Reus-Smit (1996) has long recognized the emergence of a green moral purpose of the state, and now many scholars agree that ‘environmental responsibility’ or ‘environmental stewardship’ has ‘emerged and strengthened as a primary institution in international society’ (Falkner and Buzan, 2017: 26; Buzan, 2004; Kopra 2017), and hence it has established as a legitimate basis for moral claims within international society (Falkner, 2012; Palmujoki, 2013). In this way, ‘environmental responsibility’ constitutes important part of global normative structural change.

The English School identifies the normative structure as set of international norms, which are defined as ‘shared (social) understanding of standard of appropriate behaviors’ (Klotz 1995, 451). The global normative structure comprises primary institutions and secondary institutions. The former refers to some norms that have naturally evolved internationally and subsequently won universal recognition, such as sovereignty, diplomacy, balance of power, and great power management. The latter is a series of artificial institutions, such as international organizations and international conventions, which were set up by people in order to maintain and develop those primary institutions. The global normative structure stipulates the standards for states’ behavior in the international arena and thus underpins the identities with which people define themselves and ‘others’ (Buzan 2017).

Since the European international society of sovereign states came into being and expanded globally in the 19th century, Western countries have always been recognized as the world’s leading actors, and thereby the international norm makers, interpreters and adjudicators. At this point, international norms are perceived to offer a type of promise and legitimacy for other countries in order to be engaged with Western countries’ justice, progress, and prosperity (Finnemore 1996, 326). Consequently, the global normative structure, particularly the primary institutions, is considered as a normative tool to decide the legitimacy of the membership in the international community as well as great power status. Although the GNS has constantly changed over time, as the English School argues, it always shapes states’ foreign policies and is a source of the legitimacy of states’

behaviors.

Given that China is so eager to build its global image as a responsible “great power”, it cannot ignore these changes in GNS and the growing importance of environmental norms. When China became the world’s largest carbon emitter in terms of annual emissions in 2005, the international call for China to act as a responsible member of the international community has largely pushed the Chinese government to adopt more ambitious and far-reaching measures to promote the transition of energy. Yet, that does not mean China could solve its environmental problems overnight, nor does it suggest China on balance has abandoned all its old energy intensive growth models. Despite China’s efforts to tackle emission problems, in 2006 China finally surpassed the United States as the biggest carbon emitter in the world. Furthermore, as Fergus Green and Nicholas Stern (2016, 425) rightly point out, China’s economic policy between 2000 and 2013 were continue to be an “energy-intensive, heavy industry–based growth model.” Under such a development model, although its GDP growth averaged 10.5 percent each year, it was done with high levels of energy and coal consumption, causing intensive CO₂ emissions, both growing at an average rate of around 8 percent per year (Hilton and Kerr 2016).

Thus, receiving even greater pressure from the international community to shoulder more responsibility in climate change mitigation (Kopra 2017). Such pressure seems even more real in the context of gradual transformation of international climate politics throughout the 2000s. For example, the number of climate change laws and policies worldwide in the twenty-first century increased rapidly, from 426 in 2009 to 804 by the end of 2014. Crucially, these policies now apply not just to Annex I countries, but also to non–Annex I countries (Falkner 2016), making it more difficult for China to use its status as a developing country as an excuse.

It has been against such background that China in responding to both internal and external pressures, the Chinese government stepped in to make radical changes to its economic policy, as was evident in its Twelfth Five-Year Plan (2011–2015), which explicitly linked economic policy with the climate agenda (Li and Wang, 2012). The need for fundamental structural change and policy reform was reconfirmed and intensified at the Third Plenary Session of the Eighteenth Party Congress in November 2013, signaling a marked change in economic policy compared to the previous decade (Xinhua 2013). Under this “new normal” developmental model, environmental sustainability was no longer seen as an issue separate from economic policy but inextricably linked to accelerating economic restructuring, even elevated into talking about reform of the “eco-civilization” system (State Council 2015). Isabel Hilton and Oliver Kerr (2016) believe that the shift to a new

normal model of economic development has largely contributed to China's more constructive role in the global climate regime. This trend continues as the Nineteenth National Congress of the Communist Party of China, held in October 2017, further emphasized this high-quality and green development (see China.org.cn. 2017).

Thus, Chinese leaders now repeatedly stress publically that developing renewable and clean energy is a concrete action for China to act as a responsible great power, showing China's desire behind its energy transition. China's efforts and contributions in the global energy transition have obtained general recognition from the international community. At the 2017 Bonn Climate Change Conference, many delegates, including the U.S., admitted that China has been playing a leading role in energy transition and climate change.²⁴ In light of that change, to further act as a norm entrepreneur and thereby lead the transformation of the global normative structure, China needs to seek a more proactive energy transition and promote further energy cooperation on the global scale.

3 Conclusions

This paper explored how China's energy development has transcended from national security oriented toward environmental security and the driving force behind this transition. By reviewing the energy-related policies and strategies during 1949-2017, this paper finds that 2005 was a watershed. Before 2005, China's energy development was overall national security oriented, but the meaning and dimension of national security had been broadened, thus making the energy development have different focuses. During 1949-1970s, China's energy was linked closely to national security with strong military discourses, rather than serving the goal of economic and social development. After the 1970s, China's rapprochement with the U.S.-led Western countries, accompanied by the broader understanding of national security, China's energy policy began to serve the goal of national economic development. Deng Xiaoping and his successors all believed that China's political future is premised on its good economic performance and the rising living standards of the people, which is crucial to maintaining social progress and stability of the regime. Energy has been mentioned as a security imperative in Chinese government documents. However, starting from the 1990s, energy shortage has been increasingly serious in China, and the Chinese government has responded to the challenges by pursuing a 'going-out' strategy, which is a state-led effort to reduce China's vulnerability to energy

²⁴ “全球能源转型 中国贡献突出”. 人民网, 2017-11-13. Retrieved from: <http://world.people.com.cn/n1/2017/1123/c1002-29663309.html>

shortage, relying mostly upon bureaucratic agencies and state-owned companies.

Since starting to open up and reform its economy in 1978, China has averaged 9.4% annual GDP growth, one of the highest growth rates in the world. However, this rapid growth was based on an energy-intensive model, which adversely affected the environment and thus raised much political concerns, but it was not until 2005, when the Kyoto Protocol came into force and China became the world's largest carbon emitter in terms of annual emissions, that the Chinese government showed its strong determination to transcend the old model of industrialization, that was, whatever cost to put economic growth first, and from then on, environmental security has been highlighted in energy policies, both internally and externally. Of course, the emphasis on environmental security does not mean that China has no longer concerned about energy supply and self-sufficiency, which continues occupy important part of its national security concept.

In view of this significant transition since 2005, this paper explored the driving forces behind this transition at both domestic and international levels. In a domestic context, some serious environmental pollution problems have greatly induced public awareness of environmental protection and some Chinese environmental NGOs also played active roles in facilitating government's efforts to tackle environmental issues. Chinese government had to respond to increased public dissatisfaction that has unnerved its legitimacy. Since most environmental pollution is caused by the extensive use of traditional energy, especially coal. Thus, environmental sustainability cannot be achieved without transforming the old model of energy development.

In a global context, one of the essential reasons for this transition is in the transformation of the GNS in the 21st century. The GNS, as the ES argues, comprises primary institutions and secondary institutions, and can identify who is a legitimate member of international society and what is legitimate behavior. For a long time, the GNS has been dominated by the Western countries, with many liberal democratic norms, and China as a non-Western and non-democratic country has often been in defensive position.. Consequently, China faces much difficulty in obtaining great power status, although it has achieved tremendous economic development, with about 7% growth for about 40 years. More importantly, the transformation of the GNS in the 21st century, which features a near-universal norm called environmental stewardship as an emerging primary institution, provides an unprecedented chance for China to reconcile itself with the Western-led GIS and act as a responsible great power. Indeed, China has seized this opportunity by actively stressing the environmental concerns and adopting eco-friendly energy policies, which has a positive effect on the GIS and gradually has earned China an increasingly good

reputation for being a responsible great power in promoting the global energy transition.

Observing from China's experiences in energy sector, it is not difficult to find how energy and environment are so closely connected with each other. The energy transition become the prerequisite for environmental protection, and the calls for environmental sustainability from both domestic and international level have driven China to step up its energy transition. The situation is probably the same in East Asia and the whole world. China also faces some difficulties and challenges in this process. The participation of Chinese NGOs in environmental protection is much limited compared to western states. And China's "going-out" strategy for solving energy shortage has raised much international concern.

The global energy transition along with climate change calls for deeper cooperation between states. Economic globalization coupled with geopolitical instability has made it impossible for any single country to achieve the energy transition entirely on its own. A state's environmental problem may easily affect its neighboring countries, thus the neighboring countries share much more common interest in the regional cooperation of environmental security and energy transition. China should firstly try to play an active role in building up East-Asian energy community that includes the increased involvement of non-state actors from China, Japan and South Korea, and then initiate and engage in more multilateral cooperation in global energy transition, which could be helpful for China in taking the lead in the transformation of the GNS and gaining a larger voice in setting up the international rules.

References

- ADB 2005. *Technical Assistance Consultant's Report: People's Republic of China: Songhua River Basin Water Quality and Pollution Control Management – Summary Report*, September, Manila: Asian Development Bank.
- Allenby, Braden R. 2000. "Environmental security: Concept and implementation," *International Political Science Review*, 21 (1): 5-21.
- Brauch, H. G. and Oswald Spring, Ú. 2009. "Towards sustainable peace for the 21st century." In "Facing Global Environmental Change: Environmental, Human, Energy, Food, Health and Water Security Concepts," edited by H.G. Brauch et al., *Hexagon Series on Human and Environmental Security and Peace*, vol. 4, Berlin:

- Springer-Verlag, 1295-1310.
- Buzan, Barry 2017. "The Post-western world order: Assumptions, rationales, predictions," (Manuscript).
- Buzan, Barry, and Hansen, Lene 2009. *The Evolution of International Security Studies*. Cambridge, Cambridge: Cambridge University Press.
- Buzan, Barry, Ole Waever, and Jaap de Wilde 1998. *Security: A New Framework for Analysis*, Boulder CO: Lynne Rienner.
- Chen, Fengying, and Ni Jiejun 2008. "Asian energy security: The role of China and India," *Strategic Analysis*, 32 (1): 41-55.
- Cheng, Joseph Y. S. 2008. "A Chinese view of China's energy security," *Journal of Contemporary China*, 17 (55): 297-317.
- China.org.cn 2017. "Press conference: Pursuing green development," October 27, www.china.org.cn/china/2017-10/27/content_41802605.htm.
- Dadwal, Shebonti Ray 2007. "China's search for energy security: Emerging dilemmas," *Strategic Analysis*, 31 (6): 889-914.
- Falkner, Robert 2012. "Global environmentalism and the greening of international society," *International Affairs*, 88 (3): 503-522.
- Falkner, R. 2016. 'The Paris Agreement and the new logic of international climate politics', *International Affairs*, 92 (5): 1107-1125.
- Falkner, Robert and Barry Buzan 2017. "Global environmental politics in English school perspective: Environmental stewardship as an emerging primary institution of international society," paper presented at the 2017 Annual Convention of the International Studies Association, Baltimore: February 22-25, 2017.
- Finnemore, Martha 1996. "Norms, culture, and world politics: Insights from sociology's institutionalism," *International Organization*, 50 (2): 325-347.
- François Godement 2007. "China's energy policy: From self-sufficiency to energy efficiency," *International Spectator*, 42.3: 391-397.
- Gong, Gerrit 2008. *The Standard of 'Civilization' in International Society*, Oxford: Clarendon.
- Graf, Rüdiger 2010. "Between 'national' and 'human security': Energy security in the United States and Western Europe in the 1970s," *Historical Social Research*, 35 (4) (134): 329-348.
- Green, F. and Stern, N. 2016. 'China's changing economy: Implications for its carbon dioxide emissions,' *Climate Policy*, doi: 10.1080/14693062.2016.1156515.
- Hamer, Paul, and A. D. Barnett 1976. "China's economy in global perspective," *Pacific*

- Affairs*, 55 (2): 306.
- Hilton, I. and Kerr, O. 2017. 'The Paris Agreement: China's 'New Normal' role in international climate negotiations,' *Climate Policy*, 17 (1): 48-58.
- Jin, Wei, and Z. X. Zhang 2014. *From Energy-Intensive to Innovation-Led Growth: On the Transition Dynamics of China's Economy* (Rep.), Fondazione Eni Enrico Mattei (FEEM). Retrieved from <http://www.jstor.org/stable/resrep01109>.
- Klotz, Audie 1995. "Norms reconstituting interests: Global racial equality and U.S. sanctions against South Africa," *International Organization*, 49 (3): 451-478.
- Kopra, S. 2017. 'China and international norm of climate responsibility: Agency and institutional change', paper presented at the 2017 Annual Convention of the International Studies Association, Baltimore, February 22-25, 2017.
- Li, J., & Wang, X. 2012. "Energy and climate policy in China's twelfth five-year plan: A paradigm shift," *Energy Policy*, (41): 519-528.
- Lieberthal, Kenneth, and M. Herberg 2006. "China's search for energy security: Implications for U.S. policy," *NBR Analysis*, 17 (1): 5-42.
- Mondale, Walter F. 1974. "Beyond detente: Toward international economic security," *Foreign Affairs*, 53 (1): 1-23.
- NDRC 2014. *China's Policies and Actions on Climate Change*, Beijing: NDRC.
- Palmujoki, Eero 2013. "Fragmentation and diversification of climate change governance in international society," *International Relations*, 27 (2): 180-201.
- PBL (Netherlands Environmental Assessment Agency) 2008. "Global CO₂ emissions: Increase continued in 2007," *PBL*, December 6, 2008.
- Reus-Smit, C. 1996. "The normative structure of international society." In *Earthly Goods: Environmental Change and Social Justice*, edited by F. O. Hampson and J. Reppy, Ithaca: Cornell University Press, 96-121.
- State Council 2015. "China plans to reform eco-civilization system," August 12, <http://english.gov.cn>.
- Weng, Xiaoxue, et al. 2015. *China's Path To A Green Economy: Decoding China's Green Economy Concepts and Policies*, IIED Country Report. IIED, London.
- Xinhua 2013. "中共中央关于全面深化改革若干重大问题的决定" [Decision on major issues concerning comprehensively deepening reforms]. November 13, 2013.
- Xu, Qinhua 2007. "China's energy diplomacy and its implications for global energy security," *China Energy Online FES Briefing Paper 13*, Retrieved from, <http://library.fes.de/pdf-files/iez/global/04763.pdf>.
- Zha, Daojiong 2006. "China's energy security: Domestic and international

Issues," *Survival*, 48 (1): 179-190.

Zhang, Xiaoming 2011. "A rising China and the normative changes in international society," *East Asia*, 28 (3): 235-246.

Zhao, Suisheng 2008. "China's global search for energy security: Cooperation and competition in Asia–Pacific," *Journal of Contemporary China*, 17 (55): 207-227.

Zheng, Bijian 2005. "China's "Peaceful Rise" to Great-Power Status," *Foreign Affairs*, 84 (5): 18-24.

Zheng, Yuxin, and S. Jamil 2012. "Beyond efficiency: China's energy saving and emission reduction initiatives vis-à-vis human development." In *Rethinking Energy Security in Asia: A Non-Traditional View of Human Security*, edited by Mely Caballero-Anthony, Youngho Chang, and Nur Azha Putra, 79-98. Springer-Verlag Berlin Heidelberg.