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Legal issues regarding energy market integration in Northeast Asia

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ABSTRACT

Economic development brings along strong energy demand. Northeast Asia is one of the regions with the most potential for further energy development in the world. Due to the complex geopolitical dilemma, barriers haven't been eliminated in energy trade and investment; therefore, there is more competition than cooperation among the States in this region. The energy market of each State has not been interconnected, and the energy market integration progress is slow. This paper investigates the current situation of energy cooperation in Northeast Asia and the necessity of energy market integration. It analyzes the legal challenges faced by the integration of the energy market in Northeast Asia and examines instruments available to the integration. This paper proposes that Northeast Asian States should work together to eliminate energy trade and investment barriers, improve the level of interconnection in their energy markets, promote the efficiency of resource allocation, and deepen the regional market integration.

1. Introduction

A global energy interconnection serves as a fundamental platform for international large-scale energy development, transmission, exploitation and plays an important role in the maintenance of energy security and the improvement of the environment. The establishment of a global energy interconnection can, however, be long-term and complicated. It is hardly established overnight and is needed to be done step-by-step starting from domestic energy interconnection to inter-continental connection, and ultimately to intra-continental connection [1]. At present, to guarantee energy security, China has been focusing on facilitating energy interconnection among Asian States and North-East Asia is one of the regions which have the greatest potential for further energy development. North-East Asia covers six States, China, Mongolia, the Far East and Siberia of Russia, South Korea, North Korea and Japan, including both the world's major energy-producing and consuming States. Compared with Europe and North America, energy market integration in North-East Asia has been lagging and suffering uncertainty because of different States' policy changes regarding energy security and the turbulent political and diplomatic relations among States in this region. Although these States have realized the importance of establishing an integrated regional energy market and there are good opportunities for such development, regional energy cooperation is still largely restricted due to the complex geopolitical circumstances in Northeast Asia. Against this background, legislation is needed to promote the energy market integration. Establishing a feasible legal system to regulate and institutionalize the energy market integration can lay a foundation for future cooperation.

Possible benefits of energy market integration and cooperation in Northeast Asia have been identified by academia [2,3]. Considering the complicated geopolitical situation in Northeast Asia, integration and cooperation closely relate to regional security [4]. Several strategic initiatives have been proposed [5,6]. Recently, in particular, renewable or green energy cooperation in Northeast Asia has been discussed [7]. To support the integration and cooperation concerning energy in Northeast Asia, two important aspects are worthy of special attention. The first aspect concerns financial energy market integration in Northeast Asia. Studies have shown that despite legal restrictions on cross-border transactions, financial markets in Northeast Asia have integrated over time [8,9]. The integration provides a good instrument for investors to hedge energy risks but it may also cause contagion effects [10,11]. As a result, cooperation mechanisms are needed to address possible financial risks. The second aspect concerns legal and institutional instruments facilitating integration and cooperation. Such instruments not only provide basic frameworks for regional energy cooperation but also contribute to effective regulatory cooperation on energy issues. This can further improve the regional financial energy market.

The aim of this paper is to analyze legal issues concerning the integration of the energy market in Northeast Asia. The paper firstly investigates the current situation and the necessity of energy market

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integration. It further analyzes the legal challenges faced by the integration of the energy market in Northeast Asia and lastly examines instruments available to the integration. This paper proposes that the Northeast Asian States should work together to eliminate energy trade and investment barriers, improve the level of interconnection in their energy markets, promote the efficiency of resource allocation, and deepen the regional market integration.

2. Background

The situations concerning energy are complicated in Northeast Asia. At present, States in this area have a strong energy demand, but because of some political and economic factors, a regionally integrated energy market is absent. The regional energy supply-demand relations, the energy security issues, and the trends in market integration suggest that the establishment of an integrated Northeast Asian energy market is needed.

2.1. Status quo of Northeast Asian energy market

Establishing a common energy market has been an aspiration for Northeast Asian States for a long time. However, complex situations in different States in Northeast Asia may restrict the integration of the regional energy market. Geographically, China and Russia are vast in territory, whereas Japan, North Korea, and South Korea are relatively small. Economically, Japan and South Korea are developed countries, whereas China, Russia, North Korea, and Mongolia are still developing countries (Table 1). In particular, the economy of North Korea, which has been sanctioned by a group of States headed by the United States, is basically closed and having difficulties for further development. Politically, China and North Korea are socialist States, whereas the rest are adopting capitalism. This may lead to significant differences regarding the structure and the regulatory policy of the energy market. In terms of natural resources, Russia and Mongolia are abundant in natural resources while Japan and South Korea have small resource deposits. China has proven oil, coal, and gas reserves in its northeast part and a large amount of renewable energy remains undeveloped. North Korea is rich in mineral resources, but not fully exploited because of the electricity shortage. In respect of energy demand, the energy produced by Russia and Mongolia can be used for export in addition to self-sufficiency. China, Japan, and South Korea have large energy demand and import is needed. North Korea has to solve the power shortage problem first [12].

Despite the above challenges, there are also many factors in favor of the energy market integration in the six States. For instance, the six States are geographically close to each other, which makes it easier to transmit energy (Fig. 1). The entire region is highly complementary in energy demand, energy structure, and energy technology (Table 2). The States have a general willingness to cooperate in economic and collaborative development. In addition, a number of energy cooperation projects or initiatives have been developed, for example, the Unified Gas Supply System (UGSS), the Eastern Siberia Pacific Ocean (ESPO) Oil Pipeline, and the Asian Super Grid (Fig. 2) [13].

From a macro perspective, the energy market has shown a strong monopoly on both domestic and international levels. In the domestic energy market, although various States have carried out market liberalization and many traditional state-owned public energy entities have been demerged or dissolved, deep-rooted monopolies and restrictions on market access are difficult to be removed in the short term [16]. In most States, the energy market is still dominated by several major monopoly interest groups and emerging domestic companies are still facing barriers to enter the market. In the international energy market, the Organization of the Petroleum Exporting Countries (OPEC) monopolizes oil exports, States such as Indonesia, the United States, Australia, and South Africa monopolize coal exports, and Russia monopolizes natural gas exports [12]. In terms of petroleum, the 'new seven sisters'[1] control one-third of the world's oil and gas production and the remaining recoverable reserves and virtually seize the power to make rules in the global oil and gas industry. From the micro perspective of the market, energy products have both commodity and financial attributes. Therefore, the energy market can also be divided into two parts: the physical market and the financial market. There is not yet a regional market for physical energy trading and long-term trade is still the main method for such trading. A financial market for energy trading among China, Japan, and Russia has been established but remains low-level developed, having no significant effect on the regional pricing of energy [17].

In recent years, the economy of Northeast Asian States has developed rapidly and the energy demand has increased, especially in China, Japan, and South Korea (Fig. 3). Although States in this region have an advantage of being close to each other and therefore enjoying low transportation costs, competition has occurred more than cooperation among the energy-demanding States in Northeast Asia for a long period. A continuous and stable energy trading and investing among energy-demanding States and energy-supplying States are absent [18]. Take China, Japan, and South Korea as an example, these three States have engaged in vicious competition in the energy market using their national power to ensure their energy security, for instance, disputes between China and Japan regarding the Angarsk-Daqing pipeline and Angarsk-Nakhodka pipeline [19]. Even if these three States have the intention to cooperate, there is no clear cooperation mechanism or comprehensive guidelines [20]. So far, the trade volume of petroleum products between these three States is small, not to say the trade volume of petroleum and gas. Tariffs and multiple non-tariff barriers concerning the energy import between these three States have been impeding the energy trading in the region [17]. Although Northeast Asia is rich in energy resources, there is obvious market separation in the region and the integration of the regional energy market has been slow.

2.2. Necessity of Northeast Asian energy market integration

2.2.1. Fundamental driving forth: supply-demand relations in the region

Northeast Asia is the most economically and culturally developed region in Asia. It is also one of the regions with a most active economy in the world and a large energy demand. In 2018, the total growth rate of primary energy consumption in China, Japan, and South Korea was 30.2% [12], far exceeding the growth rate of energy consumption in other regions. At the same time, Russia and Mongolia have surplus energy and an urgent need for more exporting channels [21]. The current situation suggests that none of the Northeast Asian States can solve their problems alone, and energy cooperation becomes the consensus of these States [22]. In terms of the energy market, the participation of all States in this region is the best option. Game-theoretic models suggest that there are 63 possible cross-border power trading schemes among the six States in Northeast Asia, and the model in which all six States participate is the lowest-cost scheme [23]. It is obvious that the energy supply and demand relations of the States in this region are the fundamental driving force for the integration of the regional energy market. By reducing income elasticity and increasing price elasticity, the impact of energy demand growth will be effectively alleviated [24]. The integration of the energy market can help to improve the flexibility of Northeast Asian States in meeting their energy demand and reduce the energy-related pressures caused by the economic growth.

[1] The 'new seven sisters' are Saudi Aramco, Russia's Gazprom, CNPC of China, NIOC of Iran, Venezuela's PDVSA, Brazil's Petrobras and Petronas of Malaysia.

Table 1
Economic conditions of the northeast Asian countries.

Country	Population (2020, Million)	Land Area (2018, sq.km)	GDP			
			Year	(Million USD)	Growth (2019, %)	Per Capita (2019, USD)
China	1402.1	9,424,702.9	**2000**	1,211,346.9	5.9	10,216.6
			2010	6,087,163.9		
			2019	14,279.937.5		
Japan	125.8	364,500.0	**2000**	4,887,519.7	0.3	40,113.1
			2010	5,700,098.1		
			2019	5,064,872.9		
Mongolia	3.3	1,557,255.0	**2000**	1,136.9	5.2	4339.8
			2010	7,189.5		
			2019	13,996.8		
North Korea	25.8	120,410.0	**2000**	–	–	–
			2010	–		
			2019	–		
Russia	144.1	16,376,870.0	**2000**	259,710.1	2.0	11,497.6
			2010	1,524,917.5		
			2019	1,687,448.5		
South Korea	51.8	97,520.0	**2000**	576,178.1	2.0	31,846.2
			2010	1,144,067.0		
			2019	1,646,739.2		

- Data not applicable or not available.
Source: Data Collected from World Bank

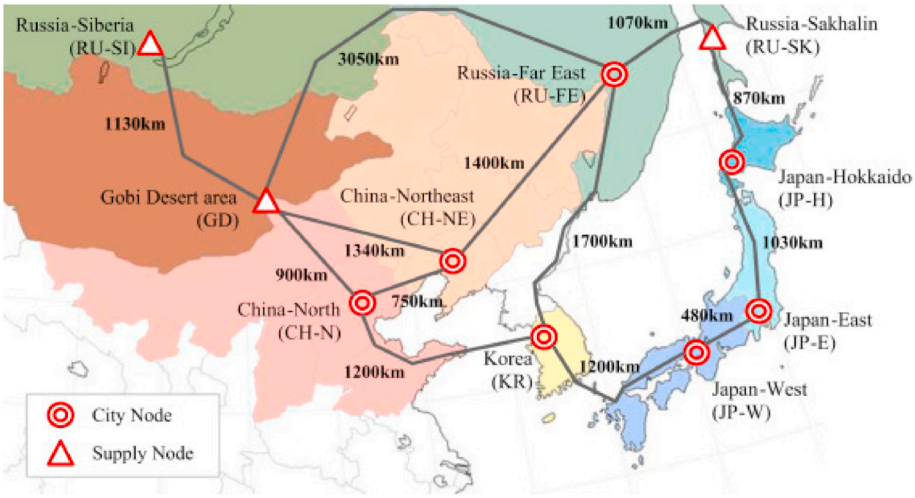

Fig. 1. Transmission distances in northeast Asia.
Source: Otsuki, T., Isa, A. B. M., & Samuelson, R. D. (2016) [14].

2.2.2. A supportive factor: extra-regional energy premium and security risks

Among the six States, China, Japan, and South Korea have an increasing energy demand. These three States largely depend on overseas imports, but they face unfair treatment such as the 'Asian Premium'. An integrated regional energy market can effectively promote energy cooperation among these six States, avoid vicious competition, and jointly maintain market stability. These six States, as a collective, can make a unified voice and take action together in the international energy market. Utilizing the market mechanism, it helps to improve the entire region's competency in the global energy market, enhance the pricing power and eliminate the 'Asian Premium' [25]. In addition, the energy imports of China, Japan, and South Korea are mainly through the land (China) and sea (China, Japan, and South Korea) routes. In terms of the land routes, transportation through Central Asia faces the risks of the complicated political situation, rampant religious forces, and frequent government changes; In terms of the sea routes, all of them need to pass through the Strait of Malacca and the South China Sea, the stability of which is threatened by complicated sovereignty disputes and frequent pirates [26].

2.2.3. The call of regional integration

Existing literature has proven that energy cooperation, including power trading, can help States in Northeast Asia to avoid the political suspicions that have long been caused by geo-competition and nationalism. Even among States with a history of conflict, trust can be built with electricity trading and the strengthened interdependence is good for the resolution of the conflicts [27]. An integrated energy market in Northeast Asia cannot only break down barriers to power trading among these six States but also extend the scope of trading to other types of energy. Cooperation by trade, investment, and contracts can improve the information exchanging and mutual understanding among these six States, ease the vicious competition, guarantee the interests of these six States as a collective community, and jointly resist the negative impact caused by market risks such as fluctuations in international energy prices. In this way, the multilateral cooperation reached in this specific area can serve as an entry point for the regional multilateral security mechanisms, the regional economic cooperation, and the regional integration in Northeast Asia [28]. At the same time, Northeast Asia is a sub-region of East Asia. The energy market integration in this region can

Table 2
Energy statistics of the northeast countries.

Country	Year	Production	Imports	Exports	Supply	Final Consumption
		(Thousand Metric Tons of Coal Equivalent)			(Petajoules)	
China	2015	2,607,837	124,709	13,088	119,870	76,046
	2016	2,415,315	160,992	16,054	–	76,244
	2017	2,496,752	169,202	13,579	–	77,878
	2018	2,622,819	171,719	12,957	129,651	82,022
Japan	2015	1107	168,250	786	18,086	12,361
	2016	942	163,473	1024	–	12,177
	2017	1106	166,350	1229	–	12,319
	2018	1053	163,922	1456	17,859	11,918
Mongolia	2015	20,639	1	12,864	272	203
	2016	31,123	0	23,064	–	224
	2017	43,242	2	27,749	–	375
	2018	46,279	2	30,650	541	424
North Korea	2015	24,101	1009	17,971	332	279
	2016	27,955	1284	20,435	–	330
	2017	18,995	794	[a]4435	–	254
	2018	15,856	128	–	265	215
Russia	2015	286,103	[a]20,429	139,806	28,943	18,383
	2016	298,801	[a]20,001	152,746	–	18,854
	2017	317,480	[a]24,602	168,843	–	19,426
	2018	361,269	[a]24,127	[a]203,710	33,226	21,464
South Korea	2015	1121	115,899	–	11,428	7316
	2016	1097	116,238	–	–	7557
	2017	983	116,668	–	–	7741
	2018	754	114,013	–	11,826	7699

- Data not applicable or not available.
Source: Data Collected from UN Energy Statistic Yearbook 2018
[a] Estimate by the United Nations Statistics Division.

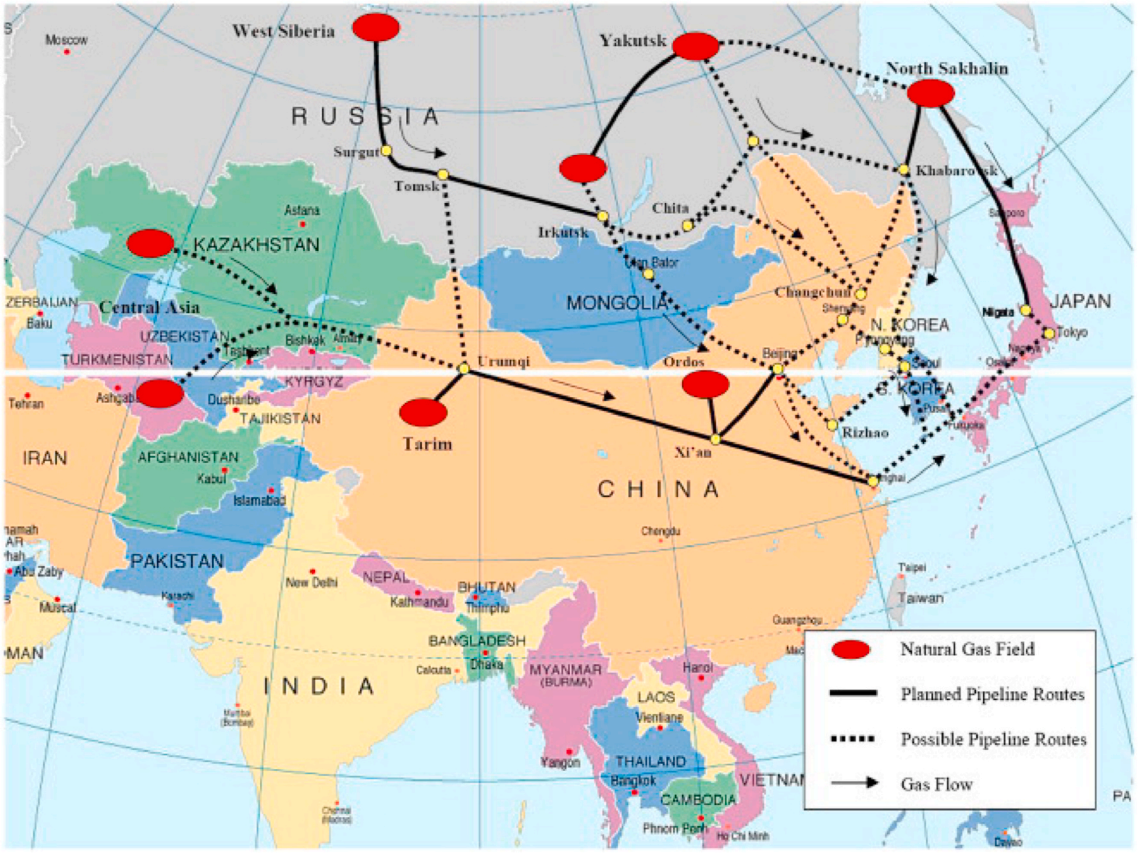

Fig. 2. Several proposed gas pipeline routes in northeast Asia.
Source: Hippel, D., Guilidov, R., Kalashnikov, V. & Hayes, P. (2011) [15].

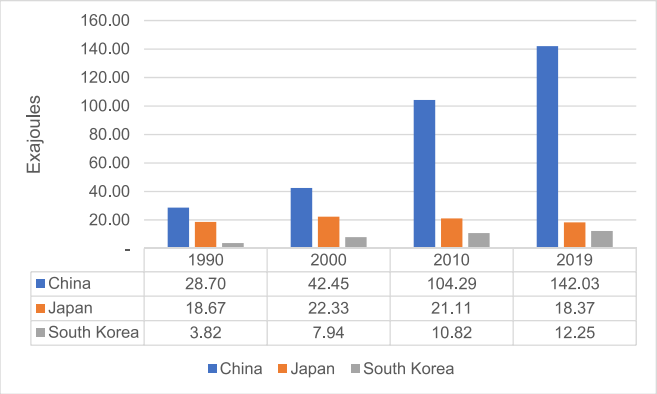

Fig. 3. Energy demand of China, Japan and South Korea.
Source: BP Statistic Review

also contribute to the energy market integration in East Asia [28]. Energy market integration and cooperation in Northeast Asia can perform as basis and an example for the integration of the energy market in entire East Asia in the future. It can gradually expand to the ten Association of Southeast Asian Nations (ASEAN) States when the cooperation is stabilized, and may further involve South Asian States such as India.

2.2.4. The requirement of China's dual-circulation strategy

On May 14, 2020, the Standing Committee of the Political Bureau of the Communist Party of China Central Committee held a meeting. To establish a 'new development pattern' in which 'the domestic and international dual cycles promote each other' [29]. The so-called 'domestic and international dual cycles', in simple terms, is to develop the domestic market and at the same time expand the international market, and both cycles promote each other. Energy is necessary for economic development. In the context of dual cycles, on the one hand, China's energy industry needs to modernize its industrial chain; on the other hand, China needs to coordinate with the other States in Northeast Asia to promote the integration of the regional energy market, eliminate the barriers to regional energy flow, reduce the national intervention, and provide a good environment for the flow of technology, capital, and personnel between States and enterprises.

3. Legal challenges for the integration of northeast Asian energy market

Integration of energy market in Northeast Asia, as a long-term goal for the energy cooperation in this region, can function in two ways: to guarantee the sufficiency and stability of energy supply and to encourage free competition to reduce energy prices (excessive monopoly needs to be prevented). However, thus now, the integration of the energy market in Northeast Asia is progressing relatively slow and faces many challenges.

3.1. Lack of multilateral agreements and coordinating institutions

The proposal of establishing a coordination mechanism regarding energy cooperation in Northeast Asia has been brought forward many years ago and States in this region have long been exploring this issue. For instance, the Northeast Asian Gas and Pipeline Forum (NAGPF) was established in 1997, ASEAN+3 Ministers on Energy Meeting was launched in 2004, the Meeting of Energy Ministers of China, India, Japan, South Korea, and the United States was held in 2006, Cebu Declaration on East Asian Energy Security was signed in 2007, etc. However, no matter official or non-official, the above-mentioned regional mechanisms for energy cooperation provide limited opportunities for information exchanging and can hardly produce actual motivation for regional energy cooperation [30]. So far, Northeast Asia has not established a regional, specialized mechanism for energy cooperation, nor has it formed a regional institutional arrangement. This has led to slow progress in multilateral cooperation, although bilateral cooperation in this region has been rapidly developed.

At the multilateral level, North Korea is in a relatively closed State and other Northeast Asian States have participated in a number of comprehensive international mechanisms covering a wide range of strategic, political, and economic issues including energy issues, for instance, the Asian Development Bank, Asia-Pacific Economic Cooperation (APEC), ASEAN+3, Asian Cooperation Dialogue, Asia-Pacific Partnership on Clean Development and Climate, United Nations Development Programme, Asia-Europe Meeting, Boao Forum for Asia, East Asia Summit, G8, G20, Northeast Asia Economic Forum and Shanghai Cooperation Organization, etc. In addition, Northeast Asian States have also participated in a number of energy-related mechanisms, comprehensive ones including the Asia-Pacific Energy Research Center, Northeast Asia Energy Cooperation Organization, Energy Charter and International Energy Agency, etc, ones concentrating on specific types of energy including the Joint Oil Data Initiative, Northeast Asia Gas and Pipeline Forum, Gas Exporting Countries Forum (oil and gas), Global Environmental Expert Networks (electricity), International Renewable Energy Agency (renewable energy), International Commission on Large Dams (hydropower), World Nuclear Power Association (nuclear energy), etc. [31].

As far as China is concerned, China has established intergovernmental energy cooperation mechanisms with more than 90 States and regions and has established cooperative relations with more than 30 international organizations and multilateral mechanisms concerning energy issues [32]. In recent years, China has strongly advocated and supported regional energy cooperation. It has developed cooperation platforms with ASEAN, Arab League, African Union, Central and Eastern Europe, etc. China has also established the East Asia Summit Clean Energy Forum and actively participated in G20 energy cooperation, China-EU Energy Dialogue, Shanghai Cooperation Organization Energy Club, Greater Mekong Subregion energy cooperation, etc. However, most of the organizations or projects mentioned above concentrate on coordination or dialogue, which do not provide legally binding decisions. It has not yet been established a mature regional energy cooperation mechanism in Northeast Asia.

At the bilateral level, cooperation has been carried out between Northeast Asian States, for example, the Sino-Russian West-East Gas Pipeline Project, Sino-Russian crude oil pipeline construction, Sino-Russian gas and coal cooperation [33], Japan-Russia Sakhalin-1 and Sakha Lin-2 Projects [34], South Korea-Russia gas supply and joint development of minerals, etc. [35] The above practice includes only independent contracts or agreements for single projects, and none of them is a complementary energy cooperation agreement.

There is not yet a cooperation mechanism concentrating on energy issues covering the whole of Northeast Asia. China-Japan-Korea cooperation,[2] the Great Tumen River Initiative, and the Northeast Asia Gas and Pipeline Forum are typical existing energy cooperation mechanisms in Northeast Asia. The former two are comprehensive governmental cooperation mechanisms, and the latter is a non-governmental mechanism focusing on gas. In fact, this type of multilateral energy cooperation mechanism rarely achieves substantive progress. They mainly concentrate on discussions and policy recommendations [22]. Overall, in terms of cooperation levels, energy cooperation in Northeast Asia is mostly bilateral, with a few multilateral mechanisms, and a complete

[2] Ministers on Energy Meeting under the framework of ASEAN+3 and ASEAN+6 provide a communication platform for China, Japan and South Korea for multilateral energy cooperation. The three States are expected to establish a China-Japan-South Korea cooperation mechanism, and further invite Russia and the other Northeast Asian States to participate.

mechanism covering all these six States has not yet been established. In terms of the cooperation areas, energy cooperation in Northeast Asia is mostly focusing on the exploration, development, and transportation of traditional energy, especially oil and gas resources. Insufficient attention has been paid to the storage and processing of renewable energy. In terms of cooperation participants, energy cooperation in Northeast Asia mainly involves China, Japan, South Korea, and Russia, occasionally involves Mongolia, and rarely involves North Korea. In terms of cooperation guarantees, energy cooperation in Northeast Asia is mostly conducted with agreements which are soft law and legally binding agreements are less likely.

Multilateral energy cooperation mechanisms bear lower costs and risks compared with bilateral cooperation mechanisms when solving energy issues [36]. Only by establishing a formal and institutionalized cooperation mechanism can Northeast Asia go beyond the current bilateral-based energy cooperation and move towards the integration of the regional energy market [37]. Multilateral mechanisms for energy cooperation require institutional guarantees. However, due to historical reasons, there is a lack of mutual trust among Northeast Asian States and there is not yet a multilateral energy cooperation agreement in the region. The consequence of the aforesaid leads to the absence of unified and effective multilateral legal mechanisms for cooperatively regulating and restricting energy exploration, mining, transportation, and environment issues.

Although existing international energy organizations have been criticized (regarding issues such as memberships, loose organization, defective mechanism design, etc.), it is no doubt that international energy organizations have promoted international cooperation. By formulating national energy policy standards, reducing transaction costs, and enhancing market transparency, international energy organizations can promote information sharing between governments [38]. They also provide platforms for governments to communicate with each other and help them to cope with energy market turbulence, jointly predict future market conditions, and negotiate energy policies, all of which contribute to the integration of the global energy market [39]. Because there is not yet a mature regional energy cooperation organization or inter-governmental energy cooperation organization in Northeast Asia, it is unable for these States to comprehensively and quickly coordinate the needs of the energy-consuming States and energy-producing States and to jointly maintain their common strategic interests.

In summary, integration of the energy market in Northeast Asia has made slow progress, far behind Europe and North America. The failure of Northeast Asia States to establish a regional cooperation mechanism or cross-border institution concerning energy issues has led to a lack of mechanisms coordinating energy development and initiating multilateral energy dialogues. This restricts the expansion of regional cooperation and the development of transnational mutually beneficial energy projects, severely undermines the integration of the Northeast Asian energy market and future regional energy cooperation [40].

3.2. Severe energy security issues

Energy is of high relevance to politics. Sovereign States often connect energy to their national security and strategy, given its strong political perception. States in the world have generally recognized the need for extensive international cooperation on energy issues. However, because of its correlation with a State's permanent sovereignty over natural resources, the issue of energy and resources has always been sensitive and controversial. With respect to energy trade and investment, energy-producing States and energy-consuming States have different interests and demand different international rules to guarantee their energy security. Therefore, energy issues are often politicized, among which energy security issue attracts special attention.

In general, under the background and trend of international cooperation, energy security is essentially energy sovereignty security for energy-exporting States, and energy supply security for energy-consuming States [41]. Energy sovereignty can be embodied in various energy rights, including core rights and transferable rights. Core rights should be resolutely reserved and any interference from abroad is not allowed. Transferable rights can be open to an appropriate extent as long as national interests are guaranteed [42]. With regard to energy supply, energy resources are unevenly distributed and only a few States control most of the oil and gas resources, while energy demand is global. This unbalanced trade basis determines that 'access to energy' is a more prominent problem than the common 'access to market' problem [16]. Energy exporting States have used a large number of trade barriers instruments such as export tariff and border adjustment taxes, which intensifies the concerns of energy-consuming countries regarding energy supply security.

As to Northeast Asia, the six States have different considerations toward energy security. Russia and Mongolia are net exporters, who pay much attention to the energy demand. They have formed a 'path dependence' on export channels, requiring a stable and lasting energy consumption market. Their top concerns are the stability and diversity of export channels and they tend to increase the prices of energy export as much as possible and attract foreign investment to improve the domestic energy infrastructure [30]. Japan and South Korea are net consumers, who attach importance to the energy supply. Their top concerns are the interruption of the energy supply chain and the increase of the costs. They pursue the stability of energy supplies and the low costs of imports and strive to expand import channels [43]. China faces a special situation, while on the one hand, the eastern coastal areas have strong energy demand, and there is an urgent need to obtain cheap and stable energy supplies from other regions (including Northeast Asia). On the other hand, there are still a lot of renewable resources in Northeast China that have not yet been exploited. If given enough technology and investment support, China can export their excess energy. Therefore, China is both an energy consumer and a potential energy exporter [44]. North Korea is rich in energy resources, especially coal and oil reserves, which have not been fully developed. The power supply in North Korea is insufficient. In addition, although North Korea cannot be an energy exporter, it can become an energy transit State. For instance, when importing electricity from Russia, building transnational power grids through North Korea is the cheapest way for Japan and South Korea [45].

Based on the above discussion, in Northeast Asia, the zero-sum game exists not only between energy importing States (such as the disputes between China and Japan on Angarsk-Daqing pipeline and Angarsk-Nakhodka pipeline) but also between energy exporting and importing States. In some circumstances, these two types of zero-sum games perform together and ultimately produce a negative impact on the effectiveness of regional energy cooperation. Confronting the increasing competition between energy-importing States, energy-exporting States will increase the price of being cooperative, which may prevent the advancement and implementation of cooperative projects. A typical example is the oil and gas pipeline construction project in Far East of Russian [30].

Energy security is a universal, common and indivisible problem for all States. Only through international cooperation can real energy security be guaranteed. A one-sided emphasis on the interests of a State will lead to zero-sum games and 'Balkanization'.[3] Energy security is not

[3] The existing global energy market has become a gradually international, integrated, effective and transparent market. However, the increasing Mercantilism measures may overly connect the oil and gas investment and supply contracts to the bilateral politics, economics, finance and aid. It may encourage the market to adopt again a nation-centred, rigid, and opaque structure as it was before the first oil shock. It will damage the globalization of the national energy markets, change the international market, and politicalize the energy market and investment. See Wang S. (2012).

only a regional issue but also a global issue. It is impossible for most States to guarantee energy security without international cooperation [46]. An important measure to address this problem is the open-up of the energy sector in various States so as to gradually realize the integration of energy markets [47]. Northeast Asian States are highly complementary to each other in terms of energy demand and consumption. By optimizing regional energy resource allocation, energy security can be greatly improved [48].

3.3. Lack of rules regulating regional energy cooperation

Energy cooperation mainly relies on international treaties, international practices and agreements between parties to regulate it. From a theoretical point of view, international energy cooperation mainly includes importing or exporting energy products, namely trade-based cooperation; transferring intangible assets such as technologies, business methods, and management experience, especially new energy technologies, energy-saving technologies, and environmental technologies, etc., namely contract-based cooperation; and conducting foreign direct investment (FDI), including the transfer of various resources, namely investment-based cooperation [49]. As far as China is concerned, in addition to some FDI in energy-related projects, China pays much attention to infrastructure construction and manufacturing in multilateral energy cooperation. Its way of using capital is simple and effective measures to promote economic cooperation in other areas are insufficient [50]. At present, a primary mode of cooperation based on oil trade is still the main mode of energy cooperation in Northeast Asia, and more effective modes of cooperation such as a regional common market are not yet developed. In addition, although Russia and Mongolia are abundant in energy resources, they face difficulties such as backward infrastructure, lack of technology and capital, etc. Therefore, relying solely on trade-based cooperation is not able to significantly reduce energy import costs, nor can it lead to market integration [51].

3.4. Lack of dispute settlement mechanism

The energy sector is capital-intensive and risky. Disputes arising in this sector are often complex and the value of the subject matter involved is also extremely large. There is not yet a specialized dispute settlement mechanism for energy interconnection. According to the current international rules, disputes caused by different types of energy cooperation can resort to different dispute settlement mechanisms. For example, the World Trade Organization (WTO) dispute settlement system can be adopted in trade cooperation, dispute settlement mechanisms adopted by bilateral agreements can be used in energy contract and investment-based cooperation. In addition, the Energy Charter Treaty,[4] Convention on International Trade in Endangered Species of Wild Fauna and Flora,[5] The Convention Establishing the Multilateral Investment Guarantee Agency,[6] some bilateral agreements, and regional free trade agreements provide arbitration institutions as dispute resolution, such as the International Center for Settlement of Investment Dispute (ICSID). Disputes concerning trade and projects other than investment can be solved in accordance with relevant international treaties by traditional international arbitration institutions [52]. Overall, the existing dispute settlement mechanisms can solve some problems, but some flaws can be found when examining the actual cases. For instance, the process of the WTO dispute settlement system may be very long. The ICSID settlement may result in unfair outcomes due to its 'no appellate mechanism' structure.

4. Instruments to the integration of the Northeast Asian energy market and related legal issues

To promote the integration of the Northeast Asian energy market, full utilization of various instruments is needed. Detailed rules should be made for each type of energy cooperation, to create a good environment for States to cooperate and to guarantee States' cooperation in energy trading and investment. For each type of energy cooperation, there are different issues that need to be addressed.

4.1. Trade-based cooperation

At present, trade-based cooperation is mainly carried out within the WTO framework. Two problems can be identified as the following:

4.1.1. Lack of specialized rules for energy trade

Energy trade has obvious mixed characteristics. In the past, the energy industry was often monopolized by a small number of suppliers (from production to distribution). This once led to the vertical integration of the energy industry, and it was impossible to strictly distinguish between energy production and services, for instance, the production and supply of electricity, the mining of oil and gas, etc. Except for the consensus that energy transmission and distribution are services, there is no agreement on whether energy mining, producing, manufacturing, extracting and refining belong to the services or commodities sector and different States have different understanding and practice [16]. On the one hand, it is hard to divide the energy industry into energy commodities and energy services according to traditional classification, on the other hand, the energy industry is a mixture of commodity trade and service trade. Based on this feature, energy trade can be regulated by both General Agreement on Tariffs and Trade (GATT)[7] and General Agreement on Trade in Services (GATS)[8] under the WTO framework. GATT covers all commodity trade, and it is applicable to all fossil fuel energy (such as oil, gas, and coal) trade. These types of energy account for more than 80% of global primary energy [53]. There are no specific provisions for energy trade in GATT, so general rules on commodity trade are applied. The provisions related to energy trade include most-favored-nation treatment (Article 1), national treatment (Article 3), concessions and restriction of tariffs (Articles 2 and 28), general elimination of quantity restrictions (Articles 11, 12, 13, 14, and 18.2), freedom of transit (Article 5), state trading enterprises (Article 17), general exception (Article 20), security exceptions (Article 21), special rules for developing countries (Article 18), and special rules for regional arrangements (Article 24) [16]. Because of the many differences between energy trade and ordinary commodity trade, for example, more State intervention, greater trade barriers, more severe path dependence, closer environmental ties, and stronger monopoly characteristics, GATT is not perfectly applicable to energy trade.

Compared with the early days, contemporary energy service trade has developed rapidly, covering the entire industrial chain, including upstream sectors such as exploration and mining, midstream sectors such as procession, refining, and transportation, downstream sectors such as distribution, storage, and marketing, as well as emerging sectors such as energy information, brokers, carbon emission trading, etc. According to the definition of services trading by GATS, international

[4] The Energy Charter Treaty, opened for signature 17 December 1994, 2080 *U.N T.S.* 100 (entered into force 16 April 1998).

[5] Convention on International Trade in Endangered Species of Wild Fauna and Flora, opened for signature 3 March 1973, 993 *U.N T.S.* 243 (entered into force 1 July 1975).

[6] The Convention Establishing the Multilateral Investment Guarantee Agency, opened for signature 11 October 1985, 1508 *U.N T.S.* 99 (entered into force 12 April 1988).

[7] General Agreement on Tariffs and Trade, opened for signature15 April 1994, 1867 *U.N T.S.* 190 (entered into force1 January 1995).

[8] General Agreement on Trade in Services, opened for signature, opened for signature 15 April 1994, 1869 *U.N T.S.* 183 (entered into force 1 January 1995).

energy services are mainly provided through commercial presence, cross-border trade, and movement of natural persons.[9] The WTO Services Sectoral Classification List[10] does not provide a separate and complete entry for energy services. It only includes three sub-sectors directly related to energy: services concerning the mining industry, energy distribution, and transportation of fuels through pipelines [54]. In addition, some services activities related but not unique to energy industry are regulated by provisions concerning other service sectors, for example, construction, consulting, trade services, and engineering services [16]. GATS and GATT are created in different periods.[11] They focus on different aspects and may have differences when applying the same principles. This makes it hard to say precisely which rules should apply to energy trade. In most cases, parties will decide which rules to adopt according to their own interests at different stages, and it may lead to confusion in the application of rules.

4.1.2. Trade barriers caused by domestic measures and policies concerning renewable energy

Renewable resources include solar, wind, biomass, nuclear, geothermal, hydropower, and ocean energy [55]. The reasons and goals for States to vigorously develop renewable energy include, first, renewable resources can help reduce carbon emission, alleviate climate change, and strengthen environmental protection; second, renewable energy is expected to replace traditional energy, especially fossil energy in the future, help States to adjust their energy supply structure, reduce energy import dependency, gradually realize energy independence and strengthen energy security; third, the renewable energy industry can foster new economic growth points, boosting the economy and generate employment [56].

At the international level, there are no international specialized rules for renewable energy, but some WTO rules can apply to renewable energy trade, including GATT non-discriminatory treatment principle, GATT general exception clause, The Agreement on Trade-Related Investment Measure (TRIMS),[12] provisions concerning subsidies in Agreement on Subsidies and Countervailing Measures (SCM Agreement),[13] etc. However, disputes concerning renewable energy have demonstrated that WTO rules are inadequate and outdated. For instance, when the current definition of 'like products', a party's different treatment of renewable energy and traditional energy may violate WTO rules because renewable energy and non-traditional energy are defined as having functional likeness and substitutability. In terms of subsidies, the SCM Agreement can hardly apply to the energy market where governments actively intervene. In addition, the standard of GATT's environmental exception clause is high and not sufficient for supporting parties' renewable energy policies [16].

Overall, current WTO rules have been lagging in regulating renewable energy sectors. Many States have promulgated domestic laws and supplementary policies to regulate them, for example, the Renewable Energy Law of the People's Republic of China (revised in 2009) provides provisions on fixed electricity price, bidding, quota, and other incentive systems. On the one hand, these provisions can encourage the development of domestic renewable resources, but on the other hand, this may result in discrimination against foreign enterprises and further trigger trade frictions [49].

4.2. Investment-based cooperation

Energy cooperation in investment is a method for promoting global energy interconnection. Investment in renewable energy is needed because it does not produce strong geopolitical influence as traditional energy [57], and therefore less sensitive. States have more willingness to cooperate with each other in this area, so renewable energy could be a pioneer area of regional integration of the energy market to strengthen exchanges and mutual trust among States and lay a foundation for further cooperation. Current problems confronting the development of cross-border investment cooperation on renewable energy include investor's limited behavior because of the information asymmetry and risks for foreign investors caused by nationalization, expropriation, currency exchange, and discriminatory treatment conducted by the host State's government [58]. Political risks are also severe problems. Investors may face unpredictable changes in environmental regulations of the host State, which may actually be a disguise for the government to protect domestic competitors [49].

4.3. Contract-based cooperation

Contract-based energy cooperation involves contracts concerning energy technology trade, energy service trade, energy exploration, mining, development of new energy, environmentally friendly energy cooperation, etc. Disputes concerning this type of cooperation can be divided into two categories, one is that the parties have different understandings and interpretations of the specific terms of the contract, which leads to differences in their respective rights and obligations; the second one is that the parties have consensus on the terms, but disputes arise due to one or more parties failing to perform their obligations. The latter ones are the main problems at present, that is, how to make the breaching parties assume the legal liability when the contract is violated [59]. In addition, a State's decision to alter the contract out of considerations of energy security, public policy, and environmental protection is legal in international law, and the State does not need to bear legal responsibility. Therefore, similar to investment-based cooperation, contract-based cooperation also faces risks such as national expropriation and domestic policy changes.

5. Suggestions for promoting the integration of energy market in Northeast Asia

To facilitate the integration of the Northeast Asian energy market, four aspects need to be highlighted for a complete conceptual and institutional guarantee: to establish a sound multilateral cooperation mechanism to realize the free circulation of resources in the region; to establish a 'new concept' of energy security which takes into account national, regional, and international common interests; to find effective ways of cooperation using various instruments such as trade-based cooperation, investment-based cooperation, and contract-based cooperation; to improve dispute settlement mechanisms to effectively resolve regional disputes.

5.1. To establish a multilateral cooperation mechanism

Market integration requires a complete set of rules and incentive mechanisms to break trade barriers and ensure the free flow of goods, services, and capital. Experience of the EU and North America suggests that a treaty should be adopted to coordinate energy production and trade between the contracting States and a legal framework should be created to urge member States to increase market openness and participate in deep-level cooperation on the energy industry [18]. A legally-binding multilateral cooperation framework for energy interconnection is needed to fulfill the regional integration of the energy

[9] The General Agreement on Trade in Services and Introduction, Trade in Services Division, WTO, 31 January 2013.

[10] WTO, Services Sectoral Classification List, MTN.GNS/W/120, 10 July 1991.

[11] GATS was concluded in 1993 during the Uruguay Round and entered into force in 1995. GATT 1947 was concluded in 1947 and entered into force in 1948. After amendment, it was updated as GATT 1994 and became part of the WTO legal framework in 1995.

[12] Agreement on Trade-Related Investment Measures, 15 April 1994, WTO Doc LT/UR/A-1A/13, 1868 *U.N T.S.* 186.

[13] Agreement on Subsidies and Countervailing Measures, 15 April 1994, 1869 *U.N T.S.* 14.

market and further facilitate freedom of trade and investment. With regard to Northeast Asia, because of the territorial disputes, political obstacles, and national consciousness among some States, a regional legal framework can contribute to the foundation for cooperation and careful-designed rules can guide, regulate and guarantee cooperation in the energy field, helping States to constrain unstable factors caused by national political turbulence.

An inter-governmental multilateral organization dedicated to energy cooperation can play an important role in realizing regional common interests in the energy sector by facilitating information sharing, coordinating energy markets, reducing price fluctuations, and balancing the interests of energy-producing and consuming States [60]. Therefore, a formal and permanent international institution or organization should also be established to implement the regional legal framework. At present, as mentioned above, energy cooperation in Northeast Asia is mainly conducted by bilateral instruments, a regional multilateral cooperation mechanism involving all these six States (or at least the five States except for North Korea) is absent. Therefore, the suggestion is to sign a multilateral energy cooperation agreement following the example of the 'Energy Charter Treaty' and to establish a specialized regional organization for energy cooperation in Northeast Asia. A General Assembly, a High Commission, a Council of Ministers, a Secretariat, and a Dispute Settlement Body should be set up and corresponding voting procedures, rules of procedure, implementation and supervision mechanisms should be created in the organization [58]. As to the scope of the regional cooperation, it can be gradually carried out in different areas, starting with cooperation in low-sensitivity issues such as scientific cooperation in renewable resources, and later expanding to cooperation in electricity, gas, coal, and nuclear energy trading and infrastructure construction.

5.2. To establish a 'new concept' of energy security

There have been three views of energy security in the international community, namely, unilateral, cooperative, and new concept of energy security [61]. Both unilateral and cooperative views are essentially based on nationalism, that is, no matter from which angle or aspect, national energy security is the core interest for States [61]. The new concept of energy security was first proposed in 2006 by the then Chinese President Hu Jintao during the G8 Summit. Since then, Chinese leaders have repeatedly advocated and expounded China's new concept of energy security at various international conferences [62]. Under this new concept, energy issues are global issues, which are universal, common, and indivisible for each State. A single State cannot solve the problem and international cooperation is needed. The international community should avoid the politicization of this issue and engage in all-round, multi-level, and wide-ranging energy cooperation from the perspective of sustainable development of human society [61]. The new concept of energy security transcends the limit of the narrow unilateral energy security concept and the unsustainable cooperative energy security concept, concentrates on the common interests of mankind, and emphasizes international energy security. It takes into account the mutually beneficial cooperation between States, the promotion and development of energy technology, and the beautiful vision of the international society to create a harmonious international political environment with energy security, and points out the direction of the ultimate solution to energy issues [58].

Initially, States sought energy security guarantees only concentrating their own interests (unilateral energy security). Later, States adopted a cooperative approach to guarantee their own and regional energy security (cooperative energy security). Gradually, States developed the concept of sustainable development of human society and sought multi-dimension, comprehensive, multi-regional, and flexible cooperation (new energy security). This demonstrated the evolution of the views of the energy security. Currently, Northeast Asian States still generally adopt a unilateral view of energy security, emphasizing their own energy security. This leads to zero-sum-game thinking and a 'Balkanization' situation, for example, the competition between China and Japan over Russian power lines [61,63]. Even there is some energy cooperation mechanisms, most of them are small-scale, without many participants, and narrow scope.

To promote the integration of the Northeast Asian energy market, it is necessary to first foster multilateral cooperation and establishes an integrated energy market, using market mechanisms to reduce State intervention and promote the flow of advanced energy technology, capital, and personnel. The regional competency can be improved in this way. This requires these six States to abandon the narrow and unilateral view of energy security, as well as the unsustainable cooperative view of energy security, and reach a regional consensus on a new view of energy security. By using it as a guide to reform the existing trade rules or establish new specialized rules concerning energy, balancing the interests between energy-producing and energy-consuming States, a 'sustainable international energy security' can be realized. In addition, a regional consensus on the new view of energy security can make the behaviors of the participants more transparent, predictable, and more legitimized [46], which will help Northeast Asian States to abandon the zero-sum game thinking in which each State is seeking energy advantages using their state power. This could foster mutual trust in the area of energy cooperation and further encourage regional cooperation in other areas, promoting regional integration and contribute to the peace and prosperity in Northeast Asia.

5.3. To develop effective cooperation methods

In addition to tariff and non-tariff barriers confronting integration of ordinary commodity market, integration of energy market also faces monopolies in the energy industry and imperfect financial market caused by the fact that dominant trading method of energy is long-term contracts. These two factors contribute to the difficulty for Northeast Asian States to form a diversified and fully competitive oil and gas market [56]. Therefore, when establishing a legal framework for the regional energy market, trade-based cooperation, investment-based cooperation, and contract-based cooperation should be fully utilized. Cooperation instruments need to be developed and the efficiency of the instruments needs to be improved under the legal framework. The low-sensitivity field of renewable energy can perform as an entry point. With more political mutual trust and friendliness among people, the possibility of cooperation on energy and other economic areas would be greatly increased.

Specifically, in terms of trade-based cooperation, in addition to applying basic WTO trade rules, modification and improvements of trade rules based on the unique feature of energy trade should be carried out and regional legal mechanisms based on the actual conditions in Northeast Asia should be established. Special rules should be made considering the particularities of renewable energy trade and clean energy trade. With regard to investment-based cooperation, an effective information disclosure mechanism should be established, focusing on special issues in the field of energy investment. A legal framework featuring stability, publication, and reasonableness should be built. Similarly, for contract-based cooperation, while effectively guaranteeing national energy sovereignty, fully disclosure of information regarding domestic policies and laws and an active introduction of foreign technology and capital should be encouraged. It is worth noting that China has been engaged in accelerating the pace of opening up to foreign invest mentors regarding the energy field and more part of the energy market will be accessible. Restrictions on the access of foreign investment will continue to decrease and a pre-establishment national treatment plus negative list management system has been adopted. Since 2018, restrictions on foreign investment regarding coal, oil, gas, electricity (except for nuclear power), and new energy have been completely removed [32].

5.4. To establish a dispute settlement mechanism

Energy disputes arising from the integration of energy markets can be divided into three types, disputes between States, disputes between investors and host States, and disputes between commercial entities such as investors and operators [31]. Specifically, disputes may concern contract terms, government levies, discriminatory policies, energy arbitration, and other procedure, etc. [52] As the current dispute settlement mechanism in the energy sector still faces problems, when developing the legal framework for the integration of the Northeast Asian energy market, special attention should be paid to methods and procedures regarding the dispute settlement mechanisms. Existing dispute settlement mechanisms can be used and different procedures should be established for different types of disputes. For instance, in terms of trade-based cooperation, the WTO dispute settlement mechanism can be applied, including consultation, good offices, conciliation, mediation, expert panels' review, Appellate Body's review, supervision of the implementation of the panel and Appellate Body reports, and arbitration, etc. In terms of the contract and investment-based cooperation, disputes can be handled by local courts, administrative arbitration institutions, or international arbitration institutions, for example, the United Nations Commission on International Trade Law (UNCITRAL), the Arbitration Institute of the International Chamber of Commerce in Stockholm, Switzerland, and the ICSID. In addition, with the experience of existing mechanisms, Northeast Asian States can make an effort to establish a special dispute settlement mechanism for energy trade, namely, a special Northeast Asian energy arbitration institution. The institution should have full jurisdiction over energy disputes among States in this region, and its decision should be legally binding. In the selection and appointment of arbitrators, a combination of regional and extra-regional experts should be adopted. In this way, the participation of States in this region can be guaranteed and the fairness and independence of the awards can be maintained as well.

6. Conclusion and policy implications

There is a global trend of building energy interconnection. In Northeast Asia, however, energy cooperation is still mainly conducted by bilateral agreements, a stable multilateral cooperation mechanism is absent, and the progress of energy market integration has been slow. The reasons for it include States' outdated concept of energy security in this region, the lack of regional multilateral cooperation agreement and inter-government coordinating institutions, low-level regulation of different types of cooperation, and the absence of dispute settlement mechanism. As one of the regions with the most potential for energy development, Northeast Asian States urgently need to improve the above-mentioned situation, remove barriers of energy trade and investment, promote the interconnection of energy markets in different States, and utilize the market mechanism to promote efficiency of resource allocation. Northeast Asian States should establish a 'new concept for energy security', make full use of multiple cooperation instruments such as trade, investment, and contracts, eliminate barriers such as trade barriers and monopolies, establish a regional multilateral cooperation mechanism, and promote the integration of the regional energy market.

Considering the complicated historical and geopolitical situation in Northeast Asia, a step-by-step approach should be adopted. Legal integration and cooperation should start with simple measures where common ground and mutual interests are easily found. Actionable priorities like scientific cooperation, periodical meeting, and consultation mechanisms should be arranged. Political consensus such as the "new concept of energy security" needs to be established. The next step will be a framework agreement and an outline timetable for forming effective mechanisms. Negotiation and adjustment are needed during this process. The aim is to establish a comprehensive legal framework promoting integration and cooperation on energy issues in Northeast Asia. The framework not only provides institutional designs for coordination of energy policies but also covers disputes resolution mechanisms concerning infrastructure building and energy trading and investment. To establish and implement the framework, both regional and national institutional capacity building is needed.

Credit author statement

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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