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Podcast Interview Transcript

*Guest: **Ashley Zumwalt-Forbes**, former U.S. Deputy Director for Batteries and Critical Materials; Principal at Smoketree Resources*

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Topic: Financing critical minerals supply chains in the U.S. and Canada

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Introduction

Pascale: Hello everyone, I'm Pascal Massot, Asia Pacific Foundation of Canada's John H. MacArthur Research Fellow and Associate Professor at the University of Ottawa. And today I'm delighted to welcome Ashley Zumwalt-Forbes. Ashley is an engineer who served as the U.S. Department of Energy's Deputy Director for Batteries and Critical Minerals. She's now a principal at Smoketree Resources and also a non-resident fellow at Rice University's Baker Institute for Public Policy, where her work covers price formation, byproduct economics, and critical minerals finance. And I think she has a truly unique perspective on building secure and resilient critical minerals supply chains. She offers a steady stream of trenchant analysis on the current critical minerals landscape. So, I'm really delighted to welcome you on the podcast today, Ashley. It's great to have you.

Ashley: Thank you so much for having me, Pascal.

Introduction to the Critical Minerals Landscape

Pascale: Let's get started. I thought we could ask a broader question. You know, the narratives around critical minerals have really evolved fast over the past five years. And we've gone from discussions that we're having principally around market-led procurement and environment to a really heavily securitized environment and discussion. And so, we've seen, you know, many governments release critical mineral strategies, and we're really in this de-risking moment. So, from your perspective, how do you live this moment? Can you give us a sense of your perspective on the moment right now?

Ashley: Absolutely I can. And in order to give perspective on today, kind of 2026, I'd like to take you back about nine years when I first started working in critical minerals. When, you know, the term didn't exist yet. Like it...

Pascale: It was just minerals, not critical minerals.

Ashley: Yes! It was just minerals. Like, we are just mining. And you know, at the time, I was building a nickel mining company in Western Australia, Perth, and my background is petroleum engineering and trying to describe to all of my oil and gas colleagues why on earth I had pivoted into mining and was

going and doing this random thing. It really made me question, you know, what am I doing? You know, why am I doing this? But as time has gone on- fast-forward to 2024 through today- it's hard to, you know, pick up a newspaper without some type of reference to critical minerals, to rare earths, to geopolitical diplomacy that is largely driven by access to these materials. I am inherently an optimist, as you can probably tell by how I speak, but the positive thing about this is that awareness is the first piece of the problem, right? Awareness that we do have a problem, and you know, I fundamentally believe that if a global conflict broke out, the West broadly would have limited ability to supply its defence industrial base, particularly from that kind of midstream, downstream perspective. I think that's really scary, right?

The flip side of this is that awareness has driven a bit of irrational exuberance in markets. You're starting to see some deals get done that, you know, historically probably would have been questioned more or public investors would be thinking through it differently. Mining inherently is very capitalized. We don't have a tremendous amount of mining-focused funds. And so, starting to see generalist investors come into the space, I think has made some valuations pretty frothy.

The reason I worry about that is, inevitably, with frothy valuations, if they're not based on fundamentals, people are going to lose money. I don't want that for the mining space because people will point to that and say, can't invest in mining. It's a money loser. In reality, you just must do proper diligence in order to make those investments. I absolutely front and center end conversations today.

Critical Minerals Resilience Goals

Pascale: A question that I think we don't ask ourselves sufficiently, or certainly governments trying to drive, you know, critical mineral strategy going forward, is what we are actually trying to achieve. So, what are our resilience objectives? What are our end goals? And I wonder if you've thought about this. Other jurisdictions have developed, you know, precise targets. The EU Critical Raw Materials Act has set benchmarks, no more than 65% of annual consumption from any single third country, for example. We haven't in Canada put numbers on it. Do you think that this is the right way to look at it? Or how do you think about resilience goals from your perspective?

Ashley: I think it's hard to execute on something that you can't measure. So inevitably, I would love to see the targets. I would love to see a framework. I also do my very best to not be a Monday morning quarterback. I appreciate that you do need to start somewhere and kind of gain critical mass and critical understanding of a market, maybe prior to building out exactly what that angle looks like. So I can appreciate why, you know, maybe some deals are getting done in advance of having those kinds of firm, public-facing targets, right? I think public-facing targets also serve as strong demand signals for the private sector to understand what type of capacity they need to build out and what volume of capacity. It really guides industry in my view.

My number one goal is to try to make these markets investable for private-sector investors, such that no one government- not the U.S. government, not the Canadian government, no one government - needs to backstop every single deal because that's simply unsustainable. It's unsustainable from a dollar perspective. It's also on an election-cycle basis; it would just never survive. You know, the next person

who gets elected inevitably will finger-wag and get rid of everything. So, you have to make the guardrails endure political cycles. And in America specifically, our number one strength is depth of capital. I think we would be remiss not to leverage that. And, you know, the ability to structure interesting deals and access capital. And so, I think the government's role is to try to structure the market such that you can crowd in private.

Pascale: That's a really great way to put it. So various tools have been deployed around this space, right? You know, equity stakes, offtake agreements, price floors- you know, all various means of trying to, as you frame it, wow, structure the market. What have you seen that you think is more effective or not? You know, in terms going a way towards what you've just delineated.

Ashley: Yeah, I love the framing of your question. USGS defines critical minerals as 60 different minerals. And not every market is the same. And in fact, I would like to say no two markets are really the same. And so, the reason I say this is that what I like is a deal fit to the needs of the specific commodity and specific market that it is investing in.

I think it's really hard. I think it's really challenging to try to take a one-size-fits-all instrument and apply it kind of across the board because inevitably you're not going to be able to solve every problem with that one instrument. And so, you worry about funding just going into an albatross, right? So I really like the combination of tools that are designed for a specific market.

I will point to, although it is not replicable at scale, it was really interesting what the Department of War did with the MP materials deal, specifically because it got involved at so many different junctions.

Pascale: Can you name a few of those for the audience, maybe who's not too familiar – haha I know you can!

Ashley: Yeah! They did an equity investment. They did quite a large debt syndication. And I'll go through what these are for, but they put in place a price floor for NdPR [Neodymium-praseodymium] oxides at $110 a kilogram. Then they put in place a guaranteed offtake agreement. So effectively, it was the Department of War going in and trying to attack each piece that makes a project hard to bank.

Because, particularly in these more niche materials, prices are often set in China through bilateral agreements. It's, you know, it's not transparent. It, you know, China's supply is so thin that those prices can very much be manipulated. And so, you know, from a product's private finance standpoint, it is very hard.

To back a project that an adversary can control the price, can kind of flood the market at will and doesn't need to make money in order to compete. Like, those are really hard things to underwrite against. So, if you have a price floor in place where investors can underwrite a worst-case scenario, if you have guaranteed offtake, you don't have to worry about your offtaker going bankrupt, getting their facility built, just walking away. Prices move and [people] walk away; they declare force majeure.

And you know, when you do have a risky off-taker, that gets baked into your price of financing because there are interdependent risks. So solving both of those problems with the equity and debt pieces- getting debt from the government- it's the cheapest debt you can get. So, just from a cost of capital perspective, checkmate! And specifically, it was around extending that supply chain from MP materials being just a minor through to magnet manufacturing, such that we had that kind of vertically integrated domestic champion. We've seen that model replicated with USA rare earth. We've seen it quite a bit on the Linus side with the Japanese government kind of underwriting a price floor. We can't do it at scale. And so I do really like those structures.

Driving Value Through Vertical Integration

Pascale: That's really interesting. Can I pick up the vertical integration piece? And then we can't do it at scale piece. Just for a moment... It's something that you've advocated for in the past, you know, that the U.S. should focus on building or, you know, other partners should focus on building these vertically integrated supply chains. But can you unpack this fully? Like why is this the way to look at it?

Ashley: Yes. Let's look at how China structures these industries. And it is all the way from mine ownership through end product. The material just flows through on a cost basis, and if they have a margin, the margin is meant to be made on the end product. But as we know, [China] views these industries as more strategic. So , it's more of a decades-long kind of market share domination driven strategy versus immediate profit.

Now we look at what the West is doing, and oftentimes the way that we're going about structuring supply chains is that everyone is focusing on their competency, and the result is we have a mining company, and then we have probably a couple additional kind of assemblers, fabricators, etcetera...

Pascale: Segmenting the value chain.

Ashley: And we have this end product. So what you have at each segment of the chain is that you have transfer pricing and margin stacking. At each individual segment, that segment has to be able to attract capital. And therefore, it has to make strong enough returns for investors to put money in, right? And so you are skyrocketing the cost if you're flowing it through that model of what an end product would cost.

If you use a vertical integration structure, I'm not saying there's no transfer pricing in vertical integration, but you do not have margin stacking. And so inherently, it does drive down costs.

I would also argue on the public market; the dynamic we're seeing around multiple expansion has been really compelling. Everyone holds a fiduciary responsibility to maximize returns and valuations for their investors. If you look at where multiples sit for more of a vertically integrated company, they are very different numbers. So you really can drive a lot of value creation through vertical integration as well as make it cheaper for the consumer.

Designing a Successful Rare-Erath Program

Pascale: Hmm, that's great. We should have more of that discussion in Canada too. You've had experience in program design in your past lives. And just while we're speaking about this in a way, can you share with us a couple of thoughts about what makes a program design work or fail?

Ashley: Yeah. Again, the usual disclaimers, like speaking only from public information. I think it goes back to what I was saying earlier: the program needs to be designed and specific enough to address the problem at hand, right?

I think you need to start with a full understanding of exactly what it is that you're trying to solve and then design the program out of that. Versus oftentimes, it will almost be like the solution shows up and you're like, so what problem can I solve? I've seen that be structured successfully many times, but again, I think it's best if you start with the problem in mind, a specific problem that is actually addressable with whatever the instrument is that you have.

Pascale: That's a great way to put it. I love hearing this so much. It's something that I've tried to grapple with, is we don't spend enough time defining the China challenge. And therefore, we don't have a clear enough view of what it is that we're trying to solve as a problem, right? The copper problem is not the same thing as the gallium problem, not the same thing as the rare-earth problem.

Ashley: Exactly. They're very different problems. Yes.

Pascale: So, thinking about what you have said about some of this already, we know that the cost of capital is seen very differently from inside China and outside China. Does designing Western supply chains in some of these cases inevitably mean governments are going to need to be involved for the long term? Or, thinking about market design and structure, can we design this in another way, in your view?

Ashley: Yes. Big question. But it's yes. I am putting on my hat as a non-resident fellow at Rice University. They have been so kind to allow me to put out some position papers on how I would design a market to function and ensure that you can crowd in private capital, and it isn't underwritten by governments. The fourth paper is on the pricing mechanism, but the prior paper was basically around the reality that I think, in order to back away from government subsidization of broad markets, we first have to define and bifurcate which material is considered okay and which material is not.

The U.S. has like 10 different definitions of what an adversarial controlled material means. For this paper that is coming out, it effectively argues for an allied reference price sitting at kind of the G7-type level, not controlled by any one country, against which end users that need non-adversarial tons can trade, and it's considered material. I walk through this whole process around how it could work and point out the precedents. My general belief is no matter how nicely the government asks manufacturers to, you know, “please buy American” or “please buy Canadian”, like “please don't buy Chinese material,” like whatever it is, they have fiduciary responsibilities as well, and the likelihood is that they will continue to go to the lowest cost unless it is mandated.

And so I do think that are some really hard questions ahead. I do think that this will likely be inflationary. I don't think it needs to be across all 60 critical materials! By no stretch of the imagination, do I believe that. But I do believe that on this subset of minor metals that are very important to defence and advanced technology, where we have absolutely no foothold, I think it's one of the only ways to build out a market.

The Demand-Side Element

Pascale: Yeah, I don't disagree. We're getting here a little bit into speaking about the demand side. You know, we've spoken about structuring markets and about the supply side, but demand is obviously the other critical aspect of market design, if we can speak about that way. Just as minerals are different mineral to mineral, demands are different depending on what we're thinking about. Now we're speaking about data centers, etc., but there's also the whole green and electrification sort of set of demands.

How do you think about this demand side? We've seen that fluctuate a little bit in the U.S. as well over the past few years. Should we think differently depending on the demand pool that we're thinking about? Related to this, I'm just going to mention that you published a post saying, you know, batteries were never about cars. And that really grabbed my attention. I think that's correct. And maybe you could fit that in your answer.

Ashley: Yeah, I actually made a post specifically on this demand side incentives this morning. Look, again I have a lot of opinions and boy do I share them. I mostly focus on upstream through chemicals. I do not claim to be an end-product expert, nor am I.

However, you know, you don't have to be an expert to have an opinion, which is, you know, the truth. But if you start thinking about, okay, we have to build these supply chains, it is a security imperative. It does absolutely nothing for us to build these supply chains and then have nowhere to sell it but to China. You think China's going to pay a premium price for U.S. material? Like, absolutely not!.

It does nothing for our security. Maybe it actually would lose a considerable amount of money.

So, the 30D, the EV tax credit [New Clean Vehicle Credit] that was in the Inflation Reduction Act, which was repealed during that [One Big Beautiful Bill Act], that was meant to be kind of the pull along which we could justify building scale specific to batteries and building scale around batteries. And without that pull, it makes it very hard to justify scale because you can't underwrite large volumes, right? And the larger the scale of the plant, the more you can amortize CapEx [Capital Expenditures] across a larger base. So it's more economical and cheaper. All these things is you why you want scale, right?

So you can think of demand-side incentives as carrots or sticks.

On the defence side, I think we're seeing sticks. In the U.S., we are seeing DFARS [Defense Federal Acquisition Regulation Supplement] procurement restrictions, and they start on January 1st, 27. So that would be kind of a stick approach, right? Like ‘you must or else you cannot sell into this market.’

The carrot is kind of the tax credit side. I would argue again, I think everything needs kind of a demand-side pull. But for our most kind of sensitive and forward-facing defence technologies, things that are absolutely critical to economic success going forward, we need to have demand-side incentives. And I personally do like the tax credit approach because I view it as more palatable to taxpayers than actual dollars going out the door. Look, you still have to find the money. Its tax revenue is not just coming in, right? But I do find it to be a much more palatable approach. And I would love to see, you know, 30D brought back in a different, broader scope. I think as people get more educated around these markets and truly understand all the challenges that there are, they see that you have to attack this from all angles.

Pascale: Mm-hmm. And your comment that batteries were never about cars is so interesting because it also sort of opens the box a little bit. We tend to think in consumer products, but the electrification sort of wave that is going to unfold over the next years and decades is much broader than just cars and will drive demand in a way that maybe EVs are not right now in the U.S., but electrification is.

Ashley: No, you're exactly right. I think batteries were almost like a political sacrifice that just didn't need to happen because batteries were so tied to clean energy. EVs were politicized, and I get it, but I think batteries didn't need to be sacrificed the way that they were. And I do think we'll start seeing that.

Pascale: Yeah, yeah, yeah. They're going to have to be rescued politically. Another question I want to ask in this discussion is... you've alluded to the fact that we can't have sixty priorities. We can't structure markets the same, but we also don't have infinite resources or time or energy, right? And so, we have to apply some methods to prioritization. And I think in Canada we have the same problem where, you know, we have some projects that are moving ahead, but there tends to be a tendency to sort of sprinkle attention around too wide a range of issues to be addressed. How do you determine or identify the things that we really should get going on versus the other ones that we'll have to, you know, proceed with as they are?

Ashley: I would point to everything that China has historically or currently put export controls around. I think those are the best; that's where we go, and those are the most critical.

Pascale: Where are the choke points, the real choke points? Yeah.

Ashley: Exactly, exactly. And so, you know, in some instances, like tungsten, upstream actually is part of the choke point, which generally it is not an upstream issue. So, there are almost two lenses of criticality that I like to apply. One is from the front end of the chain: what has China put export controls around? How can we just kind of bridge this gap to survive, to get access to volumes before we can build a proper market?

The second lens you should apply, and frankly, I don't enough, is from an end use perspective. You can also look at it from a cluster perspective. So, you know, do you want to build out like a cluster for semiconductors here and kind of co-locate manufacturing such that we have quicker iterations and improvement cycles? We're very quickly approaching the time where we've got material and nothing to do with them.

The Unsexy Finance View of Mining

Pascale: Yeah, yeah, yeah. That's a great point. And I think China does that, and it's one of the reasons why it's so effective. It goes back to your point about vertical integration, right? If we don't know what we're mining or processing for, it's very difficult to build those systems.

Ashley: The flip side- and this is, I think, my number one soapbox- although the longer you're around me, you'll learn that I have like a million soapboxes, but I do think that this is my number one - is yes, I agree that it's important for miners and processors to understand where their material is going. Flip side is I desperately want end users to understand what needs to go into their materials. Because on one side, we have the sunshine and rainbows, and like we are going to have so much AI and so many data centers. And I don't know that anyone has kind of stepped back and said, “Okay, so what does that mean from a material perspective?”
I know that's a very unsexy view of the world, but you have to figure out how to get that material, and, importantly, not just the end consumers, but the funds that are only investing in end technologies drive me crazy. I think if you are only investing in the end technology and not the supply chain, you're effectively sticking your head in the sand. You know, back in 2017, when I was raising money for nickel, I can't tell you how many meetings I had where they were like, " Boy, I'd love to invest in a battery company, but a nickel mine... we don't do mining. Mining is dirty.” And I was like, you know, head in hand. And honestly, I would say it has improved to a degree, but in a lot of ways, funds still do not have it in their mandate, and I would love to see that from consumers and from funds.

Pascale: Yeah, yeah, no, that's a great point. And I haven't heard it put it quite that way. We've circled around and touched on China, you know, the elephant in the room of de-risking, if as it were. And I I'd like to have your views on how you think of the China Challenge. It's something I spend a little bit of time on myself as well. You've mentioned, and I think you're correct that the discussion has evolved a little bit. You know, it used to be that analysts assumed that China's dominance was located upstream most, that it doesn't tend to be or that it is not very unequal. In some instances, yes; in many others, not at all. But very much, you know, midstream. And I think yes, by and large, governments and analysts understand this a bit better and we hear more that we need to build the out midstream. Is that where you see the sort of see the bigger end of China's dominance here? Or do you also think about other aspects?

You know, China's approach to finance or China's dominance in some of the IP technology side, you know, the R&D [Research and development], and even going all the way to labour. We hear of American companies are struggling to just hire people because they don't exist. You know, we don't train as many engineers and so on. How do you think about this China challenge? How is it shaped or located?

The China Problem

Ashley: If an appropriate answer was all of the above, I would say that. But I know that is not what you're asking me. My description of critical minerals is always that university economics is the number one challenge to address.

I think if these industries were making money, they could attract more investors and therefore be considered and viewed as more desirable places for students to go and for areas to study and specialize in. We need so many electricians. These things are not viewed as sexy [careers]. And I think, really having [the critical minerals industry] capture the hearts and minds of people by truly being a real value driver in communities, as a tax base, in markets, that's how you get people to study it. That's how you start crowding in people thinking about it, caring about it, how you get government support. We have to make this thing profitable.

Pascale: And there is more interest. I mean, we have a similar discussion in Canada around the labour market and the lack of expertise. So there ought to be signals or a more urgent emphasis put on it, but you're right that the attractiveness of the sector is on the rise at the moment.

Ashley: I truly believe that it reolves a lot around public perception and communication around how these industries impact communities. Like nobody wants to be the bad guy. Like nobody wants to like go study something and then be shamed. So, the more we can frame mining as a good thing for society - which it is a good thing to reindustrialize the West - we must do that in order to have any sense of true security. Yeah.

Pascale: Relating a little bit to that, you know, we've spoken a lot about how we are responding in the West to China's dominance. On the flip side, I think that, and I'd like your views, among the colleagues that you have, the communities that you're in, do you think we have enough visibility into what China is doing, how it is viewing the West's push to de-risk, whether we have adequate training visibility, you know, into China ourselves? This is something that I think more broadly about, but in the context of critical minerals.

Ashley: You know, this is not really a thought that I have ever thought through previously, is the honest truth... Let me reframe it in capital markets terms. If I had an economic monopoly and I was, you know, flexing my muscles around shutting other companies off from things I produce unless they kind of do XYZ, I think I would have to feel exceptionally confident that whatever is happening in other companies has no chance of ever being able to compete with what I have as a company. You know, certainly data coming out of China is sparse, and there's always kind of mixed information around where technology advancements have gotten to or not gotten to.

Pascale: So much debate, you know, is whether China is six months behind, twelve months behind, or, you know, one week behind. It depends on what you look at.

Ashley: I always like to believe that there is someone...There must be someone who has a real grasp.

Pascale: There are few.

Ashley: I'm sure that there are people. Do we spend enough time thinking about it? I don't actually know that it's very productive to spend too much time thinking about it; that's the honest truth because we know that the economic monopoly exists. And we know their kind of entrenched position. I think

what we need to focus on is how we insulate ourselves and build out markets such that it just makes that monopoly irrelevant. Right? Because what do we have that China needs? It's the demand. We are buying the things. That is almost a strategy in and of itself.

Pascale: I appreciate that. Not everybody can think about the same things, right? We need to be complementary. But it says something that I would argue we do a little bit, not enough. Just having a clearer, more accurate visibility of the evolving environment there so that we can better adjust our own strategy here. But I really appreciate your view. I think it's great.

The Future of Western Partnerships

Pascale: I wanted to ask you one question about the U.S., one question about Canada. Being located in the U.S., can you just help us, in your way, to unpack the strategy that is unfolding in front of our eyes in terms of critical minerals? We know that the current administration clearly has identified this as a priority. And so we've seen all sorts of different strategies, some of them at the multilateral level, you know, the sort of forge and bulk proposals. We've seen some at the national level. How would you explain the sort of vision to a non-American? Is there a coherent focus?

Ashley: Look, I would say the different agencies have different approaches to funding projects, funding materials. A lot of that is driven based off the end use of the materials, right? So battery materials are more considered Department of Energy; more defence-type items are considered more Department of War. And oftentimes you see semiconductor funding coming out.

Now there are many initiatives. There are many different buckets for different purposes. I think with Project Vault specifically, I am so excited to learn more. You know, they haven't made a tremendous amount public yet. I think it could be quite compelling from a market-making mechanism, but I will say, the cohesive approach is around trying to stand up Capacity that can compete against China or insulate ourselves, at least from a defence perspective, against adversaries.

We have seen some international funding as well. And the last thing I'll say is, you know, there have been a few members of the administration who have said this one sound bite that I like to use because I really like its kind of ethos, and it's “America first does not have to mean America alone.” And I think that's really important.

Pascale: I appreciate that. And I think that many in Canada will. And this brings us right to the question I wanted to ask you about Canada or other partners. You know, how do you think about and the broader Western effort in this?

Ashley: Yeah, I think a lot about the broader Western effort. I think, you know, most recently at the G7 in June, where specifically coordinated critical minerals pricing was discussed. This is a very relevant discussion point, particularly for countries like Canada that actually mine things, you know, like Canada and Australia. You guys have such robust mining sectors. You know, I think it's very important that we hold these kind of discussions at an allied level. Just the U.S. setting a new reference price kind of does

nothing. But if we set it up from a trading bloc perspective, it is much more powerful, much more impactful. It really benefits nations across the board.

Pascale: Given the nature of the challenge, it doesn't seem to me to be something that any one country can solve on their own anyway.

Ashley: Like talk about redundancy. We're already asking private capital markets to underwrite redundancy where you know no premium exists. Like national security is an unpriced externality. If we're now asking capital markets to underwrite like 10 different supply chain, it's just it's never going happen, right? Like it from a pure capital deployment perspective, it's not possible, right?

Final Thoughts

Pascale: Yeah, yeah, yeah. It's a great way to put it. I agree. So, in closing, how do you measure success? And I think I have, from speaking with you, an idea of how you are going to approach this. But you know, five years, ten years on the line, how would you know that one has made sufficient progress towards whatever resilience objectives we have? What would you like to see?

Ashley: I mean, it's hard to measure what you don't quantify. And so it is hard to know like what success is if we don't kind of set outward-facing targets.

Personally, what would I like to see? I would like to see projects getting funded without having to go through Washington. I would love for Washington to no longer have to be the nucleus of the critical minerals project finance world. I just think there are other things to be done with the government's balance sheet. I would love to see these projects being funded on their own. That is success for me, where we don't even have to talk about how we are going to make this work? Like how are these economics ever going to work? That is success. Yeah.

Pascale: Are we getting there?

Ashley: Maybe. Awareness is so much of the problem, and again, the fact that the G7 got pretty close to outlining a coordinated pricing mechanism. Like we're certainly closer than we were. Are we there? No, but you know what the adage is: Rome was not built in a day. So, we're making progress. Yes, we are absolutely making progress.

Pascale: Yeah, yeah. We are.

Ashley: We are.

Pascale: So last question, you've done a lot of these conversations. What would you like to be asked more often that you are not?

Ashley: So I will say, the demand side discussion today I think was particularly productive. And it is not one that I have often asked, and I think we should be having that discussion more often. So I might point to that.

Pascale: That's good. I'm going to take that. All right, it's truly been a pleasure. Thank you. I know that time is the most valuable resource, so thank you for giving us that. And I'm sure our audience are going to really appreciate your perspectives. Thank you again.

Ashley: So fun, thank you