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## **Africa Walking while Asia Runs: Cobalt Nationalism and Structural Transformation in Indonesia and the DR Congo**

**Ben Radley 0000-0001-5474-7036**

### **Abstract**

Since the late 2010s, the Congolese and Indonesian governments have designed and implemented a range of cobalt nationalist policies to drive structural transformation. Policies have centred around industrial development in the electric vehicle sector, aiming to move up the global cobalt value chain from extraction to processing and eventually to the manufacture of batteries and vehicles. Based on an assessment of the medium-term outcomes of these measures, it is argued that while both countries have enjoyed some success developing midstream industries in the refining and processing of cobalt ore, Indonesia has progressed further and at greater scale. The chapter investigates the factors that have conditioned these divergent outcomes, chief among them the stronger alignment of cobalt nationalism with Indonesia's existing industrial capabilities. It closes by considering future vulnerabilities to long-term success, including the speed of technological change away from the use of cobalt in electric vehicle batteries.

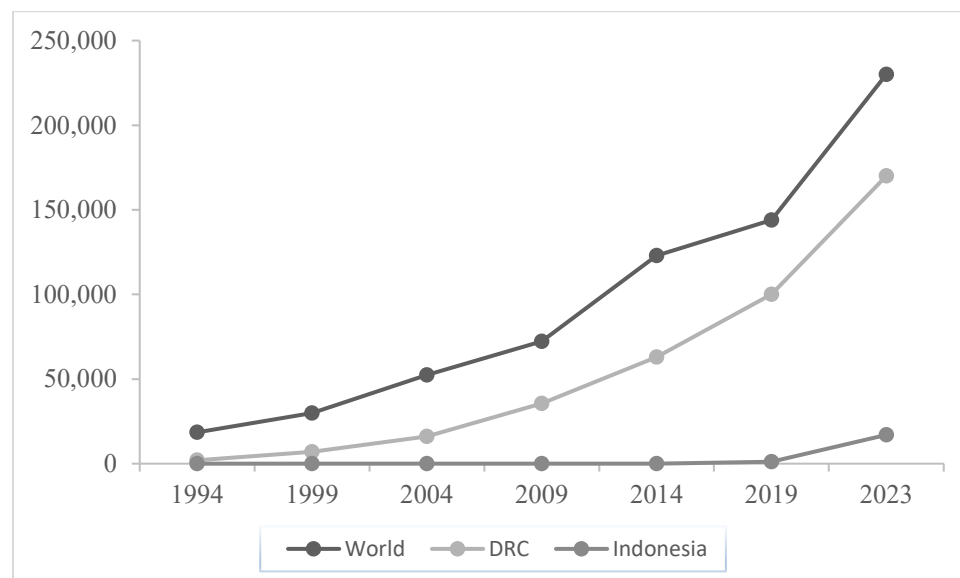
**Keywords:** DRC; Indonesia; Cobalt; Batteries; Industrial Policy

## <a> Introduction

World cobalt production nearly doubled over the last decade, from 123,000 tons in 2014 to 230,000 tons in 2023, and is forecast to double again between 2023 and 2040 (IEA, 2024a, p. 156; US Geological Survey, 2016, 2024). Resistant to corrosion, extreme temperatures and high pressure, cobalt has long been used as a superalloy in the aerospace and military industries. More recently, production growth has been driven by its use in cathode materials for lithium-ion batteries that power electric vehicles (EVs), renewable energy storage systems, and portable electronics. In 2023, lithium-ion batteries accounted for 93 percent of cobalt demand growth globally, while EV batteries alone held a 45 percent share of the cobalt end use market (Cobalt Institute, 2024).

The production and refining of cobalt are highly geographically concentrated. In 2023, the Democratic Republic of the Congo (DRC) held 55 percent of known world cobalt reserves and accounted for 74 percent of world cobalt production, while 78 percent of all cobalt refining took place in China (Ibid., p. 31; US Geological Survey, 2024). Production is just as heavily concentrated in the DRC itself. In 2020, four mines produced 41 percent of global cobalt (Manley et al., 2022, p. 13). Indonesia was the second largest producer in 2023, with a seven percent share of the world total. While the DRC has long held a significant share of world cobalt supply, production in Indonesia is a more recent phenomenon, picking up from 2019 onwards (Figure 1).

**Figure 1 World Cobalt Production, 1994 to 2023 (in metric tons)**

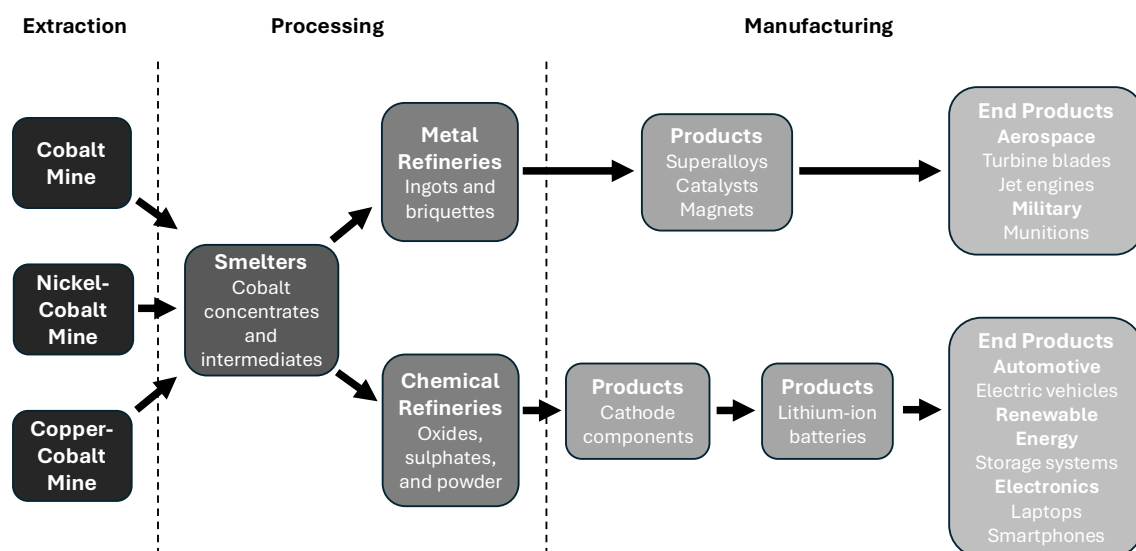


Alt text: A graph showing that cobalt production picked up in the DRC during the 1990s, growing to 170,000 metric tons by 2023, but only began in Indonesia in 2019, increasing to 17,000 metric tons by 2023.

Source: US Geological Survey mineral commodity summaries.

The two countries' dominance of world cobalt supply is forecast to hold through to 2040, with Indonesia's share increasing to around 16 percent and no other country expected to emerge with more than a two to three percent share (IEA, 2024a, p. 158). Seeking to leverage these favourable external conditions to drive structural transformation, since the late 2010s, the Congolese and Indonesian governments have designed and implemented a range of cobalt nationalist policies. Policies have centred, in both countries, around industrial development in the EV sector, aiming to move up the global cobalt value chain from extraction to processing and eventually to the manufacture of batteries and vehicles (Figure 2). In Indonesia, this strategy has been driven by the country's position as the world's leading producer of nickel, also used in lithium-ion batteries, with all cobalt produced in Indonesia as a byproduct of nickel. In the DRC, by contrast, cobalt is produced as a byproduct of copper and has itself been the primary focus of resource nationalist policy.

**Figure 2 Simplified Cobalt Supply Chain**



Alt text: A flow diagram showing the cobalt supply chain from extraction through to processing at smelters and refineries, and finally to manufacturing into products and end products.

Source: Author adaptation from Howard and Gifford (2023, p. 3)

Based on an assessment of the medium-term outcomes of these measures, it is argued that, in a reversal of former Tanzanian President Julius Nyerere's dictum that in Africa's quest to industrialise "we must run while others walk" (Mkandawire, 2011, p. 9), it is Indonesia that is running while the DRC walks, at the risk of being left behind. While both countries have enjoyed some success developing midstream industries in the refining and processing of cobalt ore, Indonesia has progressed further and at greater scale. Upstream, the DRC has yet to make headway, while in 2024 Indonesia started to manufacture EV batteries and attract

significant investments for the domestic manufacture of EVs themselves. Among other factors, the stronger alignment of cobalt nationalism with existing industrial capabilities in Indonesia compared to the DRC has been important in shaping these divergent outcomes.

Taking a longer-term perspective, a shared set of challenges and vulnerabilities remain, albeit felt more acutely in the DRC than Indonesia. First, the speed of technological change away from the use of cobalt and nickel in EV batteries. Second, the actions of China, the US, and the EU as they seek to grow or maintain their own market share in the global EV supply chain. Third, the dominance of foreign investment, ownership, and control of newly emerging midstream and industrial capabilities.

### **<a> 1. The Emergence of Cobalt Nationalism**

Towards the end of the 2010s, seeking to capitalise on favourable external conditions, the governments of the DRC and Indonesia both unveiled resource nationalist plans to capture more value-added in the global cobalt supply chain. In both countries, plans focused on developing industrial capacity to become EV battery producers. This reflected a departure from the less interventionist approach to mining sector governance that had characterised the preceding decade. In the space of just a few years, new SOEs were formed, export bans were imposed and new industrial policies introduced.

Throughout most of the 2000s, both Indonesia and the DRC operated liberalised mining economies, although with a longer history of regulating foreign investments and activity in Indonesia than in the DRC (Warburton, 2023). In Indonesia, while several state-owned enterprises (SOEs) operated in the country's mining sector, President Suharto (1968-1998) had remained open to foreign capital throughout his thirty-year tenure in office, with some companies like US miner Freeport benefiting from highly advantageous terms (Camba et al., 2020, p. 1057). This openness continued into the first decade of the 21<sup>st</sup> century as fresh US, Canadian, and Australian mining investments poured into the country (Ibid., pp. 1058-59). In the DRC, looking to reestablish the mining sector after its near total collapse prior to the Congo Wars (1996-2002), the administration under President Joseph Kabila (2001-2019) introduced a new Mining Code in 2002. Drafted under the International Monetary Fund (IMF) and the World Bank's close supervision as part of an overall effort to instil a neoliberal regime at the heart of the DRC post-war polity (Moshonas, 2013), the new code moved to privatise SOEs and attract fresh foreign direct investment (FDI) by offering a generously liberal fiscal regime, including tax holidays and exemptions and low royalty rates (Radley, 2023a).

While the 2002 Code was successful in attracting FDI to the Congolese mining sector, increasing production levels and supporting sustained high GDP growth rates throughout the 2000s, there was nonetheless a strong sense in the country at the time that sector liberalisation had had done little to deliver material improvements for the majority of Congolese. Mining sector growth had been strongly associated with the overseas repatriation of profits (Marysse & Tshimanga, 2014; Peyer et al., 2014; Trapido, 2015) and had failed to translate domestically into poverty reduction, greater household income, or the emergence of other industries (Marivoet et al., 2019; Otchia, 2015; Radley, 2023a). The country had fully ceded its resource sovereignty to foreign corporations in the space of a decade, most prominent among them by the end of the 2000s US miner Freeport, Swiss miner Glencore, and the Chinese consortium of China Railway Group, SinoHydro and Zhejiang Huayou Cobalt. The overriding sense heading into the 2010s, argued by Congolese research institutes,

civil society organisations, and youth movements alike, was that a new approach and new policies were needed to better steer the sector to serving local and national interests.

Similarly in Indonesia, Warburton (2017, p. 293) has recounted how throughout the commodity boom of the 2000s, both government and parliament became increasingly sensitive to the fact that foreign mining corporates, in particular US miners Freeport and Newmont, were the major beneficiaries of the profits being made, at the state and country's expense. Discussions began in 2007 to rethink the terms of investment for foreign corporates, centring around the idea of imposing divestment requirements to increase the equity and participation of SOEs and domestic firms in the sector. The first indications of resource nationalist interventions emerged from these discussions, with the introduction of the 2009 Mining Law. Among other changes, the new law increased royalty rates, mandated companies to engage more domestic content, and directed foreign-owned mining projects to divest shares to the government, SOEs or domestic firms (Ibid., pp. 293-294).

Similar policy began to emerge in the DRC in 2014, with the passing of an inter-ministerial local content decree instructing mining companies to procure from domestic suppliers, followed in 2017 by a subcontracting law mandating the use of domestic firms (Radley, 2020, p. 806). The introduction of a new Mining Code in 2018 continued this trend, and marked the end of a six-year battle between the Congolese government and the foreign corporations controlling the country's mining sector, who had threatened legal arbitration and mine closures should the proposed changes go through.<sup>1</sup> The major changes included an increase of state ownership in mining firms from five percent to 10 percent, new domestic processing requirements, a new windfall profits tax, royalty rates increases, and the designation of cobalt, germanium and tantalum as 'strategic minerals' (expanded to include copper in 2022) subject to a special 10 percent royalty rate.<sup>2</sup>

The DRC's designation of cobalt as a strategic mineral was the first indication in either country of a resource nationalist intervention specifically targeting the material. Yet cobalt-specific policies were soon to gather speed on both sides of the Indian Ocean, as the Congolese and Indonesian governments responded to a set of increasingly favourable external conditions, with three factors especially decisive. First, throughout the 2010s, cobalt was a major focus in a spate of newly published lists identifying so-called 'critical raw materials' deemed essential for advancing hoped-for energy transitions in buyer countries and for strengthening their national security. Highlighting cobalt's emerging geopolitical importance, lists were published by the US and Germany in 2010, the EU in 2011, and China and India in 2016. Second, from January 2016 to March 2018, soaring demand for cobalt-dependent EV batteries drove the cobalt price from around \$20,000 per ton to more than \$90,000 per ton.<sup>3</sup> While this was to prove the peak before the first of two dramatic recent crashes – the second of which was still ongoing in 2024 – it nonetheless caught the attention of Congolese and Indonesian policymakers. Not least because, third and finally, the rising price towards the end of the decade was conjoined with critical mineral forecasts envisaging anything from fivefold to tenfold growth in world cobalt production by 2050 (Sovacool et al. 2020, p. 32; World Bank, 2017, p. 17).

Inaugurated as President in January 2019, Félix Tshisekedi responded to these conditions by focusing resource nationalist policy intervention more centrally on cobalt. In November 2019, the Congolese government founded the wholly state-owned *Entreprise générale du cobalt* (EGC). EGC was swiftly designated with the sole authority to buy, process and export all Congolese cobalt produced by artisanal and small-scale mining (ASM), responsible for an

estimated 15 to 30 percent of total cobalt production in the country (Deberdt, 2021; Panella & De Putter, 2022). Until this point, ASM cobalt processing and export had been largely managed by Chinese firms and operators, chief among them Congo Dongfang Mining International, a wholly owned subsidiary of China-based Zhejiang Huayou Cobalt, which operates one of the world's largest cobalt refiners on the eastern seaboard of China (Amnesty International, 2016; BGR, 2021). According to the EGC website, one of the three pillars of its approach, alongside societal responsibility and due diligence, is economic sovereignty, with the SOE outlining its commitment to “regaining control of the cobalt industry...[and] upgrading Congolese cobalt sourced from artisanal production to promote economic development in the DRC”.<sup>4</sup>

Around two years later, in May 2021, the DRC government instituted a ban on the export of copper and cobalt concentrate, in an effort to increase the domestic capture of value-added by impelling producers to move beyond the smelting of copper and cobalt ore into concentrates to the refining of both into oxides and sulphates. Next, in November 2021, several government ministers unveiled a cobalt-led industrial strategy to move up the EV value chain from cobalt production to refining and transformation and eventually to the domestic manufacture and export of batteries.<sup>5</sup> These plans were further solidified in May 2022, when the Congolese and Zambian governments signed a memorandum of understanding (MoU) to create a regional African value chain for the production of nickel-cobalt-manganese battery precursors.<sup>6</sup> Speaking on the strategy that same year, the DRC Minister of Industry, Julien Paluku Kahongya, commented:

This great ambitious project aims not only to capture a significant share of the world market for electric cars valued at more than 8 trillion US dollars but also to help the DRC become the leading producer of electric batteries by 2030-2040, as it is, today, the world's leading producer of cobalt (UNECA, 2022).

Around the same time that the DRC was establishing new institutions and putting in place new policy to promote cobalt-led structural transformation, Indonesia began its own move in the same direction. In August 2019, three months after his reelection, President Joko Widodo introduced a Presidential Regulation mandating that the development of a domestic EV industry become a national priority. Notably, the stated motivation for this national priority, alongside the economic benefits, was to help the country meet its commitments to reduce green house gas emissions.

While Indonesia produced negligible levels of cobalt at the time, alongside the external context, internal conditions for developing an EV battery industry were favourable. Indonesia is home to one of the largest automotive industries in Asia and globally, manufacturing vehicles for sizeable export and domestic markets. In addition, and as previously stated, the country is the world's leading producer of nickel, another critical transition metal used, like cobalt, in various cathode components for lithium-ion batteries. Lastly, and also as previously stated, cobalt in Indonesia is produced as a byproduct of nickel. This meant that by simply ramping up smelting activity to extract cobalt concentrate from nickel, rather than having to bring new mines into production, it could swiftly increase production levels.

Following the passing of the 2019 Presidential Regulation, a range of nickel-cobalt nationalist policies and interventions quickly followed within an overall strategy of developing an integrated EV supply chain (Hubber, 2022). First, in January 2020, the government imposed an export ban on unprocessed nickel ore, seeking to develop its smelting and processing industries to extract both nickel and cobalt concentrates

domestically. Next, in March 2021, four SOEs in the mining and energy sectors signed an agreement to form the Indonesia Battery Corporation, intended to serve as a holding company managing the EV battery industry ecosystem (KPMG Indonesia, 2021). Around the same time, the government commissioned the construction of several high pressure acid leach (HPAL) plants, aiming to move beyond the smelting of concentrate to the refining of sulphates used in cathode components of lithium-ion batteries.

Seeking to leverage their dominant positions in the world cobalt market (and nickel, in the case of Indonesia), between 2019 and 2021, the governments of the DRC and Indonesia announced ambitious plans to move up the EV battery value chain to eventually become EV battery producers for domestic, regional, and international markets. To this end, they formed new SOEs, imposed export bans and introduced new industrial policies. In doing so, they were seeking to wrest power away from the early movers in a well-established and tightly cornered market. In 2021, China accounted for 79 percent of global lithium-ion battery manufacturing capacity, followed by Europe (10 percent), the US (six percent), South Korea (three percent) and Japan (two percent); the rest of the world held just 0.2 percent (Bhutada, 2022). A comparative assessment of Congolese and Indonesian efforts to enter this market reveals significant variation in their medium-term outcomes, with progress more advanced in Indonesia than the DRC.

## **<a> 2. Divergent Outcomes, Shared Vulnerabilities**

Considering the advances made by both countries towards their stated industrial ambitions to develop their EV battery industries, and in the case of Indonesia to develop an end-to-end EV supply chain, the last four years have seen significantly more activity in Indonesia than in the DRC. This has been due to a combination of Indonesia's greater proximity to China and access to Chinese finance, the size and strength of its pre-existing automotive industry serving domestic and international markets, and the significant role of Indonesian nickel in global stainless-steel production, which alongside its byproduct cobalt has itself been a core driver of Indonesia's resource nationalist policies.

This is not to say, however, that the situation in the DRC has not moved forward. While the Congolese state-owned EGC, aiming to take control of the country's ASM cobalt market, continues to face liquidity challenges and remains largely inactive,<sup>7</sup> there has been considerable movement in developing the midstream processing of cobalt. Following a reported \$430 million investment from Chinese state-owned miner China Nonferrous Metal Mining Company (CNMC), which owns a majority share in the DRC-based Deziwa copper-cobalt mine, the Lualaba Pyrometallurgical Smelting Plant came online in 2020. Operated by the Congolese subsidiary Lualaba Copper Smelting, in which CNMC holds a 60 percent stake, in 2024 the plant was the largest copper-cobalt smelter in the country.<sup>8</sup> All major copper-cobalt industrial miners now either send their minerals for processing at the Lualaba Plant or own and run their own smelting facilities located on-site. The smelters, including the Lualaba Plant, process cobalt concentrate into cobalt hydroxide before its export to (mostly) Chinese refiners for further processing into sulphates before being introduced into cathodes and finally into lithium-ion batteries (Deberdt, 2024, p. 4). Congolese state policy, then, has succeeded in compelling foreign investors to develop midstream processing capacity, increasing value-addition from cobalt production in the DRC.

Progress in developing local manufacturing capacity upstream has been more limited. Both the DRC and Zambia are focused in the first phase on producing and exporting battery

precursors as an intermediate input that foreign manufacturers will use in lithium-ion batteries. The establishment in 2022 of a Centre of Excellence for Advanced Battery Research at the University of Lubumbashi in the DRC indicated some intent to develop the skilled workforce required for local battery manufacturing (World Bank, 2023, p. 45). Yet in 2024, neither country held the capacity to refine cobalt into the sulphates required to manufacture the precursors, the location of the plant remained an area of unresolved disagreement between the two countries, and there was no clear plan for how the project will be financed (Olan'g & Scurfield, 2023).

In Indonesia, as in the DRC, the government's 2020 export ban on unprocessed ore had an immediate impact. Indonesia's cobalt production rose around 20-fold in the space of four years, as the export ban "drove an influx of investments in domestic nickel-cobalt processing operations" (IEA, 2024a, pp. 160-61). From negligible levels of production in 2019, by 2023 Indonesia was producing 17,000 tons of cobalt ore, catapulting the country to the position of the world's second largest producer, behind the DRC. This production increase was driven mostly by Chinese investors who responded to the export ban by committing around \$30 billion in the Indonesian nickel-cobalt supply chain, most prominent among these being Tshingshan's investments in the Morowali and Weda Bay industrial parks (IEA, 2022, p. 145).

With developments taking place on a greater scale than in the DRC, Indonesia has also developed its midstream industry beyond the processing of concentrates into oxides. Foreign investment included the construction of HPAL plants that can (unlike in the DRC) refine the cobalt sulphates used in cathode components of lithium-ion batteries. Six HPAL plants were operational in 2023, just two years after they were first commissioned (Khalil & Broughel, forthcoming). According to one estimate, HPAL facilities in Indonesia "supply nine factories accounting for over 40 percent of the global production of EVs, thereby putting Indonesia at the centre of the new global supply chains supporting the renewable energy transition" (Tritto, 2024, p. 8).

Upstream, and again unlike in the DRC, Indonesia has made visible steps in its efforts to move into EV battery and vehicle manufacturing. In July 2024, South Korean firms Hyundai and LG Energy Solution opened and began production at Indonesia's first battery cell plant. Representing a reported \$9.8 billion of investment, the cells will be used in Hyundai and its affiliate Kia's EV models. China's CATL, the world's biggest EV battery manufacturer, has also started building its own battery plant in the country.<sup>9</sup> Six months earlier, in January 2024, Chinese carmaker BYD announced plans to invest \$1.3 billion in an electric vehicle factory in Indonesia with an annual production capacity of 150,000 vehicles.<sup>10</sup> Other car manufacturers, including Japan's Toyota, Mitsubishi, Honda, and Suzuki, have voiced plans to produce EVs in Indonesia in the near future.

Indonesia, then, has made impressive strides in developing an end-to-end EV supply chain in a relatively short period of time. Looking to the longer term, however, both Indonesia and the DRC face the shared vulnerability of seeking resource-based structural transformation where demand is strongly tied to a single product – the lithium-ion battery – subject to fast-paced technological change. Alongside the quest for increasing battery density (the ability to store more electricity in fewer kilogrammes), the speed of technological change in the electric battery industry has also been motivated, in part, by a desire to reduce dependence on the DRC and (in the case of the US and the EU) China for cobalt supply (Radley, 2023b, p. 331).



While the earliest battery cathodes depended on both cobalt and nickel – nickel-cobalt-manganese, nickel-cobalt-manganese-aluminium, and nickel-cobalt-aluminium – this is no longer the case today. Chemistry changes have led to the reduction and in some instances the elimination of both. Current cobalt-based cathodes used in EV batteries contain 15 to 20 percent cobalt, down from 60 percent in the first generation of lithium-ion batteries, and the industry is actively developing 10 percent cobalt cathodes (US Department of Energy, 2019). New chemistry mixes have also emerged containing neither cobalt nor nickel, in the form of lithium-iron-phosphate (LFP), lithium-manganese-iron-phosphate, and sodium-ion.

In China, LFP batteries in Chinese passenger EVs increased from 10 percent of all EVs in 2019 to 29 percent in 2020, and there is an industry consensus that the LFP battery will continue to significantly increase its share of the EV battery market in the next five years (Manley et al., 2022, p. 10). In 2023 alone, LFP's projected share of commercial EV batteries doubled from 40 to 80 percent along with a significant increase for passenger vehicles, leading to a 25 to 35 percent drop in projected nickel demand (Ibid., p. 11). Cobalt demand has been similarly affected. Between 2019 and 2023, BloombergNEF forecasts for battery cobalt demand in 2030 fell by a factor of 3.6 (Walter et al., 2024, p. 10). IRENA (2024, pp. 54-62) has forecast that ongoing shifts in battery technologies might halve demand for both nickel and cobalt by 2030. Reflective of ever-shifting demand uncertainty, and presenting a further challenge to cobalt nationalist efforts, the cobalt price has been defined over the last decade by extreme volatility, with two major price crashes from around \$90,000 per ton to \$20,000 per ton, from which the most recent crash had yet to recover in early 2025. Seeking to address the current price slump amidst a global context of oversupply, in February 2025 the DRC announced a four-month export ban on cobalt. That same month, a DRC delegation visited Jakarta for initial discussions with Indonesian officials on how to manage global supply and pricing, including the possibility of imposing export quotas.<sup>11</sup>

An additional challenge for both countries, albeit felt less powerfully in Indonesia considering its more advanced position in the global EV value chain and closer proximity to China and the Asian market, is that China, the US and the EU want to grow or maintain their own market share in higher value-added activities along the global EV supply chain. While China currently holds a dominant position in this chain, both the US and the EU hope to leverage the low-carbon transition as an opportunity to reinvigorate their stagnating capitalist economies by catalysing massive growth in the manufacturing of renewable energy and other green technologies. In the US, for example, the Inflation Reduction Act (IRA) of 2022 aims to invest more than \$389 billion over the next ten years in energy and climate programmes, in addition to the 2021 Bipartisan Infrastructure Investment and Jobs Act, which includes \$15 billion in subsidies to the domestic EV industry (World Bank, 2023, p. 49). The IRA includes tax credits to EV manufacturers for battery packs where the materials are 50 percent sourced in the US and/or 40 percent processed or recycled domestically (Ibid.). In 2023, installed battery cell manufacturing capacity was up by 45 percent in the US and 25 percent in Europe relative to 2022 (IEA, 2024b, p. 81).

Here, Indonesia appears better insulated than the DRC, as the evidence to date suggests China's general willingness to open more market share for value addition by Indonesia-based producers. A comparable level of Chinese willingness and financial investment has not been evident in the DRC, presenting a significant additional challenge to its industrial ambitions. Meanwhile, US and EU strategy in the DRC reveals their own competing vision for the country's role in green transitions, not as a producer of green technologies, as envisioned by the Congolese government, but as a supplier of low value-added cobalt and other transition

metals in support of their own green industrialisation and job creation strategies domestically. Towards this end, in October 2023, the EU, the US, the DRC, Zambia, Angola, the African Development Bank, and the Africa Finance Corporation (AFC) signed a MoU to raise financing for a \$1.6 billion extension of the Lobito Corridor, a railway line running through the Copperbelt region of Zambia and the DRC to the port of Lobito on the Angolan Atlantic Ocean Coast. With an objective to reduce transport times from several weeks to just a few days, the US International Development Finance Corp. has committed a \$250 million loan to AFC to lead the work and is considering additional commitments of a similar magnitude. In August 2024, the first EU and US shipments of Congolese copper were loaded, with a journey time of just six days.<sup>12</sup>

Lastly, a marked feature of EV industrial development in both countries has been the dominance of foreign investment, ownership and control over both midstream and upstream activities. This creates two challenges. First, the observed tendency for FDI dominance in key industries to redirect the expected developmental benefits of industrialisation overseas in the payment for capital equipment and in a transfer of profits, royalties, and other financial payments (Sunkel, 1972). Second, while the presence of domestic firms and capitalists is difficult to locate in the DRC or Indonesia's emerging EV industries, these groups have played critical roles in post-colonial processes of structural transformation. State-business alliances, "whereby the state implements a series of incentives and rewards to persuade domestic capitalists to undertake investments in targeted sectors in the economy" (Singh & Ovadia, 2018, p. 1038), have been central to many of the sustained gains in social and economic development achieved during this period. Similar alliances will likely be necessary in the DRC and Indonesia, if domestic capitalist classes and firms are not to be suppressed by or excluded from the process, alongside tight state regulation and oversight of foreign firms to minimise the overseas disappearance of the value and profits generated.

## **<a> Conclusion**

Starting around the same time, with the 2018 Mining Code in the DRC and the 2019 Presidential Regulation in Indonesia, in recent years both the DRC and Indonesia have embarked upon cobalt nationalist industrial strategies to move up and capture a greater value-added share of the global EV supply chain. Assessing the medium-term outcomes of these efforts reveals marked divergence in their respective experiences. While the DRC has made some midstream advances in developing the domestic processing of cobalt ore, further developments upstream have yet to materialise. In Indonesia, meanwhile, billions of dollars of mostly Chinese and Asian investment have poured not only into the midstream domestic processing of nickel-cobalt, including into sulphates, but also into the upstream manufacturing of battery cells and even EVs themselves.

A few factors have been determinant in conditioning these divergent outcomes. Alongside its greater proximity to China, Indonesia has one of the largest automotive industries in Asia and access to strong domestic and regional markets for manufactured products, meaning it was better positioned than the DRC, which had neither, to attract Chinese finance and move up the EV supply chain. In addition, alongside the added demand for nickel in EV batteries, Indonesia's success in developing its midstream capabilities has been strongly dependent on the prominent role Indonesian nickel also plays in global stainless-steel production (Schröder & Iwasaki, 2023). Thus, while the case of Indonesia suggests the very real possibilities for commodity-driven structural transformation, the necessity for the strong alignment of this

strategy with existing industrial capabilities cautions against easy replicability in the absence of such alignment, as the more modest progress made in the DRC attests.

Considering the longer-term prospects for continuing to build out their downstream EV industries, both countries face some uncertainty over the strength of sustained demand for cobalt and nickel and their continued use in EV and other battery technologies. This uncertainty is most forcefully felt in the DRC, which produces only cobalt, with a growing sense that the pace of industrial development might not be sufficient to take advantage of currently favourable global conditions. This sense becomes particularly acute when considering China's hold on the EV market, the industrial ambitions of the US and Europe to grow their own market share, and Indonesia's recent progress in the same direction. As Guy Robert Lukama, the head of state-owned Congolese miner Gécamines, commented to the Financial Times in 2023, "The window of opportunity we had to drive the market and keep big value here – we lost it".<sup>13</sup> Lastly, the dominant role played by foreign investment in driving EV industrial development in both countries will require close government and state attention in the coming years and beyond, to strengthen the position of domestic firms and capitalists and ensure the anticipated developmental benefits of cobalt nationalist structural transformation accrue domestically rather than disappear overseas.

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