

China's Energy Infrastructure Development in Central Asia and Its Impact on Regional Energy Supply and Geopolitics*

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Abstract

Even before the Belt and Road Initiative, China has embarked on energy infrastructure development in Central Asia. The Kazakhstan-China Oil Pipeline and the Central Asia-China Gas Pipeline, which were built by China in the 2000s, have great impact on regional energy supply and geopolitics in Central Asia. The projects have not only changed the landscape of energy supply and demand, but also significantly influenced geopolitics in the Eurasian region. China's engagement in the region has been strengthened and Central Asian countries are increasingly depending on China. Russia's dominant influence in the region has also been replaced by China.

1. Introduction

Under the framework of the Belt and Road Initiative (BRI), China has launched large-scale infrastructure projects in Central Asia, including the high-speed rail

construction and energy infrastructure development. In fact, even before the BRI, China has already started engaging in building energy infrastructure in the region since early 2000s.

For example, as early as in 2006, China and Turkmenistan signed the framework agreement on the pipeline construction and long-term gas supply. This later led to the construction of the Central Asia-China Gas Pipeline. The Central Asia-China Gas Pipeline includes four parallel lines (A, B C, and D) that run along the route Turkmenistan-Uzbekistan-Kazakhstan-China. The first line (Line A) was completed in 2009, and now the fourth line (Line D) is under construction under the BRI. By connecting Turkmenistan to China's domestic grid, the natural gas pipeline system makes it possible to transport gas some 7,000 km from Turkmenistan to Shanghai. Also, the China National Petroleum Corporation (CNPC) and the Kazakh oil company KazMunayGas jointly built the Kazakhstan-China Oil Pipeline in the 2000s. It is also expected to be further expanded with

* The author would like to thank the two anonymous reviewers for their constructive comments.

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the impact of the BRI. The pipeline, running from Kazakhstan's Caspian Shore to Xinjiang in China, has greatly facilitated the oil import from Central Asia to China.

Both the Central Asia-China gas and oil pipelines have greatly impacted energy supply in the Eurasian region. For example, thanks to these energy infrastructures, Central Asia's energy export to China has greatly increased. China has also replaced Russia as the most influential countries in Central Asia's energy industry. The map of demand and supply of energy resource in the Eurasian region has been greatly reshaped, and will continue to change under the BRI. Energy infrastructure could benefit both the energy suppliers and consumers, and thus create a win-win relationship. Countries should further promote the development of energy infrastructure.

Although there are already some studies dealing with China's energy diplomacy toward Central Asia, the existing literature has not paid enough attention to China's energy infrastructure development in Central Asia. Some existing studies look at the security aspect of energy issue and examine the Shanghai Cooperation Organization's role in China-Central Asia energy relations (Marketos 2008; Wrobel 2014). Some study focuses on the energy supply and demand relations and claimed that China has reshaped the region's energy supply through its engagement (Fazilov and Chen 2013). Some study argues that China has conducted an energy strategy towards Central Asia in order to compete with other countries such as Russia, India and Japan who are also targeting at energy resources in the region (Pop 2010). Some argues that China is re-centering Central Asia as part of its "new great game" in Eurasia (Chen and Fazilov 2018). Other study examines the BRI's new role in China's energy diplomacy towards Central Asia (Liao 2019). To summarize, most existing studies focus on

political or geopolitical perspectives of China's energy diplomacy towards Central Asia. Political scientists tend to overstress the significance of national strategy or geopolitical motives. However, the economics perspective is somehow missing in narrating China's engagement with Central Asia for energy resources. Therefore, this paper tries to combine both economics and geopolitical perspectives to examine the relations between China and Central Asia centered on energy.

So far there has been no detailed research on China's energy infrastructure development in Central Asia. The existing studies on China's energy diplomacy towards Central Asia basically focus on macro aspects such as national strategies or trade relations. In contrast, this paper tries to examine China's energy engagement with Central Asia by looking into a micro aspect, namely, the economics concept of so-called "energy infrastructure". Energy infrastructure refers to the organizational structure that enables the large-scale of transportation of energy from producer to consumer. In this paper, specifically it means the oil and gas pipelines that were developed by China in order to transport energy from Central Asian states. Therefore, this paper's core research question is that how China's construction of energy infrastructure, in particular the oil and gas pipelines in Central Asia, has impacted energy supply and geopolitics in the region.

Under such circumstances, this paper tries to elaborate China's energy infrastructure development in Central Asia and examine its influence on energy supply and geopolitics in the Eurasia. In the following sections, the paper will first briefly review China's investment in Central Asia's energy sector, then introduce the traditional energy infrastructure in Central Asia and its limitation, and then focus on analyzing China's energy infrastructure development including the construction of pipelines for crude oil and natural gas. After that, the paper will evaluate energy infrastructure's impact

on energy supply and geopolitics in the region. Lastly the paper will exemplify the problems existing in China's energy infrastructure development in Central Asia and raise some policy recommendations.

2. China's Investment in Central Asia's Energy Sector

As China's economic growth has kept a high rate in the past three decades, its energy demand has also been increasing. China's gas consumption was 283 billion cubic meters (Bcm) in 2018; by 2024, the CNPC expects it to rise by a further 130 Bcm, while the International Energy Agency (IEA) estimates by a further 160 Bcm; and both the CNPC and the British Petroleum forecast China demand in 2035 of 610 Bcm (Pirani 2019). Meanwhile, currently China has to depend on import from foreign countries for about 60% of its energy demand. In 2018, China's net gas imports soared by 34%, making China overtake Japan as the largest gas importer (Enerdata 2019). As showed in Table 1 and Table 2, China has become the largest importers of both natural gas and crude oil in 2018.

China has long faced the so-called "Malacca Dilemma", a term coined by former President Hu Jintao in 2003. The "Malacca Dilemma" refers to the situation that the Malacca Strait has become a most important strategic checkpoint for China's energy transportation. For example, 80% of China's energy import has to go through the Malacca Strait. The "Malacca Dilemma" shows that the Chinese leaders have realized the overdependence on maritime route. To alleviate the "Malacca Dilemma," China has greatly reduced its reliance on maritime transportation by investing in cross border pipelines over the last decade, such as pipelines from Russia, Kazakhstan and Myanmar (Kumar and Chatnani 2018). Chinese policy-makers consider the land-based supply routes

less vulnerable than the sea-lanes, where the Chinese navy does not have a major presence (Oh 2018). To tackle with its increasing energy insecurity, insure and diversify its energy sources, China has been actively conducting the so-call "energy diplomacy" towards energy-rich countries and developing new routes of energy transportation. Energy diplomacy is the diplomacy aiming at acquiring energy resources and insuring energy security by strengthening economic relations with other countries in energy area. Central Asia is one of the most important regions targeted by China's "energy diplomacy."

Table 1: Natural Gas Importing Ranking in 2018

Rank	Countries	Natural Gas Imports in Bcm
1	China	115.5
2	Japan	114.2
3	Germany	85.4
4	Italy	67.5
5	Republic of Korea	57.1
6	Mexico	54.3
7	Turkey	49.3

Data Source: Enerdata Global Energy Statistical Yearbook 2019

Table 2: Crude Oil Importing Ranking in 2018

Rank	Countries	Crude Oil Imports (billion US \$)
1	China	239.2
2	United States	163.1
3	India	114.5
4	Japan	80.6

Data Source: World's Top Exports

It is also under such circumstances that China has launched the BRI in 2013. The BRI is a mega global strategy targeting at connecting the Eurasia by large-scale infrastructure development. Central Asia is among the richest regions in oil and gas reserves. Since Central Asia is close to China, it becomes the first experiment region for the BRI projects. China's official Silk Road Fund has already invested in the

Astana International Exchange, and both the China Development Bank and China Construction Bank are looking to provide lending for new infrastructure projects (Grant 2019).

However, even before the BRI, China has already started its engagement with Central Asia, in terms of economic, trade and security relations. In energy sector, China has also long been active in investing in and engaging with Central Asian states. According to the *Crude Accountability (2019)*, Central Asian countries, primarily Kazakhstan, Turkmenistan, and Uzbekistan, represent a strategic interest for China's energy market, as the overall volume of investment was greater than 70 billion dollars and accounted for 80% of Chinese investment in the region.

3. Traditional Energy Infrastructure in Central Asia

Abundant experiences of advanced economies have already demonstrated that infrastructure development is essential to economic growth. According to Cohen and Grant (2018), infrastructure (and its value chain) is the bedrock of economic opportunity, as it facilitates trade, increases productivity, promotes knowledge sharing, and creates an environment for economic and even social innovation. Central Asia, with its important geographical position and various abundant energy resources, has attracted the interest of the international community and become a popular destination of foreign investments (Liu 2019). However, infrastructure investment in Central Asia is far from enough. The Asian Development Bank estimates investment needs of around \$492 billion (or \$565 billion including climate-related needs), or \$33 billion annually until 2030 (ADB 2017). The massive infrastructure requirement of Central Asia remains a big challenge for the region.

As an energy-rich region, Central Asia urgently needs large-scale and high-quality energy infrastructure to take full advantage of its energy resources. For decades, Central Asia's energy infrastructure remained underdeveloped, with producers in the region struggling to transform their raw natural resources into output, while also having difficulty finding reliable methods of delivery (Hart 2016). The region's energy infrastructure construction was mainly from the legacy of the Soviet Union and later dominated by Russia after the collapse of the Soviet Union.

The most important energy infrastructure that has supported the region's energy trade in the late 20th Century is the Center Asia-Center Gas Pipeline. The Center Asia-Center Gas Pipeline runs from Turkmenistan through Uzbekistan and Kazakhstan, and finally reaches Russia. This pipeline system was first built between 1960 and 1988, with the support of the Soviet Union. After the Cold War, Russia then took charge of the energy infrastructure development among Central Asian states. On 12 May 2007, Russian President Vladimir Putin, Kazakh President Nursultan Nazarbayev and Turkmen President Gurbanguly Berdimuhamedow together signed a memorandum for renovation and expansion of the western branch of the pipeline, which later became the Caspian Coastal Pipeline.

There are many problems with the traditional energy infrastructure in Central Asia. First of all, it was almost dominated by Russia, and was mainly for the purpose of transporting energy from Central Asia to Russia. However, Russia's energy demand for Central Asia has continued to decline. Second, although the traditional energy infrastructure also helped supply oil and gas to Europe, there was no land route to export its energy eastward to East Asian economies such as China, Japan and Korea, whose energy demands for Central Asia were on the rise. Third, the Center Asia-

Center Gas Pipeline was able to carry on natural gas to other countries through Russia, but there was no large energy infrastructure for the transportation of crude oil, in which Central Asia is also rich.

Traditional energy infrastructure was outdated and unable to facilitate the necessity of energy supply within and outside the region. Under such circumstances, China made its policy-decision to cooperate with Central Asian countries to develop new energy infrastructure, not only to expand its energy trade with the region, but also to help better organize energy distribution within the region.

4. China's Energy Infrastructure Development in Central Asia

4.1 China and Energy Infrastructure in Central Asia

China has invested in three categories of infrastructure development in Central Asia, including transport, energy, and information and communication technology (ICT). Among the three, energy infrastructure is among the most successful projects that China has long involved so far. After the launch of the BRI, transportation infrastructure such as the high-speed rail projects has also attracted people's attention. But its effect still remains to be seen, as China's high-speed rail construction in Central Asia as well as other regions has just started in recent years. In contrast, energy infrastructure development in the region has already made considerable achievements.

Relatively China entered Central Asia's energy market later than Russia and western countries. In 1997 when the CNPC acquired the rights to the Aktobe field in Kazakhstan, China for the first time started its energy development in the region. Since then, energy infrastructure development has also become the top agenda for China's "energy diplomacy"

towards Central Asia. As China and its state-owned energy companies continue to strengthen the energy nexus with the region, it also started to increase its presence in construction of energy infrastructure through collaboration with Central Asian states and local energy companies.

From late 1990s, China has become active in negotiating with Central Asian states, bilaterally or multilaterally, to acquire the right to bid for large-scale energy infrastructure. The prime example of a cross-border energy infrastructure project being used to advance geopolitical objectives is China's BRI, launched by President Xi Jinping in 2013 (Oh 2018). Chinese companies are involved in upstream, midstream and downstream activities in oil and gas sectors. Midstream activities consist of building infrastructure linking China with supply sources, as well as addressing oil and gas infrastructure development needs within the host countries (IEA 2019).

Political support is one important factor behind the success of China's energy infrastructure development in Central Asia. For example, both China's former President Hu Jintao and current President Xi Jinping have visited Central Asia a number of times during their terms. The biggest achievements of China's energy infrastructure development are the two mega crude oil and natural gas pipelines, the Kazakhstan-China Oil Pipeline and the Central Asia-China Gas Pipeline. In the following sections, the paper will focus on analyzing the two infrastructure projects and examining their impact on regional and inter-regional energy supply and geopolitics.

4.2 The Kazakhstan-China Oil Pipeline

Kazakhstan had the potential to become Central Asia's largest crude oil supplier to China. Kazakhstan's total proven offshore and onshore oil fields' reserves constitute about 37 billion barrels of oil and 3.3 trillion

cubic meters (tcm) of natural gas, making Kazakhstan one of the world's major oil producers with the potential to expand the production of 2 million bbl/day in 2010 to 3.5 million bbl/day by 2015 (Chen and Fazilov 2018).

In September 1997, the CNPC and KazMunayGas, a Kazakh company, signed the memorandum of understanding to build the oil pipeline between Kazakhstan and China. Since then, the project was delayed for quite some years. It was then President Hu Jintao's first visit to Kazakhstan in June 2003 that reconfirmed China's commitment to the oil pipeline construction. After that, the agenda of building the oil pipeline speeded up with full support from the Chinese government.

China and Kazakhstan have considered three opportunities: the first is to prolong the existing pipeline between cities of Uzbekistan-Bukhara and Tashkent to Almaty, then through Taldikorgan to Alashankou; the second is the construction of a new gas pipeline connecting Ishim (western Siberia) and Alashankou and the one going through Astana and Karaganda; and the third is a variant of constructing a pipeline from Shalkar (western Kazakhstan) and one coming through Kizilorda until Shimkent, with connection to the pipeline Bukhara-Tashkent-Almaty (Fazilov and Chen 2013). Finally China and the Kazakhstan agreed on the construction of a new oil pipeline from Kazakhstan's Caspian Shore to Xinjiang in China. China and Kazakhstan have invested \$700 million for the project, while the total cost of building the pipeline was estimated at \$3 billion.

The Kazakhstan-China Oil Pipeline has three phases. The first phase between Atyrau and Kenkiyak, of 448 kilometers length, was completed in 2003; the second phase, between Atasu to Alashankou in China, with the length of 988 kilometers, has been functioning since July 2006; and the third phase, from Kenkiyak to Kumkol, with the length of 793 kilometers, was finished in July 2009 (Pop 2010). Since then, there have been some new expansion of the routes, making the pipeline's total length reach 2,800 kilometers, called "the first pipeline of the new silk road" by the Chinese government. Crude oil first arrives at the Dushanzi Oil and Natural Company at Alashankou, a branch of the CNPC, and then is shipped to the domestic market of China.

In 2019 alone, the Kazakhstan-China Oil Pipeline transported over 10.88 million tonnes crude oil to China, adding its accumulated shipping amount to 130 million tons since its inauguration in 2006 (China State Council 2020). Kazakhstan and China had expected to transport 10 million tonnes of crude oil annually and to increase the annual oil transportation amount to 20 million tonnes by 2010. However, this turned to be unrealistic. The shipping amount did keep rising during the first several years. As shown in Table 3, since 2010, the annual amount has remained slightly over 10 million tonnes, but never made significant increase.

The Kazakhstan-China oil pipeline now pumps 130,000 barrels per day from the Caspian Shore to the western China, and energy trade between three Central Asian states (Kazakhstan, Turkmenistan and Kazakhstan) and China supplies with 15% of its

Table 3: Crude Oil to China through Kazakhstan-China Oil Pipeline (in million tonnes)

Year	2009	2011	2013	2015	2017	2019
Crude Oil Carried to China	7.77	10.93	11.85	10.85	12.3	10.88

Data Source: National Energy Administration of China; Energy News.

natural gas needs (Grant 2019). Kazakhstan plans to increase oil exports to China to 6-7 million tonnes a year from just 1 million tonnes at the expense of shipments to Europe, starting from the second half of 2020, according to its Deputy Energy Minister Aset Magauov (Reuters 2019).

4.3 The Central Asia-China Gas Pipeline

The Central Asia-China Gas Pipeline is also known as the Turkmenistan-China Gas Pipeline. It starts from Turkmenistan and runs through Uzbekistan and Kazakhstan to reach Xinjiang in China.

The construction of the Center Asia-China Gas Pipeline started in 2009, with China's robust diplomacy towards Central Asian countries. In December 2009, then President Hu Jintao of China visited the Kazakh capital Astana. With then Kazakhstan President Nursultan Nazarbayev, he joined the ceremony to inaugurate the Kazakh stretch of the Central Asia-China Gas Pipeline. "It's a huge project that will one day restore the ancient Silk Road route," Nazarbayev told Hu in Astana, referring to a mediaeval network of trading routes that ran across Eurasia (Nurshayeva and Zhumatov 2009). On 14 December, 2009, President Gurbanguly Berdimuhamedov of Turkmenistan hosted Chinese President Hu Jintao, Kazakhstan President Nursultan Nazarbaev and Uzbekistan President Islam Karimov at a remote natural gas field in the eastern part of Turkmenistan for the inauguration of a 1,800-kilometer pipeline that connects all four countries and will transport 40 Bcm of gas annually when it reaches its ultimate capacity, which marked a turning point in the two-decade saga of bringing Central Asian oil and gas to international markets after the collapse of the Soviet Union (Chow and Hendrix 2010).

The Central Asia-China Gas Pipeline consists of four lines, called Line A, Line B, Line C and Line D. In

2012, Line A and Line B were completed. Uzbekistan started to supply natural gas through the Central Asia-China Gas Pipeline in August 2012. After that, the construction of Line C that paralleled Lines A and B was also launched and completed in 2013, which increased the total capacity of the pipeline to 55 Bcm a year, approximately 20% of China's annual natural gas consumption (Cohen and Grant 2018).

China also signed memoranda of understanding with all the parties along the route of Line D - Turkmenistan, Tajikistan, Kyrgyzstan and Uzbekistan - in September 2013. At the same time, a preliminary agreement was reached on to raise Chinese imports of Turkmen gas to 85 Bcm/year. A groundbreaking ceremony was held in Tajikistan in 2014, and a joint venture was established between the CNPC and Uzbekneftegaz to build the Uzbek section. According to the Orient News (2020), a Turkmen news media, Line D will be commissioned into operation in late 2020. However, due to COVID-19, the construction agenda might have been delayed. With the completion of the fourth line (Line D), which will transit Uzbekistan, Tajikistan and Kyrgyzstan, annual gas export capacity from the pipeline will reach 85 Bcm (Cohen and Grant 2018).

How does the Central Asia-China Gas Pipeline change the supply of natural gas in Central Asia? For example, by 2007, about 92% of Central Asia's gas went through Russia, most via the Central Asia-Center Gas Pipeline, the traditional energy infrastructure in the region (ICG 2007). As Pirani (2019) argues, the gas sectors of countries in Central Asia have traditionally been of interest because of their connection to Russia, but over the past decade this link has increasingly become less relevant as exports to China have started to dominate. The major supplier of natural gas for all lines of the Central Asia - China Gas Pipeline is Turkmenistan. With the operation of the Central-Asia-China Gas Pipeline, more than half of Turkmen

natural gas exports are delivered to China through this route, no need to go through the Central Asia-Center Gas Pipeline anymore.

China now relies on the Central Asia-China Gas Pipeline for about 15% of its natural gas import, and this percentage might continue to rise in the future. With a total length of 1,833 km and a designed annual gas transmission capacity of 60 billion cubic meters per year, the Central Asia-China Gas Pipeline has been operating stably and safely for about ten years. According to PetroChina West Pipeline Company, the Central Asia-China Gas Pipeline delivered over 47.9 Bcm of natural gas to China in 2019, and as of Dec 31, 2019, 294.6 Bcm of natural gas had been imported via the pipeline since it was put into operation in December 2009, benefiting over 500 million people in 27 provinces, municipalities, autonomous regions, and the Hong Kong Special Administrative Region (China Daily 2020).

5. The Energy Infrastructure's Impact on Energy Supply and Geopolitics

5.1 Impact on China's Energy Engagement in Central Asia

For China, the energy infrastructure development in Central Asia symbolizes the orientation change in its energy policy. Political instability in the Middle East and the "Malacca Dilemma" deteriorate China's energy security situation. With its security problems, the need to diversify its energy suppliers, and the necessity to develop the northwest China, all these factors determined the reorientation of China's foreign energy policy towards Central Asia (Pop 2010). Currently the Kazakhstan-China Oil Pipeline, Kazakhstan-China Gas Pipeline and Central Asia-China gas pipeline are the three major transit routes of Chinese hydrocarbon imports from Central Asia (Wang 2015). Although

China still relies a lot on the Middle East for its fossil energy, the percentage of energy import from the Central Asia has seen significant increase. This trend will continue, as the BRI will definitely expand the existing energy infrastructure in the region to connect not only China with Central Asia, but also the whole Eurasia.

Also, China's investment in Central Asia has been expanded with the development of energy infrastructure in the region. By April 2017, China had invested in \$304.9 billion worth of contracts with its partners in Central Asia, in sectors including transport, communication, energy infrastructure, financial linkages, technology transfer and trade facilitation (Miankhel 2019). The Kazakhstan-China Oil Pipeline project was a 50:50 joint venture of the KazMunayGas and the CNPC, though the CNPC paid over 85% of the \$800 million cost (ICG 2007).

Nowadays, the major China energy players in the region are the CNPC, China National Offshore Oil Corporation (CNOOC), China Petroleum and Chemical Corporation (SINOPEC) and Petro China, which all have partnered with local companies to compete with traditional power players like Russia and multinational companies such as Chevron, ExxonMobile, and BP in the exploration and extraction of oil and natural gas (Fazilov and Chen, 2013). In particular, the CNPC has been very active in engaging with gas pipeline construction and expansion. The CNPC has also begun building spurs from that main line not only to the major energy producers of Turkmenistan, Kazakhstan and Uzbekistan, but also to energy-poor Kyrgyzstan, Tajikistan and Afghanistan (Petersen 2013).

China and the Central Asian countries have also developed flexible and effective collaboration for the development and operation of energy infrastructure.

For example, in building the Central Asia-China Gas Pipeline, Asia Trans Gas, a joint venture of Uzbekneftegas and the CNPC, and Asian Gas Pipeline Company, a joint venture of the CNPC and KazMunayGas were established. In building the Kazakhstan-China Oil Pipeline, MunaiTas, a joint venture between the CNPC and KazMunayGas, was also established. Such examples could also provide significant experiences and know-how for the transnational energy infrastructure development in other region.

5.2 Impact on Energy Supply in Central Asia

There is no doubt that energy infrastructure developed by China, in particular the Kazakhstan-China Oil Pipeline and Center Asia-China Gas Pipeline in Central Asia, has great impact on energy supply and geopolitics in the region. First of all, energy infrastructure has helped Central Asian states to transport their crude oil and gas much more easily to China to meet its soaring energy demand and support its rapid economic development. In 2018, state-owned KazTransGas signed a five-year export deal to deliver up to 1.0 billion cubic feet per day of natural gas (10 Bcm per year) to China. The IEA has estimated that China may be importing up to 50% of the region's oil and gas by 2020, signaling a decisive shift in Central Asia's energy flow from the west to the east (Hart 2016).

How does the Kazakhstan-China Oil Pipeline change energy supply in Central Asia? In Kazakhstan's case, by 2007, about 84% of its oil exports pass through Russia to market (ICG 2007). With the operation of the Kazakhstan-China Oil Pipeline, its oil can be directly exported to the Chinese market. In addition, Russia's oil is also exported to China through Kazakhstan. As Yin Taijun, then Vice CEO of the CNPC International Ltd. pointed out, the operation of the Kazakhstan-China Oil Pipeline did not only supply reliable and secure source of oil import to China, but also provided

new stable oil export markets for Kazakhstan and Russia (China State Council 2006).

For example, the Kazakhstan-China Oil Pipeline does not only transport crude oil from Kazakhstan, but also from Russia to China. Russian companies such as TNK-BP and Gazprom Neft are also making use of the pipeline built by China. Although energy infrastructure has been greatly improved in the Kazakhstan and other Central Asian countries, energy supply still cannot meet the roaring energy demand from China. Part of the reason is that Western European countries still remain large markets for Central Asia's energy export. For example, the crude oil from Kazakhstan only account for 4% of China's oil import. Therefore, to improve the efficiency of the energy infrastructure in Central Asia, countries outside the region should be encouraged to make use of it. The Kazakhstan-China Oil Pipeline has an annual load capacity of 20 million tonnes. However, currently about only half of the amount of crude oil has been shipped to China annually (China Ministry of Commerce 2013).

5.3 Impact on Geopolitical Competition in Central Asia

The importance of both Central Asia and China's global energy status has also been changed by such large-scale oil and gas pipelines. Central Asia enjoys the strategically important status due to its energy and geopolitical position. Central Asian energy insecurity illustrates the impact of geopolitics on the regulation of energy markets, and the region is strategically located in Russia's sphere of influence and along China's New Silk Road (Boute 2019). Then what does Central Asia mean for China? In the long run, China eyes Central Asia as the strategic crossroad for its long land route to trade with the Gulf and Europe; in the short term, China needs to quell its thirst for Central Asia's oil and gas that can be brought overland

to power its factories on the eastern seaboard (Fazilov and Chen 2013).

Lying on some of the world's biggest oil, gas and metals reserves, Central Asia is at the center of a geopolitical tug-of-war between Russia, China and the West, all seeking to grab a share of its untapped riches (Gurt 2009). During the past ten years, China has gradually won the competition against Russia and the West, through the strategic development of large-scale energy infrastructure in the region. With China's increasing presence in Central Asia's energy sector, it will inevitably face competition with Russia and other Western countries who traditionally have more national interest of energy and geopolitics in Central Asia. The two mega projects have dominated the energy infrastructure landscape in Central Asia and have thus made China dominate the trade of energy resources in the region. The energy corridors will ultimately place China in the center of a "Pan-Asian global energy bridge", which will link existing and potential suppliers including Persian Gulf countries, Central Asia and Russia to major energy consumers including China, Japan and Korea (Fazilov and Chen 2013).

The strategic competition between Russia and China has tilted to China. Historically, the persistence of Soviet influence over Central Asia's energy sector led to the majority of Caspian oil and gas to flow north to Russia, and from there onward to the industrialized consumer countries of Western Europe (Hart 2016). However, as China enlarges its energy infrastructure development and enhances its influence in energy sector in the region, the situation has changed significantly. In April 2009, a suspicious explosion in the main Russia-Turkmenistan pipeline allowed Moscow to cut its annual contractual intake of gas from Turkmenistan from around 50 Bcm, to around 10 Bcm (World Politics Review 2018). This marked a significant turning point from when China started

to catch up with Russia. China now has replaced Russia as the biggest energy trader with most Central Asian states. Russia is even relying on the energy infrastructure, both the crude oil and natural gas pipelines, built by China in the region to transport and export its own energy resources. China's growing economic presence clearly comes at Russia's expense and it is now the biggest trading partner of every Central Asian country except Kazakhstan (World Politics Review 2018).

For Central Asian states, the energy infrastructure has also brought them huge geopolitical interests. Western reliance on Middle Eastern oil has long dominated global energy industry, yet the rapid development of Central Asia's energy infrastructure has made it a region that finally looks ready to fulfill its potential in delivering the burgeoning energy needs of Eurasia (Hart 2016). Central Asian states have been embracing China's BRI, while some western countries are still suspicious about it. With positive response to the BRI and active cooperation with China, Central Asian states are trying to re-direct their energy supply. By doing so, they expect to reap significant developing opportunities brought by the BRI and the Asian Infrastructure Investment Bank (AIIB). However, these states should not only focus on their energy markets, but also look at the development of substantial industrial sectors with the help of China.

6. Problems of China's Energy Infrastructure Development in Central Asia

6.1 Over-dependence on China

Central Asian states are increasingly depending on China. Taking Kazakhstan as an example, initially Chinese investments were welcomed to counter-balance perceived Russian and US influence in the

region and to allow Kazakhstan to diversify its trading partners away from dependence on Russia which historically has been the leading trading partner with the country; but with China holding more and more assets in the country, the influence of China over Kazakhstan is becoming an impediment (Malhotra 2012). Chinese oil companies off-take is anywhere between 25-30% of Kazakhstan's oil output. Now Central Asian countries are perceiving more and more threats from China because its increasing influence over the resource of Central Asia might disturb the autonomous decision making power of these countries. For example, a survey in 2017 showed that 37% of responders in Kyrgyzstan considered China as the greatest economic threat (Karibayeva 2020).

6.2 Environmental Concern

According to the Organization for Economic Co-operation and Development (OECD), many of the infrastructure projects planned and under construction in the region do not yet fully support countries' long-term development and climate objectives (OECD 2019). In the energy and industry sectors, projects tend to perpetuate the status quo, increasing the Central Asia's dependency on fossil fuel and mineral extraction and limiting economic diversification, and investment in technologies compatible with long-term de-carbonization pathways (e.g. renewable energy) remains marginal (OECD 2019).

It is worth noting that the China-led AIIB has approved a \$46.7-million loan for the construction and operation of a 100-megawatt wind power plant in southern Kazakhstan which, when completed, will be the largest in Central Asia (AIIB 2019). Although this investment is under the framework of the AIIB, this might imply that China has realized the importance of infrastructure development for renewable energy in Central Asia.

6.3 Unbalanced Investment among Sectors

China's investment in Central Asia has basically focused on infrastructure, which does help Central Asian countries a lot. However, China has invested not that much in the development of substantial economic sectors to boost the growth of Central Asian economy. It is estimated that about 90% of exports from Central Asia to China are fuel and raw materials. Without development of substantial economic sectors in Central Asia, the function of energy and other infrastructure will not be fully made use of. This should be the next important step for China and developed countries to take in Central Asia. With and via the BRI, China is potentially capable of reshaping Central Asia's economic potential through reorganizing and expanding ties with the latter (Chen and Fazilov 2018).

6.4 Bad Governance of Energy Systems

Energy sector, like other sectors in Central Asia, faces the problem of bad governance. As Boute (2019) pointed out in his book on energy law and geopolitics in Central Asia, the region holds huge energy reserves, but its energy systems are highly inefficient and unreliable, and thus require urgent reform. However, endemic corruption, discrimination and the strong centralization of power have so far blocked initiatives to reorganize energy supply. The support to help Central Asian countries transparently manage and operate the energy projects invested by China is also urgently needed.

6.5 The Trap of Energy Curse

Energy curse is another problem for Central Asia. Energy curse refers to the fact that many countries with abundant energy resources tend to just rely on the resources and thus have low level of economic development and industrialization. The three oil and gas producers in the region – Kazakhstan, Turkmenistan and Uzbekistan – are showing signs of

the “resource curse” under which energy-rich nations fail to thrive or develop distorted, unstable economies (ICG 2007). How to encourage Central Asian countries to not rely too much on its resources, but to diversify its sources of economic growth remains a big challenge.

7. Conclusion

Even before the BRI, China has started to embark on energy infrastructure development in Central Asia. The two typical large-scale energy infrastructure projects, the Kazakhstan-China Oil Pipeline and the Central Asia-China Gas Pipeline, which were built by China in the 2000s, have great impact on regional energy supply and geopolitics in Central Asia.

The mega energy infrastructure projects have not only changed the landscape of energy supply and demand, but also significantly influenced geopolitics in the region. Firstly, China's engagement in the region has been strengthened through the energy infrastructure. The oil and gas pipelines have greatly increased the energy trade between China and Central Asian countries. Secondly, with the large-scale energy infrastructure, China has gradually dominated the energy supply in the region, which made Central Asian countries depend on China more and more. Lastly, regional geopolitical competition between China and Russia over energy resources has also been impacted by the energy infrastructure built by China. Traditional energy infrastructure made by Russia gave way to China-made energy infrastructure. Russia's dominant influence in the region has also been replaced by China. Even Russia itself is making use of the China-made energy infrastructure to transport its energy to China.

However, there also exist many worries and concerns

with China's increasing presence in the region's energy sector. Under the BRI, Central Asian countries are depending on China more than ever before. The Central Asia countries might need to rethink their over-dependency on China and the trap of energy curse. In addition to traditional energy resources such as oil and gas, they should also rely on renewable energy and other substantial economic sector for a sustainable and comprehensive strategy of economic development.

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