

Fixed On ESG, Ep. 3

Transcript

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Female Voice: You're listening to *Fixed on ESG*, a monthly podcast series brought to you by PGIM Fixed Income, an active global fixed income investment manager.

David Klausner, ESG Research Specialist: Welcome to our third edition of the Fixed on ESG podcast. I'm your host David Klausner ESG specialists at PGM Fixed Income. Today's discussion we'll focus on the role of metals and mining and enabling the low carbon transition. We will touch on a wide range of topics including the dramatic increase in demand for minerals stemming from the low carbon transition. The implications of Russia's ongoing invasion of Ukraine and the supply and demand of critical metals and the risks miners face as a result of historically poor environmental and social performance as the global community tries to deliver on ambitious climate goals. Today we are joined by Beth Gunning, Senior Credit Analyst for PGIM Fixed Incomes Emerging Markets Corporate bond research team, where she focuses on Latin America and AMEA corporate debt. We're also joined by James Malone, senior associate and ESG research specialist who focuses on ESG integration, as well as sector thematic and issuer level ESG research. Welcome James and Beth.

Elizabeth Gunning, CFA, Credit Analyst, Emerging Markets Corporate Bond Research: Thanks for having us.

David: So why don't we jump straight into the discussion? James, let me start with you here. How important are minerals and metals to the low carbon transition and specifically to low carbon transition technologies?

James Malone, ESG Research Specialist: Thanks, David. Yeah, it's great to be here, but I'll put it bluntly. Without affordable and reliable access to many minerals, I think it's going to be highly unlikely that the world will be able to meet and deliver the goals of the Paris Agreement. Minerals are critical to the production of nearly all renewable energy and low carbon technologies. And given the scale of renewable energy deployment required to meet net zero emissions, the demand for these enabling minerals is going to be simply extraordinary. It may be a hard truth to hear, but the shift to net zero is going to require a lot more mining, not less. And I think this is a point that many find surprising and has gone largely unnoticed within the climate change discourse, particularly at the public policy level. Although some attention has been paid to lithium and cobalt in the context of electric vehicles. The reality is that there's a whole complex of minerals and metals needed to support the low carbon transition and its various technologies. And without proper planning and investment, a lack of affordable supply could derail the world's decarbonization ambitions, which minerals and the intensity of their usage depends on the technology. If we take electric vehicles for example, a typical EV car demands 200 kilograms of minerals, six times the input required of a conventional internal combustion engine car. Wind turbines require large amounts of steel. Their motors are reliant on rare earth elements. Solar panels require copious amounts of polysilicon [assumed spelling] which is derived from mining and processing quartz. And the expansion and deepening of electricity grids to transition from fossil

fuels and deliver electricity to the nearly 1 billion people without power today depends heavily on copper. So, in short, yes, metals and minerals are very much critical to low carbon transition technologies. And as a result, the low carbon transition.

David: Really interesting, James and I agree that this does seem to be a fact that's often overlooked in many climate change conversations. I've certainly seen that firsthand. Now to take this a step further, can you give us an idea of just how material the low carbon transition could be on demand for transition critical minerals?

James: Well, given the low carbon transition is already well underway in many regions. I think it's fair to say that the energy sector is already a major force in mineral markets and clean energy technologies are quickly becoming the fastest growing segment for many minerals demand. In fact, the International Energy Agency or IEA, has done some really interesting scenario analysis on how demand could evolve as the transition accelerates. Under their sustainable development scenario, which aligns with limiting temperature rise to 1.65 degrees Celsius with a 50% probability without any negative emissions. Total mineral demand from clean energy generation, transmission and storage technologies will need to quadruple with EVs and battery storage alone accounting for about half of this growth. But we also need to keep in mind that the sustainable development scenario, and even more ambitious scenarios aligned to 1.5 degrees are not predictions of how the world is likely to evolve. These are normative scenarios. That is they provide a view into what needs to happen to prevent the most catastrophic impacts from climate change from being realized. Sadly, as most of us know, the world trajectory remains quite a long ways away from these scenarios with emissions rising every year since the Paris Agreement was signed, with the exception of 2020 due to COVID have now quickly rebounded to their highest level ever in 2021. But I don't want to sound too pessimistic and let my cynicism give the impression that we are completely off track. Many countries have indeed committed to aggressive action which we can see reflected in the IEA steps scenario, or stated policies Scenario. This considers only demand for minerals from government policies that have been legislated or that are announced and believed to be credibly under development. Under this more conservative scenario, you may say, the growth in minerals is still enormous. By 2040 annual demand for lithium is set to grow 13 times, graphite eight times, cobalt and nickel six times, copper demand 1.7 times all relative to their pre COVID levels. So, the bottom line is that even under the more conservative steps scenario, the demand for minerals as a result of the low carbon transition is going to be a material driver for decades to come. But we also need to keep in mind that the IEA step scenario equates to a 2.6 Celsius temperature outcome, which is far from optimal as each fraction of a degree above 1.5 C represents exponentially more risks from rising sea levels, droughts, hurricanes, flooding, you name it. So, it's really my hope that we'll see increased ambition from policymakers, which will in turn mean even more demand for minerals than the numbers that I've quoted here.

David: Now, I'd like to talk about how these scenarios inform credit views. But before we do, I'd love if you could talk a bit about how the conflict in Ukraine has potentially changed the outlook for renewables and of course, by extension minerals. As we've seen Germany is rebooting coal fired power plants. And in the U.K., we've heard about the sanctioning of new oil and gas exploration projects. So, James, would you say there's a risk that climate change is going to take a backseat to energy security?

James: You're absolutely right, David, you know, we've seen Germany is rebooting its coal fired plants. In the U.S., the Biden administration has reversed a ban on oil and gas companies drilling on federal lands. I think China is even pushing ahead with expanding coal mining capacity by something like the equivalent of the entire EU's coal production. But overall, and at least I think to date, I don't believe that some of these new supply measures that we've seen in respect to fossil fuels are coming at the expense of renewables. I think instead, we've seen is largely a substitution within the existing fossil fuel energy mix as nations seek to

reduce their dependence on Russian oil, gas and coal. Europe's repower EU plan, which was released in direct response to Russia's invasion of Ukraine is a really great example. The plan is quite ambitious and that it aims to make Europe independent from Russian fossil fuels by 2030, by accelerating its transition to renewables, with an aim of generating 45% of its power from renewables by 2030 from the previous target of 40%. As you mentioned, it also includes measures by member states to diversify their fossil fuel sourcing away from Russia, including new LNG terminals and restarting coal power plants to displace Russian gas. The same acceleration dynamic in renewables deployment can be seen in the U.K. which announced its own energy security strategy that outlined plans to increase the speed of its own offshore wind deployment by 25% by 2030. And I don't think that these decisions are actually being made strictly out of concern for the climate. The crisis has brought into focus the benefits that the low carbon transition can deliver, not just in terms of energy security, but also economic efficiency. Renewable energy economics have improved substantially over the past decade with the levelized cost of electricity from new utility scale, onshore wind and PV solar plants around \$36 a megawatt hour. Compared to gas combined cycle generators of \$60 per megawatt hour, a 40% cost improvement even before factoring in the huge spikes in natural gas prices as a result of the conflict. The marginal cost of the wind blowing or the sun shining is zero, which means that the advantage of renewable electricity prices relative to fossil fuel power generation has likely widened in the context of already installed capacity. Renewables, of course, bring their own challenges, particularly around intermittency and storage. But I think it's hard to argue against the idea that the volatility and the new outlook for natural gas prices doesn't do anything except increase the investment case and the attractiveness of renewables and low carbon technologies. Which should support global demand for many critical metals.

David: Thanks, James. And Beth, don't worry, I haven't forgotten about you. You've been very patient. So, let me bring you in here. Some listeners to our sister podcast to all the credit might have heard, Russia's status as the second largest oil and gas exporter has had huge implications on the prices of those commodities. But Russia, of course, is a supplier of many minerals and metals too. So, Beth as the metals and mining analysts covering emerging markets, how important is Russia to global metals and minerals markets?

Beth: Yes, David. I would say that Russia is quite important to the secure supply of various metals. Russia produces a wide range of metals that are critical to low carbon technologies. And this includes aluminum, copper, palladium and steel, but where we're really seeing some pressure points is with nickel, which is used in EV batteries. Russia currently accounts for 7% of the world's proven nickel reserves. But as much as 17% of Class 1 nickel which is highly refined and a pure form of nickel required for EV batteries. Class 1 nickel mainly comes from nickel sulfide deposits which make up only about 20% of recent nickel discoveries and this is further exacerbating the nickel supply that we need for EV batteries. Russia is also a key supplier of cobalt, which is also necessary for EV batteries. It's number two after the Democratic Republic of Congo which produces almost three quarters of global cobalt supply. So clearly the disruption in Russian metal supply has contributed tremendously to the recent spike in the cost of EV battery production. But metal production concentration risks extend far beyond just Russia and EV battery minerals. Even more mainstream base metals and minerals like iron ore, copper and aluminum have supply concentrations that have heavy emerging markets and geopolitical risks. For example, almost 1/3 of copper is produced in Chile, while Peru accounts for another 10%; 40% of iron ore is produced in Australia. But the next four producing countries are all in emerging markets, and they total about 44% of iron ore production. In recent years, we saw significant disruption when Brazil and Australian iron ore exports both declined suddenly. The concentration of supply in both of these countries coupled with steady demand led to a sharp spike in prices in 2019. And then again in 2020, and into 2021. This puts steel margins at risk, which led to higher steel prices, which not only impacted steel buyers, but consumers as well in the form of inflation. There is

tremendous supply concentration risks for many metals. And if any one supplier faces a sudden disruption in an already tight market with rising demand, then the impact on price can be quite swift and dramatic as we've seen in recent years.

David: Beth, the macro story you just painted is great context for my next question, as I want to talk about how these trends impact credits. So how has the energy transition impacted our relative value assessments in emerging markets? And how do you think about these new risks and opportunities in the sector?

Beth: Well, David, we have a long-term bullish view on many metals due to several factors. But of course, the transition to renewable power is a particularly strong driver of long-term demand for various metals. This is especially true for copper, steel, and nickel, among others, which all face supply limitations, it's very clear to me that greater levels of investment are needed. And the sooner the better. We've not really seen companies invest enough to keep pace with the expected demand and prices are set to rise on average, irrespective of the pace of decarbonization. Now, of course, if climate action targets are accelerated, then we would forecast even higher price increases for metals in the coming decades. A large and sustained increase in metals prices, though may actually prompt a much needed acceleration in investment. And then that investment eventually could in turn lead to a price decline in certain metals in the event there is oversupply. But that's not something I worry about today. It's at least 15 years away since the average investment cycle for a new mine is anywhere from 10 to 15 years. So, what's driving this lack of investment, when it seems pretty obvious that it's truly needed here? There's been a few different factors. First of all, there have been many regulatory constraints globally as ESG risks are more heavily considered and debated. Number two, we've seen a lot more local community opposition to new mines in recent years. And third, we're seeing the election of many populist left wing leaders in several Latin American countries. And these newly elected leaders are responding sympathetically with local communities that oppose any new mine. So, if you were to combine all of these factors, it makes sense that we're seeing a lengthening in the development times for new mines, and we're also seeing higher new mines startup costs. Higher mine startup costs, of course, will require higher incentive prices to make any new mine proposals attractive to investors. Now, with respect to the pricing of metals, I'm certainly not expecting the kind of price action that we saw in 2021 to continue. And in fact, we're already seeing a pretty significant correction in many metals prices this year. But despite the recent sell off, most metals prices should remain elevated above their long-term averages. Without significant increase in supply. I expect that the floor prices that we saw over the past 30 years will be merely a distant memory for metals critical to decarbonization. There will of course, be continued volatility in commodities, there always will be due to cyclicity, but I'm expecting a new and much higher level for floor prices than in past down cycles. Well similarly, I'm also predicting that the upper price bounds will continue to push higher during coming peak periods. So, what are we finding attractive here? Well, we particularly like low cost copper producers, which we expect to benefit from growing demand and limited new supply. We also like integrated steel producers that have captive scrap supply, which enables the company to generate more stable consolidated margins over time. Of course, electric arc furnace steel production is always preferred to blast furnaces for environmental reasons. And broadly speaking, we prefer to invest in relatively low-cost operators, which can withstand price volatility and economic cycles with relative ease. Their higher profit margins and more stable balance sheets allow them the financial flexibility necessary to continue investing at this crucial juncture. It also allows them to focus more on ESG risk mitigation that weaker companies struggle to adopt.

David: Now I'm sure I'm biased here, Beth. But that all sounds like very solid analysis to me. Now, let's bring this back to the low carbon transition. If there's one main takeaway I've gotten from this discussion so far, it's that metals really are a key driver of the low carbon transition. But of course, when most of us hear about the sector, the first thing we think about are images of polluted water, stripped land, and even forced relocations

of local communities. James, and Beth, how exactly should we think about miners from an ESG impact perspective? And just as a reminder to our listeners, when we're talking about ESG impact here, we're talking about the impact the company has on the environment and society, which is very different than talking about ESG risk, which looks at the impact environment and society have on the company.

James: Assessing the ESG impact of miners is certainly a complex issue. Most people tend to view all mining as being inherently bad for the planet and society. This is overly reductive, in my view at least. But it's easy to understand why people think this way. As you outlined, we've witnessed some pretty catastrophic disasters and completely unacceptable behavior over the years in the mining industry. Tailing, stamps, collapses, where pools of toxic mud created as a byproduct of the mining process have broken and wiped out entire communities, waterways that local people rely on for their drinking water and livelihoods have been poisoned with heavy metals. And there's been wide scale reports and incidents of violence and sexual assaults within mining communities just to name a few of some of this bad behavior that we've seen in the past. We do, however, need to keep in mind that these tragic events aren't necessary conditions for mining operations, and they're absolutely avoidable. The issue is that many mining companies have a poor track record. And this has led to a general mistrust of all mining operations. On the other hand, I also think that there's a fundamental lack of recognition amongst the public and ESG investing community of the value and positive impacts that mining brings. Mining operations deliver high quality jobs that tend to benefit non degreed workers in remote communities. The royalties that these minerals generate, fund critical government services and deliver valuable infrastructure. Finally, and I think I was just as guilty on this point, we tend not to appreciate that everything we know and value in our modern life is reliant at one point or another, on the base metals and minerals that these miners produce, including the low carbon technology is essential to meeting deep goals at the Paris Agreement. So, as a result, there is a fundamental and often complex tension in mining in ESG, which demands a nuanced and holistic assessment. This is why when assessing not just mining companies, but all issuers in all industries, we consider not only the operational impacts of the issuer, but the benefits or negative impacts of the company's products and services on the environment and society. In the context of miners. Their products are of course the minerals and metals, which themselves don't have any direct impacts. So instead, we look at the end markets and products and services that they enable. Metals within markets that are largely discretionary in nature, such as gold and diamonds are viewed less favorably within our framework. Whilst metals that enable things like the low carbon transition, and electrification such as copper, lithium and cobalt are viewed much more favorably. The impact from the miner's product and services is then assessed against how well they are managing to minimize the negative impacts from their operations, which includes severe penalties to reflect controversies. And this is where most miners fall down. Beth, do you want to jump in here?

Beth: Sure. Those are all great points, James and I agree assigning ESG impact ratings to mining companies that are both bad actors in some ways, but also critical for decarbonization, at the same time is an analytical challenge to say the least. When it comes to rating assures many of the metals names that I follow would have high ESG impact scores if selling a product critical to renewable power was the only criteria. But as you rightfully point out many mining companies have long been criticized for environmental damage to local communities as well as health and safety issues. So, the average ESG impact scores for my coverage tends to be on the lower end of the scale. My coverage is also domiciled in emerging market countries where regulatory oversight tends to be more limited, and governance is also often weaker. There are differentiating factors however, such as a company's operating track record, its labor relations, and its sustainability plan around managing emissions, waste and water usage. One key factor we always consider with miners is the type of tailings dams used. We examine not only the type of tailings dam, but the age of them, the thickness,

the location, and the height and the capacity. Larger dams while certainly more cost effective for companies pose greater risks to the surrounding communities in the unlikely but highly severe event of rupture. The quality of regulatory oversight is also imperative when evaluating mining companies. This is where the country of operation can influence the ESG impact rating. Using again the example of tailings dams, some countries still have upstream tailings dams, which have proven to be dangerous as they can rupture more easily than stronger dam construction methods such as downstream and centerline. It should be noted that most of the countries that still have upstream dams are moving quickly to decommission them now after some serious accidents in recent years. In countries with better regulation and foresight, even within emerging markets, regulators forced companies to decommission upstream tailings dams many years ago in favor of stronger dam structures, or dry stacking. We tend to rate our issuers in those jurisdictions much higher than some of our mining companies that still have upstream dams. Hopefully, this example illustrates the kinds of risks and mitigants that we consider when differentiating between companies within an industry.

David: Okay, so last question for you both. With the backdrop of rising demand for these metals, it really does feel like miners are facing an uphill battle when it comes to convincing stakeholders that they're improving their practices and should be given that social license to expand their operations. So, what do we need to see from companies and policymakers to help ensure the world can deliver on the low carbon transition in a responsible way, particularly as we've seen the cost of many renewables technologies increasing as a result of rising metals prices? James, why don't we start with you, and then Beth, you can jump in.

James: Thanks, David. You're absolutely right, we need to see some radical changes from both miners and governments. As you point out, the key risk here is that the rising prices that we've seen, in large part due to the limited supply growth outlook is going to become a greater headwind for renewable technology, pricing and competitiveness in the future. Coming after two years of fiscal policy aimed at addressing COVID and the threat of a global recession, it's not clear whether governments will have the fiscal firepower to accommodate the rising cost of renewables and electric vehicles, which could spell disaster for the world's climate ambitions. But the good news is that in recent years, I would argue that we have seen a marked improvement in the way that many miners are managing their operational impacts, both in terms of better environmental performance, and from a social perspective through better engagement with stakeholders and sharing the benefits of mining company's operations with local communities. The issue is that building trust takes time and time isn't something that we have a lot of. So, to answer your question, I do think we need to see a few things. First, from companies, I think we need to see continued performance improvement in terms of managing their operational impacts on the environment and society. Combined with binding commitments to responsible mining principles that benefit as many stakeholders as possible. Second, I'd like to see governments increase the strength of their mining regulators and regulations to help give the public confidence in the commitments that are being made, and that companies are held accountable for any missteps. At the same time governments also need to recognize that increasing the production of many low carbon transition critical metals as being in the overriding public interest to help streamline responsible projects. This is something that we've seen with renewable energy in the EU, and I think it's something that we need to see replicated for critical metals mining. Finally, and most importantly, we need to reduce the metals intensity of our economies and promote recycling. Yes, we need to massively increase the supply of many of these minerals. But recycling and lifestyle choices are also extremely important levers that can be pulled to decrease the amount of mining that we ultimately need to bring to bear.

Beth: I would echo James's points. From my perspectives, I would like to see greater cooperation and coordination across various interest groups, more of a public private partnership than what we've seen so far. I think we need governments who work closely with businesses, scientists, local communities and regulators to make sure that social and environmental risks are addressed while also ensuring that investment will be sufficient to meet growing demand. Governments, I think need more clear and consistent policies than what they have currently. They need to develop some incentives for miners. Policies need to be focused on sufficient and responsible investment in mines. Number one, this can happen through the form of tax incentives, and also through funding incentives. A second area of focus for the government would be policies that would increase investment in science and research and education that would facilitate the development of new technologies that we need to allow for greater mineral extraction from current water bodies and tailings that would have less impact to the environment. For example, we're actually seeing some very interesting work done currently in the copper space with respect to the extraction of copper, from low grade ore bodies and tailings that many people had written off as uneconomical. Now, so far, the results have not really proven to be commercially viable on a large scale yet, but I really think it's just a matter of time before it will be. Now on the corporate side, I'll reiterate a little bit of what I said earlier. Number one, I think we definitely need more investment and mind development. There's been widespread under investment for many of the reasons which we've already mentioned in the podcasts. Number two, I think the companies must also invest in R&D so they can develop newer, more efficient and greener extractive technologies. The third thing I'd like to see from companies is also greater coordination with various interest groups, and that includes their own employees and labor unions. And fourth, I think companies really need to reexamine their dividend policies. In recent years, companies have favored extraordinary dividends above all else during periods of high metals prices. As a reminder, most mining companies are for profit entities with shareholders that want excess profits paid out in the form of dividends. In hindsight, though, I think many of these companies may regret not investing more today if production fails to keep pace with the expected demand tomorrow. And I think this is really where government incentives would encourage more investment that would generate enough production that we need in order to reach net zero goals. As prices on average reach higher levels, the company should divert some of these excess profits into ESG related targets and higher production. Something else we need is greater global coordination to ensure that key metals reach the optimal buyers who can use metals most efficiently. For example, as James mentioned earlier, the development of metals recycling strategies across countries would greatly help especially in countries with low levels of recycling currently. And then finally, another important factor to consider is the financing of mine development and R&D. Banks and Capital Markets must be willing to provide financing at reasonable cost to the mining company, and not just during periods of high metals prices, as we saw in past cycles. And again, this is where I think governments can truly lend a helping hand, either through loan guarantees or concessionary financing through development bank's ESG labeled bonds, of course, could play a role as well and ESG mandates, inequity and bond funds can also assist mining companies to develop new and existing mines in a more responsible way.

David: Well, that is it for us today. A big thank you to Beth and James for joining the podcast, as I think our listeners will agree this was really an engaging discussion. So goodbye for now. And please be on the lookout for future episodes of Fixed on ESG available wherever you get your podcasts.

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