

# Institutional Investor Dialogues - Investors Discuss Climate Risk

*Featuring:*

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Raman Aylur Subramanian:

Hello. Hope you have enjoyed the session on Capitalizing on Future Innovation. But innovation in the future, and what's the impact of climate change, that's the big question. So can I really capture it? So that's the objective of this panel, where we are going to focus on climate change, understanding risks and opportunities within a [inaudible] class portfolio. My name is Raman Subramanian, I'm the head of Solutions Research at MSCI. Joining me on this panel today are Patrick Blais, Head of Fundamental Equity Team at Manulife Investment Management, Meggin Eastman, she's a global ESG Editorial Director at MSCI, Limin Yang is a Managing Director at CPP Investment overseeing Investment Risk, and finally, we have Bonnie Wongtrakool, she's the global head of ESG Investment at Western Asset Management. The [inaudible] structure of this panel is to answer three broad questions. What is climate change, and can we really manage the climate change risk? What are the tools and data which are available for investors? Once we understand the climate change risk, can you actually look at them from the asset evaluation perspective? Because some of the people think that climate change is a long-term risk instead of erosion risk, are the asset losses started pricing the [inaudible] markets [inaudible]? You may want to see the asset evaluation start getting impacted because of climate change. And finally, as a good investor, if you want to see what are the opportunities out there, how do you utilize climate change for building portfolios? But with that background, before we go into the actual prepared questions, let me start with an audience poll. So this is a simple question to set the stage. How many companies were responsible for about 71% of the global emission gas, greenhouse gas emissions between 1988 and 2015? So we'll keep the poll open for an extent of 15 seconds and then we can look into the answers. Okay. Let's see what the answers were. I think the audience got it right. About 100 companies are responsible for the bulk of the carbon emissions in the [inaudible]. So with that background, let's move on to our first, you know, setting-the-stage question. Meggin, you have been involved in MSCI, looking at various parameters from the ESG risk and ESG data points, so can you please briefly explain what is climate change? You know, what is climate change, and what is climate change risk? Can we really measure it? Because that's the crux of the question when people talk about the risk we know about, if you look at stock returns, we can actually calculate the [inaudible]. But can you really measure climate change risk?

Meggin Eastman:

It is complicated, isn't it. So when we think about what is climate change, what comes to mind is usually physical, right? The floods, the fires, the heat waves, the stranded polar bears, and the rising sea levels, and it doesn't take much of a stretch to think about how those things might translate into

risks that can impact investments. We've seen flooded oil refineries, and railways infrastructure washed away, utility companies filing for bankruptcy over wildfire cost, but with that kind of thing, we're actually just scratching the surface. So physical risks take chronic form also, you've got longer droughts, you've got river flows that are too high or too low, or more rain or snow in a season, or longer hotter summers, and even when that doesn't tip over into extreme events, these kinds of changes in the climate bring added uncertainties and added costs and consequently risk. So we're talking about more days when heating or air conditioning is required, we're talking about power cuts, the inability to move goods from production to market, changes in the growing season, the expense of adaptation measures, volatility in the availability of supplies, these are all manifestations of physical risks from climate change. And there's what we call transition risk, that's a term you may have heard as well. And those are the risks that stem from the process of actually making the transition to a net-zero economy. So that includes regulatory and policy changes, anywhere from the very specific, like vehicle fuel efficiency requirements to the very high level, like the Paris Agreement, or whatever comes out of COP26 in November. But those transition risks also include things like market risks and reputational risks and legal risks. So like the recent case where a Dutch court ruled that Shell's actually fairly ambitious carbon reduction target was inadequate, and said the company needed to reduce emissions even more aggressively. And of course, there are technological risks, as more climate-friendly technologies replace older, more carbon-intensive ones. So anything from incandescent light bulbs to the internal combustion engine. And it's also worth pointing out that there's a flip side to some of these risks. And that flip side is opportunity. It's an opportunity for those who are innovating and getting ahead of the curve and that goes for companies but it also goes for investors. So that's a lot, it's no surprise really that a lot of investors are struggling to figure out how to measure climate risk. Even if you have a really solid conceptual understanding of the risks and how they could manifest, turning that into a quantitative assessment for your portfolio and then a plan of action is a huge challenge. And the other speakers are going to talk about the practicalities of that a little later in the panel. But I'll start here by just talking through, at a fairly high level, the kinds of things you need in order to be able to do that. So you need data, you need climate change scenarios, you need models, and you need tools. So if we start with data, it's like the first of several challenges. To understand physical risk, you need to know where all of the company's facilities are, down to the precise latitude and longitude, and what each one does, to understand what they're vulnerable to. You ideally want that for their suppliers as well, and their supplier's suppliers, and you want to know what kinds of adaptation measures they've taken. So the first thing there, where a company's facilities are, that's more or less obtainable, although there are still real gaps, the second two are largely still out of reach, at scale, at least. You may be able to dig into it for specific companies, but trying to do that across a whole portfolio is still really really difficult. To assess transition risk, which again, is policies and market changes, that sort of thing, you need the company emissions data measured and categorized up and down the value chain, not just through an operation, with several years of history as your starting place. And that is becoming more available, but there are still big gaps, especially in that scope 3 upstream and downstream, and also we're talking multi-asset class portfolios here, so once you get outside listed equities, or to some extent corporate debt, then you start to see a lot more gaps. If you're talking about companies, you need to know their reduction targets, and information about the strategy that they plan to use to achieve those targets, which again, is becoming more available, but lots of companies still haven't set a carbon reduction target, much less set a net-zero target. And then you want to know the markets and jurisdictions where companies operate to see what kind of regulatory changes or market changes they might be subject to and to understand their positioning vis-a-vis technological changes and opportunities, you want to know the product mix, the revenue streams, their RND. So that's data. And then you need a range of climate scenarios, climate change scenarios, because there's still a variety of ways this whole thing could play out, and we don't know how it's going to go. The risks will materialize differently depending on the details of the scenario. So just at a really simple level, you can imagine aggressive regulatory action might up the level of transition risk in the short term, but it probably does mitigate physical risk in the long term by limiting

the ultimate amount of actual warming, whereas on the flip side, if regulators sit on their hands for the next decade, the short-term transition risk probably isn't so bad, but then we might be headed for an overall hotter world at the end, where the physical risks are much more extreme. So once you've got those ingredients then you need models to make credible estimates to fill in the gaps where the data's lacking, like those upstream-downstream emissions, so we've got a scope 3 emissions estimation model, you need models to help take all the disparate sorts of data and disclosure and make them comparable. If you've ever looked at corporate carbon reduction targets, you know it's not just apples and oranges, but also carrots and broccoli. And then you need to be able to put the data together so it actually tells you what you need to know to make decisions, what sort of temperature rise is your portfolio aligned with? How much value might be at risk under different scenarios? Which holdings are most vulnerable? What companies would you engage with? And so to do all that you need tools so you can apply that to your portfolio, and conduct stress tests, and measure your performance against a meaningful benchmark, and develop a plan to reach net zero, and report out to regulators and clients, and so on. So I hope that draws the landscape a bit to start the conversation, Raman.

Raman Aylur Subramanian:

Thank you, Meggin, I think so, the way I see it, it's complicated, but it's doable. So that's where people have started to think more holistically beyond climate change and climate science, but Limin, for you, one question, Meggin pointed out there are three different risk measurements. You have physical risk, you have transition risk, and technology risk. What is more important? Is physical risk important for all asset classes, or more important for real estate, is transition risk only important for producers, or suppliers, to some extent, and then your technology risk which is more important for [inaudible] segment of the market? How do you think about this measurement problem for these three different categories of risk?

Limin Yang:

Thanks, Raman. First off, I would like to thank MCI for having me here with other panelists to share our insights on climate change. Just really quick, for those not familiar with CPP Investments, we are the organization that manages the assets of the Canada Patient Plan, which has more than 20 million contributors [inaudible]. As of June 30, the file is about 520 billion of assets, so we can see that we have literally all different asset classes across the globe, so climate change has a profound implication to the portfolio. So, Raman, to your question, I think, I wouldn't say which one is more important, I think they are both important. I really think it's important to the firm, to investors or clients of portfolio companies to really start to assess, based on different scenarios, which one is more important to them. To a point, yes, certainly certain sectors and certain [inaudible] companies may be more impacted by physical risk sooner than the transition risk. And in the oil, or fossil fuel industry, likely those transition risks will impact more immediately than in the other sectors. So it's very dependent on the sectors, the business model, or the strategy you're in. And I really discourage saying, you know, I do hear a lot of voices, and in the last few years, transition risk may be more important, because yes, we do see physical impact, but it's very localized. And you know, we're not going to see the devastating impact on the earth across the globe anytime soon. That's not the case. It really depends what the investment's in. If you invest in infrastructure very near the ocean, the sea level rise already has had an impact on the cost migration from one city to the other. So I think, bottom line, that you really need to assess, I can give you very quick examples that we started with, at CPP Investments, we started with transition risk, we think about understanding the carbon emission and potential abatement costs that different companies needed to incur, and an emission assessment, and then once we get into the physical risk, there are a lot of things that are pretty consistent with intuition, there are many moments that yes, I know it's a pretty big impact, a small impact, but there are many unknown moments. Once you assess, getting to the deeper pockets of some of the

portfolios you think, wow, I didn't know that, because the indirect impacts and not just direct impacts could be significant. So I think the key message is, don't just simplify which risk is more important, and understand what a [inaudible] available. They are not even close to perfection. I totally agree with Meggin, there are significant data gaps over there. To start with, there's no history. Unlike market risk, credit risk, you have a decent history, a hundred years or more than a hundred years, and a lot of the data can repeat itself. Climate change doesn't. It doesn't have history and data. So the gap is pretty decent. But don't use that excuse to not measure, starting with something, and you will be surprised that even though it's imperfect, it will give you lots of insights, and that will help you to understand what are the risks, what is really important, relevant, critical to the firm.

Raman Aylur Subramanian:

So maybe for that one, if you were advising or maybe describing to the audience today, what is the starting point for them for measurement? Should they look just at the carbon intensity to start with, Scope 1, Scope 2, Scope 3? Or do you think that we can go beyond that because that's backward-looking, at least one measurement people should be aware of?

Limin Yang:

I would encourage more backwards, really not starting yesterday, but I really think each firm should have some sort of a risk appetite or strategy. Yesterday, I was commenting from my perspective, particularly, it is a horizontal risk. It needs to be integrated into every step of the firm [inaudible] and its strategy. So it is everywhere. So it's not a new invention, I think really focus on the model. What is our appetite, what is our strategy? And then backwards, what are the measuring units for that? So for example, if the expected return is a key question, issuing a target, you have a target expected return, so reading backwards, does the [inaudible] impact the firm? So you need to find a mattress to support evaluation. Then further down, again, you need to understand whether you are in a sector that is a [inaudible] risk in [inaudible]. If it is, then yes, emission of the portfolio [inaudible] are important, especially the forward-looking. What's the trajectory of the emissions, what is their target, what potential abatement costs or spending do they need to adapt to the transition? That becomes important. And you divide those measures. But to some firms, again, maybe it's not a big issue of transition costs, but it's physical damage that can cause concern. So you need to [inaudible] those mattresses as well. So I wanted to think that you shouldn't just jump, just talk like everybody about Scope 1, Scope 2, just forget all the emissions, right, but actually backwards, really what's important to your firm, then devolve the mattress accordingly.

Raman Aylur Subramanian:

Okay, thank you. So Patrick, just falling upon what Limin and Meggin pointed out, as a Fundamental Equity Manager, you have seen other risks playing out, and you take a deep dive, understanding what the company is doing, but the question is, has the asset evaluation, specifically starting with the equity market, and we can move on into other sectors, have you started to see them [inaudible] or do you think that still the market has not priced in, there's an upward [inaudible] for investors to take advantage of it. Maybe starting with this [inaudible] generation, what do you see on the equity market?

Patrick Blais:

Yeah, so good question, just first off, Patrick Blais, I had the Fundamental Equity team at Manulife, it's an 8-person team but it's probably important to note that we're supported by a large ESG team. 13 individuals. And it's really been a partnership to better understand the ESG factors, and over the last few years, really a strong climate assessment across our portfolios, and integrating it into our

fundamental analysis, and even moving beyond that, where we do see clients clamor for products with ESG objectives and climate objectives. So coming back to our view on what's priced into the market, it's definitely being reflected, the previous speakers, they spoke eloquently to the reality of the risk, whether it's transition, physical, technology, though on the technology part, we call it a risk and an opportunity, and we're seeing it. I mean, the poster child would be oil and gas. We may even debate whether it's overpriced in this sector. So, truth be told, it's a large factor of risk, it's probably one of the biggest risks, that as a manager we feel we need to properly assess. In our mind, there are two ways to look at the risk. It's really on a systemic basis, where we really want to understand the characteristics of the portfolio. We do that through a variety of measures, meaning, as some of the previous speakers spoke to, just compiling the data on a portfolio basis, whether it's exposure, the carbon intensity, whether it's exposure to clean solutions, as well as modeling. Modeling is quite key in our case, for a variety of reasons. One, we like to know from a portfolio basis what are the risks embedded. Whether it's a CVaR analysis, a climate analysis, specific exposure to the physical, the transition, to the technology risk and opportunity, and under multiple scenarios, 3 degrees, 2 degrees, 1.5 degrees. So we actually assess this on a daily basis. But what's important is really understanding what's behind that, meaning what are the specific names driving it, so we can draw our attention and really perform a fundamental analysis, make sure there are no unintended risks that are building up in the portfolio. Many times it's a nuanced assessment, on an individual company basis, it's not just exposure to the risk but also predetermined by the competitive landscape and the ability of a company to manage through it by investing, but also recuperating the economics on that investment. Take rails, for example, they are large emitters, but we're comfortable with the risks because our understanding of the industry is they have a clear competitive advantage, a clear pricing power, and they will invest to transition to a net-zero in time, however, we do believe they'll recuperate their investment and make actually good returns through pricing power of their business model. That could be very different than other sectors, so it's really looking at each individual, so beyond the portfolio, and looking at each individual security, and thinking through from our basis, is it priced in? And what are the impacts on the fundamentals? We're very bottom-up fundamental, we measure pre-cash flow, cash with returns, we do perform our own scenario analysis. And it's really understanding how those ESGs and specifically those climate developments will impact a certain name. I will say, from personal experience, transition risk is the one that concerns us more than physical. The physical one, through our engagements with companies and discussions, we do think they're more manageable. The reality is, here, companies are addressing it, we do think it's a risk which is, again, because it's localized, it's more easily identifiable, whereas in the transition it's dependent on the pace of regulation, the competitive landscape, the end markets that the companies are addressing. And that requires really at our end also scenario analysis on the fundamental front. I'll just leave it at that for now, and allow you to speak to another speaker.

Raman Aylur Subramanian:

Now thank you, that was very helpful. We do see that transmission mechanics and we have also [inaudible] how the channel of cash flow gets impacted because of climate change and ESG. So maybe moving on on that front, Bonnie, in terms of, as Patrick said, equity markets and equity asset class, but from your perspective, you would say [inaudible] classes, real estate, so is the same thing happening in all the three areas getting priced into the market or some have priced in, some have not priced in, or have they started to price in in a certain market, like if we go to Florida maybe real estate is getting impacted more, or what happened in Houston last year, or this year, so is there something we should start foreseeing, some asset classes getting priced in better and some asset classes [inaudible]?

Bonnie Wongtrakool:

Sure Raman, I think that's exactly right. And just for context, Western Asset is a global asset manager, we have about 490 billion in assets under management and we are specialists in fixed income, so I am really addressing it through the lens of bonds, of the bond market. But within fixed income, you really do have many different types of risk, and as Patrick was discussing, importantly, different extents to which those risks have been priced in by the market, and that's really what investors are caring about when they're managing their portfolios. So if you look within fixed income at the corporate credit market, just to start off, that's arguably come the furthest in terms of disclosures, they're relatively advanced, as Meggin had mentioned, we didn't have a history of data for some of the more sophisticated issuers, so that gives us a basis to do more analysis. But there's still a lot of variants at the sector level, the sub-sector level, within corporate, at the geographic level, just because of different regulatory regimes, and what we've seen so far is there's been a lot of focus on the high emissions sectors. And particularly, let's say, within Europe in the utility sector, that's fairly efficiently priced at this point. There's a lot of regulation that's already in place, investors have already demanded that the business models transition, so we've seen that have a little bit less risk from that standpoint, but there's still a lot of other high emissions areas that are less priced, so obviously a huge focus on oil and gas right now, but within high yield where you perhaps have less disclosures, even though there isn't the information, I think there's been a risk premium that's really been put onto that particular segment of the market where we've seen the spreads really widen, I think to compensate for some of these transition risks that we're talking about, and I think it still remains to be seen, where energy bond spreads will ultimately settle out, will there be mean reversion in that market or not, but even going beyond that, there are other high emissions sectors which are really not there yet. The whole aviation industry, that's an area where Western Assets has really focused on, we're really active investors in that space, and we're actively engaging with the different issuers in that market as part of Climate Action 100+, there are other very intensive emissions sectors like steel and cement, where we're still really grappling with what technology is going to come and help us to solve those problems. So there's a wide variance within corporate credit, and I haven't even talked about any of the sectors that are less emissions-intensive, that are really not quite on the radar of many investors at this point. And if we move outside of corporate credit, there's a whole sovereign market which is a huge segment of the fixed income market, and there I would say that it's really not that well priced. And that's an area where physical risk is very pertinent. So transition risk, like others, I think in this panel, that's something we've focused on with respect to corporate credit because that seems to be the bigger risk as I think companies have become a little more efficient, or sophisticated about the physical risk, but within the sovereigns, there's a structural risk that exists because sovereigns can't just move their headquarters, they don't have any, they are where they are, so there's a lot of just inherent risk there, and it really hasn't been priced in well yet. And we certainly don't have any prior models to look at, this is a real-time phenomenon, where we don't really know how that is going to affect asset prices. So what needs to be done there is just a more comprehensive framework that leverages the data that's out there, and also encouraging sovereigns to supply more data that can support deeper analysis. So there's an effort with the Transition Pathway Initiative, it's called the ASCOR project, also the UN and PRI were involved in that as well, it's going to take what's out there and develop a framework for investors to look at sovereign climate risk in particular. The other asset classes within fixed income that are left are, you know, there's securitized assets, mortgage-backed securities, asset-backed securities, you really don't have any disclosure when it comes to the E part, and in some places the S part, when it comes to that type of asset. So that's difficult. At the same time, when we talk about physical risk, we have seen, underlying that, more efficient pricing by insurance companies of geographic risk when it comes to real estate, so it's kind of indirectly being worked into the market. But I'd say that there's a huge variance, in summary, of how these risks are manifesting, they're being priced within fixed income, and a lot of work for investors to do around it. To understand what's in their portfolios, and how they can improve.

Raman Aylur Subramanian:

Thank you, Bonnie. So maybe to follow up on that theme that okay, maybe credit markets have started to [inaudible], and the pricing is still not stuck in place, well one question that we get when I go and talk with clients is more from the skeptics who are saying if climate is a long-term risk, why should I be focused on the shorter maturity bonds, because the market will not move them, I still want to hold on to my Exxons and all those guys who are just shorter maturity, and should we focus more on the longer maturity bond. The second angle of the skeptics is that [inaudible] are maybe important, some might say, I'm more worried about the probability of default, so are there [inaudible] there today who've started to look into this, you know, what's the probability of default for the bond, especially for the [inaudible]. Because it is then saying okay, you may not [inaudible], the defaults have started to creep in into the [inaudible].

Bonnie Wongtrakool:

Right, so I think the question around sort of the maturity of the bond, and can you avoid it by just going further up the curve, the client often asks about that. And frankly, you really can't exactly, I think certainly you can see these credit curves steepen, for obvious reasons, because you can kind of kick these risks and say, they're in the future, they're not going to affect my bond, but the fact is, that the credit curves do shift up, to some extent. They may bear [inaudible], but they do get affected. And from our standpoint, we don't feel so confident that we're any smarter than the climate scientists and can know what's going to happen in 30 years when a bond matures, and what we've done with our own internal risk frameworks is that we've looked at the shorter-term risks, so kind of a one-year shock, or if there is some type of change in the regulatory regime, which we're measuring through carbon pricing, where suddenly there is a shift up in, say, the price of pollution, the price of emissions, which we are proxying as a carbon price, what would that do to default risk? It's obviously not going to take a 2-year bond to 100% default risk, but it's going to affect it. There's going to be a movement and what is that implied effect on valuation? That's how we're approaching it at Western, and philosophically we feel that looking at the risk of an issuer is obviously going to depend on how long you're in the investment, but really we want to understand the full picture of where this issuer is going, because if they haven't really planned for 10, 20, 30 years from now, it should raise questions about what they're going to look like, 2-5 years from now. This is a very fast-moving market, it's a topic of high concern globally by many people, so I don't think we can just say, we'll just hide out in the short bonds and it will be fine.

Raman Aylur Subramanian:

Thank you, thank you, Bonnie. And that's fantastic. One argument which I've seen, especially maybe for you, Limin, in CPP you're sitting on a lot of private assets there, and private assets or maybe the private equity market are more efficiently capturing climate change than the public market because they can react quickly to any of these issues, whereas public markets, they have to go to shareholders, go through the whole drama of getting the approvals and everything, proxy files and everything, from your experience of talking to someone who's borrowed from asset managers, they are more consciously taking advantage of climate change opportunities and asset migration.

Limin Yang:

Not necessarily, I think that private vs. public react to different risk, it's a similar cost. It doesn't matter, climate change risk, market risk. I think it's a similar approach, but what I would say, in general, it's really about the company's influence. I think the starting point is the company really needing to start to disclose the climate change impact information. So public, actually, in that, they're probably at a disadvantage over that, so the public has many companies, it especially depends on the geography,

right? The UK, and New Zealand, many countries are starting to make a lot of disclosure mandatory. So it puts a lot of pressure on the public companies, and when you do the disclosure, you actually are starting to really get into the strategy discussion, the so what? And they actually apparently are more advanced in thinking about how they adapt to climate change. Whereas private, less regulatory requirements, it depends really on the [inaudible]. So I think whether they put any pressure on that, CPP Investments is really, we established a climate change security selection framework about a year and a half ago, and it's very comprehensive, it's really trying to integrate that into both due diligence and the asset management processes. So the public, through proxy voting, engagement, and we are taking action. I don't know the number off the top of my head, but we're starting to really veto many companies who do not have any plan or any action on that at all. So the private, again, I think it's through the due diligence, engaged advisors, to make sure that everything is fully assessed. So I would say that both have advantages and disadvantages, but again, that goes back to maybe the question, interest in pricing, I would say that there's a lot of literature out there to study this pricing [inaudible] in. Reading some internal research confirmed some interesting observations: historically it may not be very well priced, but as a trend, it's definitely going to be more and more priced in. I think that is partially just simply because of awareness and education, and people just are more and more comfortable understanding with the tools and data available such as MSCI, you're one of the biggest vendors in providing climate change data and tools. So when people have tools and understand what that means, they can do that. And you go back to say, 10 years, a decade ago, climate change was already a thing, there's a [inaudible] 23, 24, 25, but people didn't know what to do with that. I think this is going to be a trend. Things will be priced in more and more.

Raman Aylur Subramanian:

Thank you Limin. So building on what Limin said, MSCI provides this so-called horizontal climate value-at-risk. So what exactly is that? Is it like value at risk that we're seeing, the technique with the financial markets before, or is there a difference between climate value-at-risk and value at risk?

Meggin Eastman:

Yeah, it is a different thing, the climate value-at-risk model basically takes the key risks I outlined at the beginning and it quantifies them for individual companies, or you can aggregate it to a portfolio. So the exposure and vulnerability to an array of different physical risks, acute and chronic, the exposure to policy risk, and the positioning with regard to technological risks and opportunities, as Patrick rightly pointed out, definitely opportunities there as well. Under a variety of different climate scenarios over the coming decades, and it translates all of that into financial terms, forward-looking financial terms for companies and portfolios. So effectively answering the question of how much of this company's, or portfolio's value could be at risk over the coming years, under this scenario or that scenario. So it's worth pointing out, for some companies, it's actually a positive number, they're well set up to navigate the transition, and well-positioned to take advantage of the opportunities. And then for other companies, we can be looking at estimates that are a large chunk of their value, and in some cases even most of it, where that could be at risk in certain kinds of climate change scenarios. And there's a lot of different ways to use this information, both the aggregate metric and the underlying pieces of it, so some of our clients use it for engagement, they're looking to identify individual companies within their portfolio or within a potential investment universe that are facing high risks and high costs and they want to engage them to encourage them to take more action, some might use it for investment ideas, for example, to spot companies, these opportunities, again, where maybe the market is not currently pricing that accurately, or they don't think it is, and then some of our clients use it at the portfolio level, like I said, to try to do this at scale, to understand aggregate climate risk exposure and maybe set tolerance levels. I think it was Limin earlier who mentioned the idea of risk tolerance, a scenario where you could have a risk tolerance and maybe set targets. And of course, it's also useful

for all their reporting requirements out to regulators and the TCFD and the like. So not quite the same as what you normally think of for value at risk, but again, useful for understanding the possible scope of impact in dollar terms.

Raman Aylur Subramanian:

Thank you Meggin. So we move on to the last section of this panel. So we already went over what are the risk measurements, we've understood it's challenging but it's doable, we've also seen what the impact is on asset evaluation, from fixed income to equity and asset classes, now the question is how do we build a portfolio? Knowing the risks, how do you actually, as a risk manager, or as an asset allocator, start incorporating this risk into asset allocation policies? But as Meggin was pointing out, and other panelists, that the [inaudible] scenario plays out, so if there is a [inaudible] scenario, that means stress testing is a critical component of any of this building of the portfolio. So maybe we can ask the audience, how important is, let me put this next poll up, hopefully you can see this poll, are you stress testing your portfolio for climate change? So maybe we'll give the audience about 15-20 seconds to see what the response is, and then we'll move on to the last session of the panel. Okay. So we're seeing some numbers out here. Not yet, so I think about 50% of the audience is still considering it, and about 20% they say have started to do it, so maybe this is a question which maybe I can ask Limin, from a CPP perspective, have these started to get integrated into the portfolio construction, stress testing, is there one stress testing people should use, or multiple stress testings, depending on each asset class, you know, multiple ways of seeing it. But from a top-level, has CPP started to do stress testing at the broader asset allocation, and then maybe trickle down to each asset class?

Limin Yang:

Sure, thanks Raman, for the question. You probably need to forgive me, it's not my [inaudible] to comment on the portfolio asset allocation, there is a total from the management function, I can tell you that yes, in terms of integrating to commerce factor as part of the total fund of construction, is definitely making progress and it's always a part of the processes. But in general, what I want to comment is how important scenario analysis and stress testing portfolio-wise is important, it is very important. Interestingly, I think again, really because of the uncertainty of the transition and the science model, the range of the possible outcome is very, very wide. Now that is a challenge, why the challenge internally? I think most investments have their specific [inaudible]. As you mentioned, in the question, you said where people just care about their short-term bonds, it depends [inaudible]. Some of the investments you hold for five years, or ten years, and some portfolio-wise are probably the asset allocation folks, so that definitely plays a challenge for understanding how the outcome is going to look. And that's why scenario analysis and stress testing are really important, to identify the range, but not necessarily pinpoint, here is where the most likely... I don't think any people can say that this is the most likely outcome. Nobody can really predict the future. But I think that within a range you can probably rationalize and have an informed judgment. Now that is a time to tie in the portfolio managers inside. You provide me information, say, under the 1.5 scenarios, and into the 4th-degree scenarios, those are the bookends. You're starting with the bookends, and in each bookend, you probably have a range of possibilities, and while [inaudible], because different assumptions of GDP, different assumptions of a damage function, and different assumptions of the carbon emission trajectory and abatement cost, and so when you have that very rich information, the portfolio manager needs to make an assessment. They know their portfolio better. They know their portfolio companies better, they need to understand within a range which one is more important or likely and they need the price and an evaluation. So I think it's kind of top-down [inaudible]. You start with the top down, understanding that, portfolio-wise, what are the pockets, what sectors, geography, strategies may be impacting most, as a screening. Screening the materiality, the heat map, and then you kind of zoom in. Does it make sense? A lot of things, actually, I would say that a meaningful portion of that probably

doesn't make sense if you just apply some kind of oversimplified assumptions. [inaudible] that, but quite a significant portion of that does make sense, and then you start an engaging conversation and then we call assessment, once you pass a screening process you start with an assessment process, that's where the rubber hits the road, you know, you're getting to the nitty-gritty. I think many lenders, I would say the provider [inaudible], have a kind of a [inaudible], I think I had a conversation with a [inaudible], the assumption is really a good starting point as a screening, you know, what's happening to the portfolio or with the individual. But I think the really important part is once you're starting that refinement, nobody can really do that for you other than yourself, because you know the portfolio, you know the company well. Then you're starting [inaudible] assumptions, and then refine. And again, that possible [inaudible] can be really, really wide, I can tell you that one example that we studied was a kind of transition risk assessment, that impacted to an internal rate of return, is just about a 1.5%, but once we started to refine, understand indirect impact on the transaction, it jumped to about 6%. So again, I think when you're screening an assessment, it could be a very different thing, but you have to start with some type of scenario to assess and understand a plausible outcome.

Raman Aylur Subramanian:

Thank you Limin. So far we have been looking at the gloomy side of climate change. Everything looks like there's a doomsday coming. But there's money to be made on this thing, isn't there? There's an opportunity out there. You are a fundamental equity manager. You are smelling money out there somewhere, [inaudible]. So what should the investor do while thinking about, okay, I know how to manage this, but if I could take the angle of making money, what are the suggestions that you would put forward?

Patrick Blais:

Yeah, well, I'd like it to be that simple, but the reality is, it's about structuring a good portfolio that captures a good risk-return profile. And I think I'll just hit on some of the comments that were made, and maybe my personal perspective. During the CVaR analysis, I think it's quite revealing. I know from our end it's relative to the benchmark, but the amount of sensitivity through 3 degrees to 2 degrees and to 1.5 degrees does wake you up to certain risks you may not have been aware of previously in the portfolio, and you want to gauge that appropriately. Second, you quickly realize there are very different levels of preparedness across corporations in terms of this transition risk. We hear grand statements, but once you look beyond those statements and you're actually looking at the facts and the way forward that these companies are taking, you may come away with a very different assessment of the risk and the opportunity being presented. One noted fact is we use MSCI, it's definitely one of our key data providers and modeling service, but there are other services as well, and science-based targets are definitely something that we look to, and there's only 24% of names on the MSCI world which have developed science-based targets, so it does tell you there's quite a wide level of preparedness. And in terms of structuring the portfolios, there are two ways to look at it. There's climate assessment, and integrating it into your fundamental analysis, and really determining on a case by case basis, a name per name basis, the risk-return profile, or adjusting it to your understanding of the climate impact, but there's also taking a step back and structuring portfolios where maybe certain clients, we are a third party asset manager, have developed the desire to invest according to their values, and one of them is to invest according to how they want to see their money being invested from a climate perspective, meaning investing in a climate transition fund that's going to minimize the risk and maybe even take advantage of what hopefully is a quick transition to that zero. And that has been user modeling, using the MSCI service, using the appropriate data, we structure those products. And going beyond just avoiding fuel reserves, for example, but really taking a forward-looking path and investing in companies that are ahead in terms of real decarbonization and offering clean technology solutions that allow us to get where we want to be. And just lastly, quality of data. I think it's been mentioned

many times, it's really looking behind the covers and understanding where the data are coming from, how it's used in the modeling, but also the quality of the data and making sure that you agree with it. We've had many discussions with our providers, including MSCI, to better understand the data, and refining and making it our own. And I think there's value in that. There's a lack of transparency, and many companies actually have yet to broadly communicate. If you can get ahead of that curve, you can better understand the risk-return profile before the market and hopefully make some sound decisions that pay off.

Raman Aylur Subramanian:

Thank you, Patrick. So Bonnie, maybe to wrap up this panel, one question, what's the plan of action for investors, if you had to describe to them how you approach it, so that they can [inaudible] portfolio?

Bonnie Wongtrakool:

The first step really has to be education, I think. Everyone has something to learn in this space because it is so complex. And so you need to educate, not just yourself, but also your stakeholders. So does your board understand it? Does your investment committee understand it? We know science has advanced a lot, but there's still some doubt and concern about climate science modeling, so we need to be very careful about the [inaudible] and the risks and making sure that everybody understands exactly what's being presented. Where are there holes in coverage, and where there are shortcomings in the modeling. And then with that as a baseline, I think you need to measure where you are. You need to know what's the starting point of your portfolios today, [inaudible] multiple approaches I'd recommend, just cause there are going to be degrees of model error, uncertainties or weaknesses, and strengths of different approaches. And then once you've got that starting point, then you can start making [inaudible] portfolio. You want to make sure that all of your portfolio [inaudible] climate risk, but I also think you need to have some diversification. Have some ESG-enhanced strategies, have some strategies that are seizing upon the opportunities created by the transition and [inaudible]. I think you need from there to just continue having the conversation with your managers, your external managers, with policymakers if you can, with the [inaudible] if you're managing your own portfolio, definitely risk model [inaudible] like MSCI, and again, your stakeholders, through your company. Everyone needs to be aligned on this. And then from there, you reiterate. Measure regularly, calibrate, and then [inaudible]. I think that's really the course of action that investors should take.

Raman Aylur Subramanian:

Thank you, thank you. I think it was exciting, we could continue talking about this for hours to come. It's such an interesting topic. So we've come to the conclusion of the panel, and there was one question that was asked about the data gap between MBSA, BS, and other asset classes, we'll pass it on to Bonnie later on, so let me close the panel out here, and hand it over to Jeremy Baskin who's the Head of our coverage for the Americas for closing remarks. Thank you.

Jeremy Baskin:

Hello everyone. I'm Jeremy Baskin, Head of the Americas at MSCI. And on behalf of MSCI and our partners at CalSTRS and CalPERS, I'm here to bring this year's Institutional Investor Conference to a close. I'd like to thank you all again for joining us, we hope you've had an insightful and enjoyable past couple of days. The investment industry is at a critical juncture right now, as the environment has become increasingly complex, there are many more investment choices and considerations, emerging risks as well as opportunities for growth, and ultimately many more decisions. At the same time, climate change is increasingly regarded as an existential risk to society. For the past couple of days,

we've heard from a number of industry leaders on actionable ideas on how to reposition portfolios in light of the investment landscape ahead. Many of the event's actions have been focused on climate change. Personally, I found Henry Fernandez's interview of CalSTRS CIO Chris Ailman especially relevant and enlightening on that topic. We've also covered advances in factor investing, private assets, disruptive innovation, as well as the role of fixed income. In addition, we had a preview of the latest finance from MSCI research. We hope that these sessions helped you think differently about asset allocation, risk management, and portfolio construction, and as you map out your long-term investment strategies. I'd like to take this opportunity to thank all the moderators, panelists, and speakers for your contributions, as well as to thank all those working behind the scenes for their hard work organizing the event. Please be sure to share your feedback on the conference and its content so we can ensure that future conferences are of the utmost value to you. Finally, we welcome you to continue this conversation on climate by joining the Global Investment Conference, the Greening 20s – The Net-Zero Revolution, which will be held virtually in two weeks, on October 6th and 7th. And of course, we hope that you join us again for this event next year, perhaps by then, we'll be able to meet in person and see each other face to face. Take care, and please stay safe.

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