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Can the Race for Decarbonization Be 'Green'?: Critical Minerals, China's Responsible Mining Initiatives, and the Role of Non-State Actors

Jessica DiCarlo is an Assistant Professor at the University of Utah and a 2023–24 Wilson China Fellow

Abstract

This report examines China's evolving role in promoting responsible critical mineral extraction within the context of the global energy transition. It focuses on the pivotal role of non-state actors in shaping environmental, social, and governance (ESG) standards and corporate social responsibility (CSR) practices in the mining sector through the case of the China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC). CCCMC emerges as a key player in developing and implementing ESG guidelines, bridging government policies, industry interests, and international standards. By analyzing CCCMC's evolution, international engagements, and influence on policy and ground-level practices, this report provides insights into China's approach to responsible mining and its implications for global mineral supply chains. It also challenges conventional portrayals of Western and Chinese ESG standards as disparate, demonstrating their increasing convergence and co-evolution. It highlights the complexities Chinese firms face in implementing these standards, noting distinct challenges for upstream and downstream companies across different minerals. The findings suggest that China's efforts in this domain serve multiple purposes: securing critical mineral supplies, mitigating reputational risks, and perhaps increasingly projecting green soft power. It suggests the need for a more granular understanding of and increased international cooperation in addressing the environmental and social challenges of the global energy transition.

Takeaways

- Western and Chinese ESG standards in the mining sector are increasingly converging and evolving in tandem. Efforts should focus on identifying areas of alignment and opportunities for collaboration rather than emphasizing differences.

- The role of Chinese non-state actors in shaping ESG standards for the mining sector should be recognized as an important avenue for engagement in responsible critical mineral supply chains. Policymakers and industry leaders should seek to understand and collaborate with these organizations rather than viewing them through a competitive lens.

- Implementation of ESG guidelines by Chinese firms varies between upstream and downstream companies. Policymakers and industry leaders should develop targeted approaches to address the unique challenges faced by different actors in the supply chain of each specific mineral.

- US industry and safeguard leaders should build on existing collaborations between CCCMC and international organizations using, for instance, multilateral platforms such as the UNFCCC, OECD Mineral Supply Chain Forum, and G20 to promote alignment, effective implementation, and global discussions on standards for responsible critical mineral extraction and processing.

- Support subnational and non-state actor engagement between the United States and China through a) facilitating direct engagement between provincial/state-level governments and industry associations involved in critical mineral extraction and processing, and b) providing resources and platforms for non-state actors, including industry associations and NGOs, to participate in international dialogues on critical mineral standards in light of the low-carbon transition.

- Promote industry-to-industry collaboration through partnerships and dialogues between organizations like CCCMC and their Western counterparts. This could encompass technical exchanges, shared research initiatives, and joint development of common ESG standards for the critical minerals sector.

- Given the current politicized competition with China, US NGOs, or industry groups might serve as less risky intermediaries in reaching out to Chinese industry groups like CCCMC.

- Create joint research and development initiatives between Chinese and Western institutions focused on environmentally responsible extraction and processing technologies for critical minerals.

- Chinese and Western companies rely on increasingly harmonized ESG standards. As such, they should engage in developing programs to assist resource-rich countries in implementing and monitoring these standards and improve enforcement at the company level.

Introduction

The global transition to clean energy technologies has dramatically increased demand for critical minerals, sparking competition to secure stable supply chains. This transition represents more than just a shift in power sources; it signifies a fundamental transformation of the global economy, environment, and geopolitical landscape. As countries strive to reduce their carbon footprints, demand for minerals essential to low-carbon technology has reshaped how we produce, extract, transport, store, and use energy. However, this swift transition, necessitated by the urgency of climate change, brings significant risks and harms, leading to what some have deemed "climate necropolitics"[1] and "green transition necropolitics."[2] The extraction and processing of minerals often come with severe environmental and social costs, such as labor exploitation and environmental harms.[3] As a result, societies are grappling with balancing the environmental benefits and need for renewable energy with negative consequences, such as habitat destruction, water pollution, deforestation, and human rights violations. Moreover, there is a danger of reproducing damaging extractive histories and exacerbating geopolitical tensions.

China, as a major player in global mineral supply chains, plays a crucial role in shaping mining practices. The country is a leader in the extraction, processing, and manufacturing of many critical minerals, so its approach to environmental, social, and governance (ESG) issues in the mining sector has far-reaching implications for the global decarbonization effort. Chinese firms have increasingly prioritized corporate social responsibility (CSR) and ESG standards across various sectors, prompting debates on whether China will emerge as a global standard-setter[4] or an environmental great power.[5]

While this debate and research on China's environmental governance often focus on high-level policy decisions and guidelines from policy banks or the Ministry of Ecology and Environment, particularly in relation to the Belt and Road Initiative (BRI).[6] This is due, in large part, to efforts to "green" the BRI and China's overseas activities.[7] China's environmental governance, however, has shifted from a command-and-control approach to a more diversified system involving market mechanisms, civil society, and international integration.[8] It is, thus, crucial to recognize the role of non-state actors in shaping and implementing these policies. Scholarship has highlighted the importance of non-state actors in environmental governance, both domestically

and in China's overseas activities.[9] Scholars have turned to analyzing the role of Chinese NGOs in environmental governance[10] and their ability to generate knowledge for environmental regulations,[11] demonstrating how local governance shapes policy implementation. Others have shown how civil society organizations might participate domestically in environmental governance.[12] Increasingly, Chinese non-state actors play an important role in the environmental governance of China's overseas activities, as they accumulate knowledge through international engagements and disseminate this knowledge domestically.[13] The changing ways Chinese people and organizations respond to environmental issues in China illuminate the country's growing role in global environmental politics, reflecting dynamic state-society relations in China.[14]

Building on an understanding of the critical bridging and knowledge production role of non-state actors from NGOs to civil society,[15] this paper examines China's push for more responsible critical mineral extraction in the context of the global energy transition by focusing on the role of business or industry associations. In particular, I center the case of the China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC), an increasingly critical non-state actor shaping corporate social responsibility, ESG standards, and supply chain practices.

CCCMC has played an essential role in setting environmental standards for other resources, such as rubber,[16] and it has emerged as a proactive actor in developing ESG standards for Chinese outward investment and global mineral supply chains. Between 2014–2023, the organization developed several guidelines and initiatives that closely align with international standards like the UN Guiding Principles on Business and Human Rights and OECD Due Diligence Guidance. By centering CCCMC and its role in developing and promoting sustainable practices within the industry, this paper demonstrates how organizations like CCCMC act as translators and mediators between Chinese companies, international standards, and host extractive locations. It also examines how CCCMC bridges central government objectives and firm actions that affect socio-environmental impacts across the supply chain.

This report employs a suite of qualitative methods, including policy analysis, interviews, observations of international mining conferences, and case studies. It incorporates a review and analysis of Chinese government policies and strategies, industry reports, primary sources from CCCMC, news

reports, a series of CSR initiatives, and ESG guidance published and revised between 2014 to 2024. Through this approach, I aim to develop a comprehensive understanding of the role of non-state actors in translating and defining critical mineral governance in China and its global implications.

The paper begins by detailing the geopolitical context surrounding critical minerals, followed by an overview of China's central policy landscape related to these resources. The core of the paper focuses on CCCMC's role in relation to critical minerals, examining its impact on ESG standards in the Chinese mining sector and how they compare to Western standards. I consider how CCCMC acts as a bridge between Chinese policy directives, international standard setting, and mining companies operating around the world, showing how standards evolve and are used to address responsible supply chain challenges in ways that are specific to the Chinese context and their role as an industry association. The paper concludes with policy recommendations for how China and other global actors can collaborate towards a more responsible decarbonization path that balances the urgent need for climate action with the imperatives of environmental protection and social justice in mineral-rich regions.

Background: Critical Mineral Geopolitics and Securing Supply Chains

The concept of "critical minerals" has gained significant attention in recent years, particularly in the context of the clean energy transition and related technological advancement. These minerals are essential for a wide range of applications, including renewable energy technologies, digital devices, defense systems, and infrastructure. However, the definition and prioritization of critical minerals vary among countries, reflecting unique strategic interests, industrial structures, and geopolitical considerations. China, the United States (US), and the European Union (EU) are shaping the landscape of critical minerals and driving competition globally. While there are minerals that all three actors consider critical, their lists are not identical. This divergence reflects each region's strategic priorities, industrial capabilities, and resource endowments. For example, minerals central to electric vehicle batteries, such as lithium, cobalt, and nickel, are found at the intersection of all three lists, highlighting the global race to secure supplies for the growing EV market.

While China's dominance in critical mineral supplies and production is often emphasized, it is crucial to recognize that this position results from years of strategic decisions and investments. Decades of research and development have led China to develop a robust supply chain from mineral extraction to chemical processing and manufacturing. China's dominance in this field can be attributed to a combination of factors, including its abundant mineral resources, strategic investments, and supportive government policies. More recently, in light of the low-carbon transition, China has taken steps to secure its supplies of certain critical minerals domestically and abroad. These measures are being implemented at various levels across the Chinese bureaucracy, reflecting the country's strategic approach to ensuring a stable supply of these resources (such as rare earths, cobalt, and nickel).

The surge in mineral demands, coupled with China's dominance in several key mineral sectors, has raised concerns among Western countries about potential dependencies and vulnerabilities in their decarbonization efforts. In response, governments are implementing strategies to secure and diversify their critical mineral supply chains. The United States, for instance, has passed legislation allocating billions of dollars toward clean energy technology and infrastructure, such as the Inflation Reduction Act (IRA), the CHIPS Act, and the Infrastructure Law. The IRA aims to increase clean technology development and uptake by providing incentives to expand wind and solar energy, offering production tax credits to support domestic manufacturing of these technologies, investment tax credits for zero-emission energy generation and storage facilities, incentives for Americans to decarbonize their homes through upgrades like heat pumps, and tax credits for qualifying electric vehicles. Securing stable supplies has become a bipartisan issue, largely because of China's dominance in the relevant industries and ongoing trade tensions. The United States is facing significant demand increases for critical minerals due to the growth of electric vehicles, batteries, solar panels, and wind turbines, as well as their applications in defense, IT sectors, and medical devices. The US Geological Survey (USGS) has maintained a list of critical minerals since 1973, but the Department of Energy (DoE) recently released its own list, employing a different methodology that considers the country's specific needs and vulnerabilities.

In addition to domestic efforts, the United States also engages in international cooperation to secure critical mineral supply chains. In 2023, President

Biden met with the head of the European Commission to discuss critical minerals trade. This meeting resulted in an agreement that will allow EU-sourced minerals to qualify for the United States' recent and substantial EV-related subsidies. The EU's Critical Raw Materials Act entered into force in 2024. Meanwhile, Australia and India are discussing their own critical minerals trade deal, highlighting the global nature of these efforts.

The spatial distribution of supply chains further complicates the geopolitical landscape of critical minerals. While upstream extraction occurs in resource-rich countries like Indonesia, Chile, Peru, China, and the Democratic Republic of the Congo, downstream processing is heavily concentrated in China. This has raised concerns about the potential risks associated with overreliance on a single country for critical mineral processing and has prompted efforts to diversify supply sources and develop domestic processing capabilities in other nations. Finally, the criticality of minerals can be viewed through both short-term and long-term lenses. Some minerals may be considered critical in the near future due to immediate supply shortages or geopolitical tensions. In contrast, others may become increasingly important in the longer term as technologies evolve and global demand shifts.

As the world transitions towards a more sustainable and technologically advanced future, critical minerals demand is expected to grow. With Xi Jinping's commitment to ending the production of internal combustion engines by 2035 and Beijing's increasing orientation towards EV batteries and other lower-carbon initiatives, China requires its own robust and secure supplies of a range of minerals. It is to the central-level policy landscape concern with climate and mineral security within China that I now turn.

China's Policy Landscape in Relation to Critical Minerals

China's approach to critical minerals and environmental governance reflects interactions between national priorities and local implementation. At the core of Beijing's strategy is a commitment to "green growth," which underpins its critical mineral and energy transition policies. These policies are considered crucial pillars of the country's environmental and economic development and aim to achieve two main objectives: channeling investment

into green industries to foster growth and securing a stable supply of critical minerals to reduce China's dependence on imports and protect domestic industries. This dual focus is evident in recent legislation. For instance, the Renewable Energy Law of 2017 emphasizes developing and utilizing energy sources aligned with the broader green growth agenda. In contrast, the revised Mineral Resources Law of January 2024 only briefly mentions green development, though it does not explicitly refer to the Green Development Concept (*lüse fazhan linian*; 绿色发展理念). Instead, it highlights the importance of critical minerals for economic security, reflecting the central government's priorities of expanding domestic extraction and mitigating foreign reliance and competition.

Overall, mining policy primarily focuses on domestic development, shaping provincial growth and the overall industrial structure, such as encouraging enterprises to "go out" and invest overseas. Natural resource (*ziyuan*; 资源) policy is derived from broader strategic goals. Green technology and innovation policies are typically subsets of climate and economic policies, which have emerged to address the balance between growth and sustainability. These green technologies will undoubtedly shape China's strategic mineral interests in the coming decades, including the country's absolute demand for green minerals.[17]

China's environmental governance, however, is characterized by fragmentation rather than centralized control.[18] It involves negotiation and redefinition at multiple levels and by a range of actors, including private entities, NGOs, civil society, and non-state actors. While the central government sets the overarching agenda, provinces, municipalities, businesses, and SOEs do not simply follow top-down critical mineral directives. Instead, they interpret and translate key national directives to pursue local interests, often in an iterative process between central and subnational actors.[19]

The central government typically identifies strategic priorities and high-level solutions, tasking lower-level bureaucratic actors with determining implementation specifics. Beijing tends to outline relatively open-ended problem sets in the minerals sector, allowing space for lower-level experimentation. This approach enables local officials and firms to translate central directives in ways that align with their interests, resulting in more technical and solution-focused plans at the subnational level. Additionally, scholars have highlighted

that China's environmental governance is not purely authoritarian; although national policies might appear, local implementation often results in a mix of authoritarian and liberal features due to weak central control over local governments and enterprises.[20] Thus, understanding the dynamics of critical mineral supply chains requires looking beyond national supply and centralized directives to examine how these sectors are shaped by various factors and actors. The roles of non-state actors, including NGOs, civil society, and private entities, in shaping China's environmental policies are increasingly recognized as indispensable.[21]

This report focuses on one such actor: the China Chamber of Commerce of Metals, Minerals & Chemicals Importers & Exporters (CCCMC). As a non-state organization with close ties to state bodies, CCCMC occupies a unique position in China's environmental governance landscape. It is increasingly integral in shaping critical mineral supply chains, related ESG standards, and their implementation. By examining CCCMC and its evolution, this report aims to provide insights into China's evolving approach to responsible critical mineral extraction in the context of the global energy transition. It explores how non-state actors like CCCMC navigate the landscape of Chinese environmental governance, bridging national priorities, industry practices, and international standards. It contributes to a broader understanding of how China balances economic development, resource security, and environmental protection in its critical minerals sector.

CCCMC and the Role of *Shanghui* in ESG Safeguards

CCCMC acts as the primary business association for metals and mining in China and has led the development of ESG guidance for mining. Established in 1988, CCCMC has grown to represent over 6,000 Chinese companies by 2021, playing a crucial role in an industry that constitutes a substantial portion of China's foreign trade.

CCCMC exemplifies the unique nature of Chinese business associations, or *'Shanghui,'* which have become important intermediaries between the government and the private sector since China's economic reforms began in the late 1970s.[22] These organizations blend state influence with market-oriented approaches, often maintaining ties with state institutions while representing

industry interests. They have taken on increasingly important roles in promoting social responsibility, including environmental standard-setting, guidance, and implementation. The development of these associations reflects China's approach to governance, blending state control with market-oriented reforms.

Scholars have argued that Western concepts of non-state actors in environmental governance are inadequate to describe China's system, where the line between state and non-state is blurred, and the government is central in many sectors.[23] This is particularly relevant in relation to CCCMC, which is officially a non-state actor, though it maintains close communication with state bodies. Many of these organizations have roots in former government ministries or departments, maintaining ties with state institutions while representing industry interests. These associations span sectors, including textiles, mining, agriculture, energy, banking, and construction.

CCCMC Overview and Membership

Metals, minerals, and chemicals constitute an enormous portion of China's foreign trade, accounting for 40 percent of imports and 20 percent of exports. The sector involves some of China's largest corporations, positioning CCCMC as an influential entity across multiple industries. The Chinese government has tasked CCCMC with driving shifts in its member companies and their respective sectors, focusing on environmental sustainability, social responsibility, and technical standards. In response, CCCMC began developing guidelines for Chinese outbound mining investments in 2014 and recently partnered with the Responsible Critical Mineral Initiative to establish a new accountability mechanism for the mining sector.

CCCMC's membership encompasses companies involved in various economic activities related to metals and minerals, non-metallic minerals, hardware and building materials, petroleum and chemical raw materials, and associated upstream and downstream industrial chains. Only companies legally registered in China with a Business License (企业法人营业执照) issued by the State Administration for Industry and Commerce are eligible for membership. CCCMC has established 23 commodity branches (商品分会), each with its chairman, council companies, principles, and rules tailored to sectoral needs. The organization's primary functions include providing coordination,

consultation, and services to members, maintaining a fair-trade order, and safeguarding member rights and interests to promote sustainable industry development. Members have also used CCCMC as a 'billboard' to advertise or make statements to the public. However, the extent of CCCMC's influence over its members remains unclear. Currently, there is no published member list online; only council members (48 permanent and 144 sessional as of 2024) and companies joining commodity clubs are visible to the public.

CCCMC has historically emphasized Africa as a region of interest. In September 2021, it launched the Alliance of Chinese Business in Africa for Social Responsibility (ACBASR) during the second China-Africa Economic and Trade Expo. In October 2023, CCCMC published a CSR report on Chinese business in Africa at the 3rd Belt and Road Forum. From 2009 to 2014, CCCMC was entrusted by the Ministry of Commerce of the State Council of China (MOFCOM) to review and record China's companies engaged in overseas development and investment until September 2014. In 2020, CCCMC formally separated from MOFCOM during a round of decoupling between industry associations and administrative agencies that resulted from the 2015 "Plan for the Decoupling of Industry Associations and Administrative Agencies" (行业协会商会与行政机关脱钩总体方案).

CCCMC's Evolution and Expanding Role

CCCMC has been pivotal in shaping China's engagement with metal and mineral resource investment and development. However, with the turn toward increased environmental standards and critical mineral securitization over the past decade, their engagement and leadership have evolved. For example, the 2023 annual meeting featured seven sub-forums focused on iron, copper, lead, aluminum, magnesium, silicon, and nickel, with attendees from the government (MOFCOM and embassies of other countries), academia, researchers, private corporations (mining and investment banks), NGOs, and think tanks, providing industrial and geopolitical insights for CCCMC members.

CCCMC's development can be understood through several key phases:

1. **MOFCOM Assistance (1988–1999):** From its establishment in 1988 until the late 1990s, CCCMC served as a critical institution specializing

in metal minerals and chemicals under the supervision of the MOFCOM, the executive department of the State Council responsible for export control policies. During this period, China imposed restrictions on exporting raw materials like magnesium to stimulate the development of downstream industries. CCCMC assisted MOFCOM with the export of magnesite as China transitioned from a state-controlled economy to a market-based system. MOFCOM controlled the annual export quota of magnesite and required prospective exporters to bid on an allotment from the aggregate quota, with CCCMC administering the bidding process on behalf of the government. The bidding committee even comprised employees from both MOFCOM and CCCMC.

2. **CCCMC responds to "Going Out" (1999–2012):** The launch of China's "Go Out" policy in 1999 marked a significant shift in CCCMC's focus. Aligning with the national strategy to encourage Chinese firms to venture abroad for natural resource extraction. In a 2011 interview, CCCMC chairman Xu Xun explained that over the previous decade, the organization's primary goals were to act as an intermediary to reduce information asymmetry for domestic industries. The organization researched investment environments and policies in resource-intensive countries while assisting Chinese companies in navigating trade remedy cases, including anti-dumping and countervailing measures. By 2012, CCCMC had assisted in approximately 300 such cases, demonstrating its growing importance in facilitating China's global economic engagement. For instance, CCCMC protected Chinese iron firms from dumping charges by other importing countries. MOFCOM appointed CCCMC to serve as a REACH Act Counselling Service Center, facilitating communication between the EU and domestic companies in China and laying the groundwork for increased cooperation on guidelines in subsequent years.

3. **A turn toward guidelines (2012–2016):** From 2012 to 2016, CCCMC pivoted towards developing guidelines for responsible business practices in response to challenges faced by Chinese firms during the "Go Out" era and the 2013 launch of the BRI. CCCMC's leader, Sun Lihui,

identified that both CCCMC and the Chinese government had overly emphasized pre-approval processes for overseas activities while neglecting post-investment regulations. This oversight contributed to a high failure rate of Chinese overseas investments, with over 80 percent encountering issues related to human rights, labor practices, environmental concerns, and community relations. Furthermore, many Chinese companies lacked adequate corporate risk assessment tools, posing risks, especially considering that the majority of Chinese mineral companies invested in underdeveloped or "high-risk" regions. Recognizing these challenges, CCCMC advocated for industrial associations to take a leading role in guiding Chinese companies, particularly those engaged in natural resource extraction. This shift was further motivated by the Chinese government's National Human Rights Action Plans (2009) and the UN Guiding Principles on Business and Human Rights (2011). Consequently, in 2014, CCCMC published its first "Guidelines for Social Responsibility in Outbound Mining Investments" under the Emerging Market Multinational Network for Sustainability and Sino-German CSR Project.[24] This marked a significant step in industry self-regulation and demonstrated China's growing attention to CSR in its global economic activities. These guidelines were later revised in 2017 to align with the UN's 2030 sustainability agenda. Building on this momentum, CCCMC co-sponsored the 2015 International Workshop on Responsible Mineral Supply Chains with the OECD. During this event, CCCMC introduced the "Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains,"[25] based on the OECD Due Diligence Guidance, and co-authored with Germany's primary development agency GiZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) with input from OECD and Global Witness. They addressed the issue of "conflict minerals" (known as 3TG: tin, tantalum, tungsten, and gold) in response to the 2012 Congolese Due Diligence Law and EU and US laws requiring companies whose products contain 3TG to conduct due diligence on minerals originating in the DRC or its nine surrounding countries. The effectiveness of these guidelines was later recognized in 2022 when the London Metal Exchange (LME) conditionally approved CCCMC's Due Diligence Guidelines as a standard for responsible supply chain

management among LME-registered brand owners. This approval marked a significant milestone in CCCMC's efforts to promote responsible mining practices on a global scale.

4. **DRC Cobalt and international engagement (2016–2020):** The period from 2016 to 2020 saw CCCMC intensify its focus on specific mineral supply chain issues, particularly concerning cobalt mining in the Democratic Republic of Congo (DRC). This shift was precipitated by policy incentives from the National Plan for Mineral Resources (2016–2020) that aimed to secure mineral supplies and the publication of China's strategic resource list by the Ministry of Natural Resources. Additionally, CCCMC's pivot was a direct response to Amnesty International's report on human rights abuses in the Democratic Republic of Congo, which heavily criticized Chinese company Huayou Cobalt. In response to the report, CCCMC collaborated with OECD and several international and Chinese companies to launch the Responsible Cobalt Initiative (RCI) in 2016 to reduce the negative impacts of cobalt extraction. The RCI agenda addressed issues related to child labor, health, and safety and sought cooperation with the Congolese government and local stakeholders. The nine council members of RCI included companies named in the report, such as Huayou Cobalt, Jinchuan Group, BMW, Dell, and Xiamen Tungsten, as well as industry associations like CCCMC, CSR Europe, and the China Nonferrous Metals Association Cobalt Branch. Following the incident, an increasing number of Chinese mining and manufacturing corporations chose to engage more actively with CCCMC and its guidelines, participate in their annual conferences, and respond more promptly to their appeals. Huayou Cobalt, for example, has been sponsoring CCCMC's international forums since then. CCCMC also undertook further actions to address issues surrounding artisanal cobalt. In November 2019, CCCMC and OECD co-investigated local mechanized mining, artisanal mining, smelters, and trading markets in the DRC. They also held a "multi-stakeholder conference on the global copper and cobalt supply chain (全球铜钴供应链多利益相关方大会)." The same year, CCCMC stated that cobalt should not be labeled as a "conflict mineral"

and that it would be a wrong move for companies to exclude artisanal cobalt from the supply chain to reduce risks. The OECD supported this statement in their November 2019 report titled "Interconnected Supply Chains: A Comprehensive Look at Due Diligence Challenges and Opportunities Sourcing Cobalt and Copper from the Democratic Republic of Congo." Moreover, CCCMC started working on an Artisanal Cobalt ESG Management Framework (钴手采矿ESG管理框架), with the first draft completed in 2021.

5. **Universal mechanisms for all critical minerals (Post-2020):** Since 2020, CCCMC has broadened its focus to address universal mechanisms for all critical minerals, significantly expanding its cooperation with international organizations, governments, and private and public actors in mineral supply chains. The organization launched its annual Sustainable Mineral Supply Chain International Forum (SMISC) in 2020, attracting a growing international audience and establishing CCCMC as a key convener in the global mineral supply chain dialogue. This expanded role, from a pure attendee to an international event holder, has enabled CCCMC to develop comprehensive accountability mechanisms for the mineral supply chain. In 2021, CCCMC joined the Responsible Minerals Initiative, contributing to the launch of the Cobalt Refiner Supply Chain Due Diligence Standard (Version 2.0). The following year, CCCMC revised its Due Diligence Guidelines, adding a sixth step focused on remediation. Recognizing the need for a more mineral-inclusive approach, CCCMC shifted its strategy from cobalt-specific initiatives to creating universal mechanisms applicable to all critical minerals, such as cobalt, lithium, and nickel. This shift was exemplified by the rebranding of the Responsible Cobalt Initiative (RCI) to the Responsible Critical Mineral Initiative (关键矿产责任倡议) in November 2022. While CCCMC mentions "critical minerals," it rarely does so explicitly. In interviews, the organization acknowledges the impact of geopolitics and great power competition on mineral supply chains. Still, it avoids directly addressing geopolitical questions, instead emphasizing its focus on sustainability, human rights, and social responsibility. Most recently, in 2023, it issued a procedural document for mediation and consultation mechanisms

related to mining disputes. To support these initiatives, CCCMC issued new accountability measures, training programs, and mediation and consultation mechanisms related to mining disputes. They include, for instance, the Complaint and Consultation Mechanism for the Mining Industry and Mineral Value Chain and a Mineral Supply Chain Due Diligence Assessment Program in 2023. It also launched a training for domestic mining stakeholders, covering due diligence practices across various mineral supply chains, including copper, lead, zinc, tin, lithium, nickel, and cobalt. The Mineral Supply Chain Due Diligence Assessment Program, initiated in June 2023, aims to identify gaps in due diligence performance and implement corrective actions to help companies align with international standards. Most recently, in May 2024, CCCMC participated in the OECD Mineral Supply Chain Forum in France, hosting several sessions, organizing the attendance of leaders from key Chinese companies, and giving a Keynote address on due diligence incentives for smelters and refiners.

CCCMC's Key Mining Guidelines and Interactions with Global Environmental Governance

As the preceding chronology illustrates, CCCMC has been shaped by several international actors, institutions, and organizations. Simultaneously, it has come to shape environmental standards within the Chinese and global mineral sectors. CCCMC's increasing international engagements impact not only their standards but broader supply chain governance. Guidelines have been developed through multi-stakeholder collaboration involving Chinese and international actors from government, industry, and civil society, including member companies, Germany, the United Kingdom, OECD, United Nations offices, the Responsible Mining Initiative, and international NGOs like Global Witness and Amnesty International.[26] These guidelines, summarized in Table 1 and explored in depth in the following paragraphs, demonstrate CCCMC's evolving role in promoting responsible mining practices and aligning Chinese standards with international best practices.

TABLE 1. Summary of CCCMC's main guidelines

Guidelines for Social Responsibility in Outbound Mining Investments (GSRM) (中国对外矿业投资行业社会责任指引)[27]	2014 *(revised 2017)*
Chinese Due Diligence Guidelines for Mineral Supply Chains (中国负责任矿产供应链尽责管理指南)[28]	2015 *(revised 2022)*
Sustainable Mining Action Plan (SMAP; of the Responsible Cobalt Initiative) (可持续矿业行动计划)	2016
Cobalt Refiner Supply Chain Due Diligence Standard (钴冶炼厂供应链尽责管理标准)[29]	2018 *(revised 2019; 2021)*
Responsible Cobalt Initiative (RCI) rebranded Responsible Critical Mineral Initiative (关键矿产责任倡议)	2022
Mediation and Consultation Mechanism for the Mining Industry and Mineral Value Chain: Procedure Document (采矿业和矿产价值链调解磋商机制:程序文件)[30]	2023

The Guidelines for Social Responsibility in Outbound Mining Investments were first launched in 2014 under the framework of the Emerging Market Multinational Network for Sustainability and Sino-German CSR Project. It was revised in 2017 after the United Nations launched the 2030 Sustainable Development Agenda. It was designed to guide Chinese companies engaged in mining investment and cooperation inside and outside China and mining-related infrastructure construction in creating effective management systems to strengthen their capacity for social responsibility governance and sustainable development.

The guidelines are structured according to the principles and core subjects of the ISO 26000 Guidance on Social Responsibility and are in line with the standard development procedure of the International Social and Environmental Accreditation and Labelling Alliance. They are risk-oriented and apply to all mineral exploration, extraction, processing, and investment cooperation projects at the corporate level. It considers the Guiding Principles on Business and Human Rights, Ten Principles of the United Nations Global Compact, and other international initiatives, as well

as internationally recognized codes and initiatives in the mining field, such as the Sustainable Development Framework of the International Council of Minerals and Metals (ICMM), the Code of Practices from the Responsible Jewelry Council, the Bettercoal Code, and more. It also follows the Guiding Opinions on the Performance of Social Responsibilities by State-owned Enterprises under the Central Government released by the State-owned Assets Supervision and Administration Commission of the State Council and relevant Chinese laws and regulations.

The updated guidelines are divided into four chapters, namely the scope of application and seven guiding principles, social responsibility issues (organizational governance, fair operating practices, supply chain management, human rights, labor issues, occupational health and safety, environment, and community development), and implementation of the Guidelines. It offers guidance to enhance companies' strategies and capacities for corporate social responsibility (CSR), sustainable development, and environmental and social impact assessments.

The Due Diligence Guidelines for Responsible Mineral Supply Chains were published in 2015 and revised in 2022. It was an additional guideline to operationalize the Chinese Guidelines for Social Responsibility in Outbound Mining Investments to provide specific guidance to all Chinese companies engaging in extractive activities or using mineral resources in their products to identify, prevent, and mitigate their risks of contributing to conflict, serious human rights abuses, and risks of serious misconduct during the entire life cycle of the mining supply chain.

Compared with past guidelines, the 2022 version added an additional chapter categorizing ten different characteristics of Due Diligence and re-designing a 6-step Due Diligence process (adding step six: "provide for or cooperate in remediation when appropriate") based on the 5-step model of OECD DDG. CCCMC guidelines also highlight two kinds of risks: Type 1 Risks, which contribute to conflict and serious human rights abuses associated with extracting, trading, processing, and exporting of resources from conflict-affected and high-risk areas, and Type 2 Risks relating to serious misconduct in environmental, social and ethical issues.

According to the guidelines, companies are responsible for carrying out their individual due diligence, conducting third-party audits, and publishing

their due diligence policies and practices. The guidelines use the UN Guiding Principles on Business and Human Rights and the OECD Due Diligence Guidance on Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas as the basis. CCCMC guidelines have been cross-recognized with the OECD DDG guideline. London Metal Exchange (LME) has also announced that their approved brands can choose the CCCMC Guide and its supporting assessment tools to carry out supply chain due diligence management by following the LME Responsible Sourcing Handbook requirements.

The Mediation and Consultation Mechanism for the Mining Industry and Mineral Value Chain (2023)[31] is the RCI and CCCMC-developed new grievance mechanism for Chinese overseas mining projects. This initiative is the first accountability mechanism established by a Chinese industry association for overseas mining and is accompanied by a procedures document of the mechanism.[32] It aims to address the "accountability gap" by allowing affected communities to raise concerns about social and environmental impacts across all mineral value chains. The mechanism will offer a mediated dialogue process for dispute resolution, supported by independent fact-finding when necessary. It is based on CCCMC's established guidelines like the Guidelines for Social Responsibility in Outbound Mining Investments and the UN Guiding Principles on Business and Human Rights. While the proposed mechanism includes important provisions for representation, confidentiality, and protection against retaliation, there are areas for improvement, including clarifying its scope, ensuring independence, and establishing adequate funding to make it free for community applicants. If implemented effectively, this mechanism could set a significant precedent for increasing accountability in Chinese overseas investments across various sectors.[33]

"Western" Versus "Chinese" ESG Standards

Zooming out, then, how do Western ESG standards compare to those of CCCMC in the mining sector? Based on a comparison of thirteen widely used international ESG instruments, CCCMC's growing prominence challenges conventional portrayals of Western and Chinese ESG standards as disparate or competing entities. Instead, a more nuanced reality is emerging, characterized by increasing convergence and co-evolution of these standards.

This trend is driven by multiple factors: reputational risks faced by Chinese companies operating globally, national standardization efforts within China, and burgeoning international partnerships. The historical context provides insight into these developments. While Western ESG standards were largely shaped by concerns over corporate complicity in human rights abuses, exemplified by campaigns against "blood diamonds," Chinese engagement with ESG is more recent, motivated by mineral supply security needs and a desire to align with international best practices. Despite some differences in approach, the content of Western and Chinese ESG instruments is increasingly related, with cross-recognition and cooperation mechanisms highlighting their interoperability.

Examining the adoption of the preceding ESG instruments by ten major Western and Chinese mining companies challenges the notion of China attempting to set global standards and highlights important implementation differences. Principally, Chinese companies tend to focus more on downstream stakeholders, while Western counterparts lean towards upstream considerations. However, to navigate and promote CSR schemes under pressure from the unique institutional system and political environment in China, there is a need to make calculated trade-offs between state interests and corporate interests, which risk exacerbating negative environmental consequences on the marginalized groups in the local community. For more in-depth analysis, see Deberdt, DiCarlo, and Park, 2024.[34]

Translating Up and Down: Industry Representative, Non-state Actor, International Partner

CCCMC occupies a unique position as an industry representative and a non-state actor with strong state relations, serving as a bridge between individual companies, government policies, and industry practices. Throughout its evolution, CCCMC has maintained a relationship with MOFCOM while expanding its engagement with other international organizations, governments, and private sector actors. The organization's trajectory reflects China's changing approach to global mineral resource engagement, emphasizing responsible practices, international cooperation, and comprehensive ESG standards. As it sits between the state and business, the organization operates in

a dual capacity. On the one hand, it also acts as a conduit for communicating industry concerns and recommendations to relevant government bodies. On the other hand, it serves as a bridge between its member companies and the government, translating and promoting ESG standards among its members within the contexts of their foreign investments. CCCMC's influence thus extends to policy formulation and ground-level practices.

At the national and international scales, CCCMC acts as a conduit for communicating industry concerns at national and international levels. In China's system, this upward advocacy takes the form of policy recommendations rather than direct lobbying. CCCMC shares reports and proposals with government agencies such as the MOFCOM and NDRC. These often include suggestions for policy improvements based on the practical experiences and challenges member companies face in implementing ESG standards.

This approach differs from the United States in several ways. First, organizations like CCCMC are often closely aligned with government objectives, acting more as partners in policy implementation rather than independent advocates. Second, CCCMC focuses on building consensus among its members and presenting a unified voice to the government rather than representing diverse competing interests. Third, CCCMC not only advocates for policies but also plays a crucial role in interpreting and implementing government directives for its members.

This model of advocacy aligns with Xi Jinping's broader reforms aimed at improving governance and promoting responsible development. Under Xi, there has been an increased emphasis on environmental protection, social responsibility, and corporate governance. CCCMC's efforts in promoting ESG standards can be seen as complementary to these broader governance reforms. For instance, CCCMC's work aligns with the government's push for a "Green" BRI and the emphasis on sustainable development in China's 14th Five-Year Plan (2021–2025). By advocating for higher ESG standards in the mining sector, CCCMC is effectively supporting the government's goals of improving China's international image and promoting more sustainable economic development. China's promotion of responsible mining practices and ESG standards can be viewed as a form of green soft power.[35] By engaging in international forums and collaborating with global organizations, China is positioning itself as a responsible actor in environmental governance.

Second, as a translator, CCCMC interprets and disseminates directives to its member companies, helping them navigate complex regulatory environments. CCCMC experts regularly visit mine sites of Chinese companies abroad. For example, in early 2024 alone, staff visited Nickel mines in Indonesia and Cobalt mines in the DRC to monitor company practices and collect data on challenges in each location. These visits allow for multidirectional information exchange in which upstream and downstream companies in global mineral supply chains share their experiences, roadblocks, and successes.

Implications for Chinese Companies

Although China has made significant strides in developing ESG standards and guidelines for the mining industry, implementing and enforcing these initiatives remain uneven and subject to competing priorities at the firm, non-state, and subnational levels and variable contexts and challenges in host locations. An examination of the implementation of ESG guidelines by ten Chinese firms reveals distinct patterns in the engagement of upstream and downstream companies within CCCMC. Upstream companies, primarily involved in mineral extraction and processing, tend to be more actively involved in CCCMC's initiatives and guidelines development. This could be attributed to the higher reputational risks they face, being directly associated with the environmental and social impacts of mining operations. In contrast, downstream companies, such as purchasers and manufacturers, show relatively lower levels of engagement, possibly due to their indirect connection to the extractive process.

Firms face various challenges in implementing ESG guidelines, varying across minerals and operational contexts. Upstream companies are often directly confronted with issues such as resource availability, infrastructure development, and community relations. For instance, in the DRC, Chinese firms involved in cobalt mining face reputational risks related to child labor, occupational health, and corruption. Similarly, lithium extraction in South America poses challenges related to the impacts on indigenous communities and water resources. Downstream companies, on the other hand, are more concerned with issues such as responsible sourcing, supply chain transparency,

and market competition. These companies must navigate the complexities of ensuring that the minerals they purchase and use in their products are sourced responsibly and ethically. Failure to do so can result in significant reputational damage and loss of consumer trust. Table 2 offers a comparative framework of firm challenges across four key minerals—cobalt, lithium, copper, and nickel—to illustrate the challenges of upstream and downstream operations in the critical minerals sector.

TABLE 2. Firm Challenges Across Critical Minerals

Mineral	Upstream Challenges	Downstream Challenges
Cobalt (DRC)	Child labor, Occupational health, Corruption	Reputational risks; Supply chain transparency
Lithium (South America)	Impacts on indigenous communities, Water resource depletion	Environmental concerns; Social license to operate
Copper (Various)	Environmental degradation, Community relations	Responsible sourcing; Market competition
Nickel (Indonesia)	Deforestation, Pollution	Regulatory compliance; Sustainable production

To manage these challenges, Chinese firms are increasingly adopting ESG standards and engaging in CSR initiatives through CCCMC. CMOC Group, for instance, has been actively involved in CCCMC's efforts to promote responsible cobalt mining in the DRC. The company has implemented various ESG standards, including the RMI RMAP and CIRAF, and has established grievance mechanisms to address community concerns. However, the costs of improving supply chain governance are not evenly distributed across the value chain. Upstream companies often bear the financial and operational burden of implementing responsible mining practices. In contrast, downstream companies may be able to pass on some of these costs to consumers. This imbalance highlights the need for greater collaboration and shared responsibility among all actors in the critical minerals supply chain.

Conclusion

Despite geopolitical tensions, opportunities exist for cooperation on environmental governance in critical mineral supply chains between China and Western countries and businesses, as evidenced by CCCMC's expanding international partnerships and dialogues. This necessitates moving beyond a purely competitive view of China's environmental efforts. To foster collaboration on environmental standards between the United States and Chinese companies and governments, a multi-pronged and multi-scaled approach is necessary. Engagement with non-state actors through multilateral forums such as the United Nations Framework Convention on Climate Change, the OECD Mineral Supply Chain Forum, and the G20 can provide platforms for dialogue and cooperation. These venues allow discussions on global standards and best practices while minimizing direct bilateral tensions. Second, industry-to-industry engagements, particularly between organizations like CCCMC and their US counterparts, could prove effective. These interactions can focus on technical exchanges, shared challenges, and the development of common standards, potentially sidestepping some of the political sensitivities of government-to-government talks. However, the risk of interacting with sanctioned entities must be carefully managed. US companies and government agencies must ensure compliance with existing sanctions while engaging in environmental collaborations. This may involve creating specific carve-outs for environmental cooperation or working through trusted intermediaries.

While China has made significant progress in developing ESG standards for the mining industry, implementation remains uneven due to competing priorities at various levels. Critics may argue that China's ESG standards and guidelines, while impressive on paper, lack meaningful implementation. This is an important point, and US and Chinese actors alike must advocate for improved implementation and monitoring. While comprehensive data on implementation is limited, it's important to recognize the progress made and the potential for future improvements. The increasing international scrutiny and market pressures for responsible sourcing are likely to drive more rigorous implementation over time. Moreover, establishing accountability mechanisms like CCCMC's Mediation and Consultation Mechanism suggests a growing commitment to putting principles into practice.

From a broader perspective, CCCMC's evolution and China's engagement with global ESG standards represent a significant shift in the country's approach to international environmental governance. It demonstrates recognition of the importance of sustainable practices in securing long-term access to critical minerals and maintaining global economic competitiveness. Centrally, the significance of these developments extends beyond China's borders. As the world's largest producer of many critical minerals, China's adoption and promotion of ESG standards have the potential to reshape global supply chains. This could lead to improved environmental and social practices in resource-rich developing countries, many of which host Chinese mining operations. Furthermore, the convergence of Chinese and Western ESG standards could facilitate greater global cooperation in addressing the environmental and social challenges of the energy transition.

The case of CCCMC illustrates how non-state actors, industry associations, and similar organizations serve as crucial intermediaries between government, industry, international stakeholders, and local communities. In turn, they are critically shaping China's environmental governance. Such organizations deserve further engagement and research.

As such, this report serves as a starting point, emphasizing that understanding critical mineral supply and production in the coming years requires a more granular approach, which, by way of conclusion, I suggest might happen in three ways. First, different points in the supply chain, including extraction, processing, and manufacturing capabilities, should be examined. Second, we must consider minerals individually, as they differ materially across their extraction and production networks. Mineral-specific analysis may, for example, examine whether China is consuming or exporting what its companies extract and process, such as processing copper (40 percent) and nickel (35 percent) and consuming much of that domestically. It would also illuminate the environmental challenges and labor practices specific to a particular mineral's modes of extraction and processing. Third, we need to better define what we mean by "China" by not only focusing on Beijing but on non-state and subnational actors. My other research has explored how provinces in extractive jurisdictions negotiate mining projects, how provincial and city offices within China position themselves to decarbonize, and how non-state Chinese organizations engage in international and domestic ESG standard setting.

As the world grapples with the urgent need to transition to clean energy while ensuring responsible and sustainable practices, understanding China's role and actions across the critical minerals supply chain is paramount. Dialogue and collaboration among policymakers, industry leaders, civil society, and research as they navigate the geopolitical and economic challenges associated with critical mineral supply in the years to come will ensure a more swift, responsible, and equitable energy transition.

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Notes

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Woodrow Wilson International Center for Scholars
One Woodrow Wilson Plaza
1300 Pennsylvania Avenue NW
Washington, DC 20004-3027

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