






RESEARCH ARTICLE

Environmental Governance of China's Belt and Road Initiative

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Abstract

China's Belt and Road Initiative (BRI), launched in 2013, is rapidly subsuming much of China's political and economic involvement abroad. As a far-reaching infrastructure development and investment strategy, officially involving more than 130 countries, the expansion of the BRI raises important questions about its environmental impacts and its implications for environmental governance. This article examines how China is actively and rapidly developing an institutional architecture for its envisioned "green BRI," considering the key actors, policies, and initiatives involved in the environmental governance of the BRI. We find that the current institutional architecture of the "green BRI" relies on voluntary corporate self-governance and a multitude of international and transnational sustainability initiatives. The effectiveness of the environmental governance of the BRI not only hinges on China's priorities and commitments, **but also on the political willingness and capacity of BRI partner countries** to maintain, implement, and enforce stringent environmental laws and regulations. We conclude by outlining several environmental governance challenges and an agenda for future research.

KEYWORDS

environmental policy, global environmental governance, new silk road, sustainable development, telecoupling

1 | INTRODUCTION

In 2013, the Chinese President Xi Jinping launched the Belt and Road Initiative (BRI) to improve regional and trans-continental cooperation and connectivity through investments, trade, and infrastructure projects. Under the umbrella of the BRI, China invests in transport and energy infrastructure, such as railways, roads, ports, airports and pipelines across the Eurasian, Asian, and African continents via the land-based "Silk Road Economic Belt" and the "twenty-first century Maritime Silk Road." The BRI is intended to extend beyond infrastructure construction to encompass policy coordination, trade facilitation, financial integration, and cultural and scientific exchange

(NDRC, 2015). Chinese policy banks and state-owned commercial banks provide the largest sources of funding for the BRI, totaling at least USD 500 billion by 2019, while additional investments are made by Chinese companies, non-Chinese companies and banks, international organizations, and governments of partner countries (European Union Chamber of Commerce in China, 2020).

Today, most social or economic cooperation agreements, plans, or projects between China and foreign countries are framed as BRI-related activities (Zhang, 2018). As of January 2020, the Chinese government had signed 200 cooperation documents with 138 countries and 30 international organizations (Figure 1). Since the BRI is still expanding, and an official registry of all BRI projects does not exist, it

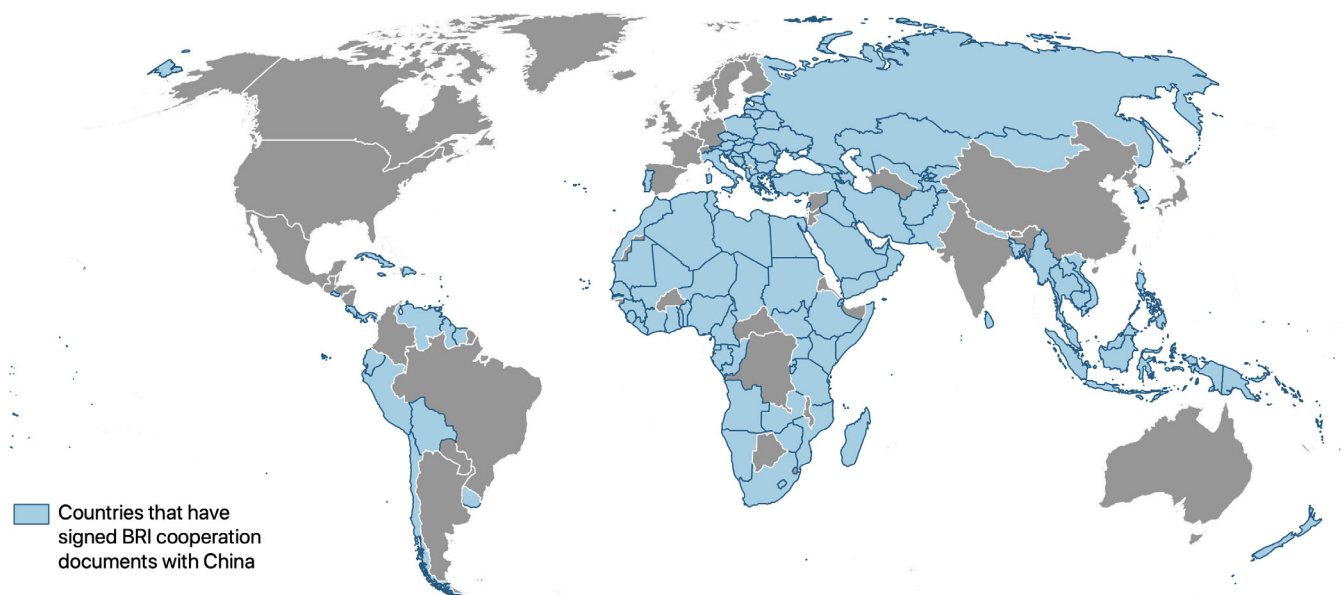


FIGURE 1 Countries that have signed cooperation documents with China to jointly build the Belt and Road. Data retrieved from Belt and Road Portal (2019) [Color figure can be viewed at wileyonlinelibrary.com]

remains challenging to pinpoint the geographical scope and full number of BRI projects. Even countries that have not signed bilateral cooperation documents on jointly building the BRI with China (Figure 1) may be considered part of the BRI, such as Turkmenistan (Xinhua, 2017c).

Given the unprecedented dimension of this initiative, scholars and civil society organizations have voiced concerns about its actual and potential negative environmental impacts (Ascensão et al., 2018; Teo et al., 2019; Tracy, Shvarts, Simonov, & Babenko, 2017; WWF, 2017). Protecting the environment while fostering economic development under the BRI will be challenging, as the initiative traverses a diverse range of fragile environments. Biophysical conditions range from forests and steppes in Russia, to ice, snow, and permafrost across the Tibetan Plateau, and tropical rainforests in Malaysia. Partly in response to growing international criticism, several Chinese ministries collectively issued policies on the “green Belt and Road” or “green Silk Road”¹ (Belt and Road Portal, 2017a, 2017b) to respond “to the international trend of seeking green, low-carbon and circular development” (Belt and Road Portal, 2017a, section 1.2). After launching high-level domestic policy commitments to achieving an “ecological civilization,”² China is now increasingly making efforts to mainstream this policy paradigm in its international activities (Belt and Road Portal, 2017a).

To date, most research on the BRI has focused on geopolitical and geo-economic impacts, centering on the question of international order. The BRI is seen as part of a new phase of globalization in which China plays a more active role (Gao, 2018; Kolosov et al., 2017; Liu & Dunford, 2016). Scholars widely agree that the BRI, if implemented as planned, will rewrite the current geopolitical landscape (Beeson, 2018; Du, 2016; Fallon, 2015; Minghao, 2016). In contrast, environmental issues have attracted less attention, and

research on the environmental governance challenges and institutional structures arising as part of the “green BRI” remains sparse (Hughes et al., 2020).

This article provides an initial assessment of the emerging environmental governance architecture of the BRI, which comprises organizations, regimes, and other forms or norms, principles, regulations and decision-making procedures (Biermann, Pattberg, van Asselt, & Zelli, 2009). We address the question of how Chinese, BRI-host country, and international and transnational institutions contribute to the environmental governance of the BRI. Since the BRI is governed by multiple independent but interacting governance arrangements, it is crucial to examine the governance architecture of the BRI rather than the design and effectiveness of individual institutions. In this we follow Dauvergne and Clapp (2016), who argue that global environmental governance scholarship focuses too narrowly on specific existing international governance schemes and may therefore miss important developments concerning new environmental issues that are not yet the subject of sophisticated governance frameworks. We restrict this analysis to formal institutions; thus, we do not consider the role of social norms or implicit rules. Our insights are drawn from official government documents, published peer-reviewed literature, media articles, reports, and working papers published in English. Even though the use of Chinese sources could have improved this work, all of the cited BRI-specific policy documents are available in English. The BRI is a young, fast-developing initiative that requires more empirical and joint research effort by both Chinese and non-Chinese scholars.

After outlining the major environmental risks and opportunities of the BRI, we present the emerging environmental governance architecture of the BRI. Then, we discuss three key governance challenges, and the role of the BRI in global environmental governance. Finally,

we outline a future research agenda for analyzing environmental governance of the BRI.

2 | ENVIRONMENTAL CHALLENGES AND OPPORTUNITIES OF THE BRI

There are two overarching perspectives on the prospects of the BRI to contribute to sustainable development. From one point of view, scholars, policy analysts, and politicians see the BRI as an opportunity for sustainable development (Dong, Yang, & Li, 2018; Jin, 2018; UNDP & CCIEE, 2017). At the first BRI Forum in 2017, the Chinese President Xi Jinping emphasized “efforts should be made to strengthen cooperation in ecological and environmental protection and build a sound ecosystem so as to realize the goals set by the 2030 Agenda for Sustainable Development” (Xinhua, 2017a). Green trade (i.e., cap and trade mechanisms), finance and investment, as well as green technology and innovation, are seen as the key mechanisms through which the BRI can accelerate progress in achieving the Sustainable Development Goals (SDGs) (UNDP & CCIEE, 2017). Chinese financial institutions could provide financial resources to BRI countries to implement their Nationally Determined Contributions under the Paris Agreement (Zhou, Gilbert, Wang, Muñoz Cabré, & Gallagher, 2018). As the world's largest supplier of renewable energy equipment, China could help to unlock the huge renewable energy potential of BRI countries (Andrews-Speed & Zhang, 2018; Chen et al., 2019), and share its knowledge and expertise on how to adjust policy targets, change subsidy structures, and reduce power wastage (Eyler, 2019). The Digital Silk Road,³ which aims, for example, to build a network for collecting and sharing Earth observation data, could improve environmental monitoring and support sound policy-making in BRI countries (Guo et al., 2018). From this perspective, the BRI could thus contribute to the Paris Agreement and the SDGs, but concrete empirical demonstrations have not yet been explored.

From another point of view, observers are concerned about the environmental risks that the BRI poses. Infrastructure development, trade, and investments under the BRI could bring unprecedented negative environmental impacts that may outweigh its economic benefits (Li, Qian, & Zhou, 2017). The potential impacts of the BRI are manifold. Infrastructure projects have direct effects on ecosystems and wildlife, but also indirect effects such as attracting logging, poaching, and settlement (Teo et al., 2019), contributing to deforestation and other land use changes (Losos, Pfaff, Olander, Mason, & Morgan, 2019). The BRI may drive biodiversity loss due to fragmentation and degradation of habitats (Ascensão et al., 2018; Lechner, Chan, & Campos-Arceiz, 2018; WWF, 2017), and increase greenhouse gas emissions due to the construction and maintenance of transportation infrastructure and further Chinese investment in coal-fired power plants (Zhang, Liu, Zheng, & Xue, 2017; Zhou et al., 2018). It could also accelerate extraction of natural resources, such as water, sand, and ferrous metal ores in countries along the BRI (Howard & Howard, 2016; Hughes, 2019; Suocheng et al., 2017). These

environmental problems are neither exhaustive nor exclusive to the BRI, but without effective environmental governance, infrastructure investments and other development projects can cause direct and indirect environmental impacts.

The difficulty of defining the scope and size of the BRI and its related activities makes it challenging to draw clear, evidence-based conclusions about the environmental effects of the BRI on a global scale. According to research by the Mercator Institute for China Studies (MERICS), about two-thirds of Chinese spending on completed BRI projects was directed at the energy sector (more than USD 50 billion), of which more than USD 20 billion were invested in renewable energy projects, followed by fossil-fuel energy generation projects (about USD 15 billion) and grid investments (about USD 12 billion). Several large hydropower projects contribute to higher overall investments in renewables. Additionally, USD 15 billion were spent on transport projects and USD 10 billion on the Digital Silk Road (Eder & Mardell, 2019).

In Figures 2 and 3, we analyze 374 BRI projects across 51 countries, which have been identified by the Reconnecting Asia Database (CSIS, 2020). We find that most BRI projects concern the transport sector (215 projects), followed by the energy sector (159 projects). Despite China's leadership in renewable energy manufacturing and deployment (Andrews-Speed & Zhang, 2018), the majority of energy projects are still related to fossil-fuels. Although the two figures provide only a snapshot of all BRI projects and deviate from the research results by MERICS, they contribute towards clarifying the scope of the BRI, given the paucity of official information. The funding for the 300 projects for which data is available amounts to about USD 500 billion (Figure 3). Pakistan, Bangladesh, China, Indonesia, and Cambodia are the top five recipients of BRI project funding. The overall highest costs are reported for BRI projects in Pakistan, China, Russia, Bangladesh, and Belarus.

3 | ENVIRONMENTAL GOVERNANCE ARCHITECTURE OF THE BRI

China's endeavor to build hard infrastructure across the world is accompanied by efforts to develop the necessary soft infrastructure such as the “green BRI,” to provide governance structures to coordinate and implement BRI activities. Governance implies finding collective solutions to problems that involve multiple actors and are too complex to be addressed by individuals, groups of individuals, or non-state actors (Young et al., 2015). Kooiman (1993) defines governance as the patterns that emerge from all those activities of social, political, and administrative actors to guide, steer, control, and manage societies. Research on environmental governance is concerned with “the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes” (Lemos & Agrawal, 2006, p. 298).

In our analysis of the environmental governance architecture of the BRI, we focus on institutions, defined as “persistent and connected sets of rules and practices that prescribe behavioral roles, constrain activity, and shape expectations” (Keohane, 1989, p. 3). The

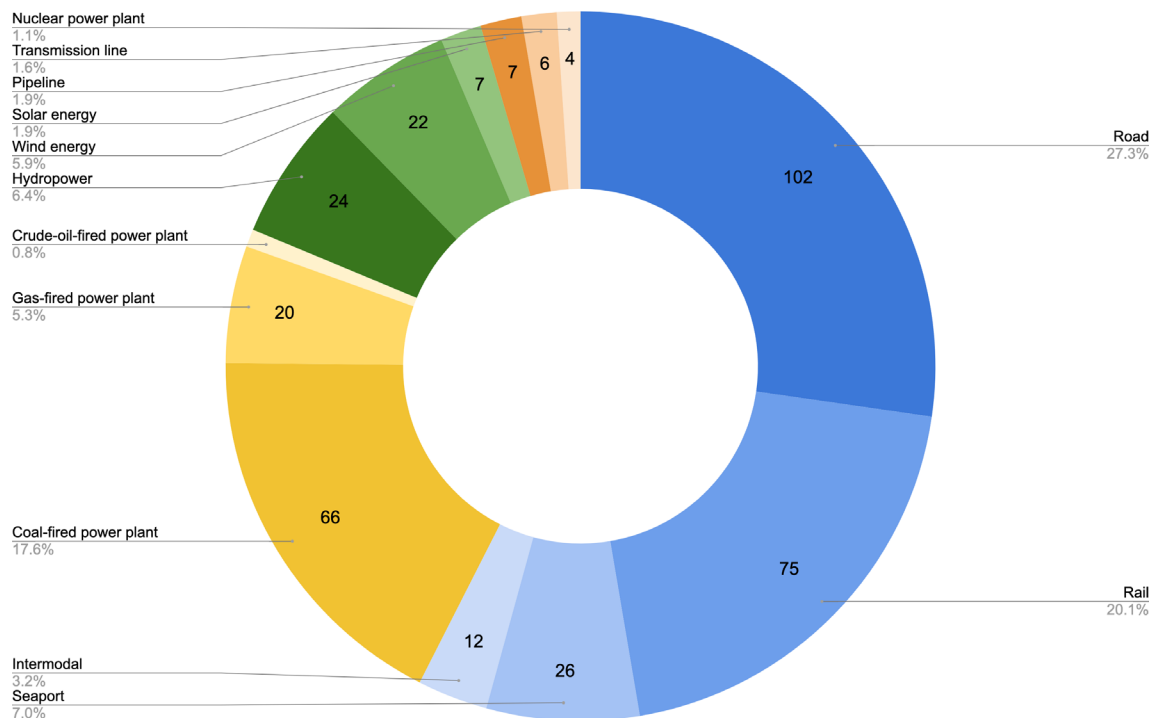


FIGURE 2 Type of Belt and Road Initiative projects in 51 countries ($n = 374$). Transport (blue), fossil-fuel energy (yellow), renewable energy (green), other energy (orange) [Color figure can be viewed at wileyonlinelibrary.com]

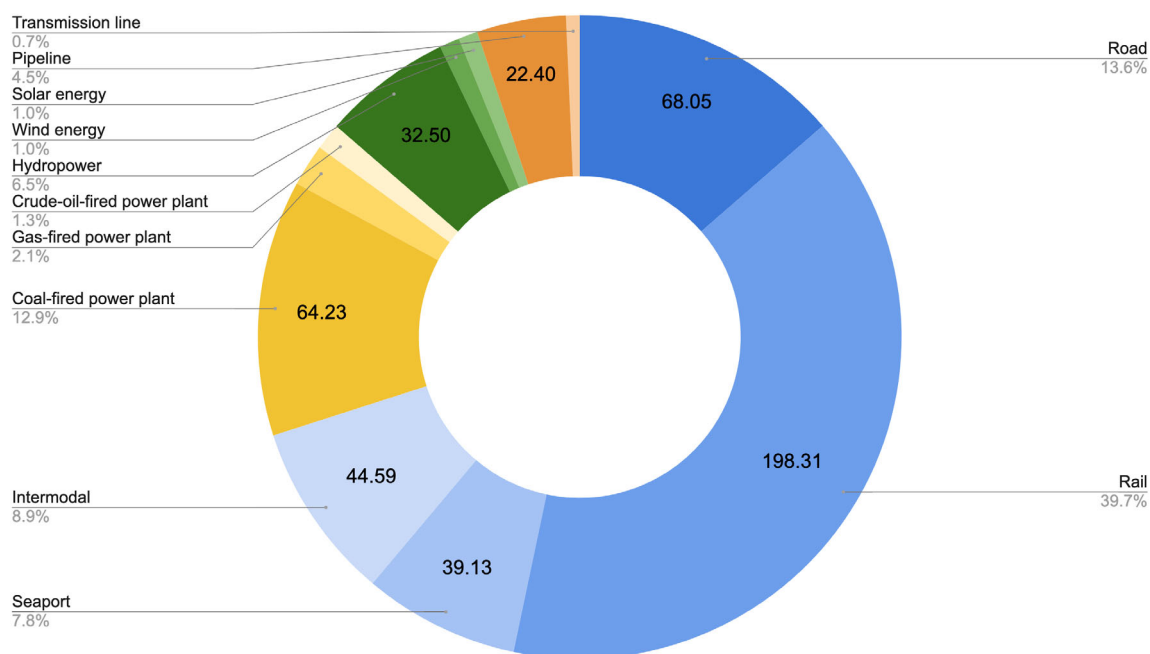


FIGURE 3 Reported costs (in USD billion) of Belt and Road Initiative projects ($n = 300$). Transport (blue), fossil-fuel energy (yellow), renewable energy (green), other energy (orange) [Color figure can be viewed at wileyonlinelibrary.com]

concept of governance architecture allows us to analyze an issue area, which is regulated by more than one institution. All governance architectures are fragmented to some degree because they consist of different parts that are rarely ever fully interlinked or integrated (Biermann et al., 2009). This is clearly applicable to the “green BRI”, as

it is governed by multiple independent public and private governance institutions from China, BRI host countries, and the international realm. While some scholars rely on the notion of fragmentation to analyze these complex governance systems (Biermann et al., 2009), others adopt the perspective of polycentricity, emphasizing the

system's ability to self-organize (Ostrom, 2005). Focusing on the wider governance architecture helps keep us alert to overarching trends in environmental governance, such as the emergence of new multi-stakeholder modes of governance, and their more or less integrated coexistence with traditional forms of state-based governance (Cashore, 2002; Folke et al., 2019; Newell, Pattberg, & Schroeder, 2012), as well as interactions of multiple institutions across horizontal and vertical governance levels (Gehring & Oberthür, 2009; Schreurs, 2017). Increasing long-distance flows of traded goods, capital, and foreign direct investment (FDI) pose governance challenges that are difficult for national public authorities to address alone, but require interstate collaboration and actions by civil society and market actors (Challies, Newig, & Lenschow, 2019). In our analysis, we draw on these theoretical perspectives in assessing the environmental governance of the BRI by considering the role of non-environmental institutions such as banks, the interactions between the BRI institutions and established international governance institutions, and the use of non-mandatory policy instruments.

3.1 | Chinese institutions governing the “Green BRI”

The formulation and implementation of BRI activities take place across multiple actors and multiple levels, including various Chinese

government ministries and organizations under the State Council (Figure 4), banking institutions, as well as state-owned and private corporate actors.

China has developed a complex institutional framework for environmental protection in the context of the BRI, which is composed of BRI-specific and BRI-related policies. In addition to the official guidelines of government authorities, industrial associations and business networks have issued environmental guidelines, many of which are based on international guidelines developed by the organisation for economic co-operation and development or United Nations (UN) (Table 1). Unlike enforceable laws and regulations, these policies and guidelines are voluntary, primarily outlining aspirational goals and visions. China proactively engages with stakeholders from BRI host countries using soft law, that is, nearly all the sources of BRI-specific rules are legally non-binding informal documents rather than formal treaties (Wang, 2019). The two core policy documents on the BRI are the “Visions and Actions on Jointly Building Silk Road Economic Belt and 21st Century Maritime Silk Road” and the “Vision for Maritime Cooperation under the Belt and Road Initiative,” published in 2015 and 2017, respectively (NDRC, 2015; Xinhua, 2017b). Both vision documents state that the BRI should increase exchange and cooperation on ecological protection, but provide no regulatory provisions for achieving these aspirations.

The most relevant policies on environmental governance of the BRI are the “Guidance on promoting a green Belt and Road” and the

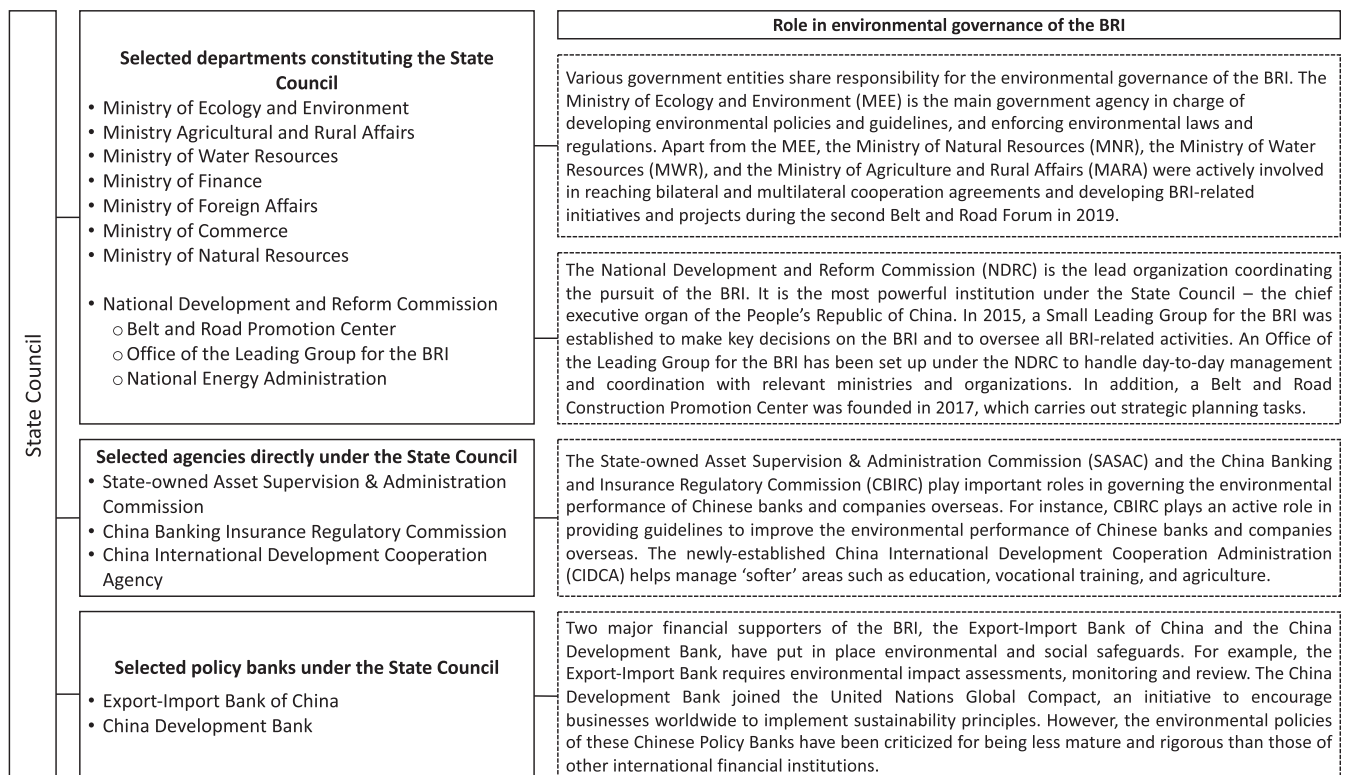


FIGURE 4 Key Chinese governance entities involved in the environmental governance of the Belt and Road Initiative (non-exhaustive). Sources: Ministry of Foreign Affairs (2019); National People's Congress Observer (2018), Ren, Zhang, Zhu, and Zhang (2017), Rolland (2018), Yu (2018)

TABLE 1 Key policies and guidelines governing the environmental aspects of the Belt and Road Initiative (BRI). A short description of all documents can be found in the Appendix S1. The table includes policies and guidelines that do not refer explicitly to the BRI, but are related to the BRI by governing environmental dimensions of Chinese trade and investment. A full overview of regulations governing Chinese outward foreign direct investment (FDI) can be found in Gallagher and Qi (2018)

Scope	Title	Year
Policies and guidelines issued by government authorities		
BRI-specific	Visions and actions on jointly building Silk Road Economic Belt and 21st century Maritime Silk Road	2015
	Building the belt and road: Concepts, practices and China's contributions	2017
	Guidance on promoting a green belt and road	2017
	Vision for maritime cooperation under the belt and road initiative	2017
	The belt and road ecological and environmental cooperation plan	2017
	Vision and actions on agriculture cooperation in jointly building silk road Economic Belt and 21st century maritime silk road	2017
	Vision and actions on energy cooperation in jointly building silk road Economic Belt and 21st century Maritime Silk Road	2017
	A guide on sustainable overseas Silviculture by Chinese enterprises	2007
	A guide on sustainable overseas forests management and utilization by Chinese enterprises	2009
	Green credit guidelines	2012
BRI-related	Guidelines on environmental protection for overseas investment and cooperation	2013
	Guidelines for establishing the green financial system	2016
	Regulations on outbound investment and business activities of private enterprises	2017
	China banking regulatory commission on the standardization of banking service enterprises going abroad: Guide to strengthen risk prevention and control	2017
	Measures for the management outbound investment regulations	2017
	A guide on sustainable overseas trade and Investment of Forest Products by Chinese enterprises	In progress
Guidelines issued by industry associations		
BRI-related	Guide on Social Responsibility for Chinese International Contractors (2012), Operational Manual for the Guide on Social Responsibility for Chinese International Contractors (2018)	2012, 2018
	Guidelines for social responsibility in outbound mining investments	2015
	Chinese due diligence guidelines for responsible mineral supply chains	2016
	Environmental risk management for China's overseas investment guidelines	2017
	Guidelines of sustainable infrastructure for Chinese international contractors	2017
	The guidelines on China's sustainable agricultural overseas investment	2018
	Guide for overseas investment and production of sustainable palm oil by Chinese enterprises	In progress

"The Belt and Road Ecological and Environmental Cooperation Plan". They promote a very strong pro-environmental narrative on the BRI, underscoring that projects should support green and low-carbon development, protect biodiversity, and address climate change. China thus projects itself through these policies as a key supporter of global environmental governance. The policies explicitly state that "promoting the green Belt and Road is an essential effort to participate in global environmental governance" (Belt and Road Portal, 2017a, section 1.2), and repeatedly emphasize the goal of aligning the "green BRI" with the most prominent global sustainability agenda—the 2030 Agenda for Sustainable Development. The Cooperation Plan lists 25 specific projects, without providing additional detail beyond project names (Belt and Road Portal, 2017b). While several projects have already been launched (see Appendix S1), others do not seem to have

started yet, like the "Eco-Label Mutual Recognition" or the "Biodiversity Conservation Corridor Demonstration" projects. The scheduled targets are to integrate the concept of "ecological civilization" into the BRI by 2025, and to promote cooperation on environmental protection "with higher standards and at deeper levels" to accomplish the SDGs by 2030 (Belt and Road Portal, 2017b, section 2.3).

A key feature of these two policies is that they demonstrate China's push for corporate environmental governance under the BRI. Both indicate the roles and responsibilities of different governance actors: The role of the state is to provide guidance and to establish cooperation platforms for communication, information support, technology transfer, and big data. Corporations are expected to be the main players in the environmental governance of the BRI and to voluntarily bear environmental and social responsibilities. They are urged

to observe both international regulations, policies, and standards and those of the host countries (Belt and Road Portal, 2017a). Corporations should adhere to guidelines on “green corporate behavior” issued by various ministries, strengthen environmental management, and disclose environmental information (Belt and Road Portal, 2017b). The main mechanism to achieve the sustainability objectives of the BRI is cooperation, “characterized by governance guidance, business commitment, and social participation” (Belt and Road Portal, 2017b, section 2.2).

In addition to the BRI-specific policy documents, China has established a wider governance structure to guide and supervise Chinese overseas investments. Many policies governing the conduct of and reporting by state-owned and private Chinese corporations operating overseas predate the BRI. Growing concerns about the environmental practices of Chinese companies operating abroad have led the Chinese government to issue a number of policies and initiatives, calling for compliance with host countries' laws and regulations. To date, no formal law regulating environmental matters in Chinese overseas investments exists (Gallagher & Qi, 2018). Several government agencies have issued policy guidelines that set out voluntary measures for environmental protection (Table 1). For instance, the “Guidelines on Environmental Protection in Overseas Investment and Cooperation” encourage—but do not require—Chinese companies operating overseas to conduct environmental impact assessments (EIA) (MOFCOM & MEP, 2013). In contrast, within China, EIAs have been legally required since 2003 for all construction projects or plans with potential environmental impacts (National People's Congress, 2003). Thus, while companies can be held accountable for their potential impacts within China, they will not be legally sanctioned by the Chinese government for operations abroad.

Furthermore, financial institutions have substantial leverage with companies and governance actors by defining socioeconomic conditions for project approval and financing (Brombal, 2018). China has made efforts to establish a green banking system. The “Green Credit Guidelines”, issued in 2012, are the most important Chinese regulations regarding sustainable banking practices. The guidelines encourage banking institutions to promote green credit and to effectively identify, measure, monitor, and control environmental and social risks associated with their credit activities. Overseas projects to which credit is granted should abide by applicable laws and regulations on environmental protection in the country where the project is located, and follow relevant international practices or standards (CBRC, 2012). The 2016 “Guidelines for Establishing the Green Financial System” signal China's commitment to green finance. For example, the largest lenders for BRI projects, the Chinese policy banks, have developed environmental and social safeguards (Figure 4). Other important financiers of the BRI are multilateral development banks such as the Asian Investment and Infrastructure Bank and the New Development Bank, which adopted Environmental and Social Frameworks in 2016 (Losos et al., 2019).

Overall, all identified BRI-specific and BRI-related environmental rules are legally non-binding. Gallagher and Qi (2018) conclude that even though the governance system for overseas investments has

matured, the policies governing the environmental impacts of Chinese overseas investments remain relatively weak, mostly voluntary in nature, and inconsistent with the policies that govern domestic investments. The Chinese government has incorporated green strategies into the BRI, but so far only in aspirational terms. China has a growing collection of BRI guidelines, but they lack essential details regarding implementation, monitoring, and enforcement (Losos et al., 2019). A report by the Asia Society Policy Institute highlights a disconnect between China's proclamations on implementing a “green BRI,” and actual environmental practices on the ground (Russel & Berger, 2019). In the absence of financial or legal sanctions for non-compliance, both public authorities and civil society actors can potentially engage in “naming and shaming” to hold companies accountable to their voluntary commitments (van Erp, 2008). Domestically, this mechanism is increasingly being employed in China as polluting industries are publicized in an effort to shame companies into action, and citizens are expected to assist by reporting violations (Schreurs, 2017). Yet, citizens' awareness of and interest in environmentally or socially harmful behavior of companies in distant countries is arguably lower compared with their interest in domestic misbehavior. Therefore, transnational advocacy networks and strong civil society organizations in BRI host countries are important actors, which could employ this extralegal social mechanism to hold foreign companies accountable.

3.2 | International and transnational environmental institutions governing the BRI

Apart from formal policies and guidelines, China is also actively developing an international and transnational governance structure for the “green BRI.” The Chinese government pursues a dual-track approach in this regard. On the one hand, China aims to build new environmental protection cooperation networks, and on the other hand, it also plans to make use of existing bilateral and multilateral international cooperation mechanisms, such as China-ASEAN, the Euro-Asia Economic Forum, the Shanghai Cooperation Organisation, the Lancang-Mekong Cooperation (Belt and Road Portal, 2017a), as well as the 17 + 1 (formerly 16 + 1) cooperation framework between China and 17 Central and Eastern European Countries.

First, China seeks recognition for the BRI from international organizations, particularly the UN, in order to gain some external legitimacy for its mega-project. More than 25 UN agencies have signed cooperation agreements with the Chinese government on the BRI (UN Environment Programme [UNEP], n.d.), and around 20 high-level UN officials, including the UN Secretary-General, attended the second Belt and Road Forum in 2019 (Rosellini, 2019). According to the Chinese Minister of Ecology and Environment, China has strengthened several bilateral and multilateral environmental cooperation mechanisms under the umbrella of the BRI. The Lancang-Mekong Environmental Cooperation Center, the China-Cambodia Environmental Cooperation Center, and the China-Laos Environmental Cooperation Office have been opened in recent years, while the China-Africa Environmental Cooperation Center is in planning



(Li, 2019). The Green Silk Road Envoys Program, a training program for environmental officials, is a prime example of how the Chinese government builds the “green BRI” upon existing environmental governance institutions. This flagship project, launched in 2011 and carried out by the Ministry of Ecology and Environment (MEE), trained more than 1,000 environmental officials, technical personnel, and scholars from more than 20 countries on topics such as green economic policies and environmental law enforcement (Kou, 2019). China continues to implement the program as part of the “green BRI” and aims to train another 1,500 environmental officials over the next 3 years (Benson Wahlén, 2019). Additionally, the Chinese Academy of Sciences has developed research institutes to facilitate research and collaboration and initiated other BRI-related training and research projects, most notably the Alliance of International Science Organizations of the BRI region.

Second, the government of China initiates new cooperation platforms for the “green BRI,” often in collaboration with international governmental or non-governmental organizations (NGOs) (see Appendix S1). A paramount example is the “International Coalition for Green Development on the Belt and Road” (BRIGC), which was jointly initiated by the MEE and international partners, first and foremost the UNEP (Nakano, 2019). President Xi proposed the Coalition himself during the opening of the first Belt and Road Forum in 2017, showing that the Coalition receives support from the highest political levels (Xinhua, 2017a). As of August 26, 2019 national environmental ministries, eight intergovernmental organizations, 68 NGOs, and 30 corporations had joined the Coalition, comprising a total of 132 members (BRIGC, 2019). The BRIGC aims to provide guidance, advice, and financial support to its partners to make progress toward achieving the SDGs and the Paris Agreement (BRIGC, 2019). The Coalition has established 10 thematic issue areas covering a wide range of issues, such as renewable energy, sustainable transportation, and biodiversity. The emerging institutional structure of the BRIGC suggests that it will potentially serve as an “orchestrator” of various public and private governance activities, thus enacting a form of meta-governance (Abbott, 2017).

Numerous international and transnational initiatives have been established to govern environmental aspects of the BRI. Year 2019 alone saw the launch the Coalition of Sustainable Cities on the Belt and Road, the Belt and Road South–South Cooperation Initiative on Climate Change, the BRI Green Cooling Initiative, BRI Environmental Big Data Platform, the BRI Green Lighting Initiative, and the BRI Green Going-Out Initiative (see Appendix S1). Aside from launching transnational initiatives, the Chinese government has also engaged in bilateral environmental governance by signing Memoranda of Understanding (MoU) with international partners (see Appendix S1). These actions underscore that China employs both classical environmental governance instruments, such as intergovernmental MoUs, and new governance arrangements, such as transnational cooperation initiatives. The Chinese government utilizes the “green BRI” as a platform to actively raise its profile as a participant in global environmental governance. The question arises whether the “green BRI” will integrate with the existing global environmental governance landscape or

create entirely new governance structures. To date, there are strong indicators that China has no intention of replacing the existing institutions of global environmental governance through the “green BRI.” Instead, China makes use of regional and multilateral cooperation mechanisms and creates new environmental governance initiatives under Chinese leadership, such as the BRIGC, in close collaboration with international partners, including UN agencies. China’s current approach to the “green BRI” is characterized by a combination of rule-taking and rule-making (Hamel, 1996). Since it remains unclear precisely what mandates and organizational structures the newly established initiatives will assume, it is too early to assess whether they will complement or undermine existing international environmental governance institutions, or shift leadership in environmental governance eastwards.

3.3 | Environmental governance in BRI partner countries

Even though China has made efforts to strengthen and expand the institutional architecture of the “green BRI,” a genuinely “green BRI” will require effective environmental governance in BRI partner countries. Since numerous Chinese policies strongly urge Chinese companies to adhere to host countries’ environmental laws and regulations, the political willingness and institutional capacity of BRI partner countries to formulate, implement, and enforce strict environmental rules will significantly influence the environmental sustainability of the BRI. Yet, low-income countries may prioritize national economic development over environmental protection and set weak environmental standards in order to attract FDI (Gray, 2002). Especially countries with poor environmental governance records face high environmental risks under the BRI (Tracy et al., 2017). Even if environmental regulations are present, they may not be enforced. Brombal (2018) warns that many BRI projects will be realized in countries where public participation and environmental rights remain curtailed. For example, the use of robust and effective EIAs and Strategic Environmental Assessments (SEAs) is essential for identifying the direct and indirect effects of infrastructure projects, and can potentially alter infrastructure designs to avoid or mitigate impacts (Hughes et al., 2020; Lee & George, 2013). BRI projects often involve complex contractual arrangements with numerous parties including investors, financiers, consultants, construction contractors, operators, and government authorities. Contracts can require that the countries hosting BRI infrastructure projects undertake EIAs (Masood, 2019). Some host countries, however, have little capacity to monitor and evaluate such assessments. Comprehensive EIAs and SEAs take time to develop and can result in changes to the original plan—all of which can lead to project delays. China and BRI partner countries are often reluctant to do anything that could slow projects’ progress (Masood, 2019).

Increasing trade and investment flows between BRI countries may affect public and private environmental standards in multiple

TABLE 2 Potential effects of trade and investment on public and private environmental standards

	Adverse effects	Beneficial effects
Investments	<p>Pollution haven effect: Pollution-intensive industries migrate from countries with strict environmental standards to countries with lax environmental regulations (Zarsky, 1999).</p> <p>This can lead to a race to the bottom (or Delaware effect, see Vogel, 2009), whereby governments actively lower environmental standards to attract foreign direct investment (FDI), or a regulatory chill, when countries refrain from enacting stricter regulations to not lose FDI (Gray, 2002).</p> <p>For example, as environmental regulations are becoming stricter in China, heavy-polluting Chinese cement plants relocate to Tajikistan (Teo et al., 2019). More than 100 new cement plants are planned along the Belt and Road Initiative (Hughes, 2019).</p>	<p>Pollution halo effect: Foreign companies use cleaner environmental technology and improved environmental management practices, which they spread to their counterparts in the host country (Zarsky, 1999).</p> <p>This can lead to environmental leapfrogging as developing countries need not pass through the dirty stages of industrial growth experienced by developed countries.</p> <p>For example, coal advocates argue that Chinese backed coal power plants will bring environmental benefits to host countries because they provide more efficient technologies than these countries could otherwise afford (Walker, 2016).</p>
Trade	<p>Shanghai effect: Exporters apply lower environmental and social standards if they shift from markets with requirements for high standards to markets with lower standard requirements or demands. A shift to new export markets can undermine social and environmental conditions in producer countries (adapted from Adolph, Quince, & Prakash, 2017).</p> <p>For example, a change in final market from the European Union to China led to lower requirements for standards being applied to the value chains of timber from Gabon and cassava from Thailand (Kaplinsky, Terheggen, & Tijaja, 2011).</p>	<p>California effect (or race to the top): Governments enact higher environmental standards to facilitate exports to jurisdictions with higher regulatory standards (Vogel, 2009). By adopting higher standards, producers are able to continue selling to higher regulated markets, which outweigh the investment costs necessary for compliance. Arguably, this effect also applies to companies selling their products to environmentally conscious consumer markets (see example below).</p> <p>For example, multinational firms that produce in China and export a large proportion of their output to developed countries are more likely to adopt ISO 14000 environmental management standards than non-export-oriented firms (Christmann & Taylor, 2001).</p>

ways (Table 2). The BRI may accelerate the “pollution haven effect” by shifting polluting industries to less-regulated jurisdictions within the BRI (Kolosov et al., 2017; Suocheng et al., 2017; Teo et al., 2019). Since China is increasingly strengthening environmental protection (Schreurs, 2017), it is becoming attractive for Chinese companies to migrate inefficient or resource-intensive industries and technologies to BRI countries that do not follow suit (Tracy et al., 2017). The “pollution haven effect” can lead to a “race to the bottom” if governments lower environmental standards to attract FDI (Table 2). Gamso (2018) shows that trade with China generates a race to the bottom in the environmental policies in countries of Latin America and Sub-Saharan Africa. This effect is moderated by the strength of governance institutions, in particular bureaucratic capacity. Analyzing manufacturing industries exclusively, Tian, Hu, Yin, Geng, and Bleischwitz (2019) find no evidence so far that the BRI shifts pollution and resource exploitation from China to other BRI countries. Morris (2018, p. 54) concludes that effective coordination between BRI countries on legal and regulatory matters is needed to ensure that enterprises do not engage in “jurisdiction shopping” and migrate their unsustainable activities from one country to another. Many BRI partner countries rank low on environmental performance, including top BRI investment

recipients like Pakistan, Bangladesh, and Cambodia, highlighting the risk that these countries become pollution havens (Figure 5).

On the contrary, the BRI may improve environmental standards and regulation in BRI countries. If the BRI advances trade relations with environmentally conscious consumer markets, it may stimulate a “race to the top,” whereby exporter countries adopt higher environmental standards to gain or maintain market access (Table 2). According to Liu (2018), the Chinese government intends to use the BRI to export China's environmental standards to countries with lower development levels. For instance, the guidance document on the “green BRI” outlines that China commits to include environmental protection requirements in free trade agreements (Belt and Road Portal, 2017a). In addition, China will recommend that BRI partner countries include more eco-labeled products in public procurement (Belt and Road Portal, 2017b). This indicates that China is no longer ostensibly refraining from intervening in host countries' internal affairs, at least when it comes to environmental issues. Mol (2011) argues that China is slowly replacing its strict principle of “non-interference” by securing popular support through foreign assistance in non-economic sectors such as the environment. In addition to public governmental actors, corporate actors can encourage environmental sustainability in host countries

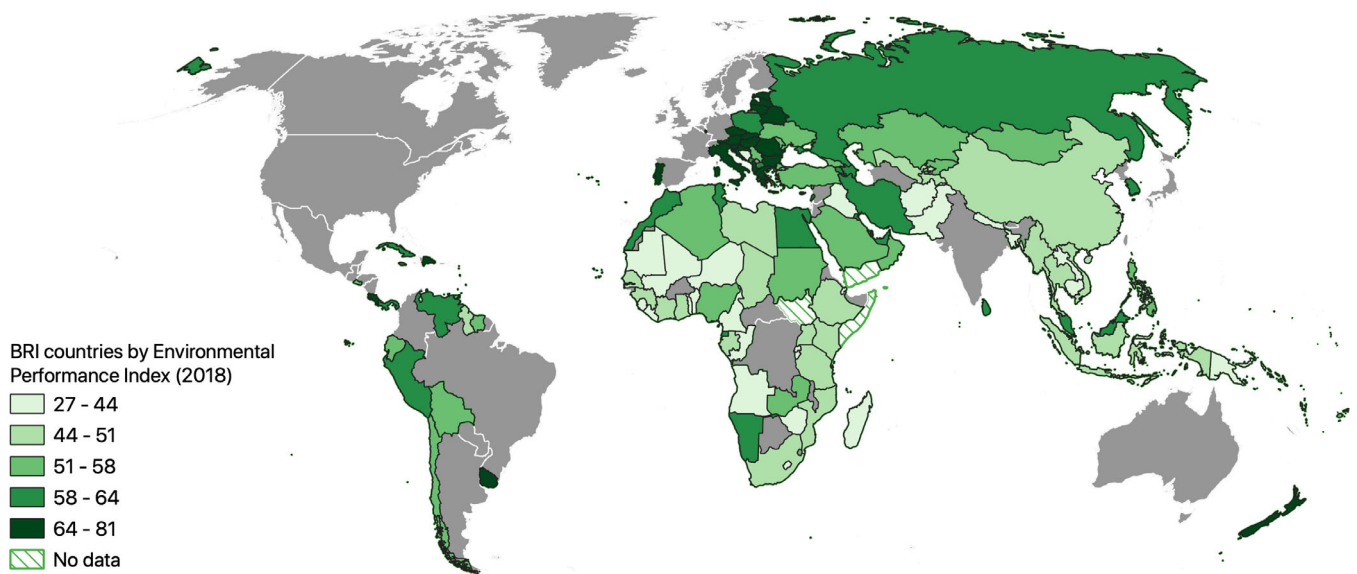


FIGURE 5 Environmental performance of China and countries that have signed cooperation documents with China to jointly build the Belt and Road. The Environmental Performance Index (EPI) ranks countries on 24 performance indicators, which indicate how close countries are to established environmental policy goals (Wendling et al., 2018). While 83 BRI countries have a higher EPI than China (EPI 50.74), 50 BRI countries rank lower than China. Data is not available for five BRI countries. The average EPI for BRI countries is 54.47 [Color figure can be viewed at wileyonlinelibrary.com]

through the so-called “pollution halo effect” (Table 2). However, to our knowledge, there are to date no empirical studies of how the BRI affects the environmental governance of host countries and vice versa.

As the BRI covers ever more European countries, it increasingly intersects with environmental governance institutions of the European Union (EU). A prime example is the Peljesac Bridge project in Croatia, the first BRI project that is financed by the EU and built by a Chinese consortium. In order to meet the strict environmental regulations of the EU, the Chinese consortium set up a Safety and Environmental Protection Department, introduced noise-canceling technology to protect the marine environment, and collaborates with local companies to meet EU environmental rules and regulations (Xinhua, 2019). This example suggests that EU member countries engaging in BRI projects are less likely to engage a race to the bottom than non-EU countries, as they are bound to comply with supra-national EU environmental law. Even if BRI projects are implemented outside the EU and funded by other financiers, international organizations like the EU or the World Bank may exert some limited, but not negligible influence on environmental governance by requiring adherence to existing environmental standards as part of their lending criteria (Lee & George, 2013) or by drawing on their normative power towards BRI host countries. For instance, European and international actors have voiced concerns about the environmental effects of a BRI highway project in Montenegro (European Parliament, 2018; Word Heritage Committee, 2019). The engagement of third parties can help scrutinize contracts and encourage host countries to negotiate better deals, as in the case of a special economic zone in Myanmar, where a U.S. task force

facilitated renegotiations with China in an effort to protect the human rights of local people (Hughes et al., 2020).

4 | GOVERNANCE CHALLENGES OF THE “GREEN BRI”

In the few years since the inception of the BRI, the environmental governance architecture of the “green BRI” has developed into a fragmented patchwork of national, regional, transnational, and international institutions of various forms—initiatives, guidelines, agreements, and programs. The Chinese government plays a key role in initiating voluntary and cooperative programs and networks of public, private, and civil society actors and institutions for the environmental governance of the BRI. Formally, the government of China does not take a “command-and-control” approach, but rather provides incentives for enterprises and banks to self-regulate. Responsibility for environmental governance is widely dispersed across multiple state agencies, which explicitly request that corporations assume a key role. Overall, the development of the institutional landscape for the “green BRI” mirrors major trends in global environmental governance toward increasing reliance on transnational multi-actor governance and the use of soft law (Folke et al., 2019).

Despite the rapid proliferation of initiatives under the umbrella of the “green BRI,” major challenges for environmental governance remain. First, BRI-specific and -related policies are not stringent, but based on voluntary and corporate self-regulatory instruments. China’s vision of a “green BRI” is unlikely to be realized in the absence of stricter policies that set out concrete sets of actions. China has

outlined a detailed set of principles to govern the “green BRI,” but unless these are further operationalized, they will likely be criticized as mere window dressing, designed to improve China's international image, rather than ensure environmental protection.

Second, another challenge for the environmental governance of the BRI is to address telecouplings. Telecouplings arise when various geographically distant human–environmental systems become increasingly interconnected and interdependent due to accelerated flows of capital, labor, energy, materials, and economic activities across distances (Eakin, Rueda, & Mahanti, 2017; Friis et al., 2016; Liu et al., 2013). There is growing recognition that activities in any world region can have environmental impacts in other regions and even the wider Earth system (Dietz, 2003; Kissinger, Rees, & Timmer, 2011). Analyzing the BRI from a telecoupling perspective helps in understanding and governing the interconnected socioeconomic and environmental issues within and among BRI countries (Yang et al., 2016).

Telecoupling shows that distant, seemingly unconnected, human–environmental systems can become closely interdependent, highlighting that (un)sustainability in one place is closely linked to (un)sustainability other places. Policy leakage is a clear example. Leakage occurs if environmental policies (e.g., in China) create indirect impacts (e.g., in BRI-affected countries) that go against the objectives of the policy, reducing the overall benefit of the intervention (Bastos Lima, Persson, & Meyfroidt, 2019). Environmental governance of the BRI needs to mitigate the risk that increasingly stringent environmental policies in China create leakages to BRI countries. If China wants to achieve its dual goal of sustaining economic growth, while at the same time preserving its natural environment, the country will likely need to import more energy and natural resources.⁴ Land-use leakage serves as an illustrative example. As China has strengthened its afforestation and conservation policies through a moratorium on commercial logging in domestic natural forests, the BRI could help meet China's growing demand for timber though additional imports from participating countries (Kolosov et al., 2017). Since 1998, logging bans in China have led to increasing timber imports from abroad, especially from Russia and Southeast Asia (Laurance, 2008; Mayer, 2005). Simonov (2018) argues that the China-Mongolia-Russia-Economic Corridor of the BRI could lead to the reopening of a Sino-Russian border crossing, which would allow for export of roundwood to China, likely contributing to deforestation in Russian border provinces in the future. Between 2013 and 2018, exports of forestry products from Russia to China grew by 11% (Chatham House, 2018).

The BRI will increase interdependencies between regions of different countries involved in the BRI through material and immaterial flows. This highlights that there are limits to the ability of territorially bounded national governance to address environmental impacts resulting from changing policies, consumption patterns, or sourcing practices in distant locations. In contrast to strictly global-scale problems, such as climate change, for which mitigation actions can take place anywhere because the concentration of pollutants is evenly spread, the environmental governance of telecouplings needs to be

targeted at specific flows and places (Newig, Lenschow, Challies, Cotta, & Schilling-Vacaflor, 2018).

Third, we find a strong discourse on a “green BRI” at national level. However, this does not necessarily mean that local governmental institutions, local state-owned, or private companies will adapt their actions accordingly. China's local governments tend to lack motivation and capacity for effective enforcement of national environmental regulations (Qi & Zhang, 2014). BRI projects involve many different private and public actors, including contractors, developers, consultants, financiers, and regulators, not only from China, but also from host countries and international organizations. Therefore, the Chinese government needs to link its pro-environmental narrative and various recently established high-level initiatives across spatial and jurisdictional scales to projects at the local level. As the BRI is governed by multiple interacting governance arrangements, it needs to bridge the social and institutional distance between actors and institutions from China and BRI partner countries. Although countries may be geographically close, they can be institutionally distant if they share few governance arrangements, or socially distant if there are few linkages of social networks, values, and knowledge between them (Eakin et al., 2017). In terms of social distance, high communication barriers and long-standing trust deficits between China and some BRI countries create high transaction costs for environmental governance. The legal and regulatory systems of countries along the BRI vary widely, ranging from those which rest on religious teachings to those with common law or civil law traditions. Chinese companies should show awareness and concern for the sociopolitical climate and local environmental laws and regulations of host countries where they invest.

5 | CONCLUSION

The Chinese government is taking an active, yet soft approach to the environmental governance of the BRI. China is actively and rapidly developing an institutional architecture for the “green BRI” based on aspirational vision statements and voluntary instruments at the national, international, and transnational level. This underlines China's ambitions to seek a more influential role in global environmental governance. The Chinese government has increasingly sought to strengthen multi-actor governance by involving a number of private and international actors in the strongly state-driven institution-building process of the “green BRI.” Companies are explicitly expected to play a leading role in realizing the government's vision of a “green BRI.” China seeks to integrate its “ecological civilization” policy paradigm into the BRI, but it remains to be seen whether the country manages to further move its ambitions from words to actions.

China uses the BRI as a platform to present itself as a rule-taker and rule-maker in global environmental governance as it mobilizes existing environmental governance institutions and builds new ones. However, **the environmental sustainability of the BRI does not only hinge on the environmental governance efforts of Chinese actors, but notably on the effective implementation, monitoring, and**



enforcement of environmental laws and regulations in BRI host countries. Since China strongly encourages its enterprises and financial institutions to comply with the laws in the countries where BRI projects are implemented, BRI host countries have substantial leverage on how the sustainability of the BRI unfolds. The governance capacity and political willingness of BRI host countries to safeguard the natural environment will strongly influence the environmental performance of the BRI. Countries with low environmental performance, such as Pakistan, Bangladesh, or Cambodia, are arguably at greater risk to become pollution havens.

Several key research questions regarding the environmental governance of the BRI remain. Due to the vague and expanding size of the BRI and associated enormous data requirements, the scientific community will face considerable methodological challenges in moving from outlining potential environmental effects of the BRI toward developing comprehensive studies of its actual global environmental impacts in the coming years. Another important task for future research is to empirically investigate whether and how China's "green BRI" influences environmental governance in BRI countries. Will the BRI drive a race to the bottom among partner countries in search of investment or will China actually become an exporter of stricter environmental regulations and norms? Does the BRI lead to environmental policy convergence? Will environmental standards be subject to Shanghai or California effects?

Moreover, it is necessary to better understand how countries or groups of countries that do not formally take part in the BRI, such as the EU or the United States, can affect the sustainability of the BRI. Consumption in the United States and the EU is responsible for 30% of the carbon emissions in 65 BRI countries through embodied carbon flows (Han, Yao, Liu, & Dunford, 2018). Thus, researchers should investigate how the newly established BRI institutions can govern the environmental effects of telecoupled commodity and resource flows and their interplay with existing global governance arrangements. Applying the telecoupling framework to trade or investment flows associated with the BRI may be a fruitful approach to examining sustainability challenges and opportunities that transcend national borders. Additionally, our work on the environmental governance architecture of the BRI provides a basis from which to explore the roles of particular actors and the effectiveness of specific governance arrangements. Finally, a core question for political scientists will be how the emerging environmental governance architecture intersects with inter- and intra-state power relations and national interests. Since China is not a unitary actor, but a collection of provinces, autonomous regions and municipalities, future studies could explore the role of subnational governance institutions in the context of the "green BRI." The formidable challenge regarding the sustainability of the BRI is to govern a wide variety of environmental issues that transcend spatial and jurisdictional scales, and involve multiple institutions, actors, and sectors. Orchestrating the various environmental governance efforts outlined in this article and ensuring their effectiveness will be a core task on the long road ahead.

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ENDNOTES

¹Subsequently referred to as "green BRI".

²The aim of developing an "ecological civilization" is to promote greater conservation of natural resources, low carbon development, greater recycling of resources, and cultivation of an ecological culture. This policy paradigm calls for reductions in carbon intensity and water consumption, improved water quality and biodiversity protection, sound land use and development, and greening of the industrial structure and urban areas (Schreurs, 2017).

³The Digital Silk Road (also referred to as "online Silk Road" or "information Silk Road") refers to the goal of improving digital connections along the BRI by building bilateral cable networks, transcontinental submarine cable projects, and improving satellite passageways (Shen, 2018).

⁴This process is of course not unique to China's development path. Western countries also achieved their ecological modernization partly through displacement of extractive and polluting industries and the outsourcing of production to less industrialized countries.

REFERENCES

- Abbott, K. W. (2017). Orchestration: Strategic ordering in polycentric climate governance. In A. Jordan, D. Huitema, H. Van Asselt, & J. Forster (Eds.), *Governing climate change* (pp. 188–209). Cambridge: Cambridge University Press. <https://doi.org/10.1017/9781108284646.012>
- Adolph, C., Quince, V., & Prakash, A. (2017). The Shanghai effect: Do exports to China affect labor practices in Africa? *World Development*, 89, 1–18. <https://doi.org/10.1016/j.worlddev.2016.05.009>
- Andrews-Speed, P., & Zhang, S. (2018). China as a low-carbon energy leader: Successes and limitations. *Journal of Asian Energy Studies*, 2(1), 1–9. <https://doi.org/10.24112/jaes.020101>
- Ascensão, F., Fahrig, L., Clevenger, A. P., Corlett, R. T., Jaeger, J. A. G., Laurance, W. F., & Pereira, H. M. (2018). Environmental challenges for the belt and road initiative. *Nature Sustainability*, 1(5), 206–209. <https://doi.org/10.1038/s41893-018-0059-3>
- Bastos Lima, M. G., Persson, U. M., & Meyfroidt, P. (2019). Leakage and boosting effects in environmental governance: A framework for analysis. *Environmental Research Letters*, 14(10), 105006. <https://doi.org/10.1088/1748-9326/ab4551>
- Beeson, M. (2018). Geoeconomics with Chinese characteristics: The BRI and China's evolving grand strategy. *Economic and Political Studies*, 6(3), 240–256. <https://doi.org/10.1080/20954816.2018.1498988>
- Belt and Road Portal. (2017a). *Guidance on promoting green belt and road*. Retrieved from <https://eng.yidaiyilu.gov.cn/zchj/qwfb/12479.htm>
- Belt and Road Portal. (2017b). *The belt and road ecological and environmental cooperation plan*. Retrieved from <https://eng.yidaiyilu.gov.cn/zchj/qwfb/13392.htm>

- Belt and Road Portal. (2019). 已同中国签订共建“一带一路”合作文件的国家一览 [List of countries that have signed cooperation documents with - China to jointly build the Belt and Road]. Retrieved from https://www.yidaiyilu.gov.cn/info/iList.jsp?tm_id=126&cat_id=10122&info_id=77298
- Benson Wahlén, C. (2019). *Second belt and road forum results in over 283 deliverables*. Retrieved from <https://sdg.iisd.org/news/second-belt-and-road-forum-results-in-over-283-deliverables/>
- Biermann, F., Pattberg, P., van Asselt, H., & Zelli, F. (2009). The fragmentation of global governance architectures: A framework for analysis. *Global Environmental Politics*, 9(4), 14–40. <https://doi.org/10.1162/glep.2009.9.4.14>
- BRIGC. (2019). *BRI international green development coalition: Introduction*. Retrieved from <http://eng.greenbr.org.cn/icfgd/aboutus/introduce/>
- Brombal, D. (2018). Planning for a sustainable belt and road initiative (BRI): An appraisal of the Asian Infrastructure Investment Bank (AIIB) environmental and social safeguards. In W. Shan, K. Nuotio, & K. Zhang (Eds.), *Normative readings of the belt and road initiative* (pp. 129–145). Cham: Springer. https://doi.org/10.1007/978-3-319-78018-4_7
- Cashore, B. (2002). Legitimacy and the privatization of environmental governance: How non-state market-driven (NSMD) governance systems gain rule-making authority. *Governance*, 15(4), 503–529. <https://doi.org/10.1111/1468-0491.00199>
- CBRC. (2012). *Notice of the CBRC on issuing the green credit guidelines*. Retrieved from <http://www.cbrc.gov.cn/EngdocView.do?docID=3CE646AB629B46B9B533B1D8D9FF8C4A>
- Challies, E., Newig, J., & Lenschow, A. (2019). Governance for sustainability in telecoupled systems. In C. Friis & J. Ø. Nielsen (Eds.), *Telecoupling: Exploring land-use change in a globalised world* (pp. 177–197). Cham: Palgrave Macmillan. https://doi.org/10.1007/978-3-030-11105-2_9
- Chatham House. (2018). resourcetrade.earth. Retrieved from <http://resourcetrade.earth/>
- Chen, S., Lu, X., Miao, Y., Deng, Y., Nielsen, C. P., Elbot, N., ... Hao, J. (2019). The potential of photovoltaics to power the belt and road initiative. *Joule*, 3(8), 1895–1912. <https://doi.org/10.1016/j.joule.2019.06.006>
- Christmann, P., & Taylor, G. (2001). Globalization and the environment: Determinants of firm self-regulation in China. *Journal of International Business Studies*, 32(3), 439–458. <https://doi.org/10.1057/palgrave.jibs.8490976>
- CSIS. (2020). *Reconnecting Asia*. Retrieved from <https://reconnectingasia.csis.org/>
- Dauvergne, P., & Clapp, J. (2016). Researching global environmental politics in the 21st century. *Global Environmental Politics*, 16(1), 1–12. https://doi.org/10.1162/GLEP_e.00333
- Dietz, T. (2003). The struggle to govern the commons. *Science*, 302(5652), 1907–1912. <https://doi.org/10.1126/science.1091015>
- Dong, L., Yang, X., & Li, H. (2018). The belt and road initiative and the 2030 agenda for sustainable development: Seeking linkages for global environmental governance. *Chinese Journal of Population Resources and Environment*, 16(3), 203–210. <https://doi.org/10.1080/10042857.2018.1487745>
- Du, M. M. (2016). China's “one belt, one road” initiative: Context, focus, institutions, and implications. *The Chinese Journal of Global Governance*, 2(1), 30–43. <https://doi.org/10.1163/23525207-12340014>
- Eakin, H., Rueda, X., & Mahanti, A. (2017). Transforming governance in telecoupled food systems. *Ecology and Society*, 22(4), art32. <https://doi.org/10.5751/ES-09831-220432>
- Eder, T. S., & Mardell, J. (2019). *Powering the belt and road*. Retrieved from <https://www.merics.org/en/bri-tracker/powering-the-belt-and-road>
- European Parliament. (2018). *2018 Report on Montenegro* (P8_TA(2018)0482 2018).
- European Union Chamber of Commerce in China. (2020). *The road less travelled: European involvement in China's belt and road initiative*. Retrieved from https://www.europeanchamber.com.cn/en/publications-archive/762/The_Road_Less_Travelled_European_Involvement_in_China_s_Belt_and_Road_Initiative
- Eyler, B. (2019). *Can solar diplomacy green the Belt and Road?* Retrieved from <https://www.chinadialogue.net/article/show/single/en/11037-Can-solar-diplomacy-green-the-Belt-and-Road->
- Fallon, T. (2015). The new silk road: Xi Jinping's grand strategy for Eurasia. *American Foreign Policy Interests*, 37(3), 140–147. <https://doi.org/10.1080/10803920.2015.1056682>
- Folke, C., Österblom, H., Jouffray, J., Lambin, E. F., Adger, W. N., Scheffer, M., ... de Zeeuw, A. (2019). Transnational corporations and the challenge of biosphere stewardship. *Nature Ecology & Evolution*, 3(10), 1396–1403. <https://doi.org/10.1038/s41559-019-0978-z>
- Friis, C., Nielsen, J. Ø., Otero, I., Haberl, H., Niewöhner, J., & Hostert, P. (2016). From teleconnection to telecoupling: Taking stock of an emerging framework in land system science. *Journal of Land Use Science*, 11(2), 131–153.
- Gallagher, K. S., & Qi, Q. (2018). *Policies governing China's overseas development finance implications for climate change*. Retrieved from https://sites.tufts.edu/cierp/files/2018/03/CPL_ChinaOverseasDev.pdf
- Gamso, J. (2018). Environmental policy impacts of trade with China and the moderating effect of governance. *Environmental Policy and Governance*, 28(6), 395–405. <https://doi.org/10.1002/eet.1807>
- Gao, M. H. (2018). Globalization 5.0 led by China: Powered by positive frames for BRI. In W. Zhang, I. Alon, & C. Lattemann (Eds.), *China's belt and road initiative: Changing the rules of globalization* (pp. 321–335). Cham: Springer. https://doi.org/10.1007/978-3-319-75435-2_17
- Gehring, T., & Oberthür, S. (2009). The causal mechanisms of interaction between international institutions. *European Journal of International Relations*, 15(1), 125–156.
- Gray, K. R. (2002). Foreign direct investment and environmental impacts - Is the debate over? *Review of European Community and International Environmental Law*, 11(3), 306–313. <https://doi.org/10.1111/1467-9388.00329>
- Guo, H., Liu, J., Qiu, Y., Menenti, M., Chen, F., Uhlir, P. F., ... Liu, J. (2018). The digital belt and road program in support of regional sustainability. *International Journal of Digital Earth*, 11(7), 657–669. <https://doi.org/10.1080/17538947.2018.1471790>
- Hamel, G. (1996). Strategy as revolution. *Harvard Business Review*, July–August, 69–82.
- Han, M., Yao, Q., Liu, W., & Dunford, M. (2018). Tracking embodied carbon flows in the belt and road regions. *Journal of Geographical Sciences*, 28(9), 1263–1274. <https://doi.org/10.1007/s11442-018-1524-7>
- Howard, K. W. F., & Howard, K. K. (2016). The new “silk road Economic Belt” as a threat to the sustainable management of Central Asia's transboundary water resources. *Environmental Earth Sciences*, 75(11), 1–12. <https://doi.org/10.1007/s12665-016-5752-9>
- Hughes, A. C. (2019). Understanding and minimizing environmental impacts of the belt and road initiative. *Conservation Biology*, 33(4), 883–894. <https://doi.org/10.1111/cobi.13317>
- Hughes, A. C., Lechner, A. M., Chitov, A., Horstmann, A., Hinsley, A., Tritto, A., ... Yu, D. W. (2020). Horizon scan of the belt and road initiative. *Trends in Ecology & Evolution*, 1–11. <https://doi.org/10.1016/j.tree.2020.02.005>
- Jin, L. (2018). Synergies between the belt and road initiative and the 2030 SDGs: From the perspective of development. *Economic and Political Studies*, 6(3), 278–292. <https://doi.org/10.1080/20954816.2018.1498990>
- Kaplinsky, R., Terheggen, A., & Tijaja, J. (2011). China as a final market: The Gabon timber and Thai cassava value chains. *World Development*, 39(7), 1177–1190. <https://doi.org/10.1016/j.worlddev.2010.12.007>
- Keohane, R. O. (1989). *International institutions and state power: Essays in international relations theory*. Boulder, CO: Westview Press.
- Kissinger, M., Rees, W. E., & Timmer, V. (2011). Interregional sustainability: Governance and policy in an ecologically interdependent world. *Environmental Science & Policy*, 14(8), 965–976.



- Kolosov, V. A., Suocheng, D., Portyakov, V. Y., Chubarov, I. G., Tarkhov, S. A., & Shuper, V. A. (2017). The Chinese initiative "the belt and road": A geographical perspective. *Geography, Environment, Sustainability*, 10(1), 5–20. <https://doi.org/10.24057/2071-9388-2017-10-1-5-20>
- Kooiman, J. (1993). *Modern governance: New government-society interactions*. London, England: Sage.
- Kou, J. (2019). *China-proposed plan adds power to Belt and Road environmental cooperation*. Retrieved from <http://en.people.cn/n3/2019/0423/c90000-9571019.html>
- Laurance, W. F. (2008). The need to cut China's illegal timber imports. *Science*, 319(5867), 1184–1185. <https://doi.org/10.1126/science.319.5867.1184b>
- Lechner, A. M., Chan, F. K. S., & Campos-Arceiz, A. (2018). Biodiversity conservation should be a core value of China's belt and road initiative. *Nature Ecology & Evolution*, 2(3), 408–409. <https://doi.org/10.1038/s41559-017-0452-8>
- Lee, N., & George, C. (2013). *Environmental assessment in developing and transitional countries: Principles, methods and practice*. Chichester, England: John Wiley & Sons.
- Lemos, M. C., & Agrawal, A. (2006). Environmental governance. *Annual Review of Environment and Resources*, 31(1), 297–325. <https://doi.org/10.1146/annurev.energy.31.042605.135621>
- Li, G. (2019). *Initiative offers path to green growth*. Retrieved from http://www.chinadaily.com.cn/a/201904/25/WS5cc108efa3104842260b8369_2.html
- Li, P., Qian, H., & Zhou, W. (2017). Finding harmony between the environment and humanity: An introduction to the thematic issue of the silk road. *Environmental Earth Sciences*, 76(3), 105. <https://doi.org/10.1007/s12665-017-6428-9>
- Liu, J., Hull, V., Batistella, M., DeFries, R., Dietz, T., Fu, F., ... Zhu, C. (2013). Framing sustainability in a Telecoupled world. *Ecology and Society*, 18(2), art26. <https://doi.org/10.5751/ES-05873-180226>
- Liu, N. (2018). Will China build a green belt and road in the arctic? *The Review of European Comparative & International Environmental Law*, 27(1), 55–62. <https://doi.org/10.1111/reel.12238>
- Liu, W., & Dunford, M. (2016). Inclusive globalization: Unpacking China's belt and road initiative. *Area Development and Policy*, 1(3), 323–340. <https://doi.org/10.1080/23792949.2016.1232598>
- Losos, E., Pfaff, A., Olander, L., Mason, S., & Morgan, S. (2019). *Reducing environmental risks from belt and road initiative investments in transportation infrastructure* (World Bank Policy Research Working Paper No. 8718). Retrieved from <http://documents.worldbank.org/curated/en/700631548446492003/pdf/WPS8718.pdf>
- Masood, E. (2019). How China is redrawing the map of world science. *Nature*, 569(7754), 20–23. <https://doi.org/10.1038/d41586-019-01124-7>
- Mayer, A. L. (2005). Importing timber, exporting ecological impact. *Science*, 308(5720), 359–360. <https://doi.org/10.1126/science.1109476>
- Minghao, Z. (2016). The belt and road initiative and its implications for China-Europe relations. *International Spectator*, 51(4), 109–118. <https://doi.org/10.1080/03932729.2016.1235819>
- Ministry of Foreign Affairs. (2019). *List of deliverables of the second belt and road forum for international cooperation*. Retrieved from https://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1658767.shtml
- MOFCOM & MEP. (2013). *Guideline on environmental protection in foreign investment and cooperation*. Retrieved from http://www.geichina.org/_upload/file/201303_MOPMOCguideline/Translation_of_the_Guideline.pdf
- Mol, A. P. J. (2011). China's ascent and Africa's environment. *Global Environmental Change*, 21(3), 785–794. <https://doi.org/10.1016/j.gloenvcha.2011.03.015>
- Morris, N. (2018). Developing a sustainable legal system for the belt and road initiative. In *Normative readings of the belt and road initiative* (pp. 43–58). Cham: Springer. https://doi.org/10.1007/978-3-319-78018-4_3
- Nakano, J. (2019). *Greening or greenwashing the belt and road initiative?* Retrieved from <https://www.csis.org/analysis/greening-or-greenwashing-belt-and-road-initiative>
- National People's Congress. (2003). *Environmental impact assessment law of the People's Republic of China*. Retrieved from https://www.commissiomer.nl/docs/os/sea/legislation/china_s_ea_legislation_03.pdf
- National People's Congress Observer. (2018). *Bilingual state council organizational chart*. Retrieved from <https://npcobserver.com/bilingual-state-council-organizational-chart/>
- NDRC. (2015). *Vision and actions on jointly building silk road economic belt and 21st-century Maritime Silk Road*. Retrieved from http://en.ndrc.gov.cn/newsrelease/201503/t20150330_669367.html
- Newell, P., Pattberg, P., & Schroeder, H. (2012). Multiactor governance and the environment. *Annual Review of Environment and Resources*, 37(1), 365–387. <https://doi.org/10.1146/annurev-environ-020911-094659>
- Newig, J., Lenschow, A., Challies, E., Cotta, B., & Schilling-Vacaflor, A. (2018). *Governing global telecoupling towards environmental sustainability*. Paper presented at the Earth Systems Governance Conference, Utrecht, 5–8 November 2018.
- Ostrom, E. (2005). *Understanding institutional diversity*. Princeton, NJ: Princeton University Press.
- Qi, Y., & Zhang, L. (2014). Local environmental enforcement constrained by central-local relations in China. *Environmental Policy and Governance*, 24(3), 204–215. <https://doi.org/10.1002/eet.1640>
- Ren, P., Zhang, L., Zhu, R., & Zhang, J. (2017). *How China's policy banks can support sustainable foreign investment*. Retrieved from http://www.geichina.org/wp-content/uploads/2017/11/Sustainable_FDI_EN_GEI2017.pdf
- Rolland, N. (2018). *China's belt and road initiative: Five years later*. Retrieved from <https://www.nbr.org/publication/chinas-belt-and-road-initiative-five-years-later/>
- Rosellini, N. (2019). *Remarks at the plenary session of the BRI international green development coalition (BRIGC) by Mr. Nicholas Rosellini, UN Resident Coordinator*. Retrieved from <http://www.un.org.cn/info/7/966.html>
- Russel, D. R., & Berger, B. (2019). *Navigating the belt and road initiative*. Retrieved from https://asiasociety.org/sites/default/files/2019-06/Navigating-the-Belt-and-Road-Initiative_0.pdf
- Schreurs, M. (2017). Multi-level Climate Governance in China. *Environmental Policy and Governance*, 27(2), 163–174. <https://doi.org/10.1002/eet.1751>
- Shen, H. (2018). Building a digital silk road? Situating the internet in China's belt and road initiative. *International Journal of Communication*, 12, 2683–2701.
- Simonov, E. (2018). *China's green belt and road tested at the Russian border*. Retrieved from <https://www.chinadialogue.net/article/show/single/en/10650-China-s-green-Belt-and-Road-tested-at-the-Russian-border>
- Suocheng, D., Kolosov, V., Yu, L., Zehong, L., Fujia, L., Minyan, Z., ... Peng, G. (2017). Green development modes of the belt and road. *Geography, Environment, Sustainability*, 10(1), 53–69. <https://doi.org/10.24057/2071-9388-2017-10-1-53-69>
- Teo, H. C., Lechner, A. M., Walton, G. W., Chan, F. K. S., Cheshmehzangi, A., Tan-Mullins, M., ... Campos-Arceiz, A. (2019). Environmental impacts of infrastructure development under the belt and road initiative. *Environments*, 6(6), 72. <https://doi.org/10.3390/environments6060072>
- Tian, X., Hu, Y., Yin, H., Geng, Y., & Bleischwitz, R. (2019). Trade impacts of China's belt and road initiative: From resource and environmental perspectives. *Resources, Conservation and Recycling*, 150(April), 104430. <https://doi.org/10.1016/j.resconrec.2019.104430>
- Tracy, E. F., Shvarts, E., Simonov, E., & Babenko, M. (2017). China's new Eurasian ambitions: The environmental risks of the Silk Road economic

- belt. *Eurasian Geography and Economics*, 58(1), 56–88. <https://doi.org/10.1080/15387216.2017.1295876>
- UNDP & CCIEE. (2017). *The belt and road initiative: A new means to transformative global governance towards sustainable development* (UNDP Global Governance Report 2017). Retrieved from <http://www.cn.undp.org/content/china/en/home/library/south-south-cooperation/a-new-means-to-transformative-global-governance-towards-sustaina.html>
- UNEP. (n.d.). *UN Agencies belt and road initiative involvement*. Retrieved from <https://www.unenvironment.org/regions/asia-and-pacific/regional-initiatives/international-coalition-green-development-belt-and-1>
- van Erp, J. (2008). Reputational sanctions in private and public regulation. *Erasmus Law Review*, 1(5), 145–162.
- Vogel, D. (2009). *Trading up: Consumer and environmental regulation in a global economy*. Cambridge, MA: Harvard University Press.
- Walker, B. (2016). *China stokes global coal growth*. Retrieved from <https://www.chinadialogue.net/article/show/single/en/9264-China-stokes-global-coal-growth>
- Wang, H. (2019). China's approach to the belt and road initiative: Scope, character and sustainability. *Journal of International Economic Law*, 22(1), 29–55. <https://doi.org/10.1093/jiel/jgy048>
- Wendling, Z. A., Emerson, J. W., Esty, D. C., Levy, M. A., de Sherbinin, A. (2018). *2018 environmental performance index*. New Haven, CT: Yale Center for Environmental Law & Policy Retrieved from <https://epi.yale.edu/>
- Word Heritage Committee. (2019). *Decisions adopted during the 43rd session of the World Heritage Committee (WHC/19/43.COM/18)*. Retrieved from <http://whc.unesco.org/en/decisions/7483>
- WWF. (2017). *The belt and road initiative: WWF recommendations and spatial analysis*. Retrieved from http://awsassets.panda.org/downloads/the_belt_and_road_initiative___wwf_recommendations_and_spatial_analysis___may_2017.pdf
- Xinhua. (2017a). *Full text of President Xi's speech at opening of Belt and Road forum*. Retrieved from http://www.xinhuanet.com/english/2017-05/14/c_136282982.htm
- Xinhua. (2017b). *Vision for maritime cooperation under the belt and road initiative*. Retrieved from http://www.xinhuanet.com/english/2017-06/20/c_136380414.htm
- Xinhua. (2017c). *Xi urges more pragmatic cooperation with Turkmenistan under Belt and Road Initiative*. Retrieved April 20, 2020, from http://www.xinhuanet.com/english/2017-06/10/c_136354252.htm
- Xinhua. (2019). *Feature: In first EU-funded project, Chinese contractor rises to environmental challenges*. Retrieved from http://www.xinhuanet.com/english/2019-08/17/c_138314953.htm
- Yang, D., Cai, J., Hull, V., Wang, K., Tsang, Y.-P., & Liu, J. (2016). New road for telecoupling global prosperity and ecological sustainability. *Ecosystem Health and Sustainability*, 2(10), 1–6. <https://doi.org/10.1002/ehs2.1242>
- Young, O. R., Guttman, D., Qi, Y., Bachus, K., Belis, D., Cheng, H., ... Zhu, X. (2015). Institutionalized governance processes. Comparing environmental problem solving in China and the United States. *Global Environmental Change*, 31, 163–173. <https://doi.org/10.1016/j.gloenvcha.2015.01.010>
- Yu, J. (2018). The belt and road initiative: Domestic interests, bureaucratic politics and the EU-China relations. *Asia Europe Journal*, 16(3), 223–236. <https://doi.org/10.1007/s10308-018-0510-0>
- Zarsky, L. (1999). Havens, halos and spaghetti: Untangling the evidence about foreign direct investment and the environment. In *Foreign direct investment and the environment* (pp. 47–74). Paris, France: OECD.
- Zhang, N., Liu, Z., Zheng, X., & Xue, J. (2017). Carbon footprint of China's belt and road. *Science*, 357(6356), 1107–1107. <https://doi.org/10.1126/science.aao6621>
- Zhang, Z. (2018). The belt and road initiative: China's new geopolitical strategy? *China Quarterly of International Strategic Studies*, 04(03), 327–343. <https://doi.org/10.1142/S2377740018500240>
- Zhou, L., Gilbert, S., Wang, Y., Muñoz Cabré, M., & Gallagher, K. P. (2018). *Moving the Green Belt and road initiative: From words to actions*. Washington, DC: World Resources Institute.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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