

DevelopmentAid Dialogues

Episode 20 Season 3



Season 3. Episode 20: Is the era of EVs really green?

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Hisham Allam: Hello, everyone, and welcome to DevelopmentAid Dialogues. I'm your host, Hisham Allam. Think of a quiet street early in the morning. A car passes you, no engine sound, no smoke, only a soft sound, and on the back of the car, a promise, zero emissions. It feels like a clean future has arrived. But that quiet car began its life far away, deep in the ground, in a salt lake in the desert, in a mine in Central Africa, in a mine cut into a forest.

Last year, the world sold more than twenty millions of these cars. That is one of every four new cars on Earth. So today, we ask one simple question, is the era of EVs really as green as it looks? To help us answer it, I'm happy to welcome Peter Bryant. Peter is a board chair of Clario, a firm that advises mining and energy companies. He's also co-founder and board chair of the Development Partner Institute, which works to improve life for communities near mining projects, and he leads the key mineral forum in Washington.

Peter welcome to DevelopmentAid Dialogues.

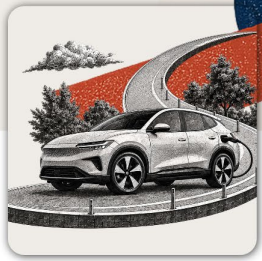
Peter Bryant: Hisham, thank you for having me here for this very important discussion.

Hisham Allam: Thank you. Let's open with the celebration itself. In twenty twenty-five, more than twenty million electric cars were sold worldwide. One in every four new cars and EVs are celebrated as the flagship of the green transition.

From where you sit, advising the companies that supply the raw materials, does the celebration match reality?

Peter Bryant: Hisham, I think it's a great question, and I think there's a number of dimensions to this. I think one is what I call materials intensity and the environmental footprint of the resources that go into an electric vehicle which are rather high.

And I don't think all the studies fully acknowledge or recognize, the energy, water, and waste intensity of the materials that go into an EV. I think secondarily, obviously, I don't think they consider quite fully the energy source for the electricity that recharges those EVs. And I think thirdly, if you're truly concerned about bending the emissions curve as fast as we can, which we should be, then hybrids become a much more important factor.



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And in fact, hybrid sales, I think plug-in and regular hybrids are about thirty million of the hundred billion new cars that are sold each year. And just my last point here, too, is we should be very focused on replacing the eight hundred million cars that are on the road that are over ten years old as fast as we can.

So, I think just being blind faith in EVs both from: A - They're not as green as people make out, and B, they're not the panacea for the next twenty years either.

Hisham Allam: That brings us to a phrase you are known for. You have warned of a looming minerals famine. What exactly do you mean by that?

Peter Bryant: A minerals famine. This is, gets down to materials intensity too. So, we have the IEA and S&P publish statistics. So, minerals famine is where we have an extreme shortage of minerals that are available. And I always pick copper, 'cause that's the metal of electricity, and it's not substitutable, so there's no alternative chemistries as there may be lithium.

And nickel's also a problem child, if you like. So today we produce 25 million tons or thereabouts of copper. That needs to almost double in the next 10 years. And by the best estimates, we're, we will be 10 to 12 million tons short per annum of copper by 2035. And this is significant.

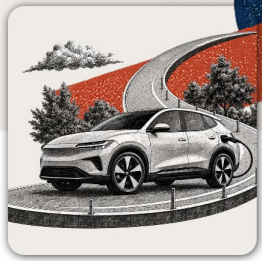
And just to give you an idea what does that actually mean, 'cause people go, "What's a ton of copper actually mean?" So that would mean 1,800 gigawatts of electricity from solar shortage, or 150 million EVs, for example, could have been built. And this is year over year. And this gap is based on all the projects that we see lined up.

And because it takes 15 to 25 years to develop some of these mines there are pathways that right now the industry's not considering that may get us that close that supply gap. But, if you look at copper, you look at nickel, you look at lithium, you look at all the current projects, you look at the capital needed for both extraction and processing, there will be a famine.

And by the way, this is before we've seen this massive acceleration for electricity from AI. And again, electricity needs massive amounts of copper and nickel. So, I think the famine's only gonna get exasperated not shortened.

Hisham Allam: Now, we will come to this point later. But let's put some numbers on that famine. The International Energy Agency projects lithium demand growing fivefold by 2040 and estimates around \$80 billion of mining and refining investments is needed. Can the mining industry physically keep up with what electrification is asking for it?

Peter Bryant: No, they can't.



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And the investment required for lithium, copper is significant. So, you mentioned for lithium it's eighty billion. For copper it's somewhere between two hundred and fifty and three hundred billion. So, when you add up all the different minerals, you're approaching potentially half a trillion dollars of investment required.

That is significantly beyond what the industry can do. And then we're also suffering from a capital deficit because of the risks, because of how long it takes to develop mines. There's not a lot of capital that's willing to invest in these projects, and often these projects are in high-risk areas.

And even the government funding we're seeing, particularly from the US government, we're talking single digit billions for small numbers of projects. Lots of memorandums of understanding. So SAFE just published a report that a lot of these promises of money aren't actually materializing into actual projects and actual commitments.

So, we have quite a challenge. And that's even before we talk about, this de-risking of the supply chain.

Hisham Allam: So, from demand, let's move underground to where every battery begins. Every EV battery starts its life in a mine. Lithium, often from water-stressed regions, cobalt and other metals from ecological sensitive areas.

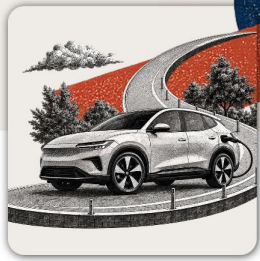
How significant is the environmental footprint of extraction? And do you think it is comparable to the exhaust emissions of EVs?

Peter Bryant: Absolutely not, I'm afraid to say. I think there's a couple of dimensions here again, Hisham. There's first the environmental footprint. So, I think that all the studies again try and quantify emissions from mines, but they don't quantify water. So ICMM, which is the pinnacle mining body in the world, actually published a report only last week that said about sixty-seven percent of all mines; all minerals; are in water-stressed areas. And as we can see from this summer, I think that's only gonna get worse, not better.

So yeah, as we've seen with copper last year, a lot of existing supply can be severely disrupted by these. So, these don't consider the water aspects. It doesn't consider the biodiversity impacts. Doesn't consider the social impacts, particularly on indigenous communities. And just so you know First Nation Major Projects Coalition, who we work with in Canada, state that eighty percent of minerals that we require globally either sit directly on or adjacent to indigenous lands.

So, I think there's a huge dimension there that we overlook as well. So, all of these factors I think need to be put into the equations for EVs, and I will maybe later on talk about, Toyota's strategy of one six ninety, I think which is significant, which is, the amount of materials required for an EV versus a plug-in hybrid or a hybrid.

Hisham Allam: Peter, part of the challenge is not just how much we mine, but where. The Democratic Republic of the Congo supplies around seventy percent of the world's cobalt, and refining is highly concentrated, with the top three countries handling roughly eighty-six percent. As a practical matter, what



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does that concentration mean for supply security and for environmental and social standards across the chain?

Peter Bryant: Exactly. So, if you look at supply chain security obviously you see the US and Europe are very focused on de-risking the supply chain from the concentration, particularly of processing across the supply chain of China. But these concentrations are significant and, China has a heavy concentration of mainly processing, but also extraction differently for each mineral.

For example, it controls the nickel supply through ownership and processing in Indonesia. Rare earths, it's all the extraction and processing in China. Copper, it controls sixty percent now of smelting. So, for the US and Europe and all that to de-risk from that is, is a tall order.

You can't dial back to zero. And minerals, in terms of extraction, God placed minerals exactly where they are. We can't change that. So, like you mentioned, for Congo. So, I think, it's about coming up with a strategy for better partnering, but also how do we approach these countries to ensure that they can capture more and more of the value of their endowed resources, which is only fair.

So, we can't say, "Send me your minerals. Don't send them to China." I just don't think that's a valid strategy and one that we're getting enormous pushback from countries as they wrestle to get more value. And I think, again, with that strategy, - that's the only way you get to that kind of responsible extraction and processing where you lessen the environmental footprint and keep up to a particular standard.

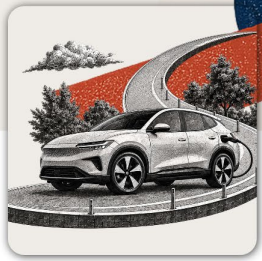
Western companies, the big challenge is to do that, but also to do it at the lowest cost. 'Cause, we've seen downstream, whether it's car companies; they're not gonna pay a premium for metal, for minerals. They're just not. There's no evidence that there's any significant user of minerals that wants to pay a premium based on either the source or whether that's mined or processed in a better way than the alternative.

Hisham Allam: You have spent a year thinking about the people who live next to these operations. Through the Development Partners Institute, you focus on outcomes for communities near resource projects. What does responsible mining actually look like on the ground, and where have you seen it done well?

Peter Bryant: Yeah. So, this is a big focus for the industry, and I think that the industry is making progress on this, Hashim.

But at the same time, the expectations and demands of communities, especially indigenous communities, is growing faster than the progress, I have to say. So, I remember when we did visits 10-plus years ago to the Vatican and also to the Church of England, and one of the things that was said to the mining CEOs that we took, which was about a dozen of them, was that "You can't show me a community that's better off when mining's left than they were before mining arrived."

And there's always exceptions. So, as we fast-forward today, yes, we've gotten better. So, some good examples are in South Africa. It's now a formal organization which we actually were involved with. The beginning was the Impact Catalyst, where we helped first in the Limpopo Province, and this involved



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AngloGold Ashanti, I'm sorry, in Exxaro where the revenues for mining were used in partnership with the government and other organizations to build other economic sectors up.

So, when mining left, the community and the region was more prosperous than it was before. So, I think that's a shining example. Specific mine is Anglo American's Quellaveco mine in Peru, I think is a standout as well. And lastly, there's several First Nation major project coalition projects in Canada, like Monago, and also there's a First Nation that has an equity stake in Canada Nickel Company.

But I think where First Nations want to get to, is what's happening in New Zealand with the Māori. So right now, what's happening is we're seeing-- Indigenous people say I want participation, not consultation. So, what that translates into is ownership. So right now, outside New Zealand, what mining companies and governments are doing is selling equity stakes in projects to the indigenous people.

In New Zealand, where they're at, geothermal is the indigenous people actually own the project and sell equity stakes to the operators. So, which is a total of 180. So, I think that's where we need to get to. So, we are seeing better performance at a mine level. I still think there's a gap between expectations that are socially, economically and there's a way to go.

There are good examples, but the industry, governments are still... I think have a long journey to do this.

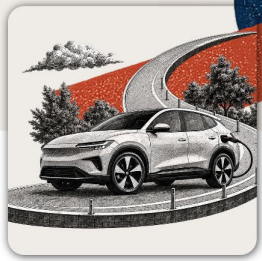
Hisham Allam: Yeah, I totally agree with you. Peter, let's test the central climate claim head on. The mainstream studies say EVs cut lifetime emissions by roughly 50 to 70% and repay their manufacturing carbon cost within about fifty thousand to twenty-five thousand miles of driving. Do you accept math? And what conditions from grid mix to battery size make it true or false?

Peter Bryant: I don't believe it. That's one. I think it's a utopian calculation. And I think the danger with advocates for EVs is they ignore hybrids. And I might be singing out of Toyota's hymnbook right now.

If you're not- anti-oil and gas, which I think people that are just, "EVs are the only way to go," they're just simply anti-oil and gas people. You're not going to eliminate oil and gas from the energy markets or any market by just replacing- the vehicles. So, I think what we need to be thinking is with a given amount of materials, a given amount of electricity in the market, and the urgent need to reduce emissions, as we're seeing, with the fires in Europe, the climate right now, is we get more bang for our buck from hybrids and plug-in hybrids today.

So, for example, Toyota talks about materials that we put into one EV, I can build six plug-ins and 90 hybrids. Take 90 hybrids, which will enable us to replace those 10-plus-year-old cars, that reduces emissions 26 percent more than one EV. Okay? So, I think it's a combination.

So, I think for us to say, "EVs are the green, this is what they're gonna do," I think two things. One, we can't be solely focused on EVs, and I don't think that they provide the benefits in the timeframes and miles that are talked about. 'Cause what happens if all the electricity is generated 100% via coal?



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What happens if the processing plants are gas and coal? So, I think a lot of the assumptions in these models, as we keep finding, are based on some utopian vision of the future with innovation. So, I think we need to be careful, and to say that these are the only solutions for the future of vehicles.

Hisham Allam: So, if mining is the front door of the battery story, recycling is supposed to be the back door. Today, recycled lithium covers only around three percent of the supply. Yet the IEA says battery cycling could meet twenty to thirty percent of the demand for lithium and cobalt by twenty-five, for example.

So, is recycling a genuine solution or a comforting story we tell ourselves while the hard work stays undone?

Peter Bryant: Great question, Hisham. I think it's again the assumptions. So, I don't think the assumptions they make are right, and I think the plastics industry is an insightful lesson for us.

So, if you look at metal, the statistics you just mentioned for lithium, cobalt, copper is at a thirty percent recycle rate right now for global supply, and it's not gonna budge much. The question is, can I collect and recycle materials at the lowest possible cost and feed it back into the supply chain?

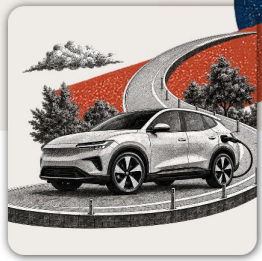
The plastics industry is a hundred percent focused on almost a hundred percent recycling, and yet they're not able to achieve recycling plastic at a lower cost than new plastic. There are some elements. So, there's just so many assumptions around innovations in getting there. I believe that if we're gonna satisfy the demand for minerals in the future, my fundamental belief is that we need to think about no new mines.

We need to recycle as much as we can, but I don't think we'll get to the rates that we are. We need to be thinking about thrifting, using less and less resources to do a given task, like hybrids use less copper. And thirdly substitution, is we should be investing in what are materials that we can do to substitute some of these metals, so we don't have to mine them.

So, I think there needs to be a much broader strategy. But I think just to hope, throw out a number, thirty percent recycling, therefore we don't need to do the hard work, as you said creates a blind comfort. And in ten years it'll be like, "Why isn't there copper?" or, "Why is copper five times the price than it is now?"

Hisham Allam: You sit close to the technologies trying to change this picture. Through your advisory work with emerging technology companies, how new approaches to extraction and battery chemistry up close. Which innovations genuinely excite you right now? Direct lithium extraction, new battery chemistries, and which are just hype?

Peter Bryant: It's interesting, yeah. So, I'm very excited and I'm an advisor to Lilac, but I really love direct lithium extraction because it's got higher recovery rates; it's faster and uses way less water. So, I think direct lithium extraction is definitely a path forward, and we need to accelerate its adoption and scale.



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And I think there's good progress being made there. I think on battery chemistries, there's just so much promise, whether it's sodium-ion batteries or other chemistries. The danger is, I think that has lithium, it's a bit like the old videos, VHS versus Base Beta. Beta was a better technology but never overtook VHS in the video days 'cause VHS just had too much of the market.

So, I always wonder, has lithium just captured too much of the battery market to, for the other battery chemistries to come in? And obviously different battery chemistries for vehicles versus grid-level storage. So, we need to be careful there. But again, as lithium continues to improve, I think there's a lot of hype around these alternative chemistries.

We'll see, but I think it's a little bit overhyped personally. I think another area, a couple of areas that are adjacent to batteries, but not as bioleaching, which excel- is again a better extraction for copper and also new technologies to extract copper out of waste. So, there's a lot of exciting technologies and also adapting fracking technology or unconventional oil and gas drilling technology to just extract copper or other resources without having to develop big new mines is a very exciting area.

And companies like Nova Mera and Stealth Minerals are leading that push. So, there's some very exciting areas. I think what we're not very good at as a sector with our downstream partners and governments is thinking about prioritizing, which is most important in terms of supply, environmental footprint, and what are the different trade-offs for each approach.

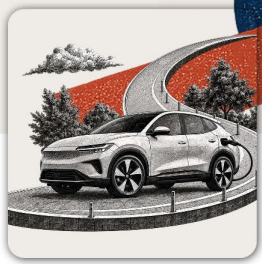
Hisham Allam: So that leads me to the next question where the two clocks don't match. A new mine can take ten to fifteen years to open, while policymakers set EVs targets on much shorter timelines. Through the key mineral forum, you work directly with legislators on exactly this problem.

How do we bring those two clocks together without ignoring climate ambitions on one side or setting up a supply shortage on the other?

Peter Bryant: This is a great question. This could be one issue facing us. So, if you look at the Kingdom form, obviously we're dealing very specifically with the US, but we're also having experience through other work with other countries.

So, there's no evidence that there's an acceleration in the permitting and developing of mines. So, there's two dimensions. There's, I call it the permitting, the twenty-year nightmare, which is heavy permitting. But it's, a lot of countries, it's not just mines, it's all infrastructure. So, the US just to even permit a power line from a wind farm can take fifteen to twenty years, not just the mines.

So, I think you're right. There's a total misalignment between ambition and goals and the time it takes to permit. So, in mines too, because mining is becoming so technically difficult because we know that all the good resources have been mined. So, we're talking about greater depth, low grade so technically becoming increasingly difficult.



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And unless we do technology innovations to actually not new-- not need these big new mines, we're gonna be stuck in this complete disconnect between time frames. 'Cause even, the thing I say, even if I'm sitting on a world-class copper resource today, okay, remember that deficit starts at twenty thirty-five.

It's gonna take me twenty years. And I'm not sitting on any. But if I was, that wouldn't come online till twenty-six to twenty-five. So that's a ten, fifteen-year mismatch. And I don't have those resources. So, my provocation always is we need to look back at what we are doing and improve recovery rates, extract the resources that are in waste, et cetera.

'Cause that's what-- we know the minerals are there. We just haven't figured out how to do it in a cost-effective way. But yeah, the legislative requirement I think is beyond most governments. And then lastly, how-- if we do accelerate things, how do we do it in a way where we don't compromise environmental issues and responsible mining and processing?

And also, how do we not ride roughshod over indigenous communities? So, it's a difficult challenge for governments and the industry, in fact,

Hisham Allam: So, this is where our audience lives. It's about the development community. Africa's EV sales grew from about four thousand cars in twenty twenty-thirds to nearly twenty-five thousand in twenty twenty-five, led by the Gulf, Egypt, Morocco, and South Africa.

Yet most mineral-producing countries still export their resources raw. What would it take for producing countries in the Global South to capture more of the value of refining manufacturing jobs? And what should development institutions and donors focus on to support that?

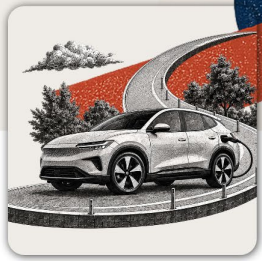
Peter Bryant: Yeah, fantastic question, and this has been one of my hobby horses, if you like, Hisham. So, a lot of countries that have minerals are poor.

So, I've sat at ministerial roundtables with African ministers, and you look at these countries, and they're poor. They're developing, but they have GDP per capita of, in single digit thousands. That's unacceptable, so we've got this dichotomy going on where the West is going for security.

Send your minerals to me for processing. The countries that have the resources are going: "No, I wanna capture more of the value, which is I wanna capture more downstream activity," whether it's producing anodes, cathodes. I wanna do the processing, et cetera, even as far into the manufacturing.

That takes infrastructure, electricity a lot of the time, 'cause a lot of these countries have poor electricity. So, I think there needs to be a thoughtful investment from development agencies, et cetera. And I've, worked with Saudi Arabia on their future minerals framework and worked with African ministers.

So, it's like to do that, you need to build up infrastructure. And we see some of that happening with railroads and cetera. But, how do you do it in a way that's rapid? And so, the example would be, let's say, I want to reduce, say, lithium processing in China by thirty percent. So where do I locate the processing plants?



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Do I put it where the resource is? That's the most sensible thing. And then I commit the investment to build those plants, build the electricity infrastructure required and other logistics infrastructure to make that happen. I personally think this is urgent because I don't think it's acceptable to tell a country that has a resource, "Just ship it to us," and you lose all that downstream value because that in no way, shape, or form helps grow the prosperity of that particular country, whether it's Congo, Zambia, Argentina, Peru, Chile.

I think we really have to be way more thoughtful in how we do that. And I think development agencies, whether it's the African Development Bank or whatever it needs a collaboration set of partnerships between mining companies, development agencies. In our early days, we did a lot of work with UNDP and governments and public and private sector financing too to come together to make this happen.

Because of the numbers we talked about before, two hundred and fifty billion, eighty billion. It's around hundreds of billions of dollars. This is a significant investment. And I think at some point, maybe the AI companies will start paying attention as well,

Hisham Allam: My final question to leave with our listeners, 10 years from now, when someone asks whether the era of EVs was truly green, what do you hope the honest answer will be? The final word is yours.

Peter Bryant: I think what I would like to see is for it to be truly green is that we can sit back in 10 years and say 80% of the 850 million vehicles that are 10 years or older have been replaced by either EVs or hybrid vehicles.

And that would be a significant reduction in emissions. Two, that to satisfy the increased demand for critical minerals that we, in fact, for almost 80% of that, we didn't need to develop new mines. Instead, we innovated with new technology. And thirdly, the standard becomes that indigenous communities own the resource and sell equity back to the operators, the miners, and other companies that extract and process the resources.

I think if those three things happen, then we can look back and say we've done a pretty good job with this evolution and transition

Hisham Allam: Thank you, Peter. If there is one thing to take away from this conversation, is that the real question was never are EVs good or bad? It is whether we are willing to face the full cost of the green transition honestly, and to manage it with care from the mine to the road. Peter, thank you for your time and your expertise, and to everyone listening, every great transition starts with a hard question.

This has been DevelopmentAid Dialogues. I'm Hisham Allam. Keep asking the harder questions, and we will see you next time. Goodbye.