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ORIGINAL PAPER

Energy cooperation in the Belt and Road Initiative: EU experience of the Trans-European Networks for Energy

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Abstract This paper examines energy cooperation within the Belt and Road Initiative (BRI) with reference to the European Union's experience of the Trans-European Network for Energy (TEN-E) in addressing various policy challenges, including market competitiveness, climate change and the security of supply through energy infrastructure networks. As a development framework with strong geo-political and geo-economical dimensions, the BRI aims to promote interconnectivity and cooperation in infrastructure, policy, trade, finance and culture among Eurasian countries. The implementation of the BRI is expected to involve numerous investments as well as infrastructure construction and industrial integration in the energy sector. The EU experience in creating an energy network has indicated a clear synergy between infrastructure networks and the market. In the 1990s, TEN-E was developed to create an integrated energy market, reinforce economic and social cohesion, and connect peripheral regions. Through an analysis of the EU experience, this paper argues that the BRI foresees turning China's energy cooperation in Eurasia into an integrated and multilateral strategy. While energy infrastructure networks could contribute to achieving the BRI's objectives, possible obstacles exist in the creation of those networks in the BRI, including asymmetric policy priorities, financing challenges and the lack of a multilateral legal framework.

Introduction

The Belt and Road Initiative (BRI) is a massive development framework with a strong geopolitical and economical dimension that China has proposed to strengthen the connection among Eurasian countries in five areas: infrastructure, policy, finance, trade and culture. The BRI consists of two main components: the land-based Silk Road

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Economic Belt and the oceangoing New Maritime Silk Road. The BRI represents the revival of the ancient Silk Roads and emphasises 'peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit' (NDRC, MFA and MOC 2015). Geographically, the BRI involves 65 states and around 4.4 billion people in six economic zones across Eurasia, stretching from Southeast and South Asia to Africa and Europe. Placing China's neighbourhood regions, such as the Central Asia, as the main strategic priority, the initiative calls for integration of the region (Chen 2015; Escobar 2015; Zeng 2017).

One key aspect of the BRI is energy cooperation, especially with respect to those nations in which infrastructure construction and industrial access are possible (Downs 2015; Escobar 2015; Pavlićević 2015). Energy cooperation involves large-scale infrastructure construction, the trading of resources, and energy finance products and energy governance, all of which cover at least four out of five areas of the connectivity in the BRI. According to official statements, Chinese energy investment in the BRI will significantly promote the development of transnational infrastructure, logistics hubs, transcontinental trade and the regional energy market in Eurasia (NDRC and NEA 2017). Considering the BRI's scale and geographical coverage, energy cooperation increases not only economic activities among the countries in the BRI region but also enhances integration of the region (Escobar 2015; Pavlićević 2015). Energy cooperation is hence one of the key means to achieve the BRI's connectivity objectives.

The connectivity of energy projects in the BRI recalls the European Union's experience with the Trans-European Networks for Energy (TEN-E), a strategy that addresses various policy challenges, including market competitiveness, climate change measures and security of supply by linking energy infrastructure (European Commission 2017b). The development of TEN-E is generally considered an important contribution to the creation of the energy market among EU member states that provides a reinforcement of economic and social cohesion. The development of energy networks has clear synergies with the competition of the energy market (Artige and Nicolini 2006; European Commission DG for Energy 2012; Kristiansen 2007; Newbery et al. 2013; Subacchi et al. 2014). Sufficient connectivity of energy projects is crucial for interoperability, transfers and flexible supply (European Commission 1995b, 2017b). The EU experience in addressing different problems through effective measures offers several implications for the BRI.

The aim of this paper is to analyse how energy cooperation can help the BRI to achieve its objectives in connectivity and to determine what lessons could be learnt from TEN-E. With connectivity as its backbone, the BRI aims to achieve China's economic, foreign and security policy interests through a series of smaller-scale initiatives and projects (Chen 2015; Pavlićević 2015; Zeng 2017). The scope of energy cooperation aligns with the key areas of connectivity in the BRI, thus allowing energy cooperation to become a key vehicle of the initiative. This paper argues that, in the long run, the BRI will turn China's energy investment in Eurasia into a regional and integrated.

The rest of this paper is structured as follows. The next section provides an overview of energy cooperation under the BRI by delving into the scope, principles and intentions of the BRI. The paper then turns to the European Union's TEN-E and compares that initiative with the BRI. Afterwards, by elaborating on the experiences in the European Union of creating energy infrastructure networks, the paper analyses

the challenges and implications for the BRI. The final section summarises the paper's main arguments.

Energy cooperation in the Belt and Road Initiative

Energy cooperation has been repeatedly highlighted in official Chinese documents that address the BRI since the initiative's inception. Energy cooperation in the BRI was mentioned in the 'Vision and Actions on Jointly Building the Silk Road Economic Belt and the 21st-century Maritime Silk Road' (hereafter 'Vision and Actions'), which presented the scope and principles of energy cooperation based on the BRI's framework of 'peace and cooperation, openness and inclusiveness, mutual learning and mutual benefit' (NDRC, MFA and MOC 2015). Energy cooperation in the BRI was then incorporated into the '13th Five-Year Plan for Economic and Social Development' in March 2016, which addressed the synergy between BRI-related economic corridors and international energy cooperation (NDRC 2016b). Energy cooperation in the BRI is elaborated on in the '13th Five-Year Plan for Energy Development'. China will utilise both domestic and international markets to expand international cooperation. By pushing energy projects forward in the BRI, China will enhance the connectivity of energy infrastructure in Eurasia as well as China's participation in global energy governance (NDRC 2016c). Since 2016, a number of policy papers have further addressed energy cooperation in the BRI by explaining the role of different energy arenas—including the oil, gas, coal, renewable and power sectors—in the BRI (NDRC 2016a, d, e, f, g).

During the 2017 BRI summit, China's National Development and Reform Committee (NDRC) and National Energy Administration (NEA) jointly published the 'Vision and Actions on Energy Cooperation in Jointly Building the Silk Road Economic Belt and the 21st-century Maritime Silk Road', hereafter 'Vision and Actions on Energy Cooperation' (NDRC and NEA 2017). The document highlights the importance to the BRI of energy cooperation and lists the cooperation principles, including being open and inclusive, mutually beneficial, market-oriented, safe, green, efficient and harmonious. The document seeks to:

1) promote energy cooperation for an open, inclusive and beneficial community of shared interests, responsibility and destiny;
2) improve regional energy safety and to optimise the distribution of energy resources;
3) integrate regional energy markets; and
4) advance green and low-carbon development.

In general, energy cooperation in the BRI is aligned with the BRI's ambitious economic vision of the opening up of and cooperation among the countries located along the Belt and Road (NDRC, MFA and MOC 2015).

Energy cooperation is a medium for linking Chinese investment 'to a broader Chinese national strategy aimed at forging tighter economic links between China and the rest of Eurasia' (Downs 2015, p. 5). The objective of energy cooperation, however, is not merely to acquire energy resources but also to cover the diversification of source and transportation routes, industry development, policy coordination, energy financing,

sustainable development and regional governance in accord with the Vision and Actions on Energy Cooperation. According to one former Chinese senior diplomat interviewed for this paper, China's strategic focus has shifted from quantitative objectives (e.g. increasing the amount of imported oil) to qualitative objectives, such as upgrading infrastructure and industries (Interview, Beijing, 20 Nov 2017). The BRI also has no clear preference among different types of energy investment as long as the investment fulfils the above objectives, especially when looking for energy investment opportunities in overseas markets. Such energy cooperation could support the BRI in addressing a number of interrelated challenges, including China's economic transformation, exploration of new markets, managing domestic excess capacity and production, and regional security and growing negativity in China's neighbourhood (Escobar 2015; Hornby 2016; Pavlićević 2015). Beyond these factors, overseas investment built on energy infrastructures and trade will allow China to bolster and solidify its geopolitical standing (Magnus 2015). The Chinese government has emphasised that strengthening energy cooperation by jointly building the BRI could 'stimulate wider and deeper regional cooperation at a higher level for the economic prosperity of the whole world' (NDRC and NEA 2017). In terms of connectivity, energy cooperation in the BRI is expected to be an integrated and multilateral engagement strategy.

Energy cooperation, which is multidimensional in nature, covers at least five areas of connectivity found in the BRI. The implementation of energy cooperation is widely expected to be rooted in the following aspects.

Energy infrastructure

China has been expanding the scale of investment in energy projects in order to advance the connectivity of infrastructures in the BRI (Feng 2017). Energy cooperation is not merely concerned with the trading of energy resources or assets acquisition, but it often includes investment in infrastructures, such as refineries, power plants, solar panels, oil and gas pipelines, and power transmission corridors. Other than energy facilities, energy projects usually include other logistics infrastructures such as roads, railways, port hubs and storage facilities. Energy projects—especially those involving massive infrastructures—are thus a promising means for the BRI (Escobar 2015). The BRI has identified the enormous demand for energy infrastructure among the regions it covers. These areas, including Russia, Central Asia and the Middle East, are mostly rich in resources such as oil and gas. Energy trade, industrialisation, urbanisation and development in these regions all require infrastructures in various sectors ranging from fossil fuel energy to renewable energies (Feng 2017). China, in considering the transnational scale of these projects, expects that energy cooperation within the BRI could develop an infrastructure network for economic advancement in Eurasia.

Industrial integration

One of the BRI's areas of focus is to create an integrated industrial value chain of energy (Chen 2015). This connectivity will rely on the deep integration of markets, the efficient allocation of resources, and cooperation in technology, equipment and engineering services in the energy sector. China is attempting to 'increase cooperation in the exploration and development of coal, oil, gas, metal minerals and other conventional

energy sources' and to 'promote cooperation in the processing and conversion of energy and resources at or near places where they are exploited' (NDRC and NEA 2017). With massive capitals, Chinese companies are in a good position to merge and acquire the energy assets found along the BRI (Feng 2017). China could also drive the development of energy-related industries, such as fertilisers, agriculture, irrigation and domestic gas sales, which would be a way to expand and integrate energy facilities and markets in the upstream, midstream and downstream areas. Other than promoting the domestic economic development of recipient countries, such an approach could also help to establish hubs in important regions such as Xinjiang and further enhance security in the region covered by the BRI.

Trade and investment

Connectivity in trade and investment is one of the major tasks in energy cooperation under the BRI. In 2016, China imported 249 million tons of crude oil from regions along the BRI, which accounted for approximately 65% of the country's total crude oil imports (Chen 2017).[1] In the same year, Chinese exportation of oil products reached 19.3 billion USD, with approximately 70% of these products exported to countries in the BRI, particularly Southeast Asian nations (Xue and Cui 2017). China will continue to expand trade in energy through investment. Energy, together with transportation and telecommunication, are the key sectors of Chinese foreign direct investment (FDI) in the BRI (Feng 2017). Chinese energy investment primarily targets regions in Southeast, Central and South Asia, all of which are in close proximity to China (Feng 2017).[2] Countries in these regions are complementary to China in terms of economic development stages and energy resources, thus enhancing the connectivity among industries. China encourages companies to adopt various measures, including direct investment, merger and acquisitions, and public-private partnerships (PPPs) to deepen energy investment cooperation (Downs 2015).

Chinese financial institutions

Energy projects always come with massive investments because of their scale. The Chinese government 'will enhance the involvement of financial institutions in the lifecycle of energy cooperation projects to create [a] sound energy "industry plus finance" cooperation pattern' (NDRC and NEA 2017). Chinese financial institutions such as the China Development Bank (CDB), the Agricultural Development Bank and the Export-Import Bank of China, as well as newly established institutes in the BRI such as the Asia Infrastructure Investment Bank (AIIB) and the Silk Road Fund (SRF), are at the centre of the current energy investment in the BRI. The BRI has brought the above financial institutions and their combined commercial strategy and development policies to the region within the initiative. Chinese financial institutions, particularly the CDB, have financed a wide range of Chinese energy investments overseas in the past and have entered partnerships with foreign governments and companies from over 140

[1] Saudi Arabia, Russia, the UAE and Iraq are the major oil suppliers to China.

[2] For example the China–Central Asia gas pipeline, the China-Russia gas pipeline, and various solar and water power projects in the China-Pakistan Economic Corridor

countries (Provaggi 2013; Rosen and Hanemann 2012). Chinese financial institutions provide energy-backed loans to foreign governments and energy companies from resource-rich regions. The loans normally include agreements about the revenue from the oil business and require borrowers to use Chinese equipment (Downs 2015).

Sustainable development

The Chinese government claims that the BRI will be green and efficient. Since China signed the Paris Agreement in 2016, the Chinese authorities have sought to accommodate climate finance and sustainable development under the framework of the BRI. According to the Vision and Actions on Energy Cooperation, BRI energy cooperation must 'attach great importance to the issue of environmental protection in the process of energy development, and strive to encourage the efficient development and utilization of clean energy' (NDRC and NEA 2017). China claims that it 'will strictly control the emission of pollutants and green-house gases, raise energy efficiency and contribute to green and efficient development in all countries [that participate in the BRI]' (NDRC and NEA 2017). This statement implies that certain environmental conditions might be included in BRI energy investments. Institutionally, China seeks to promote clean energy and infrastructural investment via the AIIB. An expansion in the investment in renewable energy such as solar power, as well as power transmission lines, can enhance connectivity in the region.

Trans-European Energy Networks

Possible integration through energy cooperation in the BRI recalls the European Union's experience with integrating energy networks in the strategy surrounding Trans-European Networks for Energy (TEN-E), which is part of a wider system of Trans-European Networks (TENs) (European Commission 2017b). The Maastricht treaty, signed in 1992, tasked the European Union with establishing and developing a transnational network in the areas of transport, telecommunications and energy. In 1996, the TEN-E was developed as part of the European Union's completion of the bloc's single market. EU regions and national networks are linked by the creation of modern and effective infrastructures. The European Union considers the TENs to be a valuable community-level tool towards the implementation of the bloc's primary policies, including

1. the creation of an internal market;
2. the reinforcement of economic and social cohesion;
3. the linking of island, landlocked and peripheral regions with central EU regions;
4. the promotion of interconnection and interoperability of national networks; and
5. the pushing forward of a sustainable development policy (European Commission 1995b).

As part of the TENs, the main purpose of TEN-E is to inject a political impulse for energy infrastructure development in the European Union with a focus on cross-border gas and electricity network projects (notably those that cross borders) in order to enable

the establishment of the internal market. TEN-E is further promoted in the strategy 'Europe 2020', launched by the European Union in 2010, with priorities for sustainable growth to be achieved by promoting a more resource-efficient, more sustainable and more competitive economy (European Commission 2017a). TEN-E is crucial for the European Union to address the policy challenges of market competitiveness, climate change and security of supply (European Commission 2017b). The European Union has a twofold reason for creating energy networks. While such networks could satisfy energy demand for economic and industrial development, they also contribute to implementing the European Union's primary policy mentioned above: integrating markets, connecting regions and increasing social cohesion (Maltby 2013).

The TEN-E guidelines were first published in 1996 and updated in 2003, 2010 and 2013 (European Commission 1996, 2003, 2010, 2013). The implementation of TEN-E is expected to be grounded in the following four aspects.

Priority in infrastructure

The European Union has identified 12 strategic TEN-E priorities and nine corridor priorities. For infrastructure, TEN-E prioritises 'the field of electricity transmission and storage, gas transmission, storage and liquefied or compressed natural gas infrastructure, oil infrastructure, smart grids, electricity highways and carbon dioxide transport' (European Commission 2013, p. 41). Among these priorities, infrastructures, particularly in the electricity and gas sectors, are a fundamental component of EU energy infrastructure and form integrated and intermodal networks. The development of the electricity network would contribute to more efficient electricity generation and could reduce the need to build new power stations, thus eliminating the difficulties of finding sites because of environmental protection constraints. The development of gas networks can increase the flexibility and security of the gas supply to EU markets. As for corridors, the nine include four electricity corridors, three gas corridors and one oil corridor.[3] Covering at least two EU member states, these corridors experience high demand in infrastructure development, especially in electricity, gas and oil. These corridors can strengthen cross-border connections in the European Union and can integrate the bloc's internal market.

Completion of the internal market

The need to achieve an integrated market has a long history in the European Union. Back in 1968, the European Commission considered the lack of market integration in the field of energy to be a 'dangerous trend' (European Commission 1968, p. 5). The commission had to 'integrate the energy sector into the common market' and to reduce 'risks arising from the great dependence of the Member States on imports and from

[3] Electricity corridors include the North Seas offshore grid (NSOG), north-south electricity interconnections in Western Europe (NSI West Electricity), north-south electricity interconnections in Central, Eastern and South-eastern Europe (NSI East Electricity) and the Baltic Energy Market Interconnection Plan for electricity (BEMIP Electricity). Gas corridors include north-south gas interconnections in Western Europe (NSI West Gas), north-south gas interconnections in Central, Eastern and South-eastern Europe (NSI East Gas), the southern gas corridor (SGC) and the Baltic Energy Market Interconnection Plan for gas (BEMIP Gas). Oil supply connections are provided in Central and Eastern Europe (OSC).

insufficient diversification of the sources of supply' (European Commission 1968, p. 6). The Single European Act, which was introduced in 1986, provided the legal groundwork to establish an internal market by 1992 (Council of the European Union 1986). In 2006, the EU energy commissioner highlighted the importance of energy market integration, where the EU member states required a much greater EU-wide approach to the issue of the security of the energy supply (Piebalgs 2006). In 2008, the European Commission stated that 'interconnection and solidarity within the internal market is not only a natural feature of an integrated market-based system but is equally essential to spread and reduce individual risk' (European Commission 2008, p. 4). TEN-E is prioritised to increase the interconnectedness of the energy markets within the European Union.

One key factor of a fragmented EU energy market is the underutilisation of and insufficient interconnections between national energy networks (European Commission 2014b; European Council 2011). The European Union lacks a common energy policy and an internal energy market. The network of infrastructure projects that state-owned companies have invested in were primarily driven by security and supply considerations. Therefore, in order to integrate the market, TEN-E was designed to lift the isolation of member states, reduce energy infrastructure bottlenecks, and enhance market competition and flexibility. Integrated energy markets and transmission systems are vital for ensuring the competitiveness of the market, optimal infrastructure utilisation, energy efficiency and the distribution of energy sources. The achievement of an integrated energy market would likely promote economic growth, employment and sustainable development.

Financial mechanisms

TEN-E is an important medium for the European Union to fund new energy infrastructure projects all over the bloc. According to EU estimations in its guideline for TEN-E, investment of around €215 billion is required to upgrade EU infrastructures from 2010 to 2020, particularly transmission grids and gas pipelines (European Commission 2010). More investments may be required for infrastructure if longer-term climate objectives, such as achieving an 80% reduction of greenhouse gas emissions, are taken seriously. Considering the commercial viability of the energy projects, the market can only provide approximately €153 billion, which is around 62.5% of the total required investment (European Commission 2010). Among these infrastructure projects, taking into account possible delays for project implementation in the energy sector, projects of only around €102 billion, which is approximately 47% of the total required investment, could be delivered (European Commission 2010). Because a gap of around €110 billion has been left, plans such as TEN-E as a funding channel are needed.

The TEN-E framework was shaped in the 1990s through guidelines and financing regulations. During the initial stage, while energy projects fulfilled the criteria of EU eligibility for community financial aid provided for TENs, private funding was also encouraged (European Commission 1995a). One condition for TEN-E funding is based on the TEN financing regulation adopted in 2007 (European Commission 2007). In the period from 2007 to 2013, the TEN-E budget remained low—around €155 million in total. A commercial incentive was assumed to be sufficient to drive energy projects

forward; no EU intervention was thought necessary (European Commission 2010). Recognising the economic and social importance of the TEN-E, additional EU funds have been granted through a number of instruments, including the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the European Energy Programme for Recovery (EEPR), the European Neighbourhood Policy, and the 'Marguerite' Fund and structural funds (Von Hirschhausen 2011).

Environmental dimension in TEN-E

Connectivity in TEN-E contributes to sustainable development within the European Union. While environmental policy is one of the key focusses of EU policy making, environmental policy is inextricably linked to energy. The European Union has adopted the 2030 Energy Strategy for its member states to cope with energy and climate issues during the period between 2020 and 2030 (European Commission 2014a). This strategy sets a greenhouse gas reduction target of 40% compared to the 1990s, which will require a greater share of renewable energy in the European Union of at least 27%. The Energy Strategy has also proposed an enhancement of interconnection capacity and energy efficiency among EU member states as one approach to achieve the above targets (European Commission 2014a). The TEN-E is aligned with this strategy because of its strategic priorities in smart grids, electricity highways and cross-border carbon dioxide networks. The deployment of smart grids helps to integrate renewable energy and to regulate energy consumption. The construction of electricity highways allows for long-distance electricity transmission across the European Union. The existence of a cross-border carbon dioxide network promotes the development of transport infrastructure for captured CO_2 among EU member states.

EU experience for the BRI

Energy cooperation under the BRI and the European Union's TEN-E attempts to enhance economic growth and stability as well as pursuing other objectives in market creation, sustainable development and cost-efficient supply in the region of these initiatives' scopes through infrastructure networks. In both efforts, energy cooperation focusses on connectivity in infrastructure, market integration, financial mechanisms and sustainable development, although the two efforts have inherent differences in context between them. The European Union is a clearly defined regional institution with supranational authority over its member states. It has a clear directive for liberalising its electricity market and for developing an internal energy market. More importantly, TEN-E was conceptualised within the harmonised law and legislations for EU member states. In contrast, the region covered by the BRI is a concept proposed by a single country (China), and it has a flexible geographical scope. The countries in the BRI region have very fragmented markets, which makes the call for energy cooperation relatively flexible and open-ended in nature. Although the operating environment is therefore very different, because the TEN-E has been operational for over two decades, its experience could shed some light on the development of energy cooperation under the BRI.

Synergy between infrastructure and development

EU experience indicates synergies between infrastructure networks and the bloc's market, especially in the gas and electricity sectors (European Commission DG for Energy 2012; Kristiansen 2007; Newbery et al. 2013; Subacchi et al. 2014). Sufficient interconnection in infrastructure is an essential criterion for interoperability, a competitive market and a more flexible supply. Policy makers tend to use energy infrastructure networks to stimulate economic growth and labour-intensive infrastructure projects to boost employment in the construction sector (Artige and Nicolini 2006; Subacchi et al. 2014). For instance, the construction of a broadband network in Great Britain has shown not only advancement in telecommunications but also higher job creation in rural areas (SQW 2013). According to the International Labour Organization, USD 1 billion of investment in infrastructure projects could potentially create up to 28,000 new jobs (ILO 2009). EU experience also shows that connections in energy infrastructure also support the creation of a well-functioning market, which generates productivity gains, reduces costs and improves market access (Égert et al. 2009; Fries et al. 2012; Subacchi et al. 2014). In the long run, connections in energy infrastructure help to integrate the economies throughout the whole region.

Asymmetric policy priorities

TEN-E projects are cross-border and EU-focussed in nature, yet the policy difficulties facing TEN-E projects remain national. TEN-E was conceptualised as the solution both to problems of energy market efficiency and to economic disparities and barriers caused by peripherality. Intra- and inter-state conflicts of interest in projects are often observed in TEN. For instance, the connection of offshore wind power in the Baltic and North seas is one of the prioritised thematic areas in TEN-E, but the project faces significant social challenges because one of the planned lines, the Kassø (Denmark) to Hamburg/Dollern (Germany) line, passes through a densely populated area (Henfridsson et al. 2007). In an integrated system, multiple layers of power could lack democratic legitimacy, thus eroding members' power (Kirchner 1998). In addition, costs and benefits are asymmetric among countries in the BRI. Regulations such as tariffs are focussed on short-term national costs and benefits instead of the long-term prospects of Europe 2020. For instance, while EU member states that are highly dependent on Russian gas have demonstrated their preference for the Russian Nord Stream gas pipeline project, the European Union has attempted to diversify the bloc's gas supply sources away from Russia (Maltby 2013). In addition, cross-border energy projects (such as the Nabucco gas pipeline) could take a long time for feasibility studies and building permission procedures to be completed, which could result in delays or even cancellations (Kandiyoti 2015).

Energy projects in the BRI, which aim for mutual benefits, are supposed to be of common interest, since they have net socioeconomic benefits. An energy project could be favourable from the BRI perspective but not from an individual country's perspective (Subacchi et al. 2014). It could also be the case that an energy project is favourable from an individual country's perspective but would achieve few socioeconomic benefits beyond the country's borders and hence would not be of common interest. Another

possibility is that a certain country that cooperates in the BRI would not be fully aligned with the idea of the initiative but would become involved in order to take advantage of Chinese capital for the country's own development. To improve project selection, EU experience recommends taking the approach of cost-benefit analysis with peer review to identify projects of common interest (Subacchi et al. 2014). Local private companies and industry unions, with expertise in local infrastructure demand, should become involved in project selection.

Financial challenges and investment risks

In both TEN-E and the BRI, PPPs and the involvement of private companies are generally encouraged. The PPP model is feasible in the energy sector because it can transfer risks to social capital, given that demand in the market is accurately estimated under such a model. This partnership, formed between the government and private sectors, provides public goods and services with a division of labour in which the government offers a political commitment in project advancement, while the private sector is responsible for construction, operation and maintenance. In TEN-E, the importance of PPPs for investing in infrastructure and in risk sharing between the public sector and private operators has been recognised at the EU level (European Commission 2004). According to the European Investment Bank, from 1990 to 2016, a total 1765 PPP projects were launched in the EU-28 countries, at a value of €355.9 billion. The transport sector remains the most important in terms of value, but a significant increase in investment in the environment and energy sector started in 2013, particularly in renewable energy, which made this sector third in the market in terms of value for that year (EIB 2017).

One should not take private involvement in infrastructure projects for granted, however, since private companies' investment priorities might differ from those of the governments, which always prioritise projects with high economic return. The European Union faces financing challenges in delivering energy infrastructure priorities. The 2008 financial crisis has resulted in increasing country-level risks in the European Union and decreasing credit ratings, which has placed constraints on companies to make loans at favourable terms (Subacchi et al. 2014). After the crisis, energy investment rates in member states such as Cyprus, Ireland, Italy, Greece, Portugal and Spain declined steadily from 44 to 22% in 2014 (European Commission 2016). In Italy, private investors remained reluctant to invest, particularly in southern Italy, due to decreased profitability and a worsened investment environment (Giacinto et al. 2012). The result has been long-lasting disparities in energy investment between northern and southern Italy, especially in the power and renewable energy sectors (Subacchi et al. 2014).

Disparity is a particular problem in the BRI, where Moody's, for example, considers less than 40% of the covered countries to have relatively high financial strength (Moody's 2017). Moody's figures show that, since 2013, 37% of BRI-related investment has flowed to countries rated 'Ba' or lower, which implies association with speculative elements and significant credit risk. In other words, Chinese investment is exposed to countries with relatively poor credit profiles, high vulnerability to event risk and unfavourable business environments. A clear, transparent and stable regulatory framework is necessary for investment in energy projects, and the public sector is

responsible for providing the stability in which investors can earn returns (Subacchi et al. 2014).

Multilateral legal framework

While the European Union has a relatively high level of economic integration, with no major geo-political conflict among member countries, uncertainties in cross-border energy relations still remain. As seen in the Russian-Ukraine gas disputes of the 2000s, responsibility, energy transitions, interest distribution, national sovereignty and ownership of cross-border transmissions could all lead to delays or disputes in energy investment (Pirani et al. 2009). In the European Union, a legal framework compatible with integration of the markets has been used to protect energy trade and investment. Other than agreements concluded in the European Union, TEN-E relies on the Energy Charter Treaty (ECT) as a legal approach to reinforce the protection of energy trade and investment (European Commission 2016).[4]

While the Vision and Actions on Energy Cooperation claims that the BRI will synchronise participating countries' efforts to jointly build a better global energy governance structure, the establishment of institutions such as the AIIB has given China primary leadership in an international organisation with substantial Eurasia-wide economic and energy involvement. But China still lacks a relevant multilateral legal framework to safeguard its overseas energy investments in the BRI. Currently, the proposed BRI cooperation also appears rather China-centric, and the associated protection relies on a series of bilateral agreements between China and its neighbouring states. Considering the fact that China is involved in an increasing number of transnational energy projects along the BRI that connect multiple countries,[5] the BRI requires a multilateral approach to handle potential trade disputes and cross-border transition problems.

Conclusion

By embracing the traditional Chinese saying 'To create wealth – first build a road', the Chinese leadership considers connectivity, particularly via transport and energy infrastructure, to be the key to boosting development and the economy of the region. With strong geo-economic and geo-political dimensions, energy cooperation in the BRI is meant to spur Eurasian connectivity by using China's enormous potential for investment and trade. As stated in Vision and Actions on Energy Cooperation, energy cooperation in the BRI emphasises new market development and industrial integration. In the long run, the connectivity of energy infrastructure in the BRI will enhance regional integration and multilateral engagement in the region.

This paper has used energy cooperation in TEN-E of the European Union as a reference for the BRI. While energy cooperation in the BRI seeks to improve the

[4] The ECT is signed in 1994 to provide comprehensive protection for energy investments and to reduce commercial risks in international energy cooperation (see Europa 2007).

[5] For example the Central Asia–China gas pipeline that connects China with Turkmenistan, Uzbekistan and Kazakhstan

energy supply, integrate regional markets, address economic negativity and promote low-carbon development, TEN-E has similar objectives. With a focus on connectivity, both plans share similar scopes in infrastructure, markets, finance and sustainable development. According to the EU experience, adequate infrastructure is the key to energy cooperation in promoting a competitive market and a more flexible supply. Clear synergies are known to exist between infrastructure networks and socioeconomic development. In addition, interoperability, multiple financing mechanisms, a common energy market and a unified technological system are also important to the implementation of TEN-E. Still, EU experience has also indicated possible obstacles to the creation of an infrastructure network in the BRI, including asymmetric policy priorities among different countries, financing challenges associated with investment risks and the lack of a multilateral legal framework.

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