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**Green Dependency: Cobalt Extraction, Structural
Underdevelopment and Human Suffering in the Democratic
Republic of the Congo**

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Abbreviations

8-OHdG	8-hydroxy-2'-deoxyguanosine (oxidative DNA-damage biomarker)
AFREWATCH	African Resources Watch
ASM	Artisanal and Small-scale Mining
CACB	Central African Copper Belt
CAGR	Compound Annual Growth Rate
CMOC	China Molybdenum Company
CNDH	National Human Rights Commission (Commission Nationale des Droits de l'Homme)
CREC	China Railway Group Limited
China Eximbank	Export-Import Bank of China
CRM	Critical Raw Material(s)
CRMA	Critical Raw Materials Act
DNA	Deoxyribonucleic Acid
DRC	Democratic Republic of the Congo
ECLA	Economic Commission for Latin America
EGD	European Green Deal
EI	Economic Importance (CRMA criticality metric)
EITI	Extractive Industries Transparency Initiative
ESG	Environmental, Social, and Governance
ETUI	European Trade Union Institute
EU	European Union
EUR	Euro
EV	Electric Vehicle
FAO	Food and Agriculture Organization (of the United Nations)
FPIC	Free, Prior and Informed Consent
HIPC	Heavily Indebted Poor Countries (initiative)
IEA	International Energy Agency
IGF	Inspection Générale des Finances
ILO	International Labour Organization
IMF	International Monetary Fund

JTM	Just Transition Mechanism (EU)
LFP	Lithium Iron Phosphate (battery)
LME	London Metal Exchange
LSM	Large-Scale Mining
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NCA	Nickel-Cobalt-Aluminium (cathode)
NCM	Nickel-Cobalt-Manganese (cathode)
OECD	Organisation for Economic Co-operation and Development
PABEA-Cobalt	Project supporting children and young people out of the cobalt supply chain (French acronym for: Projet d'Appui au bien-être alternatif des enfants et des jeunes impliqués dans la chaîne d'approvisionnement du Cobalt)
PNAS	Proceedings of the National Academy of Sciences (USA)
RAID	Rights and Accountability in Development
RFI	Resource-for-Infrastructure
SAIIA	South African Institute of International Affairs
SARL	Société à Responsabilité Limitée (limited liability company)
Sicomines	La Sino-Congolaise des Mines
SO₂	Sulphur Dioxide
SOE	State-Owned Enterprise
SRM	Strategic Raw Material(s)
TFM	Tenke Fungurume Mining
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNICEF	United Nations Children's Fund
US	United States
USD	United States Dollar
USGS	United States Geological Survey
WHO	World Health Organization

Units of Measurement

%	per cent
°C	degree Celsius (e.g. +1.5 °C warming target)
km²	square kilometre (land area)
kt	kilotonne — 1,000 tonnes (e.g. cobalt demand “200 kt”)
t	tonne / metric ton (e.g. “230,000 t of cobalt”)
µg g⁻¹	micrograms per gram — body-burden measure (e.g. per gram creatinine)
ppm	parts per million (e.g. SO ₂ exposure limits)

AI Disclosure Statement

Declaration of generative AI and AI-assisted technologies in the writing process.

During the preparation of this thesis the author used Claude.ai and DeepSeek to revise chapters, to improve linguistic clarity, for bibliography support, and to ensure technical adherence to the specific formatting and bibliography guidelines.

After using the tools/services, the author reviewed and edited the content as needed and took full responsibility for the content of the submitted manuscript. The author is responsible for all theoretical framework, data interpretation, argumentative structure, and remains fully responsible for the originality and integrity of the content.

Abstract

The global transition to low-carbon energy is presented as a moral necessity for the future of the planet but a future for whom, and at whose expense, is rarely asked. The Democratic Republic of the Congo supplies most of the cobalt that powers the global green transition, yet remains among the poorest countries on earth. This thesis examines how the global green transition, through its demand for cobalt, reproduces structural underdevelopment and human suffering in the Democratic Republic of the Congo (DRC). Building upon a qualitative single-case study, it examines this dynamic at two levels: at the macro-structural level, through dependency theory, it traces the contractual, financial, and infrastructural mechanisms — the Sicomines agreement — that lock the DRC into the supply chain as the raw-ore exporter; at the micro-empirical level, through the concept of necropolitics, it documents the lived consequences of that position across the Katanga Copperbelt, from child labour and toxic exposure to birth defects and displacement. It further argues that the European Union's "just transition," operationalised through the Critical Raw Materials Act, functions as a normative shield that legitimises continued extraction while externalising its costs onto Congolese bodies. Bringing these elements together under the concept of the green sacrifice zone, the thesis argues that the transition does not merely overlook the DRC's underdevelopment; it depends on it. A transition that maintains this structure, cannot be just for the Congolese.

Keywords: cobalt; Democratic Republic of the Congo; green transition; dependency theory; necropolitics; green sacrifice zone; Sicomines; Critical Raw Materials Act

Abstract Italian

La transizione globale verso l'energia a basse emissioni di carbonio viene presentata come una necessità morale per il futuro del pianeta; ma un futuro per chi, e a spese di chi, è una domanda che raramente viene posta. La Repubblica Democratica del Congo fornisce la maggior parte del cobalto che alimenta la transizione verde globale, eppure rimane tra i paesi più poveri della Terra. Questa tesi esamina come la transizione verde globale, attraverso la sua domanda di cobalto, riproduca il sottosviluppo strutturale e la sofferenza umana nella Repubblica Democratica del Congo (RDC). Basandosi su uno studio di caso singolo di tipo qualitativo, essa analizza questa dinamica su due livelli: sul piano macro-strutturale, attraverso la teoria della dipendenza, ricostruisce i meccanismi contrattuali, finanziari e infrastrutturali — l'accordo Sicominex — che vincolano la RDC alla catena di approvvigionamento come esportatrice di minerale grezzo; sul piano micro-empirico, attraverso il concetto di necropolitica, documenta le conseguenze concrete di tale posizione lungo la Copperbelt del Katanga, dal lavoro minorile all'esposizione tossica, fino ai difetti congeniti e agli sfollamenti. La tesi sostiene inoltre che la "transizione giusta" dell'Unione Europea, resa operativa attraverso il Regolamento sulle materie prime critiche (Critical Raw Materials Act), funga da scudo normativo che legittima l'estrazione continuata esternalizzando i costi sui corpi congolesi. Riunendo questi elementi sotto il concetto di zona di sacrificio verde, la tesi argomenta che la transizione non si limita a ignorare il sottosviluppo della RDC: da esso dipende. Una transizione che mantenga intatta questa struttura non può essere giusta per il popolo congolese.

Parole chiave: cobalto; Repubblica Democratica del Congo; transizione verde; teoria della dipendenza; necropolitica; zona di sacrificio verde; Sicominex; Regolamento sulle materie prime critiche

1. Introduction

1.1 Context & Background

The global transition to a low-carbon economy has triggered a remarkable growth in a wide array of clean energy technologies, such as solar panels, wind turbines, electric vehicles (EVs), and energy storage systems, collectively referred to as Green Transition Technologies (GTTs).

These technologies have one major thing in common; they rely heavily on green transition minerals (GTMs), including cobalt, nickel, lithium, rare earth elements (REEs), graphite, and manganese. The demand for these minerals is high due to this global green transition, as they are essential for the manufacturing of the high-performing batteries that EVs require, solar panels, energy storage systems, and wind turbines.¹ In addition to facilitating the energy transition, these minerals are essential for fostering resilience, sustainable growth, and technological progress in a world becoming more interconnected each day. Therefore, these minerals should be considered not only as critical industrial outputs, but as strategic assets in the growing green industries where control over the supply and value chains of these minerals is becoming a crucial factor in determining industrial competitiveness, national resilience, and economic sovereignty.

Two of the most important reasons why these minerals are regarded as strategic is firstly, because most GTMs, unlike fossil fuels, are geologically concentrated to an astonishing level in specific regions on earth, with only a small number of countries controlling the majority of global reserves and production. Secondly, the distinct chemical and physical features of these minerals make them hard to substitute, guaranteeing their indispensability and growing demand across a variety of

¹Elvis Korku et al., “Regionalizing Green Transition Minerals for Structural Transformation in Africa,” World Bank, 2025, p. 1 <https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099620011192519026>.

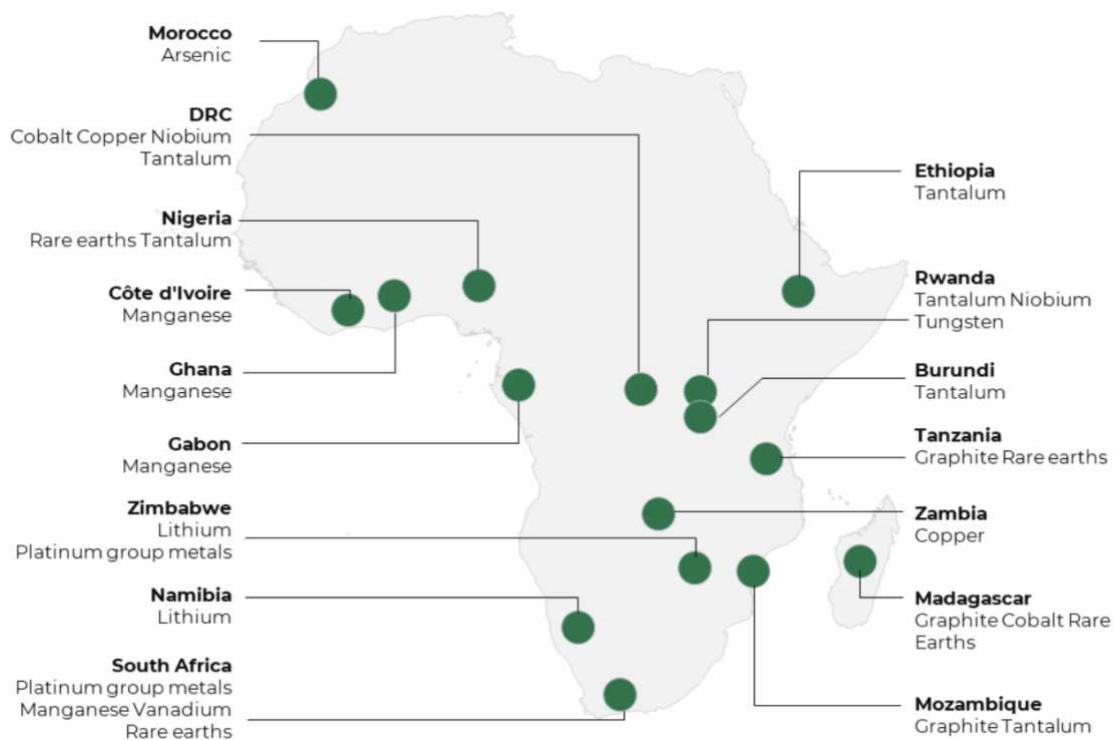
clean technologies.² However, the high concentration levels in specific regions, and low substitutability of these “strategic” minerals functions as a double-edged sword for the countries who own and/or control them, creating different forms of dependencies in this new global order. When talking about the concentration and the criticality of the reserves of these minerals, Africa stands out as the wealthiest continent of global reserves as it holds approximately 30% of the world's mineral deposits that are crucial for low-carbon technologies and digital infrastructure.³ Africa's mineral wealth offers a wide variety of commodities, bolstering global supply chain resilience for industries globally. The continent contains roughly 55% of the world's cobalt reserves, 38% of manganese reserves, 70% of manganese resources, 80% of platinum, 62% of chromium, and 25% of natural graphite.⁴

² Ibid.

³“Africa at the Core of Critical Minerals Briefing Document,” *Confidential -Client Deliverable* (B20 South Africa & WorldBank, November 2025), <https://www.b20southafrica.org/wp-content/uploads/2025/11/Africa-at-the-Core-of-Critical-Minerals.pdf>.

⁴“Mineral Commodity Summaries 2025,” *USGS Numbered Series*, January 1, 2025, <https://doi.org/10.3133/mcs2025>.

Figure 1: Africa's critical minerals



Countries in Africa which produce or have reserves of critical minerals (B20 report)⁵

A paradox emerges when looking at Africa's immense wealth of high-value minerals and essential raw materials. At a time when the global energy transformation is at its peak and in demand of these critical minerals, countries endowed with the resources necessary for green technologies somehow continue to suffer from severe poverty, underdevelopment, and exploitative and abusive labour conditions. While industrialized nations promote and benefit from the green transition, many African states remain positioned primarily as suppliers of raw materials within unequal global economic structures. This raises an important question: how can countries that are central to the energy transition remain excluded from the benefits of that transition? Africa's historical

⁵ "Africa at the Core of Critical Minerals" (B20 & WEF, November 2025), <https://www.b20southafrica.org/wp-content/uploads/2025/11/Africa-at-the-Core-of-Critical-Minerals.pdf>.

experience with resource-based development reveals a persistent challenge to transform mineral wealth into economic transformation that leads to development. Despite decades of policy reform, most African economies remain locked into upstream supply roles, with limited success in capturing value through beneficiation or manufacturing. The prevalence of extractive industries, with limited backward or forward linkages in the domestic economy, has left most African countries positioned at the periphery of global value chains, dependent on primary exports, and vulnerable to external shocks.⁶

The Democratic Republic of the Congo(DRC) provides one of the clearest examples of this paradox through the case of its immense mineral reserves, however, foreign ownership, the lack of local processing capacity partly due to the unjust investment deals, prevent the country from fully capturing the potential economic benefits.⁷

The Democratic Republic of the Congo, or the DRC (formerly Zaire), is a country situated in Sub Saharan Africa with 2,267,050 km² land area which makes it the second largest country in Africa after Algeria, and the eleventh-largest in the world.⁸ With a current estimated population of 116,4 million,⁹ the DRC is the fifteenth most populous country globally and the 4th most populous in Africa, with one of the fastest-growing populations in the world driven by a growth rate of 3.2 per cent per year.¹⁰ A large portion of the country sits on the Congo river basin and is covered by the

⁶Signe, L., & Johnson, L. (2021). Africa's Extractive Industries: Opportunities and Challenges. *African Economic Review*, 33, p. 25

⁷Pietro Rinaldi and Pier Paolo Raimondi, "Minerals and the Lobito Corridor: Between Domestic Needs and the EU's Derisking Strategy," IAI - Istituto Affari Internazionali, March 19, 2026, <https://www.iai.it/en/publications/c41/minerals-and-lobito-corridor-between-domestic-needs-and-eus-derisking-strategy>.

⁸ Worldometer, "DR Congo Demographics 2020 (Population, Age, Sex, Trends) - Worldometer," [www.worldometers.info](https://www.worldometers.info/demographics/democratic-republic-of-the-congo-demographics/), 2026, <https://www.worldometers.info/demographics/democratic-republic-of-the-congo-demographics/>.

⁹ Ibid.

¹⁰ UNICEF, "Draft country programme document: Democratic Republic of the Congo," (UNICEF Executive Board, 2024), p. 2.

world's second largest rainforest, the Congo rainforest. The DRC is abundant with exceptional natural resources, including minerals like cobalt and copper, hydroelectric power potential, substantial arable land, and vast biodiversity; however, these resources have not resulted in general prosperity for its people, but rather in continuous conflict, political instability, and foreign intervention.¹¹

The DRC currently produces approximately 76.6% of the world's mined cobalt, making it indispensable to the global battery supply chain.¹² Yet, this dominance has come at a substantial and heavy cost to the Congolese, the cobalt mining industry's degradation of the environment, alongside hazardous and exploitative labour conditions, has brought extraction without development to the communities of the Copperbelt, resulting in one of the most disastrous humanitarian crises globally. As cobalt has become a crucial component in lithium-ion batteries used in electric vehicles and renewable energy technologies, the DRC has grown in importance to the world's green economy. Despite supplying the majority of the world's cobalt, the country continues to struggle with extreme poverty, severe socio-economic inequalities, weak infrastructure, political instability, labour exploitation, and environmental destruction. The DRC remains on the periphery of global capitalism, despite supplying one of the most essential resources for the green transition. Rather than fostering self-sufficient development, cobalt extraction and means of operating this extraction perpetuates unequal exchange patterns in which value is transported externally while environmental degradation and labor exploitation remain localized within the country.¹³ The extraction of cobalt has not resulted in broader economic development

¹¹ “Democratic Republic of the Congo,” Statista, 2024, <https://www.statista.com/topics/12552/democratic-republic-of-the-congo/?srsltid=AfmBOorjuVS2Xokg4mDt5uWwalpoJVGUhrxpRniGoXHUA8NJA8Vu8vy#topicOverview>.

¹² “Mineral Commodity Summaries 2026,” *U.S. Geological Survey*, 2026, <https://doi.org/10.3133/mcs2026>.

¹³ Mark Dummett, “Amnesty International,” Amnesty.org, September 29, 2017, <https://www.amnesty.org/en/latest/news/2017/09/the-dark-side-of-electric-cars-exploitative-labor-practices/>.

or improved living conditions for the majority of the population; instead, despite the potential in the country, the Congolese economy remains heavily integrated into global markets primarily as an exporter of raw materials, perpetuating the structural dependency patterns that characterize unequal global economic relations. Corrupt governments, history of exploitative colonization, weak rule of law, domestic challenges such as war and social unrest, severe climate conditions or hostile, aggressive neighbors are also the reasons to explain the persistent poverty of the nations. A country in debt will not be able to afford good schools, and a poorly educated workforce will undermine future potential,¹⁴ – and the DRC sitting on the 7th line on the poorest nations on earth despite its abundant resources, tells a lot about this unjust system, designed to perpetuate the unjust terms.

1.2 Research Question and Central Argument

This thesis is structured around the following research question: How does the global green transition, through its demand for cobalt, reproduce structural underdevelopment and human suffering in the Democratic Republic of the Congo?

The question is designed to bridge two levels of analysis. At the macro-structural level, examined through the lens of dependency theory, it investigates the contractual, financial, and infrastructural mechanisms that lock the DRC into the perpetual export of unprocessed cobalt. At the micro-empirical level, examined through Achille Mbembe's concept of necropolitics, it investigates the lived consequences of that structural position: child labour, mine collapses, respiratory illnesses, and birth defects among the artisanal mining population of the Katanga Copperbelt. Therefore, the

¹⁴ Luca Ventura, "Poorest Countries in the World 2023," Global Finance Magazine, May 6, 2024, <https://gfmag.com/data/economic-data/poorest-country-in-the-world/>.

question is both a "how" question, about causal mechanisms; and a "why" question, about the persistence of suffering despite decades of policy intervention.

The central argument of this thesis is twofold. First, the global green transition constitutes a new mechanism of the outward orientation of an economy to serve external accumulation –a twenty-first-century reformulation of the core-periphery dynamic first theorised by Prebisch (1950)¹⁵. The structural conditions of the DRC's integration into global cobalt supply chains through asymmetric ownership arrangements, debt-secured infrastructure agreements, and the absence of domestic value-chain integration, replicate the dependency logic that has historically prevented peripheral economies from translating resource wealth into development. Second, the European Union's "Just Transition" framework, as operationalised through instruments such as the EU Critical Raw Materials Act (2024) and bilateral strategic partnerships, functions as a normative shield that legitimises continued extraction while externalising its human and environmental costs onto Congolese bodies. The EU presents its demand for cobalt as a necessary condition for *a globally just climate transition*, yet the institutional frameworks through which this demand is organised reproduce, rather than disrupt, the extractive hierarchy.

1.3 Methodology

This thesis employs a qualitative single-case study design, taking the Democratic Republic of the Congo as the case of study. The DRC is selected as a critical case in Yin's (2009) sense¹⁶: it is the world's dominant cobalt producer, making it the site where the mechanisms linking the global green transition to structural underdevelopment are most visible and most analytically tractable.

¹⁵ Prebisch, R. (1950) *The Economic Development of Latin America and Its Principal Problems*, United Nations Department of Economic Affairs, Economic Commission for Latin America (ECLA), New York.
<http://archivo.cepal.org/pdfs/cdPrebisch/002.pdf>.

¹⁶ Robert K. Yin, "Case Study Research," Google Books (SAGE, 2009), p. 49–51.

Studying the DRC is more than simply studying the DRC and its resources; it is studying the logic of green extractivism in one of its most significant instances, with implications for how the global supply chain of the energy transition operates more broadly.

The thesis combines three forms of document analysis. First, it analyses primary policy texts, including the European Green Deal, the EU-DRC Strategic Partnership on Critical Minerals, the Sicomines agreement, and its subsequent amendments constituting and the DRC's mining code revisions. Second, it draws on financial and transparency reporting, including IMF staff reports on the DRC, the Extractive Industries Transparency Initiative (EITI) reports, and Resource Matters' monitoring reports. Third, it draws on NGO reports, journalistic investigations, and published field research documenting the human conditions of artisanal and industrial cobalt mining in the Katanga Copperbelt, including work by Amnesty International, RAID, Global Witness, and Save the Children.

This combination of sources allows the thesis to operate at two levels simultaneously. The policy texts and financial reports provide the macro-structural evidence needed to apply dependency theory to the DRC's institutional arrangements. The NGO reports, field research, and investigative accounts provide the empirical foundation for the necropolitical analysis. The interpretive framework is explicitly critical: this thesis does not claim to be neutral between the interests of cobalt consumers and cobalt producers, but aims to make visible the power relations embedded in supply chain arrangements which are presented in technical or developmental language, at most times, hiding behind the just discourse.

There are two limitations of this design that should be acknowledged in this paper. Firstly, the single-case design limits applicability beyond the DRC. While the structural arguments advanced

here may apply to other mineral-producing states in the Global South, this thesis does not systematically compare cases. Second, the reliance on documentary and secondary sources means the thesis cannot claim ethnographic depth on the lived experience of mining communities; rather, it draws on published field research by others. Future research could strengthen the analysis through primary interviews with affected communities and Congolese civil society actors.

1.4 Theoretical Framework and Literature Review

This thesis sits at the intersection of three bodies of literature: the political economy of the energy transition and "critical" raw materials; the empirical literature documenting the human cost of cobalt mining in the DRC; and the critical theory of extraction — dependency, necropolitics, and green extractivism — which the analytical framework is drawn from.

Dependency Theory. Dependency theory originated in the late 1950s in Latin America, mostly as a result of Latin American analysts trying to understand why this region was unable to achieve the same level of industrial growth as developed capitalist countries. Theory emerged as a critique to Western- originated modernization theory, which at its core, claims that all societies progress through similar stages of development and that the ones have yet not achieved it, eventually following a single path to modernity. Although there are disagreements among different dependency theorists, because there are various schools of thoughts contributing to the concept, the fundamental purpose is to explain why post-colonial states, the *majority* of the Global South we know today, are persistently underdeveloped. Divergences between schools emerge on fundamental answers they give to the questions about the history of nature and capitalism, as well as how they analyse the mechanisms that sustain dependency structurally and the potential ways

of changing these relations.¹⁷ This thesis draws primarily on the dependency theory tradition. Raul Prebisch, in his 1950 study *The Economic Development of Latin America and its Principal Problems*, articulates the hypothesis, now known as the Prebisch-Singer hypothesis, and argues that the price of primary commodities (raw materials, agricultural products) declines relative to the price of manufactured items.¹⁸ According to Raúl Prebisch, the conventional international division of labor is flawed as the benefits of technological advancement are not properly distributed. Industrialization is necessary for Latin America to take advantage of these gains and improve its living standards.¹⁹ He notes that because core nations (industrial hubs) keep all of the benefits of their own technological advancements, the price ratio has consistently shifted against primary output and in favor of manufactured commodities, indicating a decline in the terms of trade for peripheral nations²⁰. Building on Prebisch's foundations, Andre Gunder Frank, coined the concept of "the development of underdevelopment" arguing that development in the metropolis (core) requires and actively produces the impoverishment of the satellite(periphery). Frank's main argument, outlined in his influential 1966 article, *The Development of Underdevelopment*, was that underdevelopment is a direct consequence of the historical process which generated development in the center rather than an original or traditional condition; he further states that "contemporary underdevelopment is in large part the historical product of past and continuing economic and other relations between the satellite underdeveloped and the now developed metropolitan countries".²¹ Frank reconceptualized Prebisch's center-periphery model through the

¹⁷Maria Dyveke Styve et al., eds., "Dialogues on Development Volume 1: Dependency - White Rose Research Online," *Whiterose.ac.uk*, June 2017, p. 7

https://eprints.whiterose.ac.uk/id/eprint/131850/1/dependency_theory_e_book_comp.pdf.

¹⁸Raúl Prebisch, "The Economic Development of Latin America and Its Principal Problems, United Nations Department of Economic Affairs," 1950, p. 8 <http://archivo.cepal.org/pdfs/cdPrebisch/002.pdf>.

¹⁹Ivi, p. 1.

²⁰Ivi, p. 14.

²¹ Andre Gunder Frank, "The Development of Underdevelopment," *Monthly Review* 18, no. 4 (September 2, 1966): p. 18; p. 23.

framework of "metropolis-satellite" relation²². Through his framework of metropolis-satellite structure, Frank illustrates how developed capitalist countries (the metropolises) have systematically taken economic surplus—which, in a capitalist society, economic surplus is produced collectively by many workers but only a few capital owners and their allies take advantage of it— from subordinate regions (the satellites) and further argues that each national and local metropolis serves to impose and maintain the monopolistic structure and exploitative relationship of this system as long as it serves the interests of the metropolises which take advantage of this global, national, and local structure to promote their own development and the enrichment of their ruling classes²³. Theotonio Dos Santos precisely formalised the definition of dependence as "a conditioning situation in which the economies of one group of countries are conditioned by the development and expansion of others," identifying three historical forms—colonial dependence, financial-industrial dependence, and the post-war technological-industrial dependence of the multinational corporation era.²⁴ Direct political control was the foundation of colonial reliance which was “based on the monopoly of trade, land, and labour”²⁵; financial-industrial dependence, “based on the domination of big capital in the centre and the investment in the production of raw materials”²⁶, characterised global economic policies of the late nineteenth and early twentieth centuries. The third type, technological-industrial dependency, which was "based on the monopolistic control of technology by multinational corporations"²⁷, was associated with the post-war period where foreign investments in the receiving country were directed in businesses that catered to the local

²²Ivi, p. 23.

²³Ivi, p. 21-22.

²⁴Theotonio Dos Santos, “The Structure of Dependence” (American Economic Association, 1970), p. 231 <http://digamo.free.fr/dosantos70.pdf>.

²⁵Ivi, 232.

²⁶Ibid.

²⁷Ibid.

markets of dependent nations. Peter Evans refined the analysis of “dependent development” by arguing that although peripheral industrialization was technically feasible, the process remained constrained by what he termed the "triple alliance."²⁸ This triple alliance refers to the interdependent but hierarchical collaboration between the state, local private capital, and multinational corporations which restructures dependency rather than breaking. “Dependent development under the aegis of the triple alliance does not resolve the contradictions of dependency; it restructures them”.²⁹ This quote of Evans summarizes the structurality argument of this thesis well: “*Dependent development under the aegis of the triple alliance does not resolve the contradictions of dependency; it restructures them*”.³⁰

Samir Amin provides a foundational perspective for dependency theory and this thesis by arguing that the reason why international order exists is because the structures of the periphery are shaped to meet the needs of accumulation at the center, wherein "the development of the center engenders produces and maintains the underdevelopment of the periphery."³¹ He adds that global capital accumulation depends on unequal exchange, which is a systematic transfer of value from the periphery to the center.³² Applying this to Africa, Amin states that the continent was historically integrated into this global capitalist system as the "periphery of the periphery" during the slave trade era and that economic growth projects in Africa –due to hidden transfer of value– deepen the "development of underdevelopment," – unlike the growth projects in center where projects leads

²⁸ Peter Evans, *Dependent Development*, Princeton University Press EBooks (Princeton University Press, 1979), p. 275 <https://doi.org/10.1515/9780691186801>.

²⁹ Ivi, p. 276.

³⁰ Ibid.

³¹ Samir Amin, “Unequal Development” (Monthly Review Press, 1976), p. 104.

³² Ivi, p. 144.

to actual growth— which disarticulates the local economy and worsens the marginalization of its community.³³

Necropolitics

While dependency theory reveals the macro-structural mechanisms of value extraction and structural underdevelopment, it does not fully account for the lived, bodily experience of populations consigned to the most extractive edges of the world economy. For this, the thesis turns to Achille Mbembe's concept of necropolitics. Mbembe defines necropolitics as a form of sovereignty that operates not through the management of life but through the production of death: "The ultimate expression of sovereignty resides, to a large degree, in the power and the capacity to dictate who may live and who must die."³⁴ Mbembe also introduces the notion of "death-worlds" to describe the physical and social conditions created by necropolitical power: "the creation of death-worlds, new and unique forms of social existence in which vast populations are subjected to conditions of life conferring upon them the status of living dead".³⁵ This concept helps to further explain how global economic mechanisms produce zones where human life is structurally disposable. Necropolitics, when applied to the dependency framework, expands on the center-periphery model by conceptualizing the periphery as a space where specific bodies and communities are actively and willingly exposed to inhumane living conditions and premature death in order to sustain the ecological and economic security of the core, rather than simply functioning as a site of poverty, underdevelopment, and value extraction.

³³ Ivi, p. 292.

³⁴ Achille Mbembé, "Necropolitics," *Public Culture* 15, no. 1 (March 25, 2003): p. 11 <https://muse.jhu.edu/article/39984/summary>.

³⁵ Ivi, p. 40.

Green Extractivism and the Political Economy of the Energy Transition

An increasing amount of academic work has begun to examine the social and political costs of the green transition, challenging the assumption that the transition to clean energy is inherently just or emancipatory. Scholars working in the tradition of political ecology have developed the concept of "green extractivism" to name the reproduction of colonial-era patterns of resource extraction under the legitimising cover of environmental sustainability goals.³⁶ A central claim of this literature is that decarbonisation, as currently organised, redistributes its costs rather than abolishing them. Zografos and Robbins capture this with the concept of the *green sacrifice zone* — the place or population whose social and ecological ruin is treated as an acceptable price for a low-carbon transition enjoyed elsewhere.³⁷ Sovacool and colleagues describe the same geography as a "decarbonisation divide," where the toxic and fatal burdens of clean energy supply chains concentrate in African mining regions while the benefits of the transition can only apply for the Global North consumers.³⁸ Deberdt and Le Billon push the argument furthest with theorising a "green transition necropolitics" to describe how the current paradigm of resource-hungry low-carbon development perpetuates the processes of colonisation and inequality creation on the most vulnerable populations,³⁹ furthermore, by explicitly bringing Mbembe's framework into contact

³⁶ Murat Arsel, Barbara Hogenboom, and Lorenzo Pellegrini, "The Extractive Imperative and the Boom in Environmental Conflicts at the End of the Progressive Cycle in Latin America," *The Extractive Industries and Society* 3, no. 4 (November 2016): 877–79, <https://doi.org/10.1016/j.exis.2016.10.013>.

³⁷ Christos Zografos and Paul Robbins, "Green Sacrifice Zones, or Why a Green New Deal Cannot Ignore the Cost Shifts of Just Transitions," *One Earth* 3, no. 5 (November 2020): 543–46, <https://doi.org/10.1016/j.oneear.2020.10.012>.

³⁸ Benjamin K. Sovacool et al., "The Decarbonisation Divide: Contextualizing Landscapes of Low-Carbon Exploitation and Toxicity in Africa," *Global Environmental Change* 60 (January 2020), <https://doi.org/10.1016/j.gloenvcha.2019.102028>.

³⁹ Raphael Deberdt and Philippe Le Billon, "Green Transition's Necropolitics: Inequalities, Climate Extractivism, and Carbon Classes," *Antipode* 56, no. 4 (February 8, 2024), <https://doi.org/10.1111/anti.13032>.

with the political economy of the green transition which supplies the bridge between this thesis's two theoretical lenses.

This thesis builds on this literature while identifying a key gap within it. The necropolitics of the green transition has so far been theorised largely at the global or theoretical level, while the empirical research on cobalt and its supply chains has documented the human cost in the DRC without fully explaining the structural mechanisms that sustain and perpetuate these conditions. This thesis addresses that gap by applying the necropolitics framework not only to the structural critique of the green transition in general, but also to the specific institutional and contractual mechanisms —most importantly, the Sicomines agreement and the EU's Critical Raw Materials Act — through which this dependency dynamic is reproduced in the DRC's cobalt economy. It is this mechanism-level analysis, organised around the concept of the green sacrifice zone, that is the central contribution of the thesis.

The Cobalt-Specific Literature. Existing empirical research on cobalt mining in the DRC has documented the human cost of artisanal mining in substantial detail. Sovacool (2019),(2021)⁴⁰ provides a systematic account of child labour, exploitation, and health risks in artisanal cobalt mining in the Katanga Copperbelt, situating these practices within broader questions of power, patriarchy, and supply chain governance. Kara (2023)⁴¹ have produced investigative accounts of the conditions in artisanal mines. The empirical contribution of this thesis builds on this literature but adds a structural-theoretical explanation: the persistence of these conditions is not simply the

⁴⁰Benjamin K. Sovacool, "The Precarious Political Economy of Cobalt: Balancing Prosperity, Poverty, and Brutality in Artisanal and Industrial Mining in the Democratic Republic of the Congo," *The Extractive Industries and Society* 6, no. 3 (July 2019): <https://doi.org/10.1016/j.exis.2019.05.018> ; Benjamin Sovacool, "When Subterranean Slavery Supports Sustainability Transitions? Power, Patriarchy, and Child Labor in Artisanal Congolese Cobalt Mining," *The Extractive Industries and Society* 8, no. 1 (December 16, 2021), <https://doi.org/10.1016/j.exis.2020.11.018>.

⁴¹Siddhart Kara, "Cobalt Red: How the Blood of the Congo Powers Our Lives," Google Books, 2023

result of inadequate regulation or corporate malfeasance, but of the structural position of the DRC in the global cobalt economy, which is reproduced and deepened by the specific institutional arrangements this thesis will analyse.

1.5 Roadmap

The thesis proceeds as follows. Chapter 2 establishes the cobalt facts: the geological and chemical properties of cobalt, the geography of its extraction and global market, and the division between artisanal and industrial mining that structures both the DRC's cobalt economy and the distribution of its human costs. Chapter 3 turns to the European dimension, examining the European Green Deal and the EU Critical Raw Materials Act as the normative and institutional framework within which European demand for cobalt is organised, and exposing the contradiction between the "Just Transition" rhetoric and the extractive realities it obscures. Chapter 4 analyses the Sicominex deal with also referred to as the minerals-for-infrastructure agreement between the DRC and a Chinese state-owned enterprise consortium as a case study of how 21st century structural dependency operates through contracts, loans, ownership arrangements, and supply chain hierarchies; rather than by physical colonial conquest. Chapter 5 analyses the human consequences of cobalt mining on Congolese communities, with particular focus on the artisanal mining sector of the Katanga Copperbelt: child labour, health impacts and birth defects, displacement due to environmental destruction, and a comparative assessment of NGO reporting on conditions in the region. Chapter 6 synthesises and explains why the green transition depends structurally on the underdevelopment of the DRC and further examines what a genuinely just transition would require as a condition of

structural change. Chapter 7 concludes by summarising the main findings, reflecting on the limitations of the study, and identifying directions for future research and policy.

2. Cobalt and the Global Cobalt Market

This chapter provides the empirical foundation for the subsequent analysis. In the context of the global energy transition, the chapter presents cobalt as a strategically important mineral, assessing its material qualities as well as its increasing significance for low-carbon industrial development and battery technologies. The chapter then traces the geographical distribution of cobalt production, emphasizing the extraordinary concentration of extraction in the Democratic Republic of the Congo (DRC) and the structural factors that support this dominance. Before analyzing the structure of the cobalt value chain from extraction to refining and processing, it examines how the global cobalt market is organized, including trends in pricing, trade, and projected demand increase. The picture assembled here reveals a profoundly asymmetrical cobalt value chain where the low-value extraction is concentrated in the DRC, while higher-value refining is concentrated in China. The following analytical chapters will concentrate on explaining the origins and persistence of this structure.

Figure 2: Cobalt



2.1 Cobalt as a Strategic Material

Cobalt (Co, atomic number 27) is a hard, lustrous, silvery-blue transition metal that occurs naturally in many different forms; valued in the global market for its thermal stability in the freezing cold and scorching hot temperatures, resistance to corrosion, and its electrochemical properties has made it a common material for aerospace, defense, medical applications and key element for clean energy technologies. Cobalt is also essential to human health as a core component of Vitamin B12, which serves a variety of vital functions including blood cell production and brain function.⁴² It is important to note that the benefits of cobalt do not warrant continuous exposure to the metal or the ongoing practices associated with its extraction. The exploitative consequences of cobalt mining will be addressed in following chapters. Historically used in superalloys, pigments, and carbides, cobalt acquired a significant strategic importance in the twenty-first century as a cathode material in rechargeable lithium-ion batteries (LIBs from now on), because in contrast to common household batteries, LIBs can be recharged and reused for years⁴³. Rechargeable LIBs, powering smartphones, laptops, and electric vehicles all rely on cobalt-based cathodes, specifically in nickel-manganese-cobalt (NMC) chemistries. Here, cobalt improves energy density and thermal stability in nickel-manganese-cobalt (NMC) and nickel-cobalt-aluminum (NCA) cathodes, extending battery lifespan and range. This is the reason why cobalt is indispensable for electric vehicles and for renewable energy storage systems.⁴⁴

⁴²“Human Health - Cobalt Institute,” Cobalt Institute, February 19, 2025, <https://www.cobaltinstitute.org/science-and-regulation/human-health/>.

⁴³Kara Norton, “Cobalt Powers Our Lives. What Is It—and Why Is It so Controversial?,” National Geographic, December 21, 2023 <https://www.nationalgeographic.com/environment/article/cobalt-mining-congo-batteries-electric-vehicles> ; Benjamin K. Sovacool, “The Precarious Political Economy of Cobalt: Balancing Prosperity, Poverty, and Brutality in Artisanal and Industrial Mining in the Democratic Republic of the Congo,” *The Extractive Industries and Society* 6, no. 3 (July 2019): p. 916 <https://doi.org/10.1016/j.exis.2019.05.018>.

⁴⁴ Riccardo Intini, “TEFL AG on Why Cobalt Is Key to the Energy Transition - Telf AG,” Telf AG, June 13, 2025, <https://telf.ch/telf-ag-on-why-cobalt-is-key-to-the-energy-transition/>.

Consequently, the anticipated rising demand of electric vehicles in this green transition era, has led to an increase in the market for cobalt and a surge in price. This transition was facilitated by a substantial reduction in costs –to be specific, module-level expenses decreased by nearly 90% since 2008– alongside a five-fold increase in volumetric energy density.⁴⁵ According to a report, Cobalt demand exceeded 200kt for the first time in 2024, growing by 14% and marking the strongest annual growth since 2021; demand for cobalt rose by 27kt annually, more than doubling the annual growth in 2023 which was 12kt.⁴⁶ Demand for this mineral is expected to increase immensely as the European Union envisions phasing out new vehicles with thermal or hybrid engines by 2035, to be replaced with electric vehicles.⁴⁷

The lithium-ion battery, owes its name to the exchange of the Li^+ ion between the graphite (Li_xC_6) anode and a layered-oxide ($\text{Li}_{1-x}\text{TMO}_2$) cathode, with TM being a transition metal (usually cobalt but sometimes nickel or manganese).⁴⁸ LIBs have been a staple of the global market since the time when they were first commercialized by Sony in 1991, and later became integral in various industries, from consumer electronics and medical equipment to industrial power tools. Commercialization of the lithium-ion battery made available an energy density of around double that possible with nickel–cadmium or nickel–metal hydride batteries, both in weight and volume. During the 1980s, along with nickel–cadmium, lead–acid and nickel–metal hydride batteries, which were under development at the time, posed limitations to reduction in size and weight.⁴⁹

⁴⁵“The Global Battery Technology Frontier,” EV Curve Futurist - Mapping the curves that shape civilisation., March 5, 2026, <https://evcurvefuturist.com/the-global-battery-technology-frontier/>.

⁴⁶“Cobalt Market Report 2024,” p. 5 *The Cobalt Institute* (Benchmark Mineral Intelligence, 2025), <https://www.cobaltinstitute.org/wp-content/uploads/2025/05/Cobalt-Market-Report-2024.pdf>.

⁴⁷Nicoletta Fagiolo, “DR Congo’s Necro-Mining, the Flip Side of the Digital and Green Revolution,” Reset DOC, April 2023, <https://www.resetdoc.org/story/drcongos-necro-mining-the-flip-side-of-the-digital-and-green-revolution/>.

⁴⁸M. Armand and J.-M. Tarascon, “Building Better Batteries,” *Nature* 451, no. 7179 (February 2008): p. 653, <https://doi.org/10.1038/451652a>.

⁴⁹Akira Yoshino, “The Birth of the Lithium-Ion Battery,” *Angewandte Chemie International Edition* 51, no. 24 (February 28, 2012): p. 5799, <https://doi.org/10.1002/anie.201105006>.

During the initial commercialization period, which lasted until the early 2000s, lithium-ion batteries were mostly used in portable gadgets most popular ones such as, laptop computers, mobile phones, and digital cameras, where their superior energy density compared to nickel-cadmium and nickel-metal hydride alternatives justified premium pricing.⁵⁰ From having been used mainly in consumer electronics during the nineties and early 2000, things have changed drastically in recent years due to the global green transition therefore since then, the application of lithium-ion batteries expanded significantly into the power tool and electric vehicle sectors. There are various chemistries in the Li-ion family: nickel-rich variations, such as NMC (nickel-manganese-cobalt) or NCA (nickel-cobalt-aluminum), have a higher energy content and a longer range, while LFP (lithium iron phosphate) has a lower energy density but better safety, longevity, and cheaper in cost because it does not include cobalt or nickel.⁵¹

Cobalt mining is sourced from two types of producers—either industrial large-scale mines (LSM) or so-called artisanal and small-scale mines (ASM). The dominant share is large-scale industrial mining, much of it Chinese-owned or financed, including the CMOC and Sicominex operations examined in Chapter 5. Alongside LSM, it sits a substantial artisanal and small-scale mining (ASM) sector, estimated to account for up to a fifth of national output and to employ between roughly 140,000 and 200,000 *creuseurs* (French for diggers) who mine largely by hand, frequently without protective equipment.⁵² Cobalt is mined in several countries, rarely as a primary mineral of extraction; in fact, 99% of cobalt is mined as a by-product from copper or nickel industrial

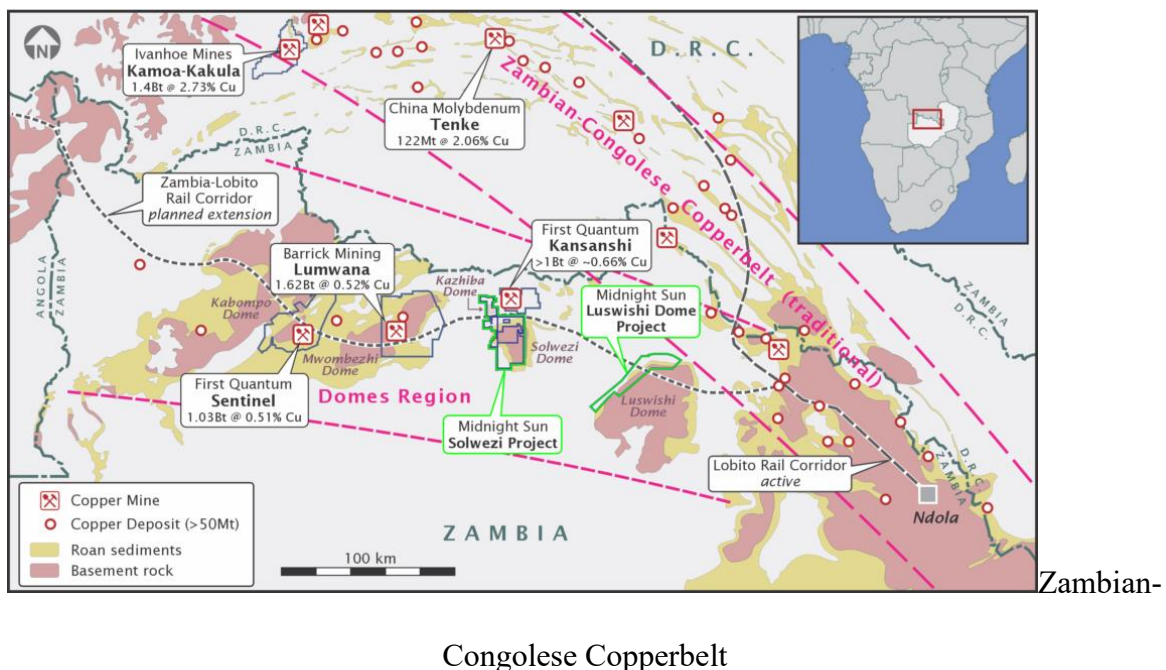
⁵⁰M. Armand and J.-M. Tarascon, “Building Better Batteries,” *Nature* 451, no. 7179 (February 2008): p. 653, <https://doi.org/10.1038/451652a>.

⁵¹Anton Zhukov, “Cell-To-Pack LFP Lithium Batteries Outperform NMC - OneCharge,” OneCharge, May 11, 2023, <https://onecharge.com.br/index.html@p=5142.html>.

⁵² Benjamin K. Sovacool, “The Precarious Political Economy of Cobalt: Balancing Prosperity, Poverty, and Brutality in Artisanal and Industrial Mining in the Democratic Republic of the Congo,” *The Extractive Industries and Society* 6, no. 3 (July 2019): p. 920, <https://doi.org/10.1016/j.exis.2019.05.018>.

mines.⁵³ The Democratic Republic of the Congo (DRC) is the undisputed anchor of the global cobalt supply chain with producing 230,000 t of cobalt in 2025, which is about 73% of world supply in the world (figures may vary according to the sources).⁵⁴ The Katanga Copperbelt region in the southern provinces of Lualaba and Haut-Katanga makes up for the majority of Congo's cobalt production.

Figure 3: Map of the Production Sites



This concentration has significant implications for both geopolitical dynamics and global supply security given that it is one of the most geographically concentrated supply chains for any key mineral. Thus, its position is not only substantial in size but also systemically dominant. Global

⁵³ “Cobalt Facts,” July 2025, p. 1-2 https://www.cobaltinstitute.org/wp-content/uploads/2025/07/Cobalt-Factsheet_July-2025.pdf.

⁵⁴ “Top 13 Countries by Cobalt Mine Production, 2025 - World Ranking Sites,” World ranking sites, December 20, 2025, <https://statranker.org/economy/resources-mining/top-13-countries-by-cobalt-mine-production-2025/>.

availability, inventory, and pricing can be dramatically influenced by even minor policy changes in Congolese exports or project timing.⁵⁵ Although it is not easy to obtain exact production numbers, according to the United States Geological Survey (USGS) Mineral commodity summaries report released in 2026, the DRC was the world’s leading source of mined cobalt in 2025; accounting for an estimated 73% of world total.⁵⁶ According to a more recent report from Statranker, the DRC accounted for 74.19% of global cobalt production in 2025.⁵⁷

Figure 4: Top 10 cobalt producing countries, 2025

Rank	Country	2025 mine production	Share of world
1	Democratic Republic of the Congo	230,000 t	74.19%
2	Indonesia	44,000 t	14.19%
3	Russia	7,700 t	2.48%
4	Madagascar	3,900 t	1.26%
5	Australia	3,700 t	1.19%
6	Philippines	3,700 t	1.19%
7	Canada	3,500 t	1.13%
8	Papua New Guinea	2,800 t	0.90%
9	China	2,000 t	0.65%
10	Cuba	2,000 t	0.65%

Shares use the rounded USGS world total for 2025. Because country values and the world total are estimated and rounded, percentages are approximate.

According to the Proceedings of the National Academy of Sciences of the United States of America (PNAS) study on resource competition, cobalt is one of the essential raw materials where high production concentration could lead to supply risks since no country has all the resources it

⁵⁵ “Cobalt Market Report 2025,” 2026, p. 5 <https://www.cobaltinstitute.org/wp-content/uploads/2026/05/Cobalt-Market-Report-2025.pdf>.

⁵⁶ “Mineral Commodity Summaries 2026,” 2026, <https://doi.org/10.3133/mcs2026>.

⁵⁷ “Top 13 Countries by Cobalt Mine Production, 2025 - World Ranking Sites,” World ranking sites, December 20, 2025, <https://statranker.org/economy/resources-mining/top-13-countries-by-cobalt-mine-production-2025/>.

requires within its own country, making countries compete more aggressively for access to assets overseas.⁵⁸

In the DRC, cobalt mainly exists in the ore mineral heterogenite ($\text{CoO}(\text{OH})$)⁵⁹ – a black, earthy oxide that forms in the oxidized zone of copper-cobalt deposits – within the sediment-hosted stratiform copper deposits of the Central African Copperbelt.⁶⁰ As mentioned above, the fact that heterogenite is a by-product of copper extraction, it automatically ties cobalt output to copper prices and to the mining schedules of large copper operations. This geological by-product status of cobalt has a decisive market consequence where cobalt supply is governed by the economics and production of its host metal copper, rather than the cobalt demand in the market alone – meaning that when copper demand falls, cobalt production declines regardless of the battery market dynamics, and when copper production booms, cobalt floods the market irrespective of end-user demand which reduces supply flexibility and intensifies price volatility, both of which are not in the control of the DRC.⁶¹ This lack of control, as well as the conditions that were once initiated and now actively perpetuating this situation, will be further investigated in Chapter 5.

2.2 Where Cobalt Is Extracted: The Geography of Production

Cobalt is one of the most geographically concentrated mineral sources as mentioned in the previous chapter, though the producer ecosystem is more diverse and dynamic than the apparent

⁵⁸ Andrew L Gulley, “China, the Democratic Republic of the Congo, and Artisanal Cobalt Mining from 2000 through 2020,” *PNAS* 120, no. 26 (June 20, 2023), <https://doi.org/10.1073/pnas.2212037120>.

⁵⁹ Guofan Zhang, Yongqiang Gao, and Mengtao Wang, “Effect of Sulfidization on the Surface Property and Flotation Behavior of Heterogenite,” *Minerals Engineering* 204 (December 2023): 108375, p. 2.

⁶⁰ USGS, “Mineral Commodity Summaries 2024 | U.S. Geological Survey,” [www.usgs.gov](https://www.usgs.gov/publications/mineral-commodity-summaries-2024), January 31, 2024, p. 62-63 <https://www.usgs.gov/publications/mineral-commodity-summaries-2024>.

⁶¹ African Development Bank, “Annual Report and Financial Report 2021,” <https://www.afdb.org/en/annualreport>. ; UNCTAD, “Trade and Development Report 2024,” UNCTAD, October 29, 2024, <https://unctad.org/publication/trade-and-development-report-2024>.

dominance of a single country, the DRC. Because cobalt is recovered almost entirely as a byproduct from its host metals which are copper and nickel, the geography of that supply is determined not by where cobalt exists but rather by where nickel and copper is mined.⁶² Figures on cobalt production and reserves vary depending on the source and accounting method; this section relies on USGS for production shares and GlobalData for prospective trajectories. Total global reserves of cobalt are estimated to be roughly 12 million tonnes; furthermore, more than 5 billion tonnes of cobalt are contained globally in sea floor polymetallic nodules.⁶³

Figure 5 : World cobalt mine production and reserves

	Mine production ^a		Reserves ⁹
	2024	2025	
United States	200	300	70,000
Australia	4,780	3,700	¹⁰ 1,700,000
Canada	3,350	3,500	220,000
China	2,000	2,000	160,000
Congo (Kinshasa)	226,000	230,000	6,000,000
Cuba	3,450	2,000	500,000
Indonesia	35,000	44,000	760,000
Madagascar	3,100	3,900	100,000
Papua New Guinea	2,630	2,800	84,000
Philippines	3,100	3,700	260,000
Russia	8,000	7,700	¹¹ 800,000
Turkey	2,200	1,900	91,000
Other countries	<u>7,780</u>	<u>9,100</u>	<u>780,000</u>
World total (rounded)	302,000	310,000	12,000,000

World mine production and reserves of cobalt (U.S. Geological Survey, Mineral Commodity Summaries, February 2026)

Identified terrestrial cobalt resources surpass 25 million tonnes, primarily located in sediment-hosted copper deposits in the DRC and Zambia, terrestrial tons of cobalt have been in sediment-hosted stratiform copper deposits in Congo (Kinshasa) and Zambia; nickel-bearing laterite deposits in Cuba, Australia and nearby island countries; magmatic nickel-copper sulfide deposits in

⁶² Benjamin K. Sovacool et al., “Beyond Cost and Carbon: The Multidimensional Co-Benefits of Low Carbon Transitions in Europe,” *Ecological Economics* 169 (March 2020): 106529, <https://doi.org/10.1016/j.ecolecon.2019.106529>.

⁶³ USGS, “Mineral Commodity Summaries 2025,” *U.S. Geological Survey*, January 31, 2025, <https://doi.org/10.3133/mcs2025>; USGS, “Mineral Commodity Summaries 2026,” 2026, <https://doi.org/10.3133/mcs2026>.

Australia, Canada, Russia, and the United States.⁶⁴ In 2024, the DRC was the biggest cobalt producer, accounting for 76% of mined output, with its output production proportion growing by +34kt from 2023 to 2024.⁶⁵ In 2025, thanks to the strong output from Indonesia and the DRC, the cobalt production reached 330kt — a notable 8.0% growth. According to a report published by GlobalData, the DRC remained as the dominant player in the global cobalt market and is estimated to account for around 72% of the global output in 2025, followed by Indonesia with 14.9%. Also in 2026, the global cobalt output is expected to grow further by 6.9% to reach 352.8kt by the end of the year, with vast amounts of supply from the two largest players, the DRC and Indonesia.⁶⁶ As a result of the increasing production output of facilities like Ningbo Lygend Mining's PT Halmahera Persada Lygend Project and Zhejiang Huayou's Huafei Cobalt-Nickel Project, Indonesia produced an estimated 49,300 t of cobalt in 2025, a 42.6% increase in the numbers compared to prior years numbers.⁶⁷ This outcome partly owed to the Indonesian government's efforts to develop a domestic supply chain for EVs.⁶⁸

Indonesia's cobalt growth path is distinct from the DRC due to the fact that it is directly tied to the growth of nickel laterite processing and mixed hydroxide precipitate supply chains;

Russia is the third largest producer outside of the Congo-Indonesia dominance, though on a significantly smaller scale; Madagascar, Papua New Guinea, and the Philippines produce relatively smaller quantities, primarily as byproducts of nickel or copper mining rather than pure cobalt mining. Between the years 2026 and 2035, in the report released by GlobalData, Indonesia's cobalt

⁶⁴ Ibid.

⁶⁵ Ibid.

⁶⁶ Cobalt Mining Market Analysis by Reserves, Production, Assets, Demand Drivers and Forecast to 2035 <https://www.globaldata.com/store/report/cobalt-mining-market-analysis/>.

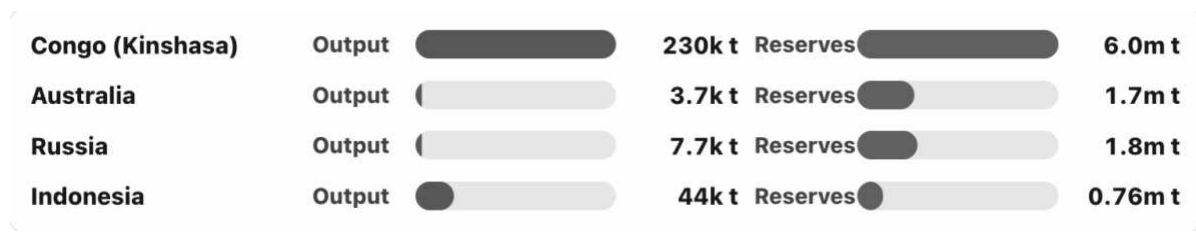
⁶⁷ New project launches and ramp-ups set to lift Indonesia's cobalt output in 2026, Global Data, https://www.mining-technology.com/analyst-comment/new-project-launches-ramp-ups-lift-indonesia-cobalt-output-2026/?utm_campaign=recommended-reports-right-hand-side-pi&cf-view&cf-view.

⁶⁸ Ibid.

output is expected to grow by a CAGR of 5.6% , reaching 97,900t by 2035 owing to the start of new projects namely, the Pomalaa and Morowali (2026), Sorowako Limonite (2027) and Pt Ceria Nugraha Indotama Project (2028).⁶⁹ Australia has a vast cobalt resources, but mining output in 2025 was way less than expected, considering its reserve base.⁷⁰ For a better comparison, the table below demonstrates the mine production and scale of the reserves in the country.

A final and noteworthy share of supply comes from no mining activity. In 2025, the cobalt composition made from collected scrap accounted for 25% of the estimated cobalt consumption.⁷¹ Secondary cobalt recovered from used batteries and industrial scrap currently supplies an estimated 12% of demand, a figure expected to climb to 22% by 2030.⁷² Unlike primary output mentioned earlier, the recycled cobalt ecosystem is not tied to Congolese copper nor Indonesian nickel, which is precisely why it is so prominent in EU and US supply diversification policies.

Figure 6: Mine production and reserve context



A reverse comparison serves as a proof of how geological potential may not translate into production. Australia has a very large reserve estimate but lower 2025 output. Congo has the largest reserve holder and also very high production (Cobalt Factsheet, 2025)

⁶⁹ Ibid.

⁷⁰“Top 13 Countries by Cobalt Mine Production, 2025 - World Ranking Sites,” World ranking sites, December 20, 2025, <https://statranker.org/economy/resources-mining/top-13-countries-by-cobalt-mine-production-2025/>.

⁷¹ “Mineral Commodity Summaries 2026,” 2026, p. 62 <https://doi.org/10.3133/mcs2026>.

⁷² “Cobalt Market Report 2025,” 2026, <https://www.cobaltinstitute.org/wp-content/uploads/2026/05/Cobalt-Market-Report-2025.pdf>.

The DRC and Indonesia dominate world cobalt supply, accounting for approximately 87% of mine output, with the DRC alone accounting for over 70%. This level of concentration has immediate consequences on price volatility and supply security, a vulnerability that manifested itself in the DRC's February 2025 export suspension.

2.3 The Global Cobalt Market

Cobalt is priced and quoted using a variety of methods, including private contracts, long-term supply agreements, and over-the-counter transactions.⁷³ Unlike copper and aluminium, cobalt is not traded in large quantities on a liquid public marketplace. Because approximately 99 percent of cobalt is a byproduct of copper or nickel, supply does not decline when prices fall, and the market moves through pronounced boom-and-bust cycles.

From 2016 to 2018, cobalt prices climbed to \$43.09 per pound.⁷⁴ However, from March 2018 to December 2019, prices fell due to decreasing electric vehicle demand, influenced by Tesla's statement saying that cobalt content in batteries could be reduced, and the oversupply from the DRC.⁷⁵ Between May 2022 and May 2025, cobalt prices fallen nearly 60 percent, falling from \$41 to \$16.62 per pound, nearly 60 percent, a decline driven largely by sustained oversupply from dominant China and producers such as China Molybdenum Company Limited (CMOC) which expanded output even as prices declined.⁷⁶

⁷³ StoneX Market Experts. n.d. "Cobalt Commodity: Pricing, Futures and LME Basics." StoneX. Accessed June 22, 2026. <https://www.stonex.com/en/business/financial-glossary/cobalt-commodity/>.

⁷⁴ Nicholas Larsen, "Why Have Cobalt Prices Crashed," International Banker, July 31, 2019, <https://internationalbanker.com/brokerage/why-have-cobalt-prices-crashed/>.

⁷⁵ Gracelin Baskaran and Meredith Schwartz, "Stabilizing Cobalt Markets: A Price Floor for U.S. Minerals Security", 2025, p. 1 <https://doi.org/10.2307/resrep74046>.

⁷⁶Ivi, p. 2.

Cobalt has become one of the most unpredictable and expensive commodities of the mid-2020s with prices surging by more than 240 percent since the beginning of 2025, as it has been labelled for years by its structural oversupply and poor market valuations.⁷⁷ To understand why cobalt has become costly, one must first focus on the unusual regulatory shift that occurred in February 2025 in the Democratic Republic of the Congo (DRC). As the source of roughly 70% of the world's cobalt, the DRC has dominance over the market. For years, the country's production of the metal has increased dramatically, as output from its various mines oversupplied the market, driving down prices to levels that the DRC government eventually considered unsustainable for the economy's stability and welfare.⁷⁸ In 2025, cobalt prices fell to their lowest level since 2016, endangering the economic sustainability of critical cobalt operations other than the DRC; with the most prominent mining companies in Australia, Canada, and Madagascar (with Japanese and South Korean ownership) producing cobalt with barely no profits as market prices dropped below operational cash expenses.⁷⁹ This led the DRC to ban cobalt exports in February 2025, in reaction to market oversupply and insufficient pricing, which needed to be regulated and adjusted accordingly for the sake of the Congolese economy. Six months later, in October 2025, the temporary ban was replaced with export quotas of 18,125 tons of contained cobalt for the rest of 2025, and nearly up to 96,000 tons contained cobalt per year in 2026 and 2027, 9,600 tons preserved for national strategic reserves.⁸⁰ Cobalt metal, which started the 2025 with roughly US\$24,000 per tonne, more than doubled to over US\$53,000 by the end of the year, while cobalt hydroxide exceeded threefold,

⁷⁷ Joseph Moss, "Cobalt Prices Have Soared over the Last Year: Here's Why," International Banker, February 6, 2026, <https://internationalbanker.com/brokerage/cobalt-prices-have-soared-over-the-last-year-heres-why/>.

⁷⁸ Ibid.

⁷⁹ Gracelin Baskaran and Meredith Schwartz, "Stabilizing Cobalt Markets: A Price Floor for U.S. Minerals Security", 2025, p. 2 <https://doi.org/10.2307/resrep74046>.

⁸⁰ "Mineral Commodity Summaries 2026," 2026, <https://doi.org/10.3133/mcs2026>.

shifting the market from oversupply to a foreseeable deficit in 2026.⁸¹ The February ban is a clear demonstration of the exercise of bargaining power of a country. A 2025 S&P Global report supports this, stating the ban and quota were part of "DRC's efforts to show it has control over the exploration and production of minerals."⁸²

These fluctuations in prices are conveyed through a trade geography as concentrated as manufacturing itself. The primary route is the flow of cobalt hydroxide from the DRC to China, where it is processed into metal and battery salts before being re-exported to supply European and other Western customers.⁸³ Because Congolese extraction is connected to global demand through a single corridor, a change in regulations in one country could reset, rise, disrupt the prices of the whole market in a short period of time.

However, cobalt demand for EV batteries has been revised down by 25% for 2040 compared with last year's Outlook due to shifts in battery chemistry choices. Meanwhile, demand for cobalt in superalloys grows steadily, driven by the aerospace and defence sectors.⁸⁴ Concerns over child labour, human rights violations, and supply chain risks in the DRC's cobalt industry have encouraged battery manufacturers to reduce their use of cobalt-heavy batteries like nickel-cobalt-manganese (NMC) and increasingly adopt lithium-iron-phosphate (LFP) batteries, which have started to take market share like never before. Although it is still difficult to remove cobalt entirely from battery chemistries, given how much of a boost it gives to battery capacity and stability, EV

⁸¹ Gracelin Baskaran and Meredith Schwartz, "Stabilizing Cobalt Markets: A Price Floor for U.S. Minerals Security", 2025, p. 2 <https://doi.org/10.2307/resrep74046>.

⁸² Alice Yu and Jomar Camposano, "DRC Cobalt Export Quotas to Support Cobalt Prices, Though Challenges Loom," S&P Global Market Intelligence, 2025, <https://www.spglobal.com/market-intelligence/en/news-insights/research/2025/10/drc-cobalt-export-quotas-to-support-cobalt-prices-though-challenges-loom>.

⁸³ Alexander Cook and Sofia Okun, "Dried-up Feedstock Pipeline Sends Cobalt Prices Soaring in 2025, Deficit Seen next Year: 2026 Preview," Fastmarkets, January 6, 2026, <https://www.fastmarkets.com/insights/dried-up-feedstock-pipeline-cobalt-prices-soaring-2025-deficit/>.

⁸⁴ International Energy Agency, "Global Critical Minerals Outlook 2024 – Analysis," IEA, May 17, 2024, p. 144 <https://www.iea.org/reports/global-critical-minerals-outlook-2024>.

manufacturers have been shifting away from cobalt because it's expensive, toxic and ethically fraught.⁸⁵

The paradox in the DRC cobalt production is striking: the very supply concentration and human suffering that characterized the production and dependency are now speeding up its substitution. As reported by the IEA(2025), LFP batteries now supply almost half the global electric car market – up from less than 10% in 2020.⁸⁶ In 2025, demand for NMC battery cells remained strong in markets which prioritize the longer driving range and performance in EVs, particularly in North America and Europe. However, LFP cells continued their rapid ascent, driven by lower cost as well as increasing adoption in China and in entry-level electric vehicles.⁸⁷

2.4 From Extraction to Refining: The Asymmetrical Value Chain of Cobalt

Key stages in cobalt mining, also most of the other critical mineral supply chains share a common structure for most cases: extraction and intermediate processing of the raw ore; Refining into battery-grade chemicals, chemical manufacture; cell and component manufacture; trading and transportation, warehousing; and lastly, recycling and/or disposal.⁸⁸ But it is evident that the value

⁸⁵ Neeraj Sharma, “‘Blood Cobalt’ Is Disappearing from Batteries – and Cheaper, Cleaner Batteries Are Arriving,” UNSW Sites, February 2026, <https://www.unsw.edu.au/newsroom/news/2026/02/blood-cobalt-disappearing-from-batteries-cheaper-cleaner-batteries-arriving>.

⁸⁶ IEA, “Beyond NMC Batteries: Supply Chain Issues for Emerging Battery Technologies - IEA,” IEA, 2025, <https://www.iea.org/reports/global-critical-minerals-outlook-2025/beyond-nmc-batteries-supply-chain-issues-for-emerging-battery-technologies>.

⁸⁷ Georgia Williams, “Cobalt Market Forecast: Top Trends That Will Affect Cobalt in 2023,” investingnews.com, January 19, 2026, <https://investingnews.com/daily/resource-investing/battery-metals-investing/cobalt-investing/cobalt-forecast/>.

⁸⁸ “Cobalt Facts,” July 2025, p. 2 https://www.cobaltinstitute.org/wp-content/uploads/2025/07/Cobalt-Factsheet_July-2025.pdf.

is not shared evenly across these steps; margins are lowest, most fragile, and usually unregulated at extraction, whereas, in the middle stages where chemical refining and component manufacturing takes place demonstrates way higher margins.

Critical minerals are mainly mined in low-income countries, while high-value processing takes place in industrialized economies. Sovacool et al. (2020) coined the term "decarbonisation divide" in their recent analyses in order to explain the disparity between the toxic, exploitative and hazardous conditions at mining or waste sites and the clean benefits received by end users in wealthy countries.⁸⁹ The global distribution of mineral supply chains establishes new structures of dependency where those who control the refining nodes of the chain, for this thesis, the refining and processing of cobalt, exercise authority and control over those who rely on them for the transition.⁹⁰ In simpler terms, the refining capacity and volume is the chokepoint of the energy transition. This feature is highly evident in the cobalt supply chain since there is a noticeable gap between *mining and refining geography*. When comparing supply chains, making the distinction between mining concentration and refining concentration is essential as they are separate risks that can compound each other in time.⁹¹

Cobalt exemplifies this logic in its sharpest form, because despite the DRC having the largest resources, China has been dominating the refining and smelting operations.⁹² In 2022, Chinese firms controlled 62% of cobalt mine materials primarily used for cobalt chemical refining, 95% of refined commercial-grade cobalt chemicals, 92% of battery-grade tricobalt tetroxide, 85% of

⁸⁹ Benjamin K. Sovacool et al., "The Decarbonisation Divide: Contextualizing Landscapes of Low-Carbon Exploitation and Toxicity in Africa," *Global Environmental Change* 60 (January 2020), p. 1 <https://doi.org/10.1016/j.gloenvcha.2019.102028>.

⁹⁰ Kuhu Singh, "The Political Economy of Critical Minerals: Energy Transitions and the Fractured World Order," *Anusandhanvallari*, July 19, 2025, p. 2631

⁹¹ "Top 13 Countries by Cobalt Mine Production, 2025 - World Ranking Sites," World ranking sites, December 20, 2025, <https://statranker.org/economy/resources-mining/top-13-countries-by-cobalt-mine-production-2025/>.

⁹² OECD/IEA (2025), The role of traceability in critical mineral supply chains, OECD Publishing, Paris, <https://doi.org/10.1787/edb0a451-en>.

battery-grade cobalt sulfate, and 91% of nickel-cobalt-manganese cathode precursor materials.⁹³ China accounted for approximately 80% of the global refined cobalt production in 2024 and is also its largest consumer, yet its domestic reserves are relatively small and Chinese production relies heavily on raw cobalt import from the DRC. In 2023, China's cobalt raw material import dependency reached 98%, with the DRC accounting for over 85%.⁹⁴ In comparison with other critical minerals, cobalt has also relatively higher levels of company concentration alongside geographical concentrations in its supply chain with the top three owners (Glencore, CMOC, Sicominex) in the formalised sector accounting for around 45% of both mining and refining. The 2025 mining table is led by Congo and Indonesia, but as USGS notes China's leading role in refined cobalt *production and consumption*, especially for lithium-ion batteries.⁹⁵ In 2025, China remained as the leading global producer of refined cobalt and the world leading consumer, primarily for the lithium-ion battery industry; therefore, China's control of battery and critical minerals supply chains is also likely to carry over through the year of 2026 as the race over domination between the West and China for the supply chains does not really stop.⁹⁶ This systemic dependency effectively weaponizes the energy transition, forcing the DRC to bear and internalize the socio-environmental costs of green extractivism, whereas global powers prioritize securing reliable raw material resources through technological and legal frameworks.⁹⁷ The central question

⁹³ Andrew L Gulley, "The Development of China's Monopoly over Cobalt Battery Materials," *Mineral Economics* 37 (June 10, 2024), p. 620 <https://doi.org/10.1007/s13563-024-00447-w>.

⁹⁴ Ibid., ; Shanghai Metals Market (SMM)," Metal.com, March 4, 2025, <https://news.metal.com/newscontent/103207307-will-the-global-cobalt-raw-material-production-of-approximately-270000-mt-in-2024-choke-the-supply-of-raw-materials-how->.

⁹⁵ "Mineral Commodity Summaries 2026," *USGS Numbered Series*, no. 978-1-4113-4643-7 (2026), p. 71 <https://doi.org/10.3133/mcs2026>.

⁹⁶ Ibid. ; Georgia Williams, "Cobalt Market Forecast: Top Trends That Will Affect Cobalt in 2023," *investingnews.com*, January 19, 2026, <https://investingnews.com/daily/resource-investing/battery-metals-investing/cobalt-investing/cobalt-forecast/>.

⁹⁷ Philippe Le Billon, Raphael Deberdt, and Julia Trombetta, "From Resource Security to Resource Securitisation: Materialities, Latent Securitisation, and the Politics of (In)Security in Low-Carbon Transitions," *Critical Studies on Security*, August 18, 2025, p. 16 <https://doi.org/10.1080/21624887.2025.2545673>.

of this thesis is precisely the separation of resource from value: how the green transition's demand for cobalt channeled through a value chain in which the DRC's role is restricted to only extraction, reproduces structural underdevelopment in the country that supplies the necessary raw material?

The actors whose demand causes and perpetuates this asymmetry are the ones who organize, fund, and justify it; the structure cannot sustain itself independently. After describing the cobalt value chain in this chapter, the analysis now shifts to the organization of that demand and the procedures used to make it appear to be legitimate by analyzing the EU's institutional and legal framework, particularly the Critical Raw Materials Act and the European Green Deal, which serve as the foundation for the EU's claim on Congolese cobalt. The costs of that claim have shifted beyond the framework's own declared commitments to justice, which will be further examined in the following chapter.

3. The European Green Deal and its Contradictions

“A global narrative of planetary crisis that is ignorant of power inequalities and of reproductive forces cannot produce real change.”

Stefania Barca, environmental historian⁹⁸

Europe has given its energy transition a moral label. The European Green Deal (EGD), promises not just to decarbonise the continent, but to do so justly to "leave no one behind."⁹⁹ This moral language — fairness, sustainability, equality, shared benefit — functions as a shield: it is what allows the European Union (EU) to demand vast quantities of raw materials from elsewhere, for its own transition, without appearing exploitative. It authorises extraction while displacing the costs of that extraction beyond the EU's territory; beyond the reach of the very "justice" it promises. Positioned between the value chain mapped in Chapter 2 and the human and contractual costs documented in Chapters 4 and 5, this chapter argues that the European Green Deal and Critical Raw Materials Act institutionalise core-periphery dynamics that externalise environmental, social and bodily costs to peripheral states, in our case to the DRC and Congolese bodies, meanwhile concentrating economic and technological benefits in core nations, European nations in our case, and further asks what and who is included in the promise of justice and, more specifically, where it stops. To do so, this chapter turns to the demand side of the cobalt economy by analyzing the normative and institutional frameworks — EGD and the CRMA – through which the EU organises

⁹⁸ Meadhbh Bolger et al., “‘Green Mining’ Is a Myth: The Case for Cutting EU Resource Consumption ” (European Environmental Bureau, 2021), p. 7 https://eeb.org/wp-content/uploads/2021/10/Green-mining-report_EEB-FoEE-2021.pdf.

⁹⁹ “A Just and Fair Transition, Leaving No One Behind,” Europa.eu, September 5, 2024, <https://projects.research-and-innovation.ec.europa.eu/en/strategy/strategy-2020-2024/environment-and-climate/european-green-deal/green-deal-projects-support/green-deal-resources/just-and-fair-transition-leaving-no-one-behind>.

and justifies its claim on Congolese cobalt. The chapter proceeds in two stages. Section 3.1 examines The Green Deal and its promise of a transition that "leaves no one behind" with regard to the geographical limit at which the promise stops. Section 3.2 draws out the contradiction that follows: that the intended virtuous use of cobalt in the EU's green transition is precisely what legitimises the catastrophes of its extraction in the DRC.

3.1 The European Green Deal: A “Just Transition” for Whom?

Despite accounting for only 6% of the world's population, the EU consumes 25–30% of all metals produced worldwide.¹⁰⁰ If there are no substantial changes on consumer behaviour that drive this consumption, EU metal consumption is predicted to grow the fastest of all material groups, with a 63% increase per capita by 2060.¹⁰¹ In 2019, the European Green Deal (EGD) put the EU on a carbon-neutral path to become the first climate-neutral continent by 2050, with the aim of transforming the EU into a fair and prosperous society, with a modern, fossil-fuel free, resource-efficient and competitive economy while ensuring that ‘no one is left behind’. The deal aims to cut emissions by at least 55% by 2030, while legally enforcing the 2050 neutrality objective through the European Climate Law.¹⁰² It is the EU's commitment to the Paris Agreement, which was accepted and ratified by the EU and all of its member nations, which aims to stabilize global warming to a maximum of +1.5°C compared to pre-industrial levels.¹⁰³ Ending coal mining and gradually reducing the use of coal is a crucial commitment to this aim, and these efforts must be

¹⁰⁰ Meadhbh Bolger et al., “‘Green Mining’ Is a Myth: The Case for Cutting EU Resource Consumption ” (European Environmental Bureau, 2021), p. 3 https://eeb.org/wp-content/uploads/2021/10/Green-mining-report_EEB-FoEE-2021.pdf.

¹⁰¹ Ibid.

¹⁰² European Commission, “The European Green Deal,” European Commission (European Commission, 2019), https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.

¹⁰³ European Council, “European Green Deal,” Consilium (European Council, 2019), <https://www.consilium.europa.eu/en/policies/european-green-deal/>.

compatible with climate, environmental, and health responsibilities, and must take into account the needs of affected workers, communities, and regions.¹⁰⁴ However, the EGD does not necessarily eliminate other ways of mining practices from the EU's future because the future in question depends on the extraction of critical raw materials (CRM): materials of high economic importance to the Union whose supply is exposed to significant risk.¹⁰⁵ Cobalt is among these CRMs and is central to the EU's decarbonization goals, most importantly, the Union does not possess it. Therefore, a mineral becomes "critical" because Europe needs it and might be unable to secure it, not because securing it scars the lungs and lands of those who dig it. In fact, approximately 75% of the global supply is coming from the DRC which makes the Deal, by its own design, an extraction-intensive project. The Green Deal does not, therefore, end mining; it relocates and intensifies it, shifting the Union's material dependence from the fossil fuels it is abandoning to the metals it now requires — metals that, as Chapter 2 established, it barely produces and must overwhelmingly import. This geographical concentration raises a necessary question: the European Green Deal rests its moral architecture and the Deal's legitimacy with the promises to protect workers, communities, and the environment,¹⁰⁶ but whose workers and whose communities are included within this vision of justice? The reason why Green Deal does not ask whether Congolese mining communities are left behind is because the framework cannot answer it. Justice, in the European Green Deal, is a domestic category. The answer to this question reveals a significant blind spot of the deal since the transition depends on supply chains that extend far

¹⁰⁴ Beyond Fossil Fuels, "Europe's Coal Exit," Beyond Fossil Fuels, March 30, 2026, <https://beyondfossilfuels.org/europes-coal-exit/>.

¹⁰⁵ The criticality of these materials are defined by the European Commission, in regard to two main metrics: supply risk (SR) and economic importance (EI). Giovanni Andrea Blengini et al., "Methodology for Establishing the EU List of Critical Raw Materials - Guidelines" 1 January 1, 201, p. 2, <https://doi.org/10.2873/769526>.

¹⁰⁶ European Commission, "The European Green Deal," European Commission (European Commission, 2019), https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.

beyond Europe, yet it often fails to fully account for the risks, vulnerabilities, and developmental needs faced by communities in producer countries which makes the ‘win-win’ scenario seem far from reach – there are winners *and* losers, with those already less well off are the ones that are most negatively affected.¹⁰⁷

3.1.1 Just Transition Mechanism

The Just Transition Mechanism, adopted in January 2020, is the main framework of the European Union (EU) to achieve just and inclusive outcomes from the EGD; *within the EU member states and their territories* through three pillars: Just Transition Fund; InvestEU "Just Transition" scheme; and Public Sector Loan Facility.¹⁰⁸ The mechanism aims to mobilise at least €55 billion to targeted regions between 2021-2027, to help ‘address the social and economic effects of the transition’.¹⁰⁹ Four nations received nearly half of the €19.7 billion Just Transition Fund for 2021–2027, including the European Recovery Instrument: Poland (around €3.8 billion), Germany (approximately €2.5 billion), Romania (around €2.1 billion), and Czechia (approximately €1.6 billion), targeting the regions most affected by the coal phase-out.¹¹⁰ As Sovacool et al. (2020) argue, the "decarbonization divide" precisely captures the contrast between the dangerous, exploitative, and toxic conditions at mining sites in the Global South and the clean benefits enjoyed by end users in wealthy nations – in this case, the EU, has been deeply rooted in this unequal

¹⁰⁷ Kalina Arabadjieva, “A Just Transition for the EU: What Role for Legislation?,” ETUI (The European Trade Union Institute, October 23, 2024), <https://www.etui.org/news/just-transition-eu-what-role-legislation>.

¹⁰⁸ “The Just Transition Mechanism: Making Sure No One Is Left Behind,” European Commission, 2024, https://commission.europa.eu/topics/regional-and-urban-policy/just-transition-mechanism_en.

¹⁰⁹ European Commission: Directorate-General for Communication, *The Just Transition Mechanism – Making sure no one is left behind – The European Green Deal*, Publications Office, 2020, <https://data.europa.eu/doi/10.2775/19010>

¹¹⁰ European Commission (2021). Commission Implementing Decision (EU) 2021/1129 of 5 July 2021 setting out the annual breakdown of available allocations under the Just Transition Fund per Member State.

system while pursuing its climate objectives.¹¹¹ While the workers who physically supply the required material receive no protection at all, the JTM finances the cushioning of European workers displaced by the change; the discourse of "win-win" partnership is intended to conceal this asymmetry.¹¹²

3.1.2 The Critical Raw Materials Act

The Critical Raw Materials Act (CRMA) reveals what the justice, examined in the previous section, costs elsewhere. Adopted in May 2024 in parallel with the EU's Net Zero Industry Act within the Green Deal, the CRMA aims to strengthen all stages of the European critical raw materials value chain, help to improve EU capacity to monitor and mitigate risks of disruptions to the supply of critical raw materials to ensure a secure, sustainable and competitive supply chain for clean energy to reach the EU's climate and energy ambitions.¹¹³ Taken directly European Commission report, the article 5 states that "the aim of the Act would be to ensure that by 2030: EU extraction capacity covers at least 10% of the EU's annual consumption of SRMs; EU processing capacity covers at least 40 % of EU annual consumption of SRMs; EU recycling

¹¹¹ Sovacool et al., "The Decarbonisation Divide: Contextualizing Landscapes of Low-Carbon Exploitation and Toxicity in Africa," *Global Environmental Change* 60 (January 2020), p. 14
<https://doi.org/10.1016/j.gloenvcha.2019.102028>.

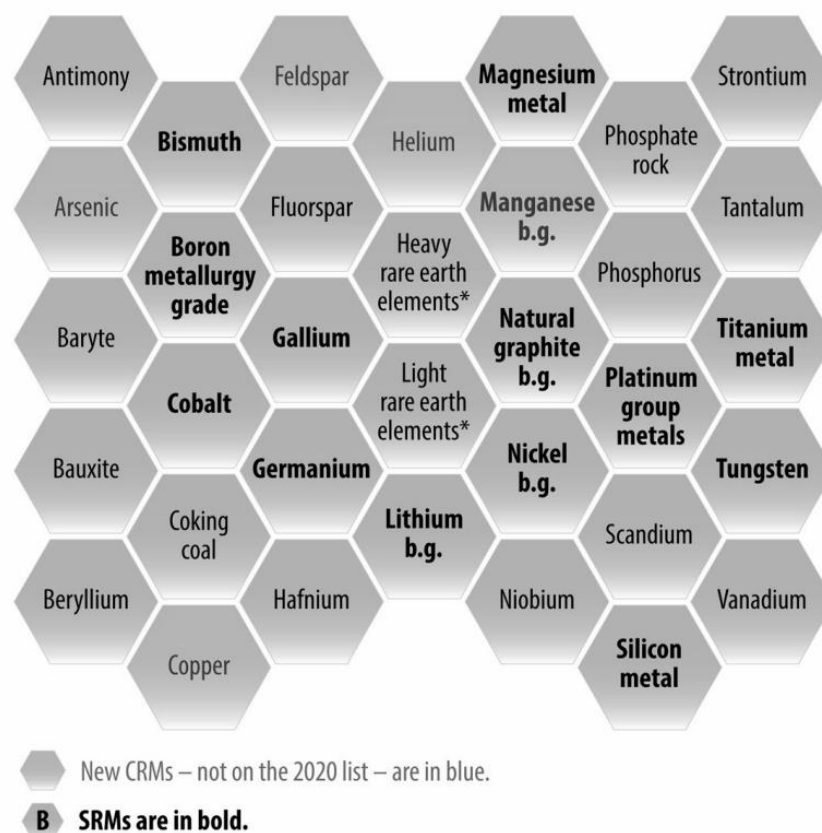
¹¹² Hyldmo et. al., "A Globally Just and Inclusive Transition? Questioning Policy Representations of the European Green Deal," *Global Environmental Change* 89 (October 16, 2024): p. 1
<https://doi.org/10.1016/j.gloenvcha.2024.102946>.

¹¹³ European Commission, "Critical Raw Materials Act," European Commission, 2023, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en.

capacity covers at least 25 % of EU annual consumption of SRMs; and to depend on no single third country for more than 65 per cent of any of the SRMs.¹¹⁴

¹¹⁴ Guillaume Ragonnaud, “BRIEFING: EU Legislation in Progress Critical Raw Materials Act” (European Parliament, June 2024), p. 4-5
[https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747898/EPRS_BRI\(2023\)747898_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747898/EPRS_BRI(2023)747898_EN.pdf).

Figure 7 : 34 critical raw materials, including 16 proposed strategic raw materials



Strategic raw materials are in bold font (Taken from Critical Raw Materials Act)¹¹⁵

The single country restriction is a measure of supply concentration risk rather than the conditions under which the material is extracted; as Chapter 2 demonstrated, it primarily targets Chinese dominance in refining of the CRMs. The 10 per cent extraction target itself is also an admission from the EU –it proves that roughly 90% of the materials on this list will still come from outside Europe. For cobalt, the numbers are stark: The DRC is the world’s leading source of mined cobalt and accounted for an estimated 73% of world's total – the local companies themselves possess only

¹¹⁵ Regulation - EU - 2024/1252 - EN - EUR-Lex,” Europa.eu, May 3, 2024, p. 5 <https://eur-lex.europa.eu/eli/reg/2024/1252/oj>.

slightly above 5 % of the mining facilities in the country. The majority of the shares in the DRC are held by China and Europe, with 47.15% and 47.77% respectively¹¹⁶— and China is still the leading cobalt refiner since accounting for 78% of the market in 2024.¹¹⁷ The EU wants to reduce its reliance on Chinese processing, but it cannot possibly reduce its reliance on Congolese mining. Europe mines almost no cobalt of its own and is reliant on imports for the great majority of its supply, nor can new supply appear quickly: on average, a mine takes more than fifteen years to move from discovery to production.¹¹⁸ So, the whether the EU will continue to use Congolese cobalt is not the question because it will. The question is on what terms. The answer can be found in ESG criteria: due-diligence duties, traceability requirements, and lastly, in the European Commission report, stating that although it aims to cut its dependencies on CRMs and supply chains, the EU is giving ‘special consideration to countries with which the Union has established a strategic partnership, a free trade agreement or other forms of cooperation covering raw materials, as they provide greater assurances regarding supply risks’.¹¹⁹ The EU acted accordingly with this strategic partnership exception, and a non-binding Memorandum of Understanding was signed between the EU and the DRC in October 2023 with the goal of creating a strategic partnership on sustainable raw materials value chains; as part of the European Union's Global Gateway initiative, which aims to raise up to EUR 300 billion in private and public investments between 2021 and 2027.¹²⁰ During the Global Gateway Forum 2025, European Commission and

¹¹⁶ Tim Greitemeier et al., “China’s Hold on the Lithium-Ion Battery Supply Chain: Prospects for Competitive Growth and Sovereign Control,” *Journal of Power Sources Advances* 32 (February 17, 2025): 100173, p. 5 <https://doi.org/10.1016/j.powera.2025.100173>.

¹¹⁷ USGS, “Mineral Commodity Summaries 2026,” 2026, p. 71 <https://doi.org/10.3133/mcs2026>.

¹¹⁸ Paul Manolo, “Discovery to Production Averages 15.7 Years for 127 Mines,” S&P Global Market Intelligence, June 2023, <https://www.spglobal.com/market-intelligence/en/news-insights/research/discovery-to-production-averages-15-7-years-for-127-mines>.

¹¹⁹ “Regulation - EU - 2024/1252 - EN - EUR-Lex,” Europa.eu, May 3, 2024, p.4 <https://eur-lex.europa.eu/eli/reg/2024/1252/oj>.

¹²⁰ “European Commission -Press Release Global Gateway: EU Signs Strategic Partnerships on Critical Raw Materials Value Chains with DRC and Zambia and Advances Cooperation with US and Other Key Partners to

Team Europe actors announced over €180 million in new investments to support major projects in various industries from energy, transport, to biodiversity and value chains.¹²¹ President Felix Tshisekedi appreciated the EU's assistance, and stated that the collaboration marked a new era for the DRC, hoping that the natural wealth will become a source of dignity and opportunity for all Congolese.¹²² In contrast, as Deberdt and Le Billon (2025) argue, such “techno-legal fixes” designed to balance the need for secure mineral supplies with socio-environmental protection, actually perpetuate harmful practices justified by low-carbon transitions rather than addressing structural asymmetries.¹²³ The Critical Raw Materials Act, the Just Transition Mechanism, and the European Green Deal come together to form a cohesive framework. Only within Europe's borders does it legitimize European extraction, safeguard European supply, and protect European workers. The promise of justice terminates beyond those boundaries. The JTM does not ask about the burdens which Congolese miners carry. The CRMA does not require binding security measures for communities or local refinement. Despite the rhetoric of sustainability and shared benefit, the strategic collaboration with the DRC sustains and perpetuates the extractive hierarchy. These points made are not implementation failures, they are stemming from the design of the system. It also presents a core paradox, which will be examined in Section 3.2.

Develop the ‘Lobito Corridor,’” October 2025, https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_23_5303/IP_23_5303_EN.pdf.

¹²¹ “EU and Democratic Republic of Congo Solidify Cooperation through Global Gateway Investments and Support for Regional Peace and Integration,” Global Gateway Forum, October 9, 2025, https://global-gateway-forum.ec.europa.eu/news/eu-and-democratic-republic-congo-solidify-cooperation-through-global-gateway-investments-and-support-2025-10-09_en.

¹²² “DRC Gets €180m from EU to Strengthen Ties,” The Extractor Magazine, October 24, 2025, <https://theextractormagazine.com/2025/10/24/drc-gets-e180m-from-eu-to-strengthen-ties/>.

¹²³ Raphael Deberdt and Philippe Le Billon, “Critical Mineral (In)Securities: Techno-Legal Fixes and the Reproduction of Socio-Environmental Abuses,” *Environment and Security*, November 6, 2025, p. 1 <https://doi.org/10.1177/27538796251383998>.

3.2 The Contradiction: The Intended "Good" Use of Cobalt Produces Disasters in Congo

This chapter's central paradox can be summarized as follows. Cobalt is a raw material which is crucial for the decarbonization of transportation, renewable energy storage, and batteries for electric vehicles in Europe. The same cobalt is extracted in the DRC through child labor, forced displacement, toxic exposure, and fatal mine collapses –these facts cannot be analyzed separately from each other. As Sovacool et al. (2020) documented in their extensive field study from the DRC, the study reveals concerning connections between decarbonization and ecological destruction, tensions and trade-offs between global climate policy and local justice concerns, and deterioration of community health in the region.¹²⁴ These characteristics constitute the silent requirements of the intended good. Europe's clean air and electrification, are conditioned on the same cobalt supply chain that, as Chapter 4 will demonstrate, is marked by child labour, displacement, toxic exposure, and disease.

This contradiction is exacerbated by the cobalt market's structure, which was designed to favor one partner over the other. The majority of the cobalt mining shares in the DRC are held by 47.15 % China and 47.77 % by Europe –the primary actors responsible for these shares are the CMOC Group from China as well as the Eurasian Resources Group(Luxembourg) and Glencore(Switzerland) as they operate major mines in Katanga.¹²⁵ However, although Europe controls production almost as much as China retains substantial control over the rest of the cobalt

¹²⁴ Sovacool et al., "The Decarbonisation Divide: Contextualizing Landscapes of Low-Carbon Exploitation and Toxicity in Africa," *Global Environmental Change* 60 (January 2020), p. 2
<https://doi.org/10.1016/j.gloenvcha.2019.102028>.

¹²⁵ Greitemeier et al., "China's Hold on the Lithium-Ion Battery Supply Chain: Prospects for Competitive Growth and Sovereign Control," *Journal of Power Sources Advances* 32 (February 17, 2025): 100173, p. 5-6
<https://doi.org/10.1016/j.powera.2025.100173>.

supply chain.¹²⁶ Nearly all raw cobalt extracted from both Chinese and European owned mines is transferred to China for refining meaning that European businesses are inadvertently maintaining China's hegemony in the refining industry. It should be stated that, while the relationship between EVs and renewable energy provides considerably higher energy security, the cobalt market poses a unique security challenge due to its limited and concentrated reserve and refining structure –for the EU and other dependent areas.¹²⁷ The value chain is divided into three parts: extraction in the Democratic Republic of the Congo (owned by both Chinese and European capital), refining in China, and consumption in Europe. The DRC remains to operate at the most dangerous and low-value end. The EU's response to tackle these inequalities and injustices only polishes the levels of suffering and exploitation. The MOU signed between the EU and the DRC does not alter the DRC's status as a raw ore exporter, nor does it require domestic refining or provide legally enforceable protections for Congolese communities, proving that the wealthiest nations are often the major appropriators of labor, resources, energy, and land, solely for their own benefit.¹²⁸

The evidence presented in this chapter suggests that the EU's green diplomacy does not facilitate a globally just transition to sustainability. Rather, it reproduces patterns of 'ecological unequal exchange in which the environmental and social burdens of decarbonisation are externalised to resource-producing regions'¹²⁹ in the Global South creating 'green sacrifice zones' – areas that are facing the severe negative consequences of the green transition.¹³⁰ The DRC's cobalt case is one

¹²⁶ Altiparmak et al., "Cornering the Market with Foreign Direct Investments: China's Cobalt Politics," *Renewable and Sustainable Energy Transition* 7 (April 5, 2025): 100113, p. 1 <https://doi.org/10.1016/j.rset.2025.100113>.

¹²⁷ Ivi, p. 7.

¹²⁸ Dorninger et al., "Global Patterns of Ecologically Unequal Exchange: Implications for Sustainability in the 21st Century," *Ecological Economics* 179, no. 179 (January 2021): 106824, p. 10 <https://doi.org/10.1016/j.ecolecon.2020.106824>.

¹²⁹ Ivi, p. 1.

¹³⁰ Gloria Pallares, "What Are Green Sacrifice Zones?," #ThinkLandscape, April 16, 2025, <https://thinklandscape.globallandscapesforum.org/72768/green-sacrifice-zones-the-places-ruined-by-the-energy-transition/>.

of the most obvious examples of this because the EU's promise of justice stops at its borders, meanwhile the Congolese cobalt is what makes it possible for Europe to decarbonize, but its people and lands are left behind.

The following chapters establish the empirical basis for this argument. Chapter 4 documents the human consequences of cobalt extraction, Chapter 5 examines the contractual and institutional mechanisms through which these asymmetrical relationships are maintained –revealing how contemporary resource governance can entrench forms of dependency despite the rhetoric of sustainable development and partnership.

4. China in the DRC: How the Sicomines Deal Locks the DRC into Structural Dependency

This chapter will explain the presence of Chinese companies in the Congolese copper/cobalt sector and their role in perpetuating the structural underdevelopment of the DRC. The DRC's periphery position in the global cobalt economy is reproduced by the agreement's rules and regulations, which include asymmetric ownership and fiscal exclusion, commodity concentration without value-chain integration, and debt accumulation with nearly no accountable infrastructure return. These interconnected mechanisms have deepened the DRC's structural dependency, and they are not historical outcomes; they are continuous, ongoing dynamics.

The Sicomines “minerals-for-infrastructure” agreement –Memorandum of Understanding– signed in 2007 by the Congolese government and a consortium of Chinese businesses is one of the most prominent instances of Chinese presence in Africa. As a result of the agreement, the DRC has become the second-largest recipient of Chinese investment in Africa, and one of China's most important trading partners within the continent.¹³¹ In order to understand why the Sicomines deal emerged, and how it has been crucial to explain the paradox in the DRC, it is necessary to analyze the deal within the context of post-war reconstruction challenges of the DRC and China’s growing global search for strategic minerals. Political ties between China and the Democratic Republic of the Congo date back to the DRC's early years of post-independence, when the DRC, then known as Zaïre, gained independence in 1960, China recognized the country and provided military

¹³¹ Panagiotis Skaltsounis, “The Sicomines Agreement: Strategic Partnership or Unequal Exchange between China and Democratic Republic of Congo?,” *African Studies Quarterly*. 23, no. 2 (September 8, 2025): p. 76, <https://doi.org/10.32473/asq.23.2.137935>.

assistance and development aid until the Second Congo War began in 1998.¹³² However, China only became a major actor in the DRC after the 2006 elections which marked the end of the transition period following the civil wars, where Joseph Kabila was elected as the President. Although the relations prior to 2006 still existed, from looking at the content of the bilateral relationship, we can say that it is mostly one-sided, consisting of aid that the DRC receives from China and some other small projects. Throughout the 1980s and 1990s, Western lenders and international financial institutions, particularly the IMF and World Bank, imposed structural adjustment plans that weakened state institutions and public infrastructure investment.¹³³ Kabila's ambitious Cinq Chantiers (Five Construction Sites) initiative, a crucial component of his post-war development policy, was introduced during his election campaign. Infrastructure, job creation, education, electricity and water, and health were the five pillars of his agenda. He began searching for the money to implement the plan after the election. President Kabila's government needed funding for reconstruction, but they had limited capacity to borrow money and no access to global credit markets. Simultaneously, China's industrial boom, followed by its green transition focused ambitions, boosted demand for copper and cobalt, minerals required for batteries, electronics, and electric vehicles. Therefore, The Sicomines Agreement marked a radical strengthening of China-Congo relations, and after 2007, China made a significant leap in the list of important foreign partners of the Congolese government.¹³⁴ Over the past two decades, relations between China and the DRC have strengthened significantly due these facts. While these resource backed loans seem

¹³² Johanna Malm, "African Perspectives Global Insights 'China-Powered' African Agency and Its Limits: The Case of the DRC 2007-2019 Policy Insights 96," 2020, p.4 <https://saiia.org.za/wp-content/uploads/2020/11/Policy-Insights-96-malm.pdf>.

¹³³ Solofo Rakotoscheno, "Sicomines: How the EITI in DRC Helped Secure 4 Billion in Additional Revenue," EITI, March 25, 2024, <https://eiti.org/blog-post/sicomines-how-eiti-drc-helped-secure-4-billion-additional-revenue>.

¹³⁴ Johanna Jansson, "The Sicomines Agreement: Change and Continuity in the Democratic Republic of Congo's International Relations" (South African Institute of International Affairs, 2011), p. 6, <https://doi.org/10.2307/resrep77050>.

to promise the best of both worlds -foreign investment and domestic infrastructure progress - the negative consequences of Chinese efforts to secure the cobalt might have outweighed the theoretical benefits of the agreement.¹³⁵ Despite the rhetoric of partnership and cooperation, the structure of the agreement gradually produced forms of dependency that resembled previous extractive relationships where the self-reinforcing logic of structural dependency is what makes the cycle harder to escape from. As it will be examined in the following, it is safe to categorize this deal as a case study of how 21st-century structural dependency functions through contracts, loans, ownership arrangements, and supply-chain hierarchies rather than by colonial conquest.

4.1 Sicomines, The Resource-for-Infrastructure Deal

Since the early 2000s, the Chinese government and China's state-owned enterprises (SOE) have invested significant effort in securing Africa's mineral resources. "Zou chu qu", which translates to "go out," was Beijing's 2001 Going Global Strategy, which encouraged businesses to expand their operations overseas in order to gain expertise and capture market share, especially in the energy sector where the demand is growing exponentially.¹³⁶ One of the methods Chinese has long used in their foreign policy is, giving infrastructure loans in exchange for raw materials and in exchange for raw material resourcing and refining, in our case, it is the copper-cobalt mining concessions. Brautigam notes that African governments viewed China's model appealing because it "combined infrastructure finance with access to natural resources in a package deal".¹³⁷

¹³⁵ Caroline Mallory, "The Paradox of the Green Energy Revolution: Does Chinese Cobalt Mining in the Democratic Republic of the Congo Undercut Benefits of Green Energy?," kb.osu.edu, May 1, 2023, <https://kb.osu.edu/items/7e9036cd-e708-4f34-9668-1e80de2fa321>.

¹³⁶ Johanna Jansson, "The Sicomines Agreement: Change and Continuity in the Democratic Republic of Congo's International Relations" (South African Institute of International Affairs, 2011), p. 7, <https://doi.org/10.2307/resrep77050>.

¹³⁷ Brautigam, Deborah. *The dragon's gift: the real story of China in Africa*. Oxford University Press, 2009. p. 147

On September 17, 2007, officials from the Democratic Republic of the Congo (DRC) and representatives from the Export-Import Bank of China (China Eximbank), China Railway Group Limited (CREC), and Sinohydro Corporation Ltd. signed a Memorandum of Understanding (MOU) that would become the DRC's largest-ever resource-for-infrastructure (RFI) deal. The Lualaba and Haut-Katanga regions' enormous copper and cobalt reserves were made available to the consortium. In return, the Chinese SOEs promised to invest \$9.5 billion in the DRC's mining and infrastructure sectors.¹³⁸ The MOU also led to the establishment of La Sino-Congolaise des Mines SARL (Sicomines SARL), a joint venture responsible for developing and operating the Sicomines copper-cobalt mine. The Congolese state-owned business (SOE) would possess 32% of the joint venture, while Chinese enterprises would own 68%¹³⁹. The Sicomines agreement, valued at USD \$9.5 billion but later reduced to \$3.2 billion in 2009 revision, following the pressures from IMF, –often referred to as the “contract of the century”– conducted between La Générale des Carrières des Mines (Gécamines), the DRC's state-owned mining company, and a consortium of Chinese state owned enterprises known as the China Enterprise Group. These enterprises include, China Railway Group Limited, China Sinohydro Corporation, China Metallurgical Group and Zhejiang Huayou Cobalt Company.¹⁴⁰ It is believed that the initiator of the agreement was the CREC's sole ambition to expand into resource extraction operations instead of a profitable deal for both parties, however, after the MOU was signed in 2007, the terms of the agreement were revised multiple times, aligned with a barter principle in order to include an infrastructure component in

¹³⁸Panagiotis Skaltsounis, “The Sicomines Agreement: Strategic Partnership or Unequal Exchange between China and Democratic Republic of Congo?,” *African Studies Quarterly*. 23, no. 2 (September 8, 2025): p. 81, <https://doi.org/10.32473/asq.23.2.137935>.

¹³⁹ Jacqueline Zimmerman, “Sicomines Copper-Cobalt Mine Chinese Financing for Transition Minerals February 2025,” January 2026, p. 2 https://docs.aiddata.org/reports/china-transition-minerals-2025/Sicomines_Copper_Cobalt_Mine_Chinese_Financing_for_Transition_Minerals.pdf.

¹⁴⁰ Antoine Roger Lokongo, “How Do the Congolese People Themselves View Chinese Investment in DRC?,” Pku.edu.cn, 2024, <https://caspu.pku.edu.cn/cn/gdhc/230857.html>.

the deal later confirmed to be of 3.2 billion USD worth infrastructure investment, was not mentioned in the documents initially.^{141,142} According to Johanna Malm's 2020 policy insight published by the South African Institute of International Affairs (SAIIA), "a Chinese package deal – the Sicomines agreement – allowed the Congolese regime to exercise 'China-powered' agency, playing China and the International Monetary Fund (IMF) off against each other."¹⁴³ During this period, the DRC successfully managed to acquire both a substantial Chinese infrastructure loan and benefit from debt relief under the Heavily Indebted Poor Countries (HIPC) initiative. This led the IMF and other big Western donors to pursue an alternative to the DRC's debt before losing political leverage to China.¹⁴⁴

On April 22, 2008 The Convention de Collaboration, an altered version of the 2007 deal was signed between the government of the DRC and on behalf of Sicomines, Sinohydro. In the new deal, the Sicomines consortiums' access to copper and cobalt reserves in the DRC were expanded. In addition, it was stated that the DRC government would be responsible for paying back Exim Bank if the consortium's profits were insufficient to cover the loans within 25 years.¹⁴⁵

In 2009, the Convention was again revised following an intervention from the IMF, the World Bank, and other DRC creditors who were concerned that the massive Chinese loans would make

¹⁴¹Johanna Jansson, "The Sicomines Agreement: Change and Continuity in the Democratic Republic of Congo's International Relations" (South African Institute of International Affairs, 2011), p. 10, <https://doi.org/10.2307/resrep77050>.

¹⁴²David Landry, "The Risks and Rewards of Resource-For- Infrastructure Deals: Lessons from the Congo's Sicomines Agreement," 2018, p. 9-10 <https://static1.squarespace.com/static/5652847de4b033f56d2bdc29/t/5bf342adf950b7e9e0dd988d/1542668974304/WP+16+-+Sicomines+-+David+G.+Landry.pdf>.

¹⁴³Johanna Malm, "African Perspectives Global Insights 'China-Powered' African Agency and Its Limits: The Case of the DRC 2007-2019 Policy Insights 96," 2020, p. 1 <https://saiia.org.za/wp-content/uploads/2020/11/Policy-Insights-96-malm.pdf>.

¹⁴⁴Ivi, p. 6.

¹⁴⁵ Andoni Maiza-Larrarte and Gloria Claudio-Quiroga, "The Impact of Sicomines on Development in the Democratic Republic of Congo," *International Affairs* 95, no. 2 (March 1, 2019): p. 424, <https://doi.org/10.1093/ia/iiz001>.

the DRC's public debt unmanageable and unsustainable. Under IMF pressure, the parties revised the deal to reduce the total value of Chinese loans to \$6 billion (\$3 billion was allocated to modernize the DRC's mining sector, and the remaining \$3 billion allocated for infrastructure development).¹⁴⁶ The Chinese partners were given mining access to cobalt and copper reserves in Kolwezi in the southeast DRC estimated value at around 93 billion dollars, for a total of \$3 billion dollars.¹⁴⁷ Moreover, the article transferring the responsibility of paying the loans to the DRC if the consortium's profits are insufficient, was also revised to Sicominex consortium would be the sole responsible for repaying the Chinese loans given to the mining industry in the event that profits proved insufficient, relieving the DRC government of any financial liability.

Table 1: Sicominex Agreement and Amendments

	Protocole d'Accord (2007)	Convention de Collaboration (2008)	Avenant No. 3 (2009)
Infrastructure Loan	USD 6.565 B	Not Mentioned	USD 3.0 B
Loan Terms	Not Mentioned	6-month LIBOR + 1%	6-month LIBOR + 1%
Mining Loan	Not Mentioned	Not Mentioned	Not Mentioned
Terms	Not Mentioned	70%: 6.1% 30%: 0% (shareholder loan)	70%: 6.1% 30%: 0% (shareholder loan)
Signing Bonus	Not Mentioned	USD 350 M	USD 350 M
Reserves	Cu: 8.05 M T Co: 202 K T Au: 372 t	Cu: 10.6 M Tons Co: 627 K Tons	Cu: 10.6 M Tons Co: 627 K Tons

¹⁴⁶ Panagiotis Skaltsounis, "The Sicominex Agreement: Strategic Partnership or Unequal Exchange between China and Democratic Republic of Congo?," *African Studies Quarterly*. 23, no. 2 (September 8, 2025): p. 82, <https://doi.org/10.32473/asq.23.2.137935>.

¹⁴⁷ Zeenat Hansrod, "Long Road for DRC as It Renegotiates Minerals Deal with China," RFI, August 12, 2023, <https://www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china>.

From a geopolitical standpoint, the agreement marked a shift in global power dynamics. China's development allowed the DRC and other African states to broaden their foreign partnerships beyond Europe and the United States. According to Jansson, Sicomines represented continuity as well as transformation in Congolese international relations— continuity because foreign powers continued to extract resources, transformation because China established a new development-finance model outside of the established Bretton Woods institutions.¹⁴⁹ The Extractive Industries Transparency Initiative (EITI), report notes that “the Sicomines project raised high hopes for the country.”¹⁵⁰ In a report from 2008, it was stated that that Chinese companies do not always uphold the highest standards, but again, many Western firms are no angels either; it was generally believed (or hoped) that a different approach from China might yield better results in the continent since the prior half a century of European and American aid have not succeeded in bringing much prosperity to Africa and other underdeveloped, poor but resource-rich places.¹⁵¹ In the following years, it was proved that this approach to the Chinese government and companies was mostly wishful thinking. Therefore, the Sicomines agreement can now be interpreted as a contemporary form of core-periphery economic integration from a standpoint of dependency theory. While being portrayed as "South-South cooperation," the Sicomines RFI models the exact pattern of reproduced familiar pattern as Amin(1979) argued: dependency relationships persist when peripheral economies remain specialized in the export of primary commodities while industrial and financial

¹⁴⁸ David Landry, “The Risks and Rewards of Resource-For- Infrastructure Deals: Lessons from the Congo’s Sicomines Agreement,” 2018, p. 9-10.

¹⁴⁹ Johanna Jansson, “The Sicomines Agreement: Change and Continuity in the Democratic Republic of Congo’s International Relations” (South African Institute of International Affairs, 2011), JSTOR, p. 5
<https://doi.org/10.2307/resrep77050>.

¹⁵⁰ Solofo Rakotoseheno, “Sicomines: How the EITI in DRC Helped Secure 4 Billion in Additional Revenue,” EITI, March 25, 2024, <https://eiti.org/blog-post/sicomines-how-eiti-drc-helped-secure-4-billion-additional-revenue>.

¹⁵¹ The Economist, “A Ravenous Dragon,” The Economist, March 15, 2008, <https://www.economist.com/special-report/2008/03/15/a-ravenous-dragon>.

control remains externalized.¹⁵² In this regard, The Sicomines agreement, alongside its wins for the DRC, reproduced this exact pattern where external actors dominate financing, ownership, processing and industrial value of the supply chains while the peripheral state exports raw materials at a low value. The sections that follow show how this structure performed in practice, how it resulted in the renegotiation of the initial agreement, and how the celebrated 2024 renegotiation reinforced the terms rather than dismantling them.

4.2 The Execution Gap (2009-2023)

Between the 2009 renegotiation (which reduced the infrastructure commitment from USD 6 billion to approximately USD 3 billion) and 2023, the implementation of the RFI deal revealed a clear gap between what was promised, and what was delivered. The empirical data presented in this section demonstrates how the structural elements mentioned above actually operated on the ground. In order to make a clear analysis and argument, the table below shows the commitments versus projected delivery.

In February 2023, the Inspection Générale des Finances (IGF), the Congolese state auditor, published a report stating twenty-six problems with the Sicomines deal. IGF reported that the consortium had spent only around US\$822 million on infrastructure projects in fifteen years of full-scale mining operations; meanwhile the promised amount was a total of US\$3 billion.¹⁵³ Furthermore, IGF estimated the value of mineral revenues around Kolwezi in the south-eastern

¹⁵² Samir Amin, “Unequal Development” (Monthly Review Press, 1976).

¹⁵³ “Chinese Companies Announce up to \$7 Billion Investment in DRC Infrastructure,” Voice of America-AFRICA, January 27, 2024, <https://www.voaafrica.com/a/chinese-companies-announce-up-to-7-billion-investment-in-drc-infrastructure-/7459900.html>.

DRC at around 93 billion dollars and demanded from Sicominex at least one billion dollars to be allocated to its Congolese partners in 2023, to settle the delays in infrastructure investments agreed in the contract.¹⁵⁴ This is how the foundations of 2024 renegotiation set.

It is true that Sicominex funded a number of urban projects as promised, including the Cinquantenaire Hospital, road maintenance in Kolwezi, and avenues in Kinshasa such as the Boulevard du 30 Juin and the Boulevard Triomphal; however, the total fundings fell significantly short of the initial promises, and a number of flagship items such as airport renovations, and hydroelectric dams were either never delivered or were flagged by the IGF for excessive costs.¹⁵⁵ For instance, Goma and Bukavu airports have never been renovated, the Kakobola and Katende hydroelectric dams were never built; additionally, only 536 kilometers of roads were constructed from the 3,656 kilometers that were promised.¹⁵⁶ The construction of the Bukavu stadium in Nyatende was allocated ten million dollars. According to the IGS report, the stadium, the building would actually cost \$3 million, which was supposed to be completed in 2019 is still under construction.¹⁵⁷ There are two aspects of this gap that are important for the argument of this thesis. First, because of the tax exemption, the Congolese treasury got practically no direct revenue during the initial years; while simultaneously witnessing the promised infrastructure being underdelivered; the Congolese did not receive roads as well as fiscal profits. Second, instead of providing social infrastructure and workforce projects that would diversify the economy away from raw extraction, the work delivered was concentrated primarily in the capital and only in a

¹⁵⁴ Zeenat Hansrod, “Long Road for DRC as It Renegotiates Minerals Deal with China,” RFI, August 12, 2023, <https://www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china>.

¹⁵⁵ Andoni Maiza-Larrarte and Gloria Claudio-Quiroga, “The Impact of Sicominex on Development in the Democratic Republic of Congo,” *International Affairs* 95, no. 2 (March 1, 2019):p. 9-10, <https://doi.org/10.1093/ia/iiz001>.

¹⁵⁶ Zeenat Hansrod, “Long Road for DRC as It Renegotiates Minerals Deal with China,” RFI, August 12, 2023, <https://www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china>.

¹⁵⁷ Ibid.

few flagship projects. Taken together, these aspects prove the execution gap was not a failure of implementation but the predictable outcome stemming from the agreement's design. As Andre Gunder Frank argued, the peripheral are neither "traditional" nor "pre-capitalist"; they are being actively underdeveloped as a result of the same mechanisms integrating them into global capitalism; this is the case for the DRC.

Table 2: What was promised and what is delivered

Commitment	Promised	Delivered (by 2022–23)	Status
Infrastructure spending	US\$3 billion (post-2009 cap)	≈ US\$822–888 million	< 30%
Road network	≈ 3,600 km	≈ 480–536 km (mostly Kinshasa avenues + Kolwezi roads)	≈ 15%
Hydroelectric dams (Katende, Kakobola)	2 dams	Not delivered by Sicominés	0%
Cinquantenaire Hospital, Kinshasa	≈ US\$100 million	Built; flagged for inflated costs by IGF	Disputed
Bukavu stadium	≈ US\$10 million	≈ US\$3 million spent, still under construction	Incomplete
Goma & Bukavu airports	Renovation	Not delivered	0%
Congolese workforce on projects	—	IGF demanded a 50% quota be imposed	Unmet

Author's contribution (Maiza-Larrarte and Claudio-Quiroga, 2019; Landry, 2018)

4.3 The 2024 Fifth Amendment: Better Terms, Same Structure

4.3.1 Better Terms

As discussed in previous sections, alongside infrastructural failures of the agreement, the financial and the ownership structure of it was also highly asymmetric, with Chinese companies financing infrastructure with loans secured by future mining revenue, tying Congolese development funds to continuous copper and cobalt extraction. The Export-Import Bank of China would provide the funds, while the consortium would use the profits derived from the extraction of natural resources to repay back the loans –meaning that the DRC's infrastructure development consequently becoming structurally dependent on foreign funding mechanisms and raw material exports. Landry(2018) argues that RFI agreements may become politicized due to their economic significance, which would weaken the host governments' willingness to properly monitor the quality of the delivered infrastructure projects¹⁵⁸, where the lack of monitoring resulted in the underdeliverance of the promises given by the Chinese in the DRC case. Furthermore, he adds that RFI agreements comprise important financial risks because of their structure and long time horizon; which may result in the exchange deal transforming into something that favors one party more than the other over time.¹⁵⁹

Therefore, in March 2024, as a result of the persistent pressures from both Congolese civil society and the IMF, the DRC government and the Chinese consortium signed the fifth amendment to the Sicomines agreement. The Sicomines agreement, signed under Joseph Kabila's presidency, had already raised concerns when it was first signed among civil society organisations and international

¹⁵⁸ David Landry, "The Risks and Rewards of Resource-For-Infrastructure Deals: Lessons from the Congo's Sicomines Agreement," *Resources Policy* 58 (October 2018): p. 166
<https://doi.org/10.1016/j.resourpol.2018.04.014>.

¹⁵⁹ Ivi, p. 167.

financial institutions such as the International Monetary Fund (IMF) due to its asymmetrical ownership structure and conditions that put the DRC in a limited position in the cobalt supply chain. Almost immediately after Felix Tshisekedi took over the presidency, he called the original contract unequal and decided to completely reassess the agreement. President Tshisekedi requested a report from Inspection Générale des Finances (IGF) to reveal the imbalances in initial agreement and said a previous minerals-for-infrastructure joint venture was poorly negotiated, and the mines were undervalued.¹⁶⁰ In 2022, the audit carried out by the IGF stated that over the 15 years, of the US\$3 billion dollars of infrastructure expected, barely US\$822 million have been spent by the Chinese –while exploiting mineral resources approximately worth US\$10 billion–, as well as mentioning irregularities in the execution of several projects, both in terms of costs and quality.¹⁶¹ In February 2023, the chairman of the IGF, Jules Alingete Key, stated that "the way this accord has been crafted is akin to an unacceptable economic colonization and reparations are therefore necessary".¹⁶² He further added that "the infrastructure works be undertaken equally by both Congolese and Chinese companies" and that Sicominex should reimburse its Congolese partners with a minimum of one billion dollars to compensate for the delays in infrastructure investments agreed upon in the contract"¹⁶³.

Under the revised deal, both parties agreed that China will invest up to \$7 billion in infrastructure projects in the DRC¹⁶⁴, an additional \$4 billion more from the figure that was agreed upon in the original agreement. Additionally, they have agreed that Chinese partners, like Sinohydro and

¹⁶⁰ "Chinese Firms Agree to Raise Investment in DRC Copper-Cobalt Mining Deal," South China Morning Post, February 4, 2024, <https://www.scmp.com/news/china/diplomacy/article/3250881/chinese-firms-agree-raise-investment-democratic-republic-congo-copper-cobalt-mining-deal>.

¹⁶¹ Ibid.

¹⁶² Ibid.

¹⁶³ Ibid.

¹⁶⁴ Emmet Livingstone, "Uncertainties Remain with Renegotiated Chinese Mining Deal in DRC," Voice of America, January 26, 2024.

China Railway Group, will pay the DRC 1.2% percent annual royalty; furthermore the Chinese side guaranteed an annual funding of USD 324 million for infrastructure which was celebrated among the DRC government. According to Congolese analyst Christian-Géraud Neema, this was a political win for Tshisekedi on its own terms.¹⁶⁵ The financial commitment was linked to a concrete deliverable, additional funds were promised, and an income stream was established. The "better terms" of this section's title are the improved figures, and they shouldn't be disregarded.

4.3.2. Same structure: why the architecture survived

Despite the improved figures, three most critical elements remained unchanged; and better figures were not matched by an improvement in process, and this was the first objection Congolese civil society raised. Emmanuel Umpula, the executive director of the African Natural Resources Watch, reported the whole renegotiation took place in secrecy, without informing the public of the terms of reference of the renegotiation, despite pressing transparency demands from NGOs and Congolese civil society.¹⁶⁶ When it comes to the critical aspects which perpetuate the dependency established in the original agreement, Firstly, the ownership ratio stayed the same as the initial agreement with 68 percent Chinese, 32 percent Gécamines despite Kinshasa openly sought to raise Gécamines' stake from 32 to 70 percent. **The DRC still has no controlling stake in its own mining concession. Secondly, the \$7 billion infrastructure commitment is not a grant ,this funding is conditioned on the fluctuations of copper prices in the global market. The DRC will not receive

¹⁶⁵ Jevans Nyabiage, "Chinese Firms Agree to Raise Investment in DRC Copper-Cobalt Mining Deal," South China Morning Post, February 4, 2024, <https://www.scmp.com/news/china/diplomacy/article/3250881/chinese-firms-agree-raise-investment-democratic-republic-congo-copper-cobalt-mining-deal>.

¹⁶⁶ Emmet Livingstone, "Uncertainties Remain with Renegotiated Chinese Mining Deal in DRC," Voice of America, January 26, 2024, <https://www.voanews.com/a/uncertainties-remain-with-renegotiated-chinese-mining-deal-in-drc-/7458908.html>.

the funds if copper prices drop below US\$5,200 per ton¹⁶⁷—however, although conditioned, the Congolese government presented this as a major achievement which guarantees an annual funding of USD 324 million for infrastructure as mentioned above. In other words, the DRC still uses the earnings from its own ore to pay for its own roads, meanwhile the consortium receives the majority of the venture's value: the fiscal exclusion continues since the tax exemption until full repayment was not eliminated.¹⁶⁸

Third, despite the small annual payment promise at 1.2%, the profit-sharing system is still absent. If Sicominex earns more profits than projected— as it did in 2021–2022 when cobalt exceeded \$80,000 per tonne — the DRC enjoys almost none of this excess profits.

The dependency logic, inherited from past experiences, is most evident in the copper price conditionality.¹⁶⁹ In dependency theory terms, the 2024 amendment does not alter the core-periphery articulation. It renegotiates the terms of exploitation without changing the fact of exploitation. The DRC still exports raw minerals. It still lacks domestic refining capacity. It still has no equity control. And it still accumulates debt that can only be repaid by extracting more cobalt, faster, and with less regard for human and environmental costs. The 2024 renegotiation, then, is best read not as a break with the dependency model but as its recalibration. The DRC won better terms within the structure precisely because it could not alter the structure itself. That is the signature move of contemporary dependency: the periphery is permitted to bargain over the price while the architecture of subordination is held constant.

¹⁶⁷ “The Sicominex Contract: A Controversial Renegotiation and Persistent Imbalances,” Resourcemat.org, May 2024, <https://www.resourcemat.org/en/ressources/the-sicomines-contract-a-controversial-renegotiation-and-persistent-imbbalances/>.

¹⁶⁸ “The Sicominex Contract: A Controversial Renegotiation and Persistent Imbalances,” Resourcemat.org, May 2024, <https://www.resourcemat.org/en/ressources/the-sicomines-contract-a-controversial-renegotiation-and-persistent-imbbalances/>.

¹⁶⁹ Zeenat Hansrod, “Long Road for DRC as It Renegotiates Minerals Deal with China,” RFI, August 12, 2023, <https://www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china>.

The Sicomines case illustrates how the DRC's macroeconomic dependency is reproduced through asymmetric ownership, fiscal exclusion, and debt-conditioned infrastructure. Dependency, however, is not experienced only in finances. In sum, asymmetric ownership, fiscal exclusion, debt-conditioned infrastructure, and a renegotiation that improved figures while preserving the underlying design, proves how the Sicomines contract reproduces the DRC's structural dependency. There are repercussions to this contractual architecture that holds the DRC at the point of extraction, and both the land itself and Congolese bodies are subject to these consequences. After addressing the macro-structural half of the thesis's central question, the paper now moves on to the micro-empirical half. The following chapter examines how this macroeconomic dependency translates into local human suffering, which is the second half of this thesis's central question.

5. The Impact of Cobalt Mining on Congo and the Congolese People

Climate change is one of the biggest human rights issues of our time, and car emissions are suffocating cities. Yes, the shift to electric vehicles will improve air quality immensely and reduce carbon emissions that have pushed our planet to breaking point. Yes, the most crucial element in this shift is cobalt. But helping rich countries hit their environmental targets comes at a cost to the people who mine this crucial element.¹⁷⁰

The key issue for the dependency argument is not simply the fact that the DRC produces and hosts the majority of the cobalt and cobalt reserves, the problem here is that although having an ownership of the resources, the DRC government acts as the subordinate component of the cobalt supply chain and taking commands from external actors regarding its domestic and developmental matters. Because cobalt in Katanga is a by-product of copper, production decisions are based on copper economics rather than cobalt fundamentals which consequently takes away the pricing power of the DRC from its cobalt. This level of concentration of high quality raw materials and the foreign control over it, has been the main reasons why this region and its people have been continuously suffering, being exploited, and left behind.

It is pointless to define this cost as accidental because it is, in fact, well-designed. In Achille Mbembe's terms, this cost is a political decision regarding whose life is expendable.¹⁷¹ Necropolitics, the sovereign power to decide who may live and who is left to die, does not require a hot war. It operates quietly and as lethally through the architecture of supply chains: by China's

¹⁷⁰ Mark Dummett, "The Dark Side of Electric Cars: Exploitative Labor Practices," TIME (Time, September 28, 2017), https://time.com/4939738/electric-cars-human-rights-congo/?utm_source=.

¹⁷¹ Achille Mbembé, "Necropolitics," *Public Culture* 15, no. 1 (March 25, 2003) p. 12.

monopolistic control over the Katanga Copperbelt's mines and refineries as well as by the European Union's Critical Raw Materials Act, which puts supply security for the consumers who can financially afford transitioning to green technologies, ahead of value capture for the country extracting the mineral by leaving Congolese communities without binding protection from all the horrors of the artisanal mining sites. As previous chapters demonstrated; these two factors (*or actors*) trap the DRC as the raw ore exporter which is the most dangerous, and the most poorly compensated position in the cobalt supply chain. This chapter discusses the consequences of the DRC's position in the supply chain: child labor, communities displaced to clear open-pit mines, birth defects passed from miners to their children, respiratory illness across generations. This suffering listed is not an indication of a failure of the green transition. It is the green transition working as designed — a death-world, in which people are kept alive only long enough to keep extraction going.

5.1 Katanga Copperbelt & The Artisanal Mining Sector

Understanding the geological uniqueness of the Katanga Copperbelt is key to explain the significance of this region, as The Katanga Copperbelt, now known as Central African Copperbelt, did not become a pillar of the Congolese economy, a strategic battlefield for the economically stronger countries, and the capital of one of the most severe humanitarian crises of the 21st century overnight. The Katanga Copperbelt, also known as The Central African Copperbelt, stretching from the southeastern region of the Democratic Republic of the Congo (DRC) and into northern Zambia, represents one of the world's most significant mineral-bearing geological formations. This arc-shaped sedimentary basin has extraordinary quantities of copper, cobalt, and other crucial

minerals that were formed in the span of hundreds of millions of years. Within DRC, this belt runs through approximately 250 kilometers between the cities, formerly known as, of Lubumbashi and Kolwezi of the former Katanga province which are now, administratively divided into Haut-Katanga and Lualaba, contains one of the world's richest copper-cobalt deposits. Furthermore, the Central African Copperbelt possesses sediment-hosted stratiform copper-cobalt ores with grades that dwarf the lateritic and magmatic deposits mined elsewhere, making Congolese cobalt substantially cheaper to mine, which automatically translates as another major reason behind the DRC's dominance in the industry.¹⁷² According to the US Geological Survey's Mineral Commodity Summaries 2026, the DRC produced over 230,000 metric tons of cobalt in 2025, which is roughly 80% of the world's total of 310,000 tons¹⁷³, indicating that it is more than just another mining region.¹⁷⁴ In terms of production and reserves, only Indonesia is comparable to Congolese cobalt. According to Benchmark Mineral Intelligence, Indonesia became the second-largest producer of cobalt in 2024, contributing about 30% in global cobalt supply, up from 23% in 2023; however, overall quantities are still much lower than those of the DRC.¹⁷⁵ To put that into perspective, in 2024, the DRC produced 244 kilotonnes of cobalt which accounts for more than 75% of all the cobalt that was extracted globally.¹⁷⁶

Katanga is unique not just because of the quantity of cobalt but also because of its quality. The majority of mines throughout the world extract ore that contains between 0.5% and 1% copper whereas Katangan ores exceed the copper content of 5%, which makes these ores five to ten times

¹⁷² Development Bank, "Critical Mineral Insights - Cobalt," African Development Bank Group, October 16, 2025, p. 4 <https://www.afdb.org/en/documents/critical-mineral-insights-cobalt>.

¹⁷³ U.S. Geological Survey, "Cobalt," in Mineral Commodity Summaries 2026 (Reston, VA: USGS, February 2026), p. 56–57.

¹⁷⁴ "Cobalt Market Report 2024," *The Cobalt Institute* (Benchmark Mineral Intelligence, 2025), p. 33 <https://www.cobaltinstitute.org/wp-content/uploads/2025/05/Cobalt-Market-Report-2024.pdf>.

¹⁷⁵ Ibid.

¹⁷⁶ U.S. Geological Survey, "Mineral Commodity Summaries 2024," January 1, 2024, <https://doi.org/10.3133/mcs2024>.

richer than the global average.¹⁷⁷ Tenke-Fungurume, Kolwezi, Konkola-Chililabombwe, Nchanga, Nkana, and Mufulira are some of the richest mines, each containing equal or more than 10 Million tons of copper. The Tenke Fungurume copper-cobalt deposits, situated on the northern end of the Central African Copper Belt (CACB), which stretches from Luanshya in Zambia to Kolwezi in the Democratic Republic of the Congo; has the highest-grade sediment-hosted stratiform copper deposits in the world.¹⁷⁸ Aside from where it is extracted, in what conditions, on what scale, and by whom cobalt is mined are the main questions this chapter will try to answer.

The significance of industrial or large-scale mining (LSM), which dominates the mineral extraction across the Katanga Copperbelt, must be briefly discussed before moving on to artisanal and small-scale mining (ASM). Industrial mining operations are the primary source of cobalt mined worldwide, including in the DRC. Usually run by big or multinational corporations, these operations are highly mechanized, capital-intensive, and have high production rates.¹⁷⁹ This industrial sector is primarily dominated by foreign capital, mostly from China and small numbers of Western commodities, such as Swiss-based Glencore and Trafigura, and Canadian-led Ivanhoe Mines, account for the majority of the DRC's industrial cobalt output, and their expansion is accelerating. To put the Chinese dominance in perspective, fifteen of the nineteen industrial cobalt-producing mines in the DRC are owned or financed by Chinese state-owned companies mentioned previously.¹⁸⁰ The largest operator in the region is the CMOC Group (formerly China

¹⁷⁷ Pascal Mambwe et al., “Geometallurgy of Cobalt Black Ores in the Katanga Copperbelt (Ruashi Cu-Co Deposit): A New Proposal for Enhancing Cobalt Recovery,” *Minerals* 12, no. 3 (February 26, 2022): 1–22, <https://doi.org/10.3390/min12030295>.

¹⁷⁸ NS Energy, “Tenke Fungurume Copper-Cobalt Mine - NS Energy,” NS Energy, 2021, <https://www.nsenerybusiness.com/projects/tenke-fungurume-copper-cobalt-mine/?cf-view>.

¹⁷⁹ “Industrial Mining - Cobalt Institute,” Cobalt Institute, February 19, 2025, <https://www.cobaltinstitute.org/responsible-sustainable-cobalt/responsible-sourcing/industrial-mining/>.

¹⁸⁰ “Why Cobalt Mining in the DRC Needs Urgent Attention | Council on Foreign Relations,” Cfr.org, October 29, 2020, <https://www.cfr.org/articles/why-cobalt-mining-drc-needs-urgent-attention>; Gracelin Baskaran and Meredith Schwartz, “Stabilizing Cobalt Markets: A Price Floor for U.S. Minerals Security,” Csis.org, 2025, <https://www.csis.org/analysis/stabilizing-cobalt-markets-price-floor-us-minerals-security>.

Molybdenum), who owns the two major mining companies, the Kisanfu mine (KFM) and Tenke Fungurume Mining (TFM) in the heart of Kolwezi, — which is owned 80% by CMOC and 20% by the Congolese state company Gecamines — produced approximately 115,000 tonnes of cobalt in 2024, which is 31% higher than CMOC's announced capacity.¹⁸¹ On one hand, these industrial operations provide nearly eighty percent of the country's total cobalt output and they have significant importance to the everyday economy in the DRC – despite the structural dependency they created for the Congolese as explained more in detail in Chapter 4. On the other hand, LSMs put considerable amounts of pressure and strain on local ecosystems, biodiversity, formalization frameworks regarding the state and future of their operations, and simply fuels the concerns over the sustainability of resource-intensive development and transition pathways. According to the Amnesty International report published in 2023, with the opening of an enormous open-pit copper and cobalt mine was in Kolwezi in 2015 and in order to make room for its expansion, long-standing communities have been systematically destroyed, bulldozed; residents have been forcibly evicted, harassed, and tricked into taking inadequate compensation for their losses while left with not much but to adequate grievance mechanism, no accountability, and no access to justice.¹⁸² In addition, the residents of Kolwezi are facing a new displacement caused by the flagship EU and US-backed projects, where countries invested billions in financing the projects links to the corridor as they see the investments as a way of increasing the Western markets' access to the DRC's critical

¹⁸¹ Cobalt Market Report 2024,” *The Cobalt Institute* (Benchmark Mineral Intelligence, 2025), p. 33
<https://www.cobaltinstitute.org/wp-content/uploads/2025/05/Cobalt-Market-Report-2024.pdf>

¹⁸² “Powering Change or Business as Usual? Forced Evictions at Industrial Cobalt and Copper Mines in the Democratic Republic of the Congo,” September 12, 2023, p. 38
https://www.amnesty.nl/content/uploads/2023/09/EMBARGOED_EN-version-Powering-Change-or-Business-as-Usual.pdf?x90844.

minerals.¹⁸³ Lobito Corridor railway project,¹⁸⁴ leaving vulnerable communities open to abuse once again. Both LSM expansion and infrastructural development follow a similar pattern where communities suffer from the displacement caused by green transition's logistics while simultaneously being alienated from the economic benefits.

Despite the predominance of industrial mining (LSM), large-scale and artisanal mining are deeply interconnected; as the demand for cobalt in recent years increased substantially, the pressure to meet this demand has facilitated the integration of wageless artisanal cobalt miners into the corporate chain through the formalization of the informal mines.¹⁸⁵ Through outsourcing work through corporate-driven formalization initiatives, these industrial giants often integrate artisanal workers into wageless, flexible labor regimes that reflect the volatility of the informal sector rather than mitigating it.¹⁸⁶ It has also become harder to distinguish between the formal and informal mining economy and international firms who operate in larger scales that refine, sell and distribute cobalt have been trying to understand how cobalt from artisanal mining has entered their supply chains.¹⁸⁷

Artisanal and small-scale mining (ASM) is a term that refers to a range of mining activities that employ basic tools for extraction and processing that require high labor intensity; focused on near-surface deposits that can be accessed without substantial capital investment or mechanization.¹⁸⁸

¹⁸³ "Lobito Corridor: Displacement Threat for Thousands in DRC," Global Witness, December 4, 2025

¹⁸⁴ The 1,739km Lobito Atlantic Railway connects Kolwezi in the Democratic Republic of the Congo to the Port of Lobito in Angola, unlocking the fastest, most reliable and secure import and export trade route from the DRC Copperbelt to Africa's west coast. <https://www.lobitoatlantic.com/>.

¹⁸⁵ Filipe Calvão and Matthew Archer, "Digital Extraction: Blockchain Traceability in Mineral Supply Chains," *Political Geography* 87, no. 1 (May 2021): 102381, p. 5 <https://doi.org/10.1016/j.polgeo.2021.102381>.

¹⁸⁶ Laura M Pereira et al., "Equity and Justice Should Underpin the Discourse on Tipping Points," *Earth System Dynamics* 15, no. 2 (April 5, 2024), p. 347.

¹⁸⁷ Aphra Murray, "Cobalt Mining: The Dark Side of the Renewable Energy Transition," Earth.Org, September 27, 2022, <https://earth.org/cobalt-mining/>.

¹⁸⁸ Rachel Perks et al., "Achieving Sustainable and Inclusive Artisanal and Small-Scale Mining (ASM): A Renewed Framework for World Bank Engagement," September 20, 2024, p. 16.

ASM is defined based on a number of factors, including the kind of equipment used, the degree of formality, the depth of the operation, the size of the surface area, and the volumes produced. The majority of ASM, due to lack of effective regulation, occurs informally; or illegally and illicitly in cases of operating in protected environmental areas such as national parks or preserved ecosystems, and when supporting armed groups, respectively.¹⁸⁹

Figure 8: Artisanal mining site near Kolwezi



Artisanal miners working at the Shabara artisanal mine near Kolwezi, the DRC (Al Jazeera, 2022).

Although it is important to acknowledge the data on the Artisanal Mining sector is very limited, it is evident that ASM contributes significantly to the global production of several commodities that

¹⁸⁹ Ibid.

are listed as "critical minerals".¹⁹⁰ As they hand-dig up about 15-30% of Congo's cobalt,¹⁹¹ artisanal miners are critical to global supply chains. The artisanal and small-scale mining industry operates as a decentralized, labor-intensive solution to persistent rural poverty and a lack of viable economic alternatives, contrary to the mechanical efficiency of large-scale enterprises.¹⁹² In extremely dangerous conditions, artisanal miners, locally referred to as "creusers" in the Katanga Copperbelt, extract minerals using primitive and physically demanding techniques, often employing only pickaxes and shovels. With no ventilation, reinforcement, or protective gear, the artisanal miner descends into underground tunnels where collapse and respiratory failure are expected accidents. In fact, deaths are rarely registered as a death toll in this region since, in most cases, bodies remain buried with the tunnels that produce them – this absence of accounting cannot be identified as a gap in the data; it is a structural consequence of how labour is governed.

¹⁹⁰"Artisanal and Small-Scale Mining of Critical Minerals," December 2024, p. 1

<https://www.iisd.org/system/files/2024-12/artisanal-small-scale-mining-critical-minerals.pdf>.

¹⁹¹ It is often difficult to obtain accurate numbers for the share of ASM in the case of cobalt production, but the proportion of "artisanally" mined cobalt has been estimated at 15 to 20 % of the total cobalt mined in the DRC.

¹⁹²James Boafo and Francis Arthur-Holmes, "Sustainability Transition Paradox: Emerging Dimensions of Illegal Artisanal and Small-Scale Mining of Critical Minerals in Africa," *Resources Policy* 108 (July 14, 2025): p. 4 105673, <https://doi.org/10.1016/j.resourpol.2025.105673>.

Figure 9: Artisanal miners in dangerous tunnels



Artisanal miners peer up from the hand-dug shaft that poses a risk of collapse(Dorothee Baumann-Pauly,2022)

Here, necropolitics functions through a more dispersed arrangement than through simply the sovereign's permission to kill, in which states, corporations, and global supply chains collectively control populations by exposing them to death while refusing to provide the conditions under which life might be secured. Mbembe's reinterpretation of sovereignty as “the power and the capacity to decide who may live and who must die”¹⁹³ describes precisely a regime in which power operates not by administering and optimizing life but by distributing exposure to death –deciding who may be the subject of the death-worlds where life is subordinated to its own attrition.¹⁹⁴ The supply chain's design and the state's absence put the artisanal miners in a position where their

¹⁹³ Achille Mbembe, “Necropolitics,” *Public Culture* 15, no. 1 (2003) p. 11.

¹⁹⁴ Ivi, p. 40.

premature mortality is the expected outcome of extraction. In addition to using force, necropolitical power operates by letting die (abandoning) the populations whose labor is economically vital but whose lives are seen as disposable. The distribution of this expendability is not random. According to Gilmore, what is produced and exploited is a "group-differentiated vulnerability to premature death"¹⁹⁵ organized along the racialized geography of global extraction, is in the simplest forms can be explained as the following: the decarbonization promised to the Global North is powered by the lethal labour of the Congolese bodies in the Katanga Copperbelt. Despite promises given made by companies to increase transparency concerning their cobalt sources and refineries, as well as pledges to buy solely from other countries¹⁹⁶ to slow down the ASM business and their destructive effects, barely nothing has changed in the DRC regarding the mining conditions. The main reason why there has been little change is the powerful economic benefits of artisanal mining. In a report from 2022 estimated that "140,000-200,000 people work as artisanal miners in the DRC and most earn less than US\$10 per day which is, in fact, significantly higher than the majority of the country's earners, who make an estimated US\$1.90 per day".¹⁹⁷ Kara explained the economic situation in his pioneering book on the DRC: "At no point in their history have the Congolese people benefited in any meaningful way from the monetization of their country's resources. Rather, they have often served as a slave labor force for the extraction of those resources at minimum cost and maximum suffering."¹⁹⁸

¹⁹⁵ Ruth Wilson Gilmore, "Golden Gulag: Prisons, Surplus, Crisis, and Opposition in Globalizing California" (University of California Press, 2007), p. 28 <https://cominsitu.wordpress.com/wp-content/uploads/2018/08/gilmore-ruth-wilson-golden-gulag-2007.pdf>; TáíwòOlúfẹ̀mí O, "A Unified Story for a Divided World," Dissent Magazine, August 2, 2021, <https://dissentmagazine.org/article/a-unified-story-for-a-divided-world/>.

¹⁹⁶ Aphra Murray, "Cobalt Mining: The Dark Side of the Renewable Energy Transition," Earth.Org, September 27, 2022, <https://earth.org/cobalt-mining/>.

¹⁹⁷ Ibid.

¹⁹⁸ Siddharth Kara, *Cobalt Red* (St. Martin's Griffin, 2024), p. 5.

Despite the country's Mining Code — last revised in 2018, which supposedly regulates all mining-related operations, including prospecting, exploration, exploitation, treatment, transportation, and sale of the minerals in the DRC — imposing age and geographical limitations for ASM, as well as requiring miners to obtain an artisanal miner card to be able to do increase the control mechanisms in the industry, human rights violations, including child labor, grave health and safety hazards, and fatal accidents, have been continuously reported in numerous artisanal mines across the country.¹⁹⁹ Thus, the promise of a "just transition" for the DRC appears as a distant abstraction with the contemporary supply chain dynamics that has been dominating the mining sector.²⁰⁰ The very same structure that denies the DRC's pricing power and legally binding protection not only exacerbates poverty, but it also distributes bodily harm which is rarely sudden. It builds up slowly in the lungs, the blood, and in the bodies of children who never chose, were never asked, to mine. The next section investigates three different kinds of that harm and argues that each one stems from the structural underdevelopment described previously.

5.2 Child Labour, Health Impacts, and Birth Defects and

5.2.1 Child Labour

"I am still a child. This job doesn't deserve me. I'd like us all to be able to study and put an end to these mining stories. I regret the time I spent in the mines. I missed out on a lot of subjects. Because

¹⁹⁹ Dorothee Baumann-Pauly and Serra Cremer, "How New Business Models Can Address Human Rights Risks in the Cobalt Supply Chain," (Rochester, NY, September 3, 2019), p. 3 https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3679885.

²⁰⁰ Cornelia Wörmann, "Global Energy Justice: The Case of Cobalt – Afrikastudien," Der Blog des Instituts für Afrikanstudien, February 17, 2022, <https://home.uni-leipzig.de/~afrikastudien/2022/02/17/global-energy-justice-the-case-of-cobalt/>.

my friends were going to school, and I was working. Those who were at the same level as me when I started mining completely passed me by. That's what I regret". ²⁰¹

These words belong to Faustin, an 11 year-old Congolese child, who worked in a cobalt mine in southwestern DRC with his mother after his father died in 2019, leaving the family with no income or means to pay his school fees. As mentioned consistently in the earlier chapters, more than half of the world's cobalt mine production comes from the Katanga Copperbelt in the DRC with a substantial proportion (estimated at 15-20%) being extracted by artisanal miners. There are tens of thousands of children who work in mines in inhumane conditions, risking their lives everyday to meet the growing demand for the mineral that powers LIBs, a vital portion of the green transition. Although there are many figures in circulation, there is no reliable data of how many children mine cobalt in the DRC, and this absence is itself revealing. These children are systematically forced to abandon school and work in hazardous conditions due to poverty and hunger just like their elders; where they face deadly landslides, severe injuries or get killed as a consequence of mine collapses and a lack of safety measures—in a country where an estimated 25.4 million people, people which accounts for the one fourth of the total population, facing crisis levels of hunger or worse.²⁰² According to a UNICEF report released in 2014, over 200,000 illegal miners worked in mines in the DRC, of whom over 40,000 were children, reports indicating that some are as young as 7 years old, where they make a maximum of \$2.50 a day after working twelve-hour hours, much less than

²⁰¹ "Catch-up Clubs Help Stop Child Labor in DRC's Deadly Cobalt Mines," Save the Children, 2024, <https://www.savethechildren.org/us/about-us/media-and-news/2024-press-releases/catch-clubs-help-stop-child-labor-drcs-deadly-cobalt>.

²⁰² Ibid.

what adults make.²⁰³ Countless artisanal miners, including children, are buried alive each year in éboulements (tunnel collapses) and glissements de terrain (landslides, or pit wall collapses).²⁰⁴ According to the Global Trace research from 2025,” approximately 35,000 children were reported to work as washers, sorters, or diggers in artisanal mines out of a total of nearly 255,000 artisanal miners”.²⁰⁵ In 2024, the DRC had almost 7 million internally displaced people where the displacement emerged mostly due to conflict in the east in which children were left increasingly vulnerable to recruitment by armed groups, forced labor in artisanal mining, and child sex trafficking.²⁰⁶ The trafficking of children for work in mines is another harsh reality of the DRC. Children are kidnapped and trafficked and sometimes transported from miles away to work in the cobalt mines by militias, to fund their own paramilitary activities and groups.²⁰⁷ In 2024, labor and criminal law enforcement agencies in the Democratic Republic of the Congo took actions to address child labor. However, these entities lacked resources and capacity to fully carry out their mandates, and the government failed to collect data on both its labor and criminal enforcement actions.²⁰⁸

²⁰³ Jonta Kamara and Stephanie Bumba, “Protecting Miners’ Health in Democratic Republic of Congo | Think Global Health,” Think Global Health, February 10, 2025, <https://www.thinkglobalhealth.org/article/protecting-miners-health-democratic-republic-congo>.

²⁰⁴ Siddharth Kara, “Blood Batteries the Human Rights and Environmental Impacts of Cobalt Mining in the Democratic Republic of the Congo,” 2025, p. 11

²⁰⁵ Jonta Kamara and Stephanie Bumba, “Protecting Miners’ Health in Democratic Republic of Congo | Think Global Health,” Think Global Health, February 10, 2025.

²⁰⁶ Bureau of International Labor Affairs, “Findings on the Worst Forms of Child Labor - Democratic Republic of the Congo | U.S. Department of Labor,” U.S. Department of Labor, 2023, <https://www.dol.gov/agencies/ilab/resources/reports/child-labor/congo-democratic-republic-drc>.

²⁰⁷ Or Salama, “The Current State of Child Labour in Cobalt Mines in the Democratic Republic of the Congo - Humanium,” Humanium, May 27, 2025, <https://www.humanium.org/en/the-current-state-of-child-labour-in-cobalt-mines-in-the-democratic-republic-of-the-congo/>.

²⁰⁸ Bureau of International Labor Affairs, “Findings on the Worst Forms of Child Labor - Democratic Republic of the Congo | U.S. Department of Labor,” U.S. Department of Labor, 2023

Figure 10: Child labor in artisanal mining site



The University of Nottingham Rights Lab's Blood Batteries report, which was released in August 2025 under the supervision of Siddharth Kara, is the most methodologically rigorous research currently available. According to a survey with 1431 artisanal and small-scale miners in total in Lualaba (895 people) and Haut-Katanga(536 people) provinces, which together accounted for 76% of global cobalt output in 2024, 9.2% of these workers are children who are forced to work to support their households, 27.7 % of respondents started mining while still underage,²⁰⁹ meaning that children who enter the sector often age into forced labour as adults. Furthermore, 87.8% of respondents began working as artisanal miners due to the lack of any alternative means of

²⁰⁹ Siddharth Kara, "Blood Batteries the Human Rights and Environmental Impacts of Cobalt Mining in the Democratic Republic of the Congo," 2025, p. 10.

survival.²¹⁰ This astonishing percentage highlights the systemic dependency established by various domestic and external actors. The PABEA-Cobalt initiative²¹¹, funded by the African Development Bank and carried out with ILO support, has reported a major achievement in January 2026. "A total of 13,587 children removed from cobalt mines and successfully reintegrated into the school system; these children are now back in school, with school fees, healthcare, and civil registration fully covered. The cobalt supply chain has been cleaned up, and child labor is on the path to elimination." said Lontulungu, the Deputy Technical Secretary of the National Human Rights Commission (CNDH).²¹² However, the same initiative recorded more than 16,800 child workers in its initial identification phase as early as 2022, indicating that nearly three years of effort had not even reached all documented cases.

As argued in 4.1 regarding unreported/unrecorded deaths, the gap between the estimated and documented in the DRC is more than a measurement error that can be corrected with improved surveys; instead, it represents a structural feature of labour governance, where children are integrated into supply chains through their invisibility within them, to them. Moreover, why families send children into work is a question that must be asked when analyzing child labor; the answer is within the structural factors described previously— poverty.

The Congolese state is to a certain level, present in attempts to better conditions of the mines, mainly in a formal role rather than pursuing better conditions for its people. The Mining Code, which was last revised in 2018 sets a minimum age and requires artisanal miners to hold a miner's

²¹⁰ Ibid.

²¹¹ Funded with \$82 million, the Project to Support the Alternative Welfare of Children and Young People in the Cobalt Supply Chain (PABEA-COBALT) is helping to lift children and youth out of hazardous work and into education and vocational training. <https://www.afdb.org/en/success-stories/democratic-republic-congo-young-people-chart-future-far-cobalt-mines-87880>.

²¹² Constance, "DRC Reports Decline in Child Labor in Cobalt Mines amid Controversy - Copperbelt Katanga Mining," Copperbelt Katanga Mining, January 4, 2025, <https://copperbeltkatangamining.com/drc-reports-decline-in-child-labor-in-cobalt-mines-amid-controversy/>.

card and further requires the mining licence holders to contribute to projects which aim to promote socio-economic and industrial development within affected communities²¹³. However, when regulations are not enforced properly, they serve more as a record of compliance rather than being a means of protection. Interventions that focus on the symptom rather than the structure have the potential to exacerbate the problem. Banning ASMs may seem like an option but at the same time, it is a critical income source for Congolese, without replacing it, could push households into more severe poverty and exacerbate child labour further underground rather than ending it. The implication reinforces the argument above –child labour cannot be addressed in isolation from the underdevelopment that produces the poverty sustaining it.

5.2.2 Health Impacts

Cobalt mining in the DRC presents severe physical and toxicological health risks to artisanal miners and their communities. The primary and most visible source of the safety risk is the manual digging of narrow and deep, poorly ventilated shafts which lead to severe injuries, fatal accidents where miners are buried alive by these collapsing tunnels.²¹⁴ Miners suffer from easily avoidable injuries to their bodies, hands, and feet because they often lack basic protective equipment as basic as boots and gloves.²¹⁵ Moreover, there is a less visible but more severe harm in cobalt extraction. The harm discussed here does not manifest itself through collapses or physical immediate injuries; instead, this harm accumulates in the blood, cells, and lungs, usually years after exposure and even

²¹³ “The Democratic Republic of Congo’s Revised Mining Code | Herbert Smith Freehills Kramer Global Law Firm,” Herbert Smith Freehills Kramer | Global law firm, April 25, 2026, <https://www.hsfkramer.com/insights/2018-04/the-democratic-republic-of-congos-revised-mining-code>.

²¹⁴ Dorothee Baumann-Pauly, “Cobalt Mining in the Democratic Republic of the Congo: Addressing Root Causes of Human Rights Abuses Center for Business and Human Rights, p. 7 https://bhr.stern.nyu.edu/wp-content/uploads/2023/02/NYUCBHRCobaltMining_FINALFeb7.pdf.

²¹⁵ Ivi, p. 10

in individuals who have never worked in a tunnel. In Mbembe's perspective: here, the power functions through "letting die", the people whose labor is economically indispensable but their survival is structurally optional. Mark Dummett, the Head of Business, Security and Human Rights at Amnesty International in 2020, said "When you visit this area of the DRC, one of the most striking things you see is just how polluted it is, and just how little is being done by the government and mining companies to prevent pollution and protect the people living and working there –they simply can't escape the dust."²¹⁶

Biomonitoring data reveals that in the case of a high cobalt contamination, average urinary cobalt levels were found to be in local children with 193 $\mu\text{g g}^{-1}$ creatinine; and miners with 133 $\mu\text{g g}^{-1}$ creatinine, drastically exceed international workplace safety threshold which is 15 $\mu\text{g l}^{-1}$.²¹⁷ The same data reports high levels of urinary manganese in populations associated with cobalt ore, especially in children.²¹⁸ Vulnerable communities are also consuming dangerous levels of other metals in addition to cobalt; the health effects of this toxic combination are serious: uranium severely damages the kidneys, manganese acts as a neurotoxic, and cobalt endangers the heart, lungs, and thyroid. Additionally, oxidative DNA damage was found, particularly in children residing in these mining zones (8OHdG levels were significantly higher in exposed children (GM, 45.0; 95% CI 21.2–95.6; n=8) (GM ratio, 6.7; 95% CI, 1.9–23.4; P=0.006))²¹⁹. This is a concerning sign of genetic alterations that significantly increase the risk of developing cancer in the future. This intergenerational harm, the transfer of poison from miner to newborn, demonstrates

²¹⁶ "DRC: Alarming Research Shows Long Lasting Harm from Cobalt Mine Abuses," [www.amnesty.org](https://www.amnesty.org/en/latest/news/2020/05/drc-alarming-research-harm-from-cobalt-mine-abuses/) (Amnesty, May 6, 2020), <https://www.amnesty.org/en/latest/news/2020/05/drc-alarming-research-harm-from-cobalt-mine-abuses/>.

²¹⁷ Célestin Banza Lubaba Nkulu et al., "Sustainability of Artisanal Mining of Cobalt in DR Congo," *Nature Sustainability* 1, no. 9 (September 2018) p. 499 <https://doi.org/10.1038/s41893-018-0139-4>.

²¹⁸ Ivi, p. 500

²¹⁹ Ivi, p. 499

powerfully how the need for cobalt in the green transition not only exploits the current generation but also permanently impacts the bodies of future generations.

5.2.3 Birth Defects

A particularly disturbing extension of this structure is that harm does not end with exposed bodies; rather, it is inherited from miners to infants. It is still unclear if prolonged exposure to metals used in the mining and processing of copper and cobalt ores might result in congenital malformations because there is limited research on the impact of toxic metals on birth defects. However, in 2024, evidence of this phenomena comes from the first study to examine mining-related pollution and birth defects in sub-Saharan Africa. In a case-control study conducted in Lubumbashi, DRC between 2013 and 2015, researchers compared 138 newborns with visible birth defects and 108 healthy neonates, revealing that paternal occupational mining exposure and mothers having paid jobs outside the home were the factors most strongly associated with birth defects, paternal factor being the strongest.²²⁰ The study also established that the numbers of recorded birth defects were 1.6 times higher for maternities situated close to mining areas than for the maternities in health zones outside mining areas.²²¹ The significance of the paternal finding cannot be minimized. It implies that the reproductive harm caused by cobalt extraction is not limited to the women who work in the pits; it is also transmitted through the bodies of male miners to children conceived afterward. The harm is already embedded in the body even before the child is born, before its first breath.

²²⁰ Daan Van Brusselen et al., “Metal Mining and Birth Defects: A Case-Control Study in Lubumbashi, Democratic Republic of the Congo,” *The Lancet Planetary Health* 4, no. 4 (April 1, 2020), p. 158, [https://doi.org/10.1016/S2542-5196\(20\)30059-0](https://doi.org/10.1016/S2542-5196(20)30059-0).

²²¹ RAID, “Beneath the Green in Collaboration With AFREWATCH” 2024, p. 35, <https://raid-uk.org/wp-content/uploads/2024/03/Report-Beneath-the-Green-DRC-Pollution-March-2024.pdf>.

The birth-defect statistics demonstrate that, if necropolitics is the authority to decide who is exposed to death, such decision now reaches backwards into the generation that hadn't yet arrived, therefore it proves that death-worlds are reproduced systematically, politically, economically.

5.3 Displacement of the Congolese through Environmental Destruction

“We live in an environment that brings us more problems than solutions. We are becoming sick, our soil and water is polluted, and our lands are taken from us.”

Resident of Kolwezi ²²²

Displacement in the DRC works in two different directions. One is direct: forced eviction of local communities to make space and clear the ground for open mining pits. For instance, residents of the village of Kishiba were forced to relocate in order to create space for Frontier, a copper and cobalt mine; their new homes in Kimfumpa lack essential amenities such as clean water, agricultural land, farming, schools, and health care.²²³ The other one is environmental, slower, and less visible which operates through a destruction that makes land impossible to live on. For instance, In 2013, heavy rains flooded the Mulungwishi Valley which allowed to dumping of mining effluents from Kanfundwa and caused these effluents to spread through the river system and contaminate surrounding land and water, resulted in pollution, destroyed crops and fisheries, discoloration of the rivers, undermining local livelihoods and forcing many households to be

²²² Ivi, p. 1.

²²³ “Community Rights Widely Abused by Cobalt Mining in Democratic Republic of Congo,” SOMO, April 18, 2016, <https://www.somo.nl/community-rights-widely-abused-by-cobalt-mining-in-democratic-republic-of-congo/>.

expelled from land that was still legally theirs but no longer fed them.²²⁴ Furthermore, evidence of mining-related pollution in the TFM mining region has been linked to negative health impacts in neighboring communities. An investigation by the Environmental Investigation Agency (EIA), based on the analysis of more than 1,200 medical records, revealed that residents living near the “30k” processing plant sought treatment for nosebleeds, coughing up blood, and severe respiratory illnesses which are consistent with SO₂ exposure and with neighborhood residents' persistent complaints that date back to the 30k plant's commissioning.²²⁵ The World Health Organization (WHO) and the South African government's National Ambient Air Quality (NAAQS) standards, stating that SO₂ levels should not exceed 0.191 ppm for more than 10 minutes, have established thresholds for air quality.²²⁶ The EIA-supported study discovered that on multiple occasions, SO₂ levels were significantly above these thresholds --on September 28, 2024, Monomania's observed SO₂ levels stayed over 0.7 ppm for around 40 minutes.²²⁷ More than 12,000 people have been displaced since 2022²²⁸, reveals the same investigation. And the reason behind this displacement is the construction of the 30k plant may have violated DRC law, which specifies how relocation must take place.²²⁹ the Lubumbashi is the capital of the Haut-Katanga province of the DRC, and it was established as a settler colony for Belgian influence based on the region's abundant natural resources and extractive potential by private companies and colonial administrators, leading to over a century of dispossession, inequality, and local poverty – these are still prevalent today, as

²²⁴ Arsene Mushagalusa Balasha and Iva Peša, ““They Polluted Our Cropfields and Our Rivers, They Killed Us’: Farmers’ Complaints about Mining Pollution in the Katangese Copperbelt,” *Heliyon* 9, no. 4 (April 2023): e14995, p. 8 <https://doi.org/10.1016/j.heliyon.2023.e14995>.

²²⁵ “World’s largest cobalt producer admits toxic emissions spikes, drc government announces an inspection, EIA,” EIA, March 25, 2026, <https://eia.org/press-releases/worlds-largest-cobalt-producer-admits-toxic-emissions-spikes-drc-government-announces-an-inspection/>.

²²⁶ “Government notices department of environmental affairs,” 2009, p. 8 https://www.gov.za/sites/default/files/gcis_document/201409/328161210.pdf.

²²⁷ “Toxic Transition - EIA,” EIA, March 17, 2026, <https://eia.org/report/toxic-transition/>. p. 7

²²⁸ Ivi, p.19

²²⁹ Ibid.

the region and its natural resources are pivotal to the global push towards low-carbon emission technologies.²³⁰ Finn and Cobbinah argue that this dispossession is a contemporary reinterpretation of colonial practice, where social displacement and structural marginalization reappear as aspects of the green transition rather than as unusual, unexpected occurrences within it.²³¹ Mining pits are not the only places where this displacement occurs. According to a Global Witness satellite investigation, the EU and US-backed Lobito Corridor railway project, which is designed to transport cobalt and copper from Kolwezi to the Angolan port of Lobito, runs the risk of evicting up to 6,500 people along its route through Kolwezi.²³² Furthermore, the discovery of radioactive minerals at the artisanal mining site of the T17 tailings pile, which is mined using artisanal mining methods, in Kolwezi, has triggered a radiological emergency with serious health and environmental concerns.²³³ The situation poses severe risks of radiation exposure specifically to miners and nearby communities, contamination of soil, water sources, and the food chain, as well as further socioeconomic impacts on the region. In response, President Félix Tshisekedi called for an urgent and coordinated intervention and instructed Prime Minister Judith Suminwa to establish an ad hoc commission in order to oversee emergency response efforts and organize and execute the necessary health, environmental, technical, and scientific measures to address the situation.²³⁴ The radioactive contamination of land, water, and air transforms the environment into a toxic

²³⁰ Finn & Cobbinah, “Lubumbashi and Cobalt: African City at the Crossroads of Global Decarbonization and Neocolonialism,” *Cities* 156 (October 23, 2024): 105521, p. 2 <https://doi.org/10.1016/j.cities.2024.105521>.

²³¹ Ivi, p. 9

²³² “Lobito Corridor: Displacement Threat for Thousands in DRC,” Global Witness, 2025, <https://globalwitness.org/en/campaigns/transition-minerals/thousands-in-drc-could-face-eviction-from-lobito-corridor-railway/>.

²³³ Noé Kalemeko, “Radiological Threat in Kolwezi: The New Congolese Civil Society Calls for Immediate Actions - Friends of the Congo,” Friends of the Congo, April 1, 2026, <https://friendsofthecongo.org/radiological-threat-in-kolwezi-the-new-congolese-civil-society-calls-for-immediate-actions/>.

²³⁴ Equipe Publication, “Glencore Faces Radiological Alert at KCC Site amid Expansion Plans in Kolwezi,” Bankable.africa (BANKABLE, March 31, 2026), <https://bankable.africa/en/mining/3103-2668-glencore-faces-radiological-alert-at-kcc-site-amid-expansion-plans-in-kolwezi>.

living space, a death-world, subjecting local communities to displacement and what Nixon (2011) terms slow violence—a form of harm that occurs gradually, often remaining invisible while producing long-term health, environmental, and social consequences.²³⁵ The testimony of the Kolwezi resident who opens this section is not just a personal story gained from a personal experience—it reflects a broader pattern. The pollution, disease, and land dispossession described, are not accidental, unexpected consequences of cobalt mining; they are structural repercussions of a green transition that extracts value from the DRC while externalizing toxicity and displacement to its people. Congolese people are systematically being displaced from their homes and communities; whether through the bulldozers of industrial mines, the construction of EU-US backed railways, or pollution that makes water undrinkable, air unbreathable and land inhabitable.

The chapters have so far followed two separate paths. Where and under what conditions cobalt is produced, where value is captured, the contracts, revised agreements that position the DRC on the extracted end of the supply chain were all addressed in Chapters 2 and 4. Chapter 5 examined the toxic consequences of cobalt mining, namely child labor, contaminated land, birth defects, genetic abnormalities, and displacement of the communities near mining areas or to make new open-pits.. These are the macro-structural and micro-empirical facets of the same question. Chapter 1 promised that this thesis would bridge these macro-structural and micro-empirical structures, therefore, the next chapter aims to develop that bridge —the value extraction and harm are not two parallel consequences of an unfortunate situation, they are two facets of the same process: the production of a sacrifice zone.

²³⁵ Rob Nixon, “Slow Violence and the Environmentalism of the Poor,” *Safundi* 13, no. 3-4 (July 2011), p. 2 <https://doi.org/10.1080/17533171.2012.716933>.

6. The Green Sacrifice Zone

The term "sacrifice zone," originally used during the Cold War to define uninhabitable areas contaminated by the mining and processing of uranium for developing nuclear weapons²³⁶, is repurposed now and most generally used in – a similar logic and practices yet distinct root causes and actors – relatively new extractive activities, at least in this thesis. Zografos & Robbins, coined the term “green sacrifice zone” redefined with the “logic of sacrificing a certain space or ecology can be expanded to include places and populations that will be affected by the sourcing, transportation, installation, and operation of solutions for powering low-carbon transitions, as well as end-of-life treatment of related material waste”.²³⁷ In the era of the energy transition and the projected increase in the demand for cobalt, "green sacrifice zones" refer to ecosystems and communities disturbed and harmed to decarbonize the global economy.²³⁸ A UN report adds that sacrifice zones are often created through the complicit collaboration of Governments and businesses, and that they are the *direct opposite of sustainable development*, harming the interests of present and future generations.²³⁹ The DRC is a brutally clear example of this definition. The Katanga Copperbelt is a sacrifice zone because it is a site of extraction, not the other way around. The previous chapters followed two different paths to analyze different outcomes of the cobalt extraction in the DRC. Where the cobalt is produced, where the value is captured, the market

²³⁶ Ryan Holifield and Mick Day, “A Framework for a Critical Physical Geography of ‘Sacrifice Zones’: Physical Landscapes and Discursive Spaces of Frac Sand Mining in Western Wisconsin,” *Geoforum* 85 (October 2017): p. 269, <https://doi.org/10.1016/j.geoforum.2017.08.004>. ; Christos Zografos and Paul Robbins, “Green Sacrifice Zones, or Why a Green New Deal Cannot Ignore the Cost Shifts of Just Transitions,” *One Earth* 3, no. 5 (November 2020): p. 543, <https://doi.org/10.1016/j.oneear.2020.10.012>.

²³⁷ Ibid.

²³⁸ Gloria Pallares, “What Are Green Sacrifice Zones?,” #ThinkLandscape, April 16, 2025, <https://thinklandscape.globallandscapesforum.org/72768/green-sacrifice-zones-the-places-ruined-by-the-energy-transition/>.

²³⁹ Special Rapporteur, ed., “The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment,” p. 7 *Un.org* (UN General Assembly, 2022), <https://docs.un.org/en/a/hrc/49/53>.

structure and contractual mechanisms that maintain the DRC's peripheral status linked to value extraction were examined in Chapters 2 and 4. Chapter 5 focused on the bodily and environmental harm – child labour, toxic exposure, inherited birth defects, and displacement – which are the direct consequences of how these mechanisms continue functioning.

Section 6.1 demonstrates how this process operates through three mechanisms and argues that each mechanism is not a failure of the green transition but a crucial condition for the possibility of a green transition. Section 6.2 then asks what a genuine just transition would actually require, and concludes that in the absence of a fundamental structural change, the term remains meaningless for the DRC.

6.1 Why the Green Transition Depends on Underdevelopment

The green transition runs on cheap cobalt and this cheap price is meticulously produced by three main mechanisms. First one is the DRC's designated position in the value chain as the raw ore exporter. Cobalt is mined mainly as a by-product of copper, which ties the price to copper economics and value is captured downstream.²⁴⁰ Furthermore, regardless of the owner of the mine, nearly all of the cobalt extracted from the DRC is refined in China.²⁴¹ Buyers almost never purchase Congolese cobalt directly; they buy chemical precursors priced by external standards meaning that the DRC sells the ore into a pricing system it does not set. This is not a coincidence. The structure of global supply chains guarantees that value is transferred to the Global North where processing, manufacturing and consuming takes place, while costs accumulate in the Global South

²⁴⁰ See Chapter 2.

²⁴¹ See Chapter 4.

where mostly only raw materials are extracted. This value extraction – especially by leaving African frameworks out of the picture and placing foreign actors in all processes, implementing elite-driven policies, leaving domestic establishments out of their own mines– carries the risk of reproducing past extractive patterns; demonstrated by initiatives such as the Lobito Corridor and Sicomines agreement.²⁴² The DRC has no operational cobalt refining capacity for now, but announced plans to build a sulfate refinery, operational from 2030.²⁴³

The second mechanism is the ownership structure. Chinese companies hold stakes in fifteen of the DRC’s nineteen operating cobalt mines, and the contractual architecture — the 2008 Sicomines agreement²⁴⁴ — secured this position. The asymmetry is loud and clear, the Sicomines deposits have been valued at close to ninety-three billion US dollars, granted in exchange for roughly three billion US dollars worth in infrastructure.²⁴⁵ Congo's current role in the green transition is indicative of a long-standing historical pattern in which global technological innovations have relied on extractive agreements that are disconnected from local development.²⁴⁶

The third mechanism is the labour regime that externalizes the environmental and social costs of the green transition to communities and ecosystems of the DRC. Artisanal miners themselves and the nearby communities around mining sites absorb the cost of keeping prices low — child labour, toxic exposure, birth defects, and displacement.²⁴⁷ While the stated aim of the EGD is to mitigate

²⁴² Manjonjo et al., “Reimagining Africa’s Critical Mineral Value Chains: From Extraction to Equitable Green Industrialisation in a Multipolar World 2025,” October 1, 2025, p. 2 https://t20southafrica.org/wp-content/uploads/2025/09/T20_PB-7_Reimagining-Africas-Critical-Mineral.pdf.

²⁴³ Alexander Cook and Sofia Okun, “Dried-up Feedstock Pipeline Sends Cobalt Prices Soaring in 2025, Deficit Seen next Year: 2026 Preview,” Fastmarkets, January 6, 2026, <https://www.fastmarkets.com/insights/dried-up-feedstock-pipeline-cobalt-prices-soaring-2025-deficit/>.

²⁴⁴ See Chapter 4 Sicomines deal

²⁴⁵ Raphael Deberdt, “Green Extractivism’s New Frontiers,” *Current History* 124, no. 858 (January 1, 2025): 27–31, p. 28 <https://doi.org/10.1525/curh.2025.124.858.27>.

²⁴⁶ Giulia Maria Galli, “Who Pays for Green Energy? Cobalt, Congo and the Politics of Extraction,” *Aspenia Online*, January 30, 2026, https://aspensiaonline.it/who-pays-for-green-energy-cobalt-congo-and-the-politics-of-extraction/#relatedposts_1851314201_2.

²⁴⁷ See Chapter 5.

climate change, the processes underpinning this development reproduce colonial patterns of resource exploitation.²⁴⁸ This arrangement is not loosening as the transition accelerates. Demand for cobalt and the other battery metals²⁴⁹ grew by six to eight percent in 2024, and the share of global mine supply held by the three largest producing countries rose from 73 percent in 2020 to 77 percent in 2024 — a concentration the IEA expects to deepen for cobalt specifically.²⁵⁰ The IEA's 2025 Global Critical Minerals Outlook illustrates this dynamic well – while demand surged, price volatility remained high, with cobalt prices nearly doubling after the DRC's 2025 export suspension.

Following the DRC's suspension on cobalt exports, cobalt hydroxide prices have increased by 84% to \$10.5 per pound and cobalt metal prices have also increased significantly, rising by more than 43%²⁵¹— proving both how dependent the market is on Congolese supply and how little that dependence has translated into Congolese power. Greater demand has meant deeper concentration, not diversification or development.

When taken together, these three mechanisms characterize the DRC's economy as being actively held at the point of extraction rather than simply being undeveloped; this is the “green extractivism” that Deberdt identifies as the new frontier of the transition.²⁵² The term green extractivism captures this paradox of renewable energy development and its close ties with

²⁴⁸ Charlize Tomaselli, “Critical Minerals, Just Transitions, and the Right to Say No,” Bio-economy.org.za, April 2025, <https://bio-economy.org.za/critical-minerals-just-transitions-and-the-right-to-say-no/>.

²⁴⁹ Battery metals include lithium, nickel, cobalt, graphite and manganese.

²⁵⁰ IEA, “Beyond NMC Batteries: Supply Chain Issues for Emerging Battery Technologies - IEA,” IEA, 2025, <https://www.iea.org/reports/global-critical-minerals-outlook-2025/beyond-nmc-batteries-supply-chain-issues-for-emerging-battery-technologies>.

²⁵¹ Emiliano Tossou, “Cobalt Prices Explode after DR Congo Halts Exports,” ed. Ola Schad Akinocho, Bankable.africa (BANKABLE, March 14, 2025), <https://bankable.africa/en/mining/1403-904-cobalt-prices-explode-after-dr-congo-halts-exports>.

²⁵² Raphael Deberdt, “Green Extractivism’s New Frontiers,” *Current History* 124, no. 858 (January 1, 2025): p. 27 <https://doi.org/10.1525/curh.2025.124.858.27>.

inherited colonial patterns. This logic can be traced in the EU's 2024 Critical Raw Materials Act –trying to fix a “problem” through better contracts, partnership discourse, due-diligence policies.²⁵³ But it cannot work. At least not for the benefit of the Congolese, because the changes that would develop the DRC are the very same changes that would make its cobalt expensive. A Congo that refined its own ore, held majority equity in its mines, taxed extraction to fund the state, and protected its workers would not be a cleaner supplier of cheap cobalt; it would be a supplier of costly cobalt. The harm is not an unwanted cost apart from the low price, waiting to be filtered out. As mentioned above, removing it raises the price. This is why the transition does not merely turn a blind eye on the DRC's underdevelopment; it directly depends on it. The green sacrifice zone combines both descriptions given that the same structure is what keeps cobalt and lives cheap.

6.2 What "Just Transition" Cannot Mean Without Structural Change

The concept of a just transition is not empty, but it has an address. The European Green Deal aims to balance an inclusive social growth plan with the European ‘green transformation’ and The Just Transition Mechanism (JTM) is a key component in this effort which offers additional funding and fostering extensive stakeholder and citizen participation.²⁵⁴ JTM was designed to manage the domestic costs of decarbonization, support European workers and regions that are most vulnerable to the transition away from fossil fuels. This is a severely limited and non-inclusive commitment considering cobalt's strategic role in this transition and Europe's limited mining capacity.²⁵⁵ The

²⁵³ European Commission, “Critical Raw Materials Act,” European Commission, 2023, https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en.

²⁵⁴ Katharina Zimmermann and Vincent Gengnagel, “Mapping the Social Dimension of the European Green Deal,” *European Journal of Social Security* 25, no. 4 (November 1, 2023): p. 524 , <https://doi.org/10.1177/13882627231208698>.

²⁵⁵ See Chapter 3.

DRC does not have a seat in this so-called just transition arrangement, and this absence is not a simple mistake that a future amendment can correct. As Chapter 6.1 argued, the European transition is affordable precisely because the costs of extraction are displaced onto the DRC; the framework can protect European workers because it does not protect Congolese ones. The exclusion of the producer is therefore not a gap in the just transition but a condition of it. Wang and Lo (2021) noted in their conceptual review that “...the term [just transition] has become extended, multifaceted, and to some degree problematically polysemic, which leaves room for confusion in interpretation”.²⁵⁶ For a transition to be genuinely just, it must cover the Congolese producer who is now carrying the costs of the transition, and the very mechanisms which now are fuelling the transition must be dismantled.

The conditions for a just transition are not obscure, controversial, nor radical. In fact, they have been explicitly articulated by the United Nations Secretary General’s Panel on Critical Energy Transition Minerals which established seven *voluntary* guiding principles –these are grounded in existing international human rights, environmental and development frameworks– for the governance of critical mineral value chains.²⁵⁷ Despite the international recognition, these principles are often executed insufficiently or severely violated in practice when the DRC’s position is measured according to the international system’s own stated criteria.

The panel’s seven principles assert that human rights must sit at the core of every mineral value chain (Principle 1); that the environment and biodiversity be must be safeguarded (Principle 2);

²⁵⁶ Xinxin Wang and Kevin Lo, “Just Transition: A Conceptual Review,” *Energy Research & Social Science* 82 (December 2021): 102291, p. 8 <https://doi.org/10.1016/j.erss.2021.102291>.

²⁵⁷ “United Nations Secretary-General’s Panel on Critical Energy Transition Minerals, Resourcing the Energy Transition: Guiding Principles and Actionable Recommendations,” September 2024, p. 4 <https://www.un.org/en/climatechange/critical-minerals>.

that justice and equity underpin the chain (Principle 3); that producing countries develop through benefit-sharing, value addition, and economic diversification (Principle 4); that investment, finance, and trade be responsible and fair (Principle 5); that transparency, accountability and anti-corruption measures must be implemented to ensure good governance (Principle 6); and that multilateral cooperation promote peace and security (Principle 7).²⁵⁸ When compared to the evidence presented in the previous chapters, the Congolese cobalt economy either fails or violates each and every single one of these principles. In the DRC, documented patterns of child labor, toxic and unsafe working conditions, and toxic exposure, forced evictions in artisanal and industrial mining areas have placed human rights far from the core of cobalt mining operations.²⁵⁹ The environment is not safeguarded but poisoned systematically. Equity—which the Panel highlighted as a necessary condition for a fair transition—is also lacking because Congolese producers only get a small portion of the value produced by global battery supply chains despite paying the dangerous, frequently fatal costs of the process.²⁶⁰ Similarly, the continuous export of raw and semi-processed minerals undermines the principle of development through value addition, and the lack of substantial local refining capacity prevents opportunities for industrial upgrading and economic diversification—mostly due to Chinese domination.²⁶¹ The lack of disclosure of resource-backed loan agreements and extractive industry contracts frequently undermines another fundamental principle outlined by the Panel, transparency.²⁶² In this regard, the countries that are driving the cobalt demand have already drafted and approved the requirements of a just transition for all, leaving no one behind. Therefore, the distance between the DRC and a just transition stems

²⁵⁸ Ivi, p. 10.

²⁵⁹ see Chapter 5.

²⁶⁰ see Chapter 6.

²⁶¹ See Chapter 2; see Chapter 4.

²⁶² See Chapter 4.

from asymmetrical power dynamics embedded in supply chains and lack of enforcement rather than lack of knowledge or understanding. With regard to the three mechanisms outlined in 6.1, and the proved insufficient principles established above, a truly just transition for the DRC would require the following:

First and most importantly, all local communities affected by mining projects should have the right to say no (or yes) whether mining activities will start or continue in their backyard.²⁶³ A consent without leaving other options to communities is not consent but enforcement through power dynamic, not compensation. The principle of free, prior and informed consent — a specific right granted to Indigenous peoples in international law which allow them to withhold/withdraw consent at any time for initiatives that affect them and/or their territories²⁶⁴ — should cover all mining affected communities like the DRC, and would have to be enforceable rather than ceremonial. Tomaselli argues that formally recognizing and institutionalizing this right could disrupt the structural inequalities embedded in global resource extraction.²⁶⁵ Secondly, as already outlined in UN report, the heavy debt burden that most raw material exporter countries having left to bear with which further pushes them into dependency cycle, should be accounted through rules-based, non-discriminatory international trade and investment agreements, frameworks, and initiatives; with the aim of fighting against price volatility, and fostering structural transformation in these countries through economic diversification and value addition.²⁶⁶ The DRC will continue to remain

²⁶³ Kamilya Tyulebayeva, Frederik Hafen, and Margarida Martins, “The Right to Say No: A Legal Toolbox for Communities Affected by Mining in the EU,” March 2023, p. 4 https://eeb.org/wp-content/uploads/2023/03/EEB_brochure_Right-to-say-no-3.pdf.

²⁶⁴ FAO, “Free, Prior and Informed Consent (FPIC) | Indigenous Peoples | FAO,” IndigenousPeoples, 2017, <https://www.fao.org/indigenous-peoples/pillars-of-work/free--prior-and-informed-consent/en>.

²⁶⁵ Charlize Tomaselli, “Critical Minerals, Just Transitions, and the Right to Say No,” Bio-economy.org.za, April 2025, <https://bio-economy.org.za/critical-minerals-just-transitions-and-the-right-to-say-no/>.

²⁶⁶ “United Nations Secretary-General’s Panel on Critical Energy Transition Minerals, Resourcing the Energy Transition: Guiding Principles and Actionable Recommendations ,” September 2024, p. 14 <https://www.un.org/en/climatechange/critical-minerals>.

unable to capture the value of its own resources as long as Congolese infrastructure is financed by mortgaging future mineral production—the logic of Sicominex deal discussed in Chapter 4—and "development" discourse will only perpetuate the existing dependency, as Amin described.²⁶⁷ The DRC should have the majority of the shares and control over its own mining operations. The current 68-32 ownership ratio established in the Sicominex joint venture, with Chinese companies holding the majority stake²⁶⁸, is incompatible with genuine sovereignty. As documented throughout the thesis, voluntary corporate social responsibility is insufficient for Congolese cobalt. Therefore, it is necessary to implement the DRC's Mining Code²⁶⁹ and hold foreign buyers legally accountable for any abuses in supply chains.

None of these measures are ideal for the foreign actors operating in mining industries within the DRC; each one of the measures makes the Congolese cobalt expensive, which is why the current model disregards them. A truly just transition would require higher cobalt prices therefore more expensive EVs, and fundamental reorientation of international trade. To put it simply, the DRC would have to industrialize and capture value from its own mines. In the absence of these deliberate reforms, green energy transition carries the risk of repeating the same colonial logic—extraction in the Global South to support consumption in the North.²⁷⁰ In a fair world, the North's resource trade deficit with the South would be balanced by a corresponding monetary trade deficit. However, the monetary trade deficit is equivalent to approximately 1% of global trade revenues—

²⁶⁷ On the minerals-for-infrastructure logic of the Sicominex agreement, see Chapter 4; on the broader argument, Samir Amin, *Unequal Development* (New York: Monthly Review Press, 1976).

²⁶⁸ See Chapter 4.

²⁶⁹ "Mining Code of the Democratic Republic of Congo," EITI, March 2018, <https://eiti.org/documents/mining-code-democratic-republic-congo>.

²⁷⁰ "The Transition to Clean Energy Is Ethically Sound in Its Ends, but Morally Complicated in Its Means," ABC Religion & Ethics, November 3, 2025, <https://www.abc.net.au/religion/ethical-goal-decarbonisation-and-morally-complicated-means/105967834>.

and fluctuates between the North and the South, meaning that the North obtains its substantial net appropriation of labor and resources from the South at no cost.²⁷¹

A truly just transition should encourage companies and governments to rethink and reshape how they operate. Rather than focusing only on profits or the tangible environmental harm they cause, the transition should foster broader, and fundamental necessary changes in long-standing business practices; from establishment of new business models, more equal approaches to profit sharing, and greater investment in local communities.²⁷² The DRC holds the resources that power the future but its people are trapped in a mechanism of extraction without development. Unless and until the Global North acknowledges that just transition – along with inclusive policy suggestions and environmental frameworks – also requires paying the true cost of cobalt, in price and also in social costs; the green transition will continue to be a transition for the few, supported by the many, in the name of a future that has already been stolen even before the extraction.

The argument made in Chapter 6 is that the green transition depends on the DRC's underdevelopment rather than just ignoring it given that any reform that would develop the DRC, simultaneously would increase the price of its cobalt. A just transition for the DRC seems unattainable without significant structural changes with respect to the international community's own declared ideals. What remains for this thesis is to connect these arguments together, return back to the initial question that made this thesis possible, and consider both what it has revealed and what it cannot reveal.

²⁷¹ Jason Hickel et al., “Imperialist Appropriation in the World Economy: Drain from the Global South through Unequal Exchange, 1990–2015,” *Global Environmental Change* 73, no. 102467 (March 1, 2022), p. 8 <https://doi.org/10.1016/j.gloenvcha.2022.102467>.

²⁷² Yixian Sun et al., “Towards a Just Transition: Integrating Fair Share, Equity and Justice into Climate Transition Plans,” Lewis & Clark Law School Digital Commons, November 2025, p. 20 <https://www.climatechampions.net/media/uurbni2u/towards-a-just-transition.pdf>.

7. Conclusion

This thesis asked how the global green transition, through its demand for cobalt, reproduces structural underdevelopment and human suffering in the Democratic Republic of the Congo. The answer it has defended throughout the chapters is that the transition does not merely produce these outcomes by accident or neglect — it requires them. Cobalt — the mineral underpinning Europe's green transition, supplied largely through Chinese-dominated and controlled supply chains — is cheap because the DRC is deliberately confined to the extractive end of the global value chain. The reforms that would allow the DRC to capture more value from its resources are the very same reforms that would make cobalt more expensive both for the refining sector and the end-users. Therefore, underdevelopment is not a problem the green transition has failed to solve in the Congo; it is a condition the transition relies upon.

The central argument has been twofold. First, the global green transition constitutes a twenty-first-century reformulation of the core–periphery dynamic theorised by Prebisch²⁷³, Frank,²⁷⁴ and Amin²⁷⁵: the DRC is integrated into global cobalt supply chains on terms that replicate the dependency logic which has historically prevented peripheral economies from translating resource wealth into development. Second, the European Union's "just transition," operationalised through instruments such as the Critical Raw Materials Act (2024), functions as a normative shield — legitimising continued extraction while externalising its human and environmental costs onto Congolese bodies, which this thesis read through Mbembe's concept of necropolitics²⁷⁶. The two

²⁷³ Raúl Prebisch, "The Economic Development of Latin America and Its Principal Problems, United Nations Department of Economic Affairs," 1950-

²⁷⁴ Andre Gunder Frank, "The Development of Underdevelopment," *Monthly Review* 18, no. 4 (September 2, 1966): 17–31.

²⁷⁵ Samir Amin, "Unequal Development" (Monthly Review Press, 1976),

²⁷⁶ Achille Mbembé, "Necropolitics," *Public Culture* 15, no. 1 (March 25, 2003): 11–40

work together: one supplies its moral licence, the other secures the structure of extraction. The EU presents its demand for cobalt as a necessity for a globally just climate transition, yet the institutional frameworks through which this demand is organised and fulfilled reproduce the extractive hierarchy, leaving the Congolese behind.

The thesis examined this dynamic across five analytical chapters, and each chapter builds on the previous one to cumulatively construct the full argument. Chapter 2 mapped the global cobalt value chain and established the DRC's locked position into low-value extraction, with refining and pricing power concentrated downstream in China. Chapter 3 examined the European Green Deal and the Critical Raw Materials Act, showing how the European promise of a "just transition" is organised around protecting European workers and European supply security, limiting this to the Union's borders. Chapter 4 traced, through the Sicomines agreement, the contractual machinery — asymmetric ownership, fiscal exclusion, and debt-secured infrastructure — that transfers the value of extraction out of the country before it can finance Congolese development. Chapter 5 documented what this position costs in human and environmental terms in lived reality: child labour, toxic exposure, inherited birth defects, and displacement across the Katanga Copperbelt. Chapter 6 synthesized these into a single claim, and developed the concept of green sacrifice zone, arguing that the transition depends on the DRC's subordination and that a "just transition" which leaves the underlying structure intact cannot, by definition, include the Congolese producer.

The thesis makes both theoretical and empirical contributions. Dependency theory describes how value is transferred from the periphery to the core, but it does not specify much about the physical body, it stops at the structural level. Necropolitics refers to the production of populations as

disposable, but it has primarily been applied to the green transition on a global or conceptual level. Necropolitics without dependency theory carries the risk of being ahistorical since it potentially characterizes suffering without describing how it is systematically produced. By integrating the two, this thesis demonstrates that the suffering of Congolese communities is not a consequence of local dysfunction but an outcome of the global green transition's standardized, legitimate operations. Furthermore, by demonstrating that decarbonization depends on exploitation rather than tolerating it, the thesis adds to the growing body of research on the political economy of the green transition. The Katanga Copperbelt can be viewed as a green sacrifice zone not only as a concept but also as the predictable, in fact, borderline inevitable outcome of where the DRC is situated in the global cobalt value chain, the ownership arrangements that control extraction, and the inhumane working conditions where the extraction occurs. The thesis argues that these mechanisms are not failures of implementation but structural conditions of the transition. This is offered as a synthesis and an application rather than a new theory through the case which matters most to the global cobalt economy, shows that structural value extraction and bodily harm are not two separate problems but two faces of the same process.

The findings of this thesis have direct implications for the actors and institutions that structure the global cobalt economy. For the European Union, the implications are clear. The EU-DRC Memorandum of Understanding and the Critical Raw Materials Act must move beyond rhetoric and marketing campaigns and evolve into legally enforceable agreements. A truly just transition would require the following: binding due diligence provisions with legal accountability for supply chain abuses; debt restructuring that does not tie infrastructure development to mortgaged mineral production; investment in domestic refining capacity in the DRC to enable and promote value

addition; and the inclusion of affected communities in decision-making about extraction activities in their territories. In the absence of such measures, the EU's claim to be pursuing a "just transition" continues to serve as a regulatory framework that externalizes the costs of persistent extraction. The evidence presented in this thesis shows that the existing structure is not designed to ensure justice for all, but rather to secure supply.

For Chinese state-owned enterprises, the implications are also clear. Despite the 2024 amendment, the Sicomines agreement maintains the fiscal exclusion and unequal ownership that perpetuate the structural dependency of the DRC. Rebalancing the 68% (China) - 32% (the DRC) ownership ratio to give the DRC majority equity, removing the copper-price conditionality that makes infrastructure delivery dependent on fluctuations in the global market, transparent accounting of infrastructure costs, and direct investment in local processing capacity to allow the DRC to extract value from its own resources are all required for a truly equitable partnership. The data presented in this thesis shows that the Sicomines model is still more of a value-extraction tool than a genuine partnership that benefits all sides.

For the Congolese Government, implications are not as clear as for the two previous actors. Enforcing the existing Mining Code, diversifying the economy away from raw-mineral exports, investing with extraction revenues in infrastructure, health care, and education, and enhancing institutional capacity to negotiate and monitor the contracts are the essential elements of a successful development strategy. The evidence presented throughout the thesis shows that institutional design and policy are also responsible for the DRC's current situation, not purely external actors or fate.

Three limitations of this thesis must be addressed.

First, the single-case design limits the generalizability of the work. Although the structural arguments presented above might be applicable to other mineral-producing states, such as Chile (lithium), Indonesia (nickel), and Zambia (copper), this thesis does not systematically compare examples. By using a comparative case study design, future research could strengthen the analysis by determining whether the mechanisms identified here operate in other contexts and, if so, whether they do so through the same institutional channels or through different ones.

Second, the thesis relies on secondary sources. The thesis draws on published field research by Amnesty International, RAID, Global Witness, the University of Nottingham Rights Lab, and academic researchers, but it does not include original interviews or participant observation. This is a limitation of the thesis's design, acknowledged in Chapter 1. By conducting primary interviews with affected communities, Congolese civil society actors, and former miners, future research could enhance the analysis and provide a more detailed picture of how structural conditions are experienced, challenged, and resisted. It is important to note that conducting primary fieldwork in the mining areas such as Katanga is a security issue as well as a resource issue. Restricted access to mines, security controls in Katanga, together with the ongoing armed conflict and presence of armed groups in the wider eastern DRC make these regions high-risk environments. Such risks limit primary research and first-hand evidence gathering, thereby making researchers dependent on secondary sources.

Third, the thesis gives less attention to internal Congolese dynamics and instead focuses on the DRC's relationship with external actors (China, the EU, multinational firms). Although acknowledged, the roles of the Congolese state, domestic political rivalry, and corruption are not thoroughly examined. Chapter 4 discusses the Sicomines deal, which was signed under President

Kabila and renegotiated under President Tshisekedi — this shift in leadership implies that domestic political dynamics are important, but the thesis does not go into detail on how.

The argument of this thesis should not be interpreted as a claim that the Congo is powerless. The 2025 suspension of cobalt exports, which roughly doubled the prices and the Congolese government's earlier renegotiation attempts that resulted in 2024 Amendment stands as a proof of the state capability of real leverage. However, this power has only been exercised to influence the price of extraction rather than the policies and frameworks which confines the country to extraction in the first place. Closing that gap is not a technical fix; it is a political choice, and the absence of that choice is what makes the present transition unjust. This choice does not fall to the Congo alone, but to the states and firms whose green economies are built on Congolese cobalt. Until these actors make this choice intentionally, the transition will remain as a promise made elsewhere and paid for at home for the Congo.

Bibliography

- African Development Bank. *Annual Report and Financial Report 2021*. African Development Bank Group, 2021. <https://www.afdb.org/en/annualreport>.
- African Development Bank. “Critical Mineral Insights – Cobalt.” African Development Bank Group, October 16, 2025. <https://www.afdb.org/en/documents/critical-mineral-insights-cobalt>.
- Altiparmak, Sevgi Balkan, et al. “Cornering the Market with Foreign Direct Investments: China’s Cobalt Politics.” *Renewable and Sustainable Energy Transition* 7 (April 2025): 100113. <https://doi.org/10.1016/j.rset.2025.100113>.
- Amin, Samir. *Unequal Development*. New York: Monthly Review Press, 1976. https://books.google.it/books/about/Unequal_Development.html?id=3U-8AAAAIAAJ.
- Amnesty International. “DRC: Alarming Research Shows Long Lasting Harm from Cobalt Mine Abuses.” May 6, 2020. <https://www.amnesty.org/en/latest/news/2020/05/drc-alarming-research-harm-from-cobalt-mine-abuses/>.
- Amnesty International. “Powering Change or Business as Usual? Forced Evictions at Industrial Cobalt and Copper Mines in the Democratic Republic of the Congo.” September 12, 2023. https://www.amnesty.nl/content/uploads/2023/09/EMBARGOED_EN-version-Powering-Change-or-Business-as-Usual.pdf.
- Arabadjieva, Kalina. “A Just Transition for the EU: What Role for Legislation?” European Trade Union Institute (ETUI), October 23, 2024. <https://www.etui.org/news/just-transition-eu-what-role-legislation>.
- Armand, M., and J.-M. Tarascon. “Building Better Batteries.” *Nature* 451, no. 7179 (February 2008): 652–657. <https://doi.org/10.1038/451652a>.
- Arsel, Murat, Barbara Hogenboom, and Lorenzo Pellegrini. “The Extractive Imperative and the Boom in Environmental Conflicts at the End of the Progressive Cycle in Latin

America.” *The Extractive Industries and Society* 3, no. 4 (November 2016): 877–879.
<https://doi.org/10.1016/j.exis.2016.10.013>.

B20 South Africa & World Bank. “Africa at the Core of Critical Minerals.” November 2025. <https://www.b20southafrica.org/wp-content/uploads/2025/11/Africa-at-the-Core-of-Critical-Minerals.pdf>.

Balasha, Arsene Mushagalusa, and Iva Peša. ““They Polluted Our Cropfields and Our Rivers, They Killed Us’: Farmers’ Complaints about Mining Pollution in the Katangese Copperbelt.” *Heliyon* 9, no. 4 (April 2023): e14995.
<https://doi.org/10.1016/j.heliyon.2023.e14995>.

Baskaran, Gracelin, and Meredith Schwartz. “Stabilizing Cobalt Markets: A Price Floor for U.S. Minerals Security.” Center for Strategic and International Studies (CSIS), 2025.
<https://www.csis.org/analysis/stabilizing-cobalt-markets-price-floor-us-minerals-security>.

Baumann-Pauly, Dorothée. “Cobalt Mining in the Democratic Republic of the Congo: Addressing Root Causes of Human Rights Abuses.” NYU Stern Center for Business and Human Rights, 2023. https://bhr.stern.nyu.edu/wp-content/uploads/2023/02/NYUCBHRCobaltMining_FINALFeb7.pdf.

Baumann-Pauly, Dorothée, and Serra Cremer. “How New Business Models Can Address Human Rights Risks in the Cobalt Supply Chain.” n.d.
<https://gcbhr.org/backoffice/resources/ssrn-id3679885.pdf>

Beyond Fossil Fuels. “Europe’s Coal Exit.” March 30, 2026.
<https://beyondfossilfuels.org/europes-coal-exit/>.

Blengini, Giovanni Andrea, et al. *Methodology for Establishing the EU List of Critical Raw Materials – Guidelines*. European Commission, 2017.
<https://doi.org/10.2873/769526>.

Boafo, James, and Francis Arthur-Holmes. “Sustainability Transition Paradox: Emerging Dimensions of Illegal Artisanal and Small-Scale Mining of Critical Minerals in Africa.” *Resources Policy* 108 (July 2025): 105673.
<https://doi.org/10.1016/j.resourpol.2025.105673>.

Bolger, Meadhbh, et al. “‘Green Mining’ Is a Myth: The Case for Cutting EU Resource Consumption.” European Environmental Bureau, 2021. https://eeb.org/wp-content/uploads/2021/10/Green-mining-report_EEB-FoEE-2021.pdf.

Brautigam, Deborah. *The Dragon’s Gift: The Real Story of China in Africa*. Oxford: Oxford University Press, 2009.

https://books.google.it/books?id=X2g2rEMSdIYC&printsec=frontcover&redir_esc=y#v=onepage&q&f=false

Bureau of International Labor Affairs. “Findings on the Worst Forms of Child Labor – Democratic Republic of the Congo.” U.S. Department of Labor, 2023.

<https://www.dol.gov/agencies/ilab/resources/reports/child-labor/congo-democratic-republic-drc>.

Calvão, Filipe, and Matthew Archer. “Digital Extraction: Blockchain Traceability in Mineral Supply Chains.” *Political Geography* 87, no. 1 (May 2021): 102381.

<https://doi.org/10.1016/j.polgeo.2021.102381>.

“Chinese Companies Announce up to \$7 Billion Investment in DRC Infrastructure.” Voice of America–Africa, January 27, 2024. <https://www.voaafrica.com/a/chinese-companies-announce-up-to-7-billion-investment-in-drc-infrastructure-/7459900.html>.

Cobalt Institute. “Cobalt Facts.” July 2025. https://www.cobaltinstitute.org/wp-content/uploads/2025/07/Cobalt-Factsheet_July-2025.pdf.

Cobalt Institute. “Industrial Mining.” February 19, 2025.

<https://www.cobaltinstitute.org/responsible-sustainable-cobalt/responsible-sourcing/industrial-mining/>.

Cobalt Institute. “Cobalt Market Report 2024.” Benchmark Mineral Intelligence, 2025. <https://www.cobaltinstitute.org/wp-content/uploads/2025/05/Cobalt-Market-Report-2024.pdf>.

Cobalt Institute. “Cobalt Market Report 2025.” 2026. <https://www.cobaltinstitute.org/wp-content/uploads/2026/05/Cobalt-Market-Report-2025.pdf>.

Constance. “DRC Reports Decline in Child Labor in Cobalt Mines amid Controversy.” Copperbelt Katanga Mining, January 4, 2025. <https://copperbeltkatangamining.com/drc-reports-decline-in-child-labor-in-cobalt-mines-amid-controversy/>.

Cook, Alexander, and Sofia Okun. “Dried-up Feedstock Pipeline Sends Cobalt Prices Soaring in 2025, Deficit Seen Next Year: 2026 Preview.” Fastmarkets, January 6, 2026. <https://www.fastmarkets.com/insights/dried-up-feedstock-pipeline-cobalt-prices-soaring-2025-deficit/>.

Council on Foreign Relations. “Why Cobalt Mining in the DRC Needs Urgent Attention.” October 29, 2020. <https://www.cfr.org/articles/why-cobalt-mining-drc-needs-urgent-attention>.

Deberdt, Raphael, and Philippe Le Billon. “Critical Mineral (In)Securities: Techno-Legal Fixes and the Reproduction of Socio-Environmental Abuses.” *Environment and Security* (November 2025). <https://doi.org/10.1177/27538796251383998>.

Deberdt, Raphael. “Green Extractivism’s New Frontiers.” *Current History* 124, no. 858 (January 2025): 27–31. <https://doi.org/10.1525/curh.2025.124.858.27>.

Deberdt, Raphael, and Philippe Le Billon. “Green Transition’s Necropolitics: Inequalities, Climate Extractivism, and Carbon Classes.” *Antipode* 56, no. 4 (2024). <https://doi.org/10.1111/anti.13032>.

Dorning, Christian, et al. “Global Patterns of Ecologically Unequal Exchange: Implications for Sustainability in the 21st Century.” *Ecological Economics* 179 (January 2021): 106824. <https://doi.org/10.1016/j.ecolecon.2020.106824>.

Dos Santos, Theotonio. “The Structure of Dependence.” *American Economic Review* 60, no. 2 (1970): 231–236. <http://digamo.free.fr/dosantos70.pdf>.

“DRC Gets €180m from EU to Strengthen Ties.” *The Extractor Magazine*, October 24, 2025. <https://theextractormagazine.com/2025/10/24/drc-gets-e180m-from-eu-to-strengthen-ties/>.

Dummet, Mark. “The Dark Side of Electric Cars: Exploitative Labor Practices.” Amnesty International, September 29, 2017.

<https://www.amnesty.org/en/latest/news/2017/09/the-dark-side-of-electric-cars-exploitative-labor-practices/>.

The Economist. “A Ravenous Dragon.” March 15, 2008.

<https://www.economist.com/special-report/2008/03/15/a-ravenous-dragon>.

Environmental Investigation Agency (EIA). “Toxic Transition.” March 17, 2026.

<https://eia.org/report/toxic-transition/>.

Environmental Investigation Agency (EIA). “World’s Largest Cobalt Producer Admits Toxic Emissions Spikes, DRC Government Announces an Inspection.” March 25, 2026.

<https://eia.org/press-releases/worlds-largest-cobalt-producer-admits-toxic-emissions-spikes-drc-government-announces-an-inspection/>.

Extractive Industries Transparency Initiative (EITI). “Mining Code of the Democratic Republic of Congo.” March 2018. <https://eiti.org/documents/mining-code-democratic-republic-congo>.

“EU and Democratic Republic of Congo Solidify Cooperation through Global Gateway Investments and Support for Regional Peace and Integration.” Global Gateway Forum, October 9, 2025. https://global-gateway-forum.ec.europa.eu/news/eu-and-democratic-republic-congo-solidify-cooperation-through-global-gateway-investments-and-support-2025-10-09_en.

European Union. *Regulation (EU) 2024/1252* (Critical Raw Materials Act). EUR-Lex, May 3, 2024. <https://eur-lex.europa.eu/eli/reg/2024/1252/oj>.

European Commission. “Critical Raw Materials Act.” 2023. https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en.

European Commission. *Commission Implementing Decision (EU) 2021/1129 of 5 July 2021 Setting Out the Annual Breakdown of Available Allocations under the Just Transition Fund per Member State*. 2021.

European Commission. “Global Gateway: EU Signs Strategic Partnerships on Critical Raw Materials Value Chains with DRC and Zambia and Advances Cooperation with US and Other Key Partners to Develop the ‘Lobito Corridor.’” Press release, October 2025.

https://ec.europa.eu/commission/presscorner/api/files/document/print/en/ip_23_5303/IP_23_5303_EN.pdf.

European Commission. “The European Green Deal.” 2019.

https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal_en.

European Commission. “A Just and Fair Transition, Leaving No One Behind.”

September 5, 2024. <https://projects.research-and-innovation.ec.europa.eu/en/strategy/strategy-2020-2024/environment-and-climate/european-green-deal/green-deal-projects-support/green-deal-resources/just-and-fair-transition-leaving-no-one-behind>.

European Commission. “The Just Transition Mechanism: Making Sure No One Is Left Behind.” 2020/2024. https://commission.europa.eu/topics/regional-and-urban-policy/just-transition-mechanism_en.

European Council. “European Green Deal.” 2019.

<https://www.consilium.europa.eu/en/policies/european-green-deal/>.

EV Curve Futurist. “The Global Battery Technology Frontier.” March 5, 2026.

<https://evcurvefuturist.com/the-global-battery-technology-frontier/>.

Evans, Peter. *Dependent Development*. Princeton: Princeton University Press, 1979.

<https://doi.org/10.1515/9780691186801>.

Fagiolo, Nicoletta. “DR Congo's Necro-Mining, the Flip Side of the Digital and Green Revolution.” Reset DOC, April 2023. <https://www.resetdoc.org/story/drcongos-necro-mining-the-flip-side-of-the-digital-and-green-revolution/>.

Food and Agriculture Organization (FAO). “Free, Prior and Informed Consent (FPIC).” 2017. <https://www.fao.org/indigenous-peoples/pillars-of-work/free--prior-and-informed-consent/en>.

Finn, Brendan, and Patrick Brandful Cobbinah. “Lubumbashi and Cobalt: African City at the Crossroads of Global Decarbonization and Neocolonialism.” *Cities* 156 (October 2024): 105521. <https://doi.org/10.1016/j.cities.2024.105521>.

Frank, Andre Gunder. “The Development of Underdevelopment.” *Monthly Review* 18, no. 4 (September 1966): 17–31.

Galli, Giulia Maria. “Who Pays for Green Energy? Cobalt, Congo and the Politics of Extraction.” *Aspenia Online*, January 30, 2026. <https://aspeniaonline.it/who-pays-for-green-energy-cobalt-congo-and-the-politics-of-extraction/>.

Global Witness. “Lobito Corridor: Displacement Threat for Thousands in DRC.” December 4, 2025. <https://globalwitness.org/en/campaigns/transition-minerals/thousands-in-drc-could-face-eviction-from-lobito-corridor-railway/>.

GlobalData. “Cobalt Mining Market Analysis by Reserves, Production, Assets, Demand Drivers and Forecast to 2035.” n.d. <https://www.globaldata.com/store/report/cobalt-mining-market-analysis/>.

Government of South Africa, Department of Environmental Affairs. “Government Notices.” 2009. https://www.gov.za/sites/default/files/gcis_document/201409/328161210.pdf.

Greitemeier, Tim, et al. “China’s Hold on the Lithium-Ion Battery Supply Chain: Prospects for Competitive Growth and Sovereign Control.” *Journal of Power Sources Advances* 32 (February 2025): 100173. <https://doi.org/10.1016/j.powera.2025.100173>.

Gulley, Andrew L. “China, the Democratic Republic of the Congo, and Artisanal Cobalt Mining from 2000 through 2020.” *Proceedings of the National Academy of Sciences* 120, no. 26 (June 2023). <https://doi.org/10.1073/pnas.2212037120>.

Gulley, Andrew L. “The Development of China’s Monopoly over Cobalt Battery Materials.” *Mineral Economics* 37 (June 2024): 615–626. <https://doi.org/10.1007/s13563-024-00447-w>.

Hansrod, Zeenat. “Long Road for DRC as It Renegotiates Minerals Deal with China.” RFI, August 12, 2023. <https://www.rfi.fr/en/africa/20230812-long-road-for-drc-as-it-renegotiates-minerals-deal-with-china>.

Herbert Smith Freehills Kramer. “The Democratic Republic of Congo’s Revised Mining Code.” April 2018. <https://www.hsfkramer.com/insights/2018-04/the-democratic-republic-of-congos-revised-mining-code>.

Hickel, Jason, et al. “Imperialist Appropriation in the World Economy: Drain from the Global South through Unequal Exchange, 1990–2015.” *Global Environmental Change* 73 (March 2022): 102467. <https://doi.org/10.1016/j.gloenvcha.2022.102467>.

Hyldmo, Hilde Østby, et al. “A Globally Just and Inclusive Transition? Questioning Policy Representations of the European Green Deal.” *Global Environmental Change* 89 (October 2024): 102946. <https://doi.org/10.1016/j.gloenvcha.2024.102946>.

International Energy Agency (IEA). “Beyond NMC Batteries: Supply Chain Issues for Emerging Battery Technologies.” 2025. <https://www.iea.org/reports/global-critical-minerals-outlook-2025/beyond-nmc-batteries-supply-chain-issues-for-emerging-battery-technologies>.

International Energy Agency (IEA). “Global Critical Minerals Outlook 2024.” May 17, 2024. <https://www.iea.org/reports/global-critical-minerals-outlook-2024>.

International Institute for Sustainable Development (IISD). “Artisanal and Small-Scale Mining of Critical Minerals.” December 2024. <https://www.iisd.org/system/files/2024-12/artisanal-small-scale-mining-critical-minerals.pdf>.

Intini, Riccardo. “TELF AG on Why Cobalt Is Key to the Energy Transition.” TELF AG, June 13, 2025. <https://telf.ch/telf-ag-on-why-cobalt-is-key-to-the-energy-transition/>.

Jansson, Johanna. “The Sicomines Agreement: Change and Continuity in the Democratic Republic of Congo’s International Relations.” South African Institute of International Affairs, 2011. <https://doi.org/10.2307/resrep77050>.

Kalemeko, Noé. “Radiological Threat in Kolwezi: The New Congolese Civil Society Calls for Immediate Actions.” Friends of the Congo, April 1, 2026. <https://friendsofthecongo.org/radiological-threat-in-kolwezi-the-new-congolese-civil-society-calls-for-immediate-actions/>.

Kamara, Jonta, and Stephanie Bumba. “Protecting Miners’ Health in Democratic Republic of Congo.” Think Global Health, February 10, 2025. <https://www.thinkglobalhealth.org/article/protecting-miners-health-democratic-republic-congo>.

Kara, Siddharth. “Blood Batteries: The Human Rights and Environmental Impacts of Cobalt Mining in the Democratic Republic of the Congo.” 2025.

<https://www.nottingham.ac.uk/research/beacons-of-excellence/rights-lab/resources/reports-and-briefings/2025/august/blood-batteries.pdf>

Kara, Siddharth. *Cobalt Red: How the Blood of the Congo Powers Our Lives*. New York: St. Martin’s Press, 2023.

Landry, David G. “The Risks and Rewards of Resource-for-Infrastructure Deals: Lessons from the Congo’s Sicomines Agreement.” *Resources Policy* 58 (October 2018): 165–174. <https://doi.org/10.1016/j.resourpol.2018.04.014>.

Larsen, Nicholas. “Why Have Cobalt Prices Crashed.” *International Banker*, July 31, 2019. <https://internationalbanker.com/brokerage/why-have-cobalt-prices-crashed/>.

Le Billon, Philippe, Raphael Deberdt, and Julia Trombetta. “From Resource Security to Resource Securitisation: Materialities, Latent Securitisation, and the Politics of (In)Security in Low-Carbon Transitions.” *Critical Studies on Security* (August 2025). <https://doi.org/10.1080/21624887.2025.2545673>.

Livingstone, Emmet. “Uncertainties Remain with Renegotiated Chinese Mining Deal in DRC.” *Voice of America*, January 26, 2024. <https://www.voanews.com/a/uncertainties-remain-with-renegotiated-chinese-mining-deal-in-drc-/7458908.html>.

Lobito Atlantic Railway. “Lobito Atlantic Railway.” Accessed 2026. [lobitoatlantic.com](https://www.lobitoatlantic.com/). <https://www.lobitoatlantic.com/>.

Lokongo, Antoine Roger. “How Do the Congolese People Themselves View Chinese Investments in DRC?” Peking University, 2024. <https://caspu.pku.edu.cn/cn/gdhc/230857.html>.

Maiza-Larrarte, Andoni, and Gloria Claudio-Quiroga. “The Impact of Sicomines on Development in the Democratic Republic of Congo.” *International Affairs* 95, no. 2 (March 2019): 423–446. <https://doi.org/10.1093/ia/iiz001>.

Mallory, Caroline. “The Paradox of the Green Energy Revolution: Does Chinese Cobalt Mining in the Democratic Republic of the Congo Undercut Benefits of Green Energy?”

Ohio State University, 2023. <https://kb.osu.edu/items/7e9036cd-e708-4f34-9668-1e80de2fa321>.

Malm, Johanna. “‘China-Powered’ African Agency and Its Limits: The Case of the DRC 2007–2019.” Policy Insights 96, South African Institute of International Affairs, 2020. <https://saiia.org.za/wp-content/uploads/2020/11/Policy-Insights-96-malm.pdf>.

Mambwe, Pascal, et al. “Geometallurgy of Cobalt Black Ores in the Katanga Copperbelt (Ruashi Cu-Co Deposit): A New Proposal for Enhancing Cobalt Recovery.” *Minerals* 12, no. 3 (February 2022): 295. <https://doi.org/10.3390/min12030295>.

Manjonjo, Shingirirai, et al. “Reimagining Africa’s Critical Mineral Value Chains: From Extraction to Equitable Green Industrialisation in a Multipolar World.” T20 South Africa, October 2025. https://t20southafrica.org/wp-content/uploads/2025/09/T20_PB-7_Reimagining-Africas-Critical-Mineral.pdf.

Manolo, Paul. “Discovery to Production Averages 15.7 Years for 127 Mines.” S&P Global Market Intelligence, June 2023. <https://www.spglobal.com/market-intelligence/en/news-insights/research/discovery-to-production-averages-15-7-years-for-127-mines>.

Mbembé, Achille. “Necropolitics.” *Public Culture* 15, no. 1 (2003): 11–40. <https://muse.jhu.edu/article/39984/summary>.

Mbembe, Achille. *Necropolitics*. Durham: Duke University Press, 2019. <https://www.dukeupress.edu/necropolitics>.

Moss, Joseph. “Cobalt Prices Have Soared over the Last Year: Here’s Why.” International Banker, February 6, 2026. <https://internationalbanker.com/brokerage/cobalt-prices-have-soared-over-the-last-year-heres-why/>.

Murray, Aphra. “Cobalt Mining: The Dark Side of the Renewable Energy Transition.” Earth.Org, September 27, 2022. <https://earth.org/cobalt-mining/>.

“New Project Launches and Ramp-Ups Set to Lift Indonesia’s Cobalt Output in 2026.” GlobalData / Mining Technology, 2026. <https://www.mining-technology.com/analyst-comment/new-project-launches-ramp-ups-lift-indonesia-cobalt-output-2026/>.

Nixon, Rob. “Slow Violence and the Environmentalism of the Poor.” *Safundi* 13, no. 3–4 (2012). <https://doi.org/10.1080/17533171.2012.716933>.

Nkulu, Célestin Banza Lubaba, et al. “Sustainability of Artisanal Mining of Cobalt in DR Congo.” *Nature Sustainability* 1, no. 9 (September 2018): 495–504. <https://doi.org/10.1038/s41893-018-0139-4>.

Norton, Kara. “Cobalt Powers Our Lives. What Is It—and Why Is It So Controversial?” National Geographic, December 21, 2023. <https://www.nationalgeographic.com/environment/article/cobalt-mining-congo-batteries-electric-vehicles>.

NS Energy. “Tenke Fungurume Copper-Cobalt Mine.” 2021. <https://www.nsenergybusiness.com/projects/tenke-fungurume-copper-cobalt-mine/>.

Nyabiage, Jevans. “Chinese Firms Agree to Raise Investment in DRC Copper-Cobalt Mining Deal.” South China Morning Post, February 4, 2024. <https://www.scmp.com/news/china/diplomacy/article/3250881/chinese-firms-agree-raise-investment-democratic-republic-congo-copper-cobalt-mining-deal>.

OECD/IEA. *The Role of Traceability in Critical Mineral Supply Chains*. Paris: OECD Publishing, 2025. <https://doi.org/10.1787/edb0a451-en>.

Pallares, Gloria. “What Are Green Sacrifice Zones?” ThinkLandscape, April 16, 2025. <https://thinklandscape.globallandscapesforum.org/72768/green-sacrifice-zones-the-places-ruined-by-the-energy-transition/>.

Pereira, Laura M., et al. “Equity and Justice Should Underpin the Discourse on Tipping Points.” *Earth System Dynamics* 15, no. 2 (April 2024). <https://doi.org/10.5194/esd-15-341-2024>.

Perks, Rachel, et al. “Achieving Sustainable and Inclusive Artisanal and Small-Scale Mining (ASM): A Renewed Framework for World Bank Engagement.” World Bank, September 2024. <https://egps.worldbank.org/sites/default/files/2024-12/P1804001c099c40251a6861abb2dbb8b722.pdf>.

Prebisch, Raúl. *The Economic Development of Latin America and Its Principal Problems*. New York: United Nations Department of Economic Affairs (ECLA), 1950.

<http://archivo.cepal.org/pdfs/cdPrebisch/002.pdf>.

Ragonnaud, Guillaume. “EU Legislation in Progress: Critical Raw Materials Act.” European Parliament, June 2024.

[https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747898/EPRS_BRI\(2023\)747898_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2023/747898/EPRS_BRI(2023)747898_EN.pdf).

RAID and AFREWATCH. “Beneath the Green.” March 2024. <https://raid-uk.org/wp-content/uploads/2024/03/Report-Beneath-the-Green-DRC-Pollution-March-2024.pdf>.

Rakotoseheno, Solofo. “Sicomines: How the EITI in DRC Helped Secure 4 Billion in Additional Revenue.” EITI, March 25, 2024. <https://eiti.org/blog-post/sicomines-how-eiti-drc-helped-secure-4-billion-additional-revenue>.

ResourceMatters. “The Sicomines Contract: A Controversial Renegotiation and Persistent Imbalances.” May 2024. <https://www.resourcematters.org/en/ressources/the-sicomines-contract-a-controversial-renegotiation-and-persistent-imbalances/>.

Rinaldi, Pietro, and Pier Paolo Raimondi. “Minerals and the Lobito Corridor: Between Domestic Needs and the EU’s Derisking Strategy.” Istituto Affari Internazionali (IAI), March 19, 2026. <https://www.iai.it/en/publications/c41/minerals-and-lobito-corridor-between-domestic-needs-and-eus-derisking-strategy>.

Salama, Or. “The Current State of Child Labour in Cobalt Mines in the Democratic Republic of the Congo.” Humanium, May 27, 2025. <https://www.humanium.org/en/the-current-state-of-child-labour-in-cobalt-mines-in-the-democratic-republic-of-the-congo/>.

Save the Children. “Catch-up Clubs Help Stop Child Labor in DRC’s Deadly Cobalt Mines.” 2024. <https://www.savethechildren.org/us/about-us/media-and-news/2024-press-releases/catch-clubs-help-stop-child-labor-drcs-deadly-cobalt>.

Shanghai Metals Market (SMM). “Will the Global Cobalt Raw Material Production of Approximately 270,000 mt in 2024 Choke the Supply of Raw Materials?” Metal.com, March 4, 2025. <https://news.metal.com/newscontent/103207307-will-the-global-cobalt->

[raw-material-production-of-approximately-270000-mt-in-2024-choke-the-supply-of-raw-materials-how-](#).

Sharma, Neeraj. “‘Blood Cobalt’ Is Disappearing from Batteries – and Cheaper, Cleaner Batteries Are Arriving.” UNSW, February 2026.

<https://www.unsw.edu.au/newsroom/news/2026/02/blood-cobalt-disappearing-from-batteries-cheaper-cleaner-batteries-arriving>.

“Chinese Firms Agree to Raise Investment in DRC Copper-Cobalt Mining Deal.” South China Morning Post, February 4, 2024.

<https://www.scmp.com/news/china/diplomacy/article/3250881/chinese-firms-agree-raise-investment-democratic-republic-congo-copper-cobalt-mining-deal>.

Signe, Landry, and L. Johnson. “Africa’s Extractive Industries: Opportunities and Challenges.” *African Economic Review* 33 (2021): 25–45.

<https://www.policycenter.ma/sites/default/files/PP-10-21-Landry-Signe.pdf>

Singh, Kuhu. “The Political Economy of Critical Minerals: Energy Transitions and the Fractured World Order.” *Anusandhanvallari* (July 2025): 2628–2640.

<https://psvmkendra.com/index.php/journal/article/download/674/533>

Skaltsounis, Panagiotis. “The Sicomines Agreement: Strategic Partnership or Unequal Exchange between China and Democratic Republic of Congo?” *African Studies Quarterly* 23, no. 2 (September 2025). <https://doi.org/10.32473/asq.23.2.137935>.

SOMO. “Community Rights Widely Abused by Cobalt Mining in Democratic Republic of Congo.” April 18, 2016. <https://www.somo.nl/community-rights-widely-abused-by-cobalt-mining-in-democratic-republic-of-congo/>.

Sovacool, Benjamin K., et al. “Beyond Cost and Carbon: The Multidimensional Co-Benefits of Low Carbon Transitions in Europe.” *Ecological Economics* 169 (March 2020): 106529. <https://doi.org/10.1016/j.ecolecon.2019.106529>.

Sovacool, Benjamin K., et al. “The Decarbonisation Divide: Contextualizing Landscapes of Low-Carbon Exploitation and Toxicity in Africa.” *Global Environmental Change* 60 (January 2020): 102028. <https://doi.org/10.1016/j.gloenvcha.2019.102028>.

Sovacool, Benjamin K. “The Precarious Political Economy of Cobalt: Balancing Prosperity, Poverty, and Brutality in Artisanal and Industrial Mining in the Democratic Republic of the Congo.” *The Extractive Industries and Society* 6, no. 3 (July 2019): 915–939. <https://doi.org/10.1016/j.exis.2019.05.018>.

Statista. “Topic: Democratic Republic of the Congo.” 2024.
<https://www.statista.com/topics/12552/democratic-republic-of-the-congo/>.

StatRanker. “Top 13 Countries by Cobalt Mine Production, 2025.” December 20, 2025.
<https://statranker.org/economy/resources-mining/top-13-countries-by-cobalt-mine-production-2025/>.

StoneX Market Experts. “Cobalt Commodity: Pricing, Futures and LME Basics.” Accessed June 22, 2026. <https://www.stonex.com/en/business/financial-glossary/cobalt-commodity/>.

Styve, Maria Dyveke, et al., eds. *Dialogues on Development, Volume 1: Dependency*. White Rose Research Online, 2017.
https://eprints.whiterose.ac.uk/id/eprint/131850/1/dependency_theory_e_book_comp.pdf.

Sun, Yixian, et al. “Towards a Just Transition: Integrating Fair Share, Equity and Justice into Climate Transition Plans.” Lewis & Clark Law School, November 2025.
<https://www.climatechampions.net/media/uurbni2u/towards-a-just-transition.pdf>.

Táíò, Olúfèmi O. “A Unified Story for a Divided World.” *Dissent Magazine*, August 2, 2021. <https://dissentmagazine.org/article/a-unified-story-for-a-divided-world/>.

Tomaselli, Charlize. “Critical Minerals, Just Transitions, and the Right to Say No.” *Bio-economy.org.za*, April 2025. <https://bio-economy.org.za/critical-minerals-just-transitions-and-the-right-to-say-no/>.

Tossou, Emiliano. “Cobalt Prices Explode after DR Congo Halts Exports.” *Bankable.africa*, March 14, 2025. <https://bankable.africa/en/mining/1403-904-cobalt-prices-explode-after-dr-congo-halts-exports>.

“The Transition to Clean Energy Is Ethically Sound in Its Ends, but Morally Complicated in Its Means.” *ABC Religion & Ethics*, November 3, 2025.

<https://www.abc.net.au/religion/ethical-goal-decarbonisation-and-morally-complicated-means/105967834>.

Tyulebayeva, Kamilya, Frederik Hafen, and Margarida Martins. “The Right to Say No: A Legal Toolbox for Communities Affected by Mining in the EU.” European Environmental Bureau, March 2023. https://eeb.org/wp-content/uploads/2023/03/EEB_brochure_Right-to-say-no-3.pdf.

United Nations Secretary-General’s Panel on Critical Energy Transition Minerals. *Resourcing the Energy Transition: Guiding Principles and Actionable Recommendations*. September 2024. <https://www.un.org/en/climatechange/critical-minerals>.

United Nations Special Rapporteur. “The Right to a Clean, Healthy and Sustainable Environment: Non-Toxic Environment.” UN General Assembly, 2022. <https://docs.un.org/en/a/hrc/49/53>.

United Nations Conference on Trade and Development (UNCTAD). *Trade and Development Report 2024*. October 2024. <https://unctad.org/publication/trade-and-development-report-2024>.

UNICEF. “Draft Country Programme Document: Democratic Republic of the Congo.” UNICEF Executive Board, 2024.

U.S. Geological Survey. *Mineral Commodity Summaries 2024*. Reston, VA: USGS, 2024. <https://doi.org/10.3133/mcs2024>.

U.S. Geological Survey. *Mineral Commodity Summaries 2025*. Reston, VA: USGS, 2025. <https://doi.org/10.3133/mcs2025>.

U.S. Geological Survey. *Mineral Commodity Summaries 2026*. Reston, VA: USGS, 2026. <https://doi.org/10.3133/mcs2026>.

Van Brusselen, Daan, et al. “Metal Mining and Birth Defects: A Case-Control Study in Lubumbashi, Democratic Republic of the Congo.” *The Lancet Planetary Health* 4, no. 4 (April 2020). [https://doi.org/10.1016/S2542-5196\(20\)30059-0](https://doi.org/10.1016/S2542-5196(20)30059-0).

Ventura, Luca. “Poorest Countries in the World 2023.” *Global Finance Magazine*, May 6, 2024. <https://gfmag.com/data/economic-data/poorest-country-in-the-world/>.

Wang, Xinxin, and Kevin Lo. “Just Transition: A Conceptual Review.” *Energy Research & Social Science* 82 (December 2021): 102291.

<https://doi.org/10.1016/j.erss.2021.102291>.

Williams, Georgia. “Cobalt Market Forecast: Top Trends That Will Affect Cobalt.”

Investing News, January 19, 2026. <https://investingnews.com/daily/resource-investing/battery-metals-investing/cobalt-investing/cobalt-forecast/>.

Worldometer. “DR Congo Demographics 2020.” 2026.

<https://www.worldometers.info/demographics/democratic-republic-of-the-congo-demographics/>.

Wörmann, Cornelia. “Global Energy Justice: The Case of Cobalt.” Institut für

Afrikastudien, Leipzig, February 17, 2022. <https://home.uni-leipzig.de/~afrikastudien/2022/02/17/global-energy-justice-the-case-of-cobalt/>

Yin, Robert K. *Case Study Research: Design and Methods*. 4th ed. Thousand Oaks: SAGE, 2009.

Yoshino, Akira. “The Birth of the Lithium-Ion Battery.” *Angewandte Chemie*

International Edition 51, no. 24 (2012): 5798–5800.

<https://doi.org/10.1002/anie.201105006>.

Yu, Alice, and Jomar Camposano. “DRC Cobalt Export Quotas to Support Cobalt Prices, Though Challenges Loom.” S&P Global Market Intelligence, October 2025.

<https://www.spglobal.com/market-intelligence/en/news-insights/research/2025/10/drc-cobalt-export-quotas-to-support-cobalt-prices-though-challenges-loom>.

Zhang, Guofan, Yongqiang Gao, and Mengtao Wang. “Effect of Sulfidization on the Surface Property and Flotation Behavior of Heterogenite.” *Minerals Engineering* 204

(December 2023): 108375. <https://doi.org/10.1016/j.mineng.2023.108375>

Zhukov, Anton. “Cell-to-Pack LFP Lithium Batteries Outperform NMC.” OneCharge,

May 11, 2023. <https://onecharge.com.br/index.html?p=5142.html>.

Zimmerman, Jacqueline. “Sicomines Copper-Cobalt Mine: Chinese Financing for

Transition Minerals.” AidData, January 2026. <https://docs.aiddata.org/reports/china->

[transition-minerals-](#)

[2025/Sicomines_Copper_Cobalt_Mine_Chinese_Financing_for_Transition_Minerals.pdf](#)

Zimmermann, Katharina, and Vincent Gengnagel. “Mapping the Social Dimension of the European Green Deal.” *European Journal of Social Security* 25, no. 4 (November 2023). <https://doi.org/10.1177/13882627231208698>.

Zografos, Christos, and Paul Robbins. “Green Sacrifice Zones, or Why a Green New Deal Cannot Ignore the Cost Shifts of Just Transitions.” *One Earth* 3, no. 5 (November 2020): 543–546. <https://doi.org/10.1016/j.oneear.2020.10.012>.