Company Name: Transitioning to a lower carbon economy: Incorporating ESG risks and opportunities in credit analysis
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<<Jeremy A. Davis, Assistant Vice President, Corporate Social Responsibility>>

Yeah. At Moody's receipt to open the door to a better future for people around the world, we believe that knowledge fuels opportunity and accesses everything. And the core of our business is to provide credit ratings, research, tools and analysis that help equip participants in global financial markets to understand the risks and move forward with critical insight. Our CSR and ESG efforts are rooted in that same approach. And it's with that lens that we'd like to present this panel today and I invite and join me in welcoming to the stage, our moderator, Chris Fowle, who's Head of Americas for PRI and who helps to manage the signatory relations in the region. I'm sure many of you in the audience know Chris Fowle. I mean if you don't, you should.

And then our panelists from Moody's Investors Service, so we have Swami Venkataraman, who's an SVP in our dedicated ESG team; Gail Sussman, Head of our US Public Finance team; Gabriel Torres from our Sovereign Risk Group; and Bruce Clark from Corporate Finance Group, who focuses on transportation and capital goods. So thank you and please welcome [indiscernible] (1:05).

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Thanks Jeremy, and thanks to CECP for producing another terrific event. As said, my name is Chris Fowle. I'm Head of the Americas for the PRI, the Principles for Responsible Investment and I do know many of you in the room. For those I don't, very quickly PRI is an international non-profit headquartered in London, that works with investors that make commitments to integrate ESG and their investment processes. And I think we serve as a good answer to the question that was posed on the panel with Mark, Erika and Morgan earlier around how can investors better demonstrate their commitment to ESG.

We have more than 2,100 signatories around the world now representing over 80 trillion in assets. And some of those now are corporates that are thinking about their investible retirement funds, whether defined benefit or defined contribution plans. And Bloomberg as well as Unilever, both of whom were mentioned earlier are both PRI signatories with regard to their defined contribution plans.

So I'm going to spend a few minutes talking about an initiative that PRI has, related to a statement on ESG in credit ratings that we put out a couple of years ago, the goal of which was to enhance the systematic and transparent considerations of ESG factors and credit risk analysis. We recognize that there is a need for discussion among credit practitioners to deepen our understanding of materiality of ESG factors on credit risk to create a common language to avoid and clarify issues around double counting of relevant ESG issues and really importantly to enhance transparency.

And so we put out this statement that our investors, signatories can sign onto 137 representing over 27 trillion in assets have done so. And in addition, 17 credit rating agencies have signed up to this initiative. They're listed here on this slide and include, of course, Moody's, who are featuring on today's panel also S&P, who in terms of progress on ESG, we would say are leading the pack, strong efforts within this regard. Fitch Ratings has been a new joiner and you'll see listed other rating agencies from around the world including specialists, smaller CRAs and regional CRAs from, for example China.

In terms of what we've been doing, like I said, we started a couple of years ago with the statement. We created an advisory committee, which is a typical way that we work. We bring together our signatories to focus on a particular issue. We put out a report called Shifting Perceptions Part 1, the state of play, where we're credit rating agencies with regard to integration and transparency related to ESG. Then we ran a series of investor forums around the world. We've had 15 over the course of the year and all the cities listed on this map.

And then we put out a second report called Shifting Perceptions Part 2, exploring the disconnects with regard to credit rating agencies, incorporation of ESG, the findings really from all of those global workshops. And then our next step is going to be putting out a new report in the fourth quarter, which is going to be a focus on solutions. And so please do keep an eye out for that. Our program had for this effort is based in London, Carmen Nuzzo, who is terrific. And if you'd like more information, I'd be happy to make an introduction to Carmen for yourselves.

So that's enough from me. Let's move on to the main event. And I'm going to start off with Swami. ESG considerations are becoming increasingly relevant to market participants as we've been discussing today. But why and what exactly are they in the context of credit rating or credit risk analysis? And Swami how is Moody's approaching ESG factors both in credit ratings as well as in its broader strategy?

<<Swami Venkataraman, Senior Vice President, Moody's Investors Service>>

Sure. Thank you, Chris, and good afternoon everybody. It's a question we face all the time. Do you incorporate ESG into credit ratings if so how? Right, it's a common. So what I thought I would do is, I'll start with two examples to illustrate the approach and then maybe give you a more theoretical approach as to our thoughts about how we approach this whole issue.

So about 10 days ago, we – Moody's downgraded all three big utilities in California. And the reason we downgraded them was, there have been lot of wildfires in the state and we sort of have now a poorer perception of the ability of these utilities to recover costs that they incurred in – fall on account of these wildfires. Now these costs, they're not going to crystallize for many years, maybe even a decade. But our perception and our assessment of those risks was bad enough that we are able to incorporate them today into ratings.

And the context there is these wildfires are getting worse at least partly because of climate change. They're getting more frequent and they're getting more worse at least partly because of climate change. Then we said that explicitly in our press release that it is partly driven by climate

change considerations. Similarly, a little earlier this summer, we upgraded a global power generating company. And again, not solely, but partly, because they completely refocus their strategy away from fossil based power generation to renewable power generation. They made a big investment, they acquired a company and they reoriented their strategy. And we thought that that contributed enough in the needle to upgrade the company partly at least in terms of our perception.

So these two – I quote these two examples because these two are examples where there is not an immediate financial change, but yet there is enough there for us to incorporate. So the general answer to do we incorporate ESG is yes. We've always include everything that's relevant to a credit rating, irrespective of how far down the road the issue might seem, but everything relevant to a credit rating is always in the rating. What happens is usually you're able to make that assessment with adequate degree of – not usually, sometimes you're able to make that decision or the judgment with a degree of confidence that you need to actually change a rating and sometimes you don't have that degree of confidence. That really is where the distinction is.

If you go to our ratings in Europe for a decade now, those ratings have been trending down. They are three notches lower now than they were 10 years ago on average. And a lot of it is driven by renewable energy, climate policies, M&A transactions, but those transactions where in turn caused by climate change policies and management positioning themselves strategically to navigate this whole environment.

So we always incorporate them. The differences at in certain times there's not an adequate – there's not an ability to change ratings today in response to some events that may be far down the road. For example, if you're talking about a where the demand for oil and gas is going to be in 2040 or 2045 and Bruce can talk more about it and he talks about autos. Clearly as the auto sector changes, there is a possibility, but oftentimes you cannot change the rating today for two main reasons. One, what that scenario is, is extremely uncertain. You don't know what that scenario is going to be. Second, companies have a lot of time to reposition their business focus to change their approach. So that they may not be that credit impact that you see today. They are able to avoid that as well.

So primarily these are the two reasons why for – and it's common to all ESG risks. I quoted climate change because it's a popular example. But any ESG risks that's very long-term in nature, you will face a similar sort of issue. So the strategy we would operate is twofold. The first, I would broadly call it a transparency strategy, which is even if where ratings are changing today, obviously there's no issue there. Where ratings are not changing today, but there is a possibility that things might change down the road.

We want to be more transparent in how we address it. So increasingly in every credit opinion, we are starting to include a section on whether it's climate change or whether it's any other ESG issue, governance or social or anything, we're trying to write more and more and more. So increasingly you will see that. You will see a statement on what sort of risk can affect this company's ratings down the road, even if they don't do so today.

The other approach we're taking is can we – and my colleagues will talk more about the work they're doing on these issues, can we – even if we do not change the rating today, can we provide some other assessment of what sort of E or S or G issue this company faces? And how significant is that risk at least relative to all the other companies. Can you rank order companies on specific risk issues on ESG?

Now, the second part is really where we are in a work in progress mode. We don't – we have not launched assessments formally. We have not done. We have not – we have said publicly as I'm doing now that this is part of our approach as to how we would like to do things. We would like to give investors tools to assess those risks even if they may not be affecting our rating today. So at least investors are better informed that this is today's ratings, but here are certain ESG risks that could affect this company and this is an assessment of how that risk can affect this particular company.

That's sort of how we want to go down the road over time. So, that's sort of a in a nutshell, the strategy that we adopt. Some ratings already affected. In other ratings, you'll see more and more transparency in our written work credit opinions, and then hopefully more analytic assessments of specific ESG issues down the road.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Great. That's terrific, Swami. Thanks very much. Why don't we hear from the analysts, now and I'd like each of them for their specific sectors to talk about ESG factors and how they affect credit worthiness in their sectors? Let's start with Gail.

<<Gail Sussman, Head of US Public Finance>>

Sure. Thank you, Chris, and thank you for having us. I guess where I really want to start is to kind of emphasize Swami's point, when I sit back and look at the environmental, the social, the governance issues, and I was preparing a couple of little tidbits for today or what kind of stories I could think of to really drive this home. It was really clear to me that we have always been incorporating these risks into our credit view, but now we're being more transparent and calling them out and saying this is an environmental risk, this is a social risk.

So, let me just give you a couple of examples. I have maybe two examples from each to really crystallize it for you. And as Chris said, I'm responsible for our U.S. Public Finance business. So, we cover government, states, higher education, healthcare and I have examples from all. So, let me give you two social examples just to think about. One is I was reading yesterday an article about population growth in Australia. I know that's not the United States, but it's the same concept, right.

So, population growth, straining, existing infrastructure in cities. And what the article is really talking about was if the growth in the major cities is beginning to increase demand for education, healthcare and transportation services. So in order to be able to react to that, those regional local governments need to invest in infrastructure and then they have to think about where do they get the money to invest in that infrastructure. So either they find new revenues to be able to pay for it

or potentially they have to think about those tradeoffs in terms of well, what do I have to skimp on over here in order to be able to cover an investment that I hadn't necessarily planned for.

So the whole concept of population growth being a social issue, it's not a problem, it's a thing. And what happens when that thing changes? Another social concept is the growing costs of healthcare and the growth of healthcare on governments as well as individual people and businesses. The reason the growth of healthcare has an impact on states and local governments is really rooted in the fact that the population is aging and as healthcare costs grow, it takes a bigger chunk out of the revenue for any particular state government.

So, some of you may know the largest expenditure that a state has related to these kinds of things is Medicaid. And then they also have their post employment health benefits that they pay to their retirees. So, yesterday, I read that the U.S. spends close to two times the amount of other high income countries as a share of the economy on healthcare. That's a huge number as opposed to around 8% to 12% in other high income countries.

So, when you think about it, why does this matter? This will sort of links back to – it ultimately ends up affecting the finances. And finances are a consistent element of all of our different methodologies not just on the government side but on the corporate side as well. And once it starts to hit the bottom line, it begins to affect credit.

Let me just mention two quick things on the environmental side, some of which you may know, some of which you may not. So, Moody's recently upgraded the general obligation rating for the state of Florida. You may know that the state of Florida is highly exposed to storm, hurricane and other kinds of climate risk. And the biggest issue was not that they didn't have good governance or good financials, it's that the state stood behind a catas – that a state sponsored – two state sponsored hurricane funds.

So, no matter how much revenue they had, no matter how much resource they collected, they still had this huge exposure to these catastrophe funds. Over time, they built their reserves even greater and they also significantly reduced their exposure to the hurricane funds. And over time, we began to see those risks, those climate risks mitigated. And then in the last few months we upgraded the rating to AAA. So, it was the climate risk that actually held back the state of Florida from being AAA, which otherwise it would have been. And then how they manage those risks and mitigated them, increase our view of their financial flexibility.

And then I'll just give one example on the governance side, and then I'm going to pass it over to Gabriel. When we think about governance, again, affecting credit. The best example – the easiest example I could think of was what happened at Penn state a number of years ago. So, when the sexual assault allegations came to light, and the more you began to peel the onion, you could see that there was a growing amount of risk that was attributed to the impact of those particular situations on the university.

University was very highly rated, tremendous endowment, tremendous support from alumni. But nonetheless, the risks, again, all came back to finance. They developed a reputational risk, they had governance issues, questions people weren't sure with the way that their governance process

was working, even though they may have had the litigation cost covered and the risk of the financial impact of litigation. Nonetheless, if you weren't comfortable that they've solved for this problem again, then you have a reputational risk here. And the reputational risk impacts people's decisions to go, which affects enrollment, which again infects the bottom line.

So, it all kind of comes back, at least in the public finance sector, back to different ways you can get to finances, whether it's governance, social issues, or the environment but it all ultimately affects the bottom line. And that's really the reason that when we look at these risks, we think they've always been incorporated in these ratings.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Thanks Gail. Now to Gabriel on the Sovereigns.

<<Gabriel Torres, Vice President, Senior Credit Officer, Sovereign Risk Group>>

Thank you. Thank you, everybody. Okay, I'm Gabriel Torres part of Moody's Sovereign Group. A lot of what I'm going to be saying echos what my colleagues have said. This is a common story, one of them is of course transparency being clear about. And we and the Sovereign Group published a report only a couple of months ago, on how we incorporate ESG risk, ESG considerations into the Sovereign analysis.

And as we went through it, one of the things that became clear is we've been doing it for a while in some cases explicitly and others not so much. And this was simply a way of making it clear, it wasn't so much new. But, it was I think being more specific about this, like watched what's been happening in other lines of business at Moody's. We're at the Sovereign Group now in our reports explicitly mentioning those countries that have certain exposure tends to be more on the social side, but they can be I'm sorry, on the environmental side, but it can happen in others as well. And so, how we incorporate that?

The ESG – the incorporation of ESG into sovereign, the report we published is not meant to be a methodology. It's really an explanation and it's not meant to come up with scores for ESG. We're not saying that certain countries are better at the environment than others or that certain countries are better at social, managing their social demands. The closest that we might have because it's part of our methodology is the scoring of governance. We do incorporate directly an assessment of governance in our assessment of credit risk countries.

But within the broad concept of governance, we really kind of focus on a narrow subset has to do with debt payment. So, governance is much more than that for many countries. And so we do have scores for any country that we follow, we have a 15 point scale and we will rank those countries in governance and that's based on a series of numbers, we don't do that so much for ESG.

So, one of the things that for ENS, one of the things that we realized when we were looking at this as, ESG are kind of lumped together and we hear a lot of them as if they were all one or parts of the same concept. And really they are pretty different, they're very distinct. In our

methodology, E and S, environmental and social tend to appear or show up indirect. And I'm going to get a few examples to explain all of this.

Whereas, as I mentioned before, governance is not, governance is a direct measure of what we do. We rely on assessments by third-parties, by our own measures, by looking at things, for example, right now we use inflation as an indication of governance in terms its ability, a country to meet and maintain policy, policy promises if you will. So we look at this variety of indicators in some cases like I said, it's very direct and others for E and S for environmental and social, it's not.

So one of the examples where has environmental shown up? Well, clear example, small islands. Caribbean, for example, last year, Saint Martin hit in the hurricane season. So losses that have been estimated over to 100% of GDP was in their case bailed out to a great extent by the Dutch government for small islands across the world, and small countries across the world, environmental concerns are a direct risk.

But it's not only small countries Argentina, for example, this year has many problems, but one issue that has precipitated the problems they have today is a huge drought that they've had at the beginning of the year. They are a major agricultural exporter. And so of course they as a consequence of the drought, they exported less, as a consequence of exporting less, they had less dollars and that affected the currency. So these things kind of follow a cycle or a series of consequences, start something and then it can get worse and worse.

Another example of this was in 2007, 2008, partly because of environmental risk and others, food prices rose across the world, as food prices rose, inflation increased, inflation in the poorer countries has a greater percentage of food as in CPI, than in advanced economy. So inflation in poorer countries rose faster than it did, just as a consequence of the higher food prices. This led to riots in some countries and it actually led to a rating action on our part on Egypt. So you start with an environmental concern, it leads to lack of sufficient food, higher prices and now you have crisis.

Social, some examples of social, I view social as a governance of the counterpart. Social, if you will, is the demand side, governance is in the supply side. Social really refers to what our society is demanding, what do they need, what do they want? And we look at governance, what is their ability to respond and provide an answer to those demands.

Well, Arab Spring, clearly an example of social problems. In their case that had been there for decades and yet one day it exploded. But they don't all have to be so dramatic.

Chile, for example, over the last decade or so has seen its debt rise. There's several reasons for that. One reason is, society is demanding more. The country became richer, as the country became richer, society wanted more. One of the things they wanted more was they realized is the higher education system was not set up for a greater percentage of high school graduates to get into college. So they were going to highly – very expensive schools in some cases, much higher as expensive as the United States, in the country that has income that's a fraction of the United States, leading to an increase in student loans.

And a society that focus [indiscernible] (0:23:27), and so the government increased, had to pay for some of that. And as a result, you had an increase in debt. So again you see this chain of causation starting with certain demands and leading to eventually an impact on the rating, which we downgraded not that long ago.

And then finally governance. Governance permeates a lot of what we do. I would look at many, many examples here. I'll just mention one big one. 2004 Argentina defaults. It defaults not because it lacks the money, in fact, it had the money to make its debt payments. It defaults because it decides it would not accept certain rulings that were against it in New York courts. This is a governance issue part of law. As a consequence the money was stopped and turned to default. So the payments were there waiting for investors.

And so if you were looking at Argentina purely from a perspective prior to this of their ability to pay and you did a cash flow analysis, you would have not predicted a problem. It was the governance that brought it down. So kind of running out of time, I want give my colleagues some time. But just some few thoughts on…

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Thanks, Gabriel. That's good. That's great. Let's turn it over to Bruce.

<<Bruce Clark, Senior Vice President, Corporate Finance Group>>

Okay. I'm Bruce Clark. I'm the analyst for the domestic auto companies at Moody's and also filed some of the capital goods company like [indiscernible] (0:24:47). Just want to hit – I'm sorry.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

It doesn't sound like it.

<<Gail Sussman, Head of US Public Finance>>

[Indiscernible] (0:24:54).

<<Bruce Clark, Corporate Finance Group>>

Alright, couple of important points I want to emphasize. Number one, as you listen to all of our comments, it's important to realize or remember that everything that we do is geared towards one thing and that is assessing the likelihood that the company is going to be able to service its debt, and the likelihood of default and severity of default, in fact they don't do it.

Everything that we look at in all of our analysis is geared towards getting an answer to that question. In the auto sector E, S and G has always played an important part of what we've done. But I as an analyst, never really thought of it as an E, S, G I just thought of it as fundamental

analysis. Quick example, Ford, the F-150, far and away the most important vehicle that Ford makes, it makes or breaks that company.

When they move to an all aluminum body that was purely an E, S and G type issue. They did that to save on fuel economy and they did that because the regulations in the United States and California. I as an analyst didn't really look at it from that perspective. I said, are you going to be able to make this vehicle, make it effectively or you're going to be able to repair it when it gets into an accident, will customers buy it? But it incorporated on a very important E, S, G concept. And it was very important in terms of assessing Ford's ability to service its debt. It's always been there.

Another example would be for instance on the government side – governance side. General Motors, one of the big problems they had, one of the major credit risk was being a target of activist investors. Ford did not have that problem in part because of their heavy family ownership. That's a very important fundamental analytic issue, but it does relate to this whole topic of E, S and G. So the concept is that it's always been there and some of the things that Swami has talked about with respect to transparency, it's going to help our communication with the market in terms of understanding what we look at with the E, S and G.

Refresh, it's also going to help make me a better analyst, because as Moody's comes up with these very rigorous tools internally that help us communicate better with the external market, it frankly helps me be a better analyst, so also because it brings a lot of discipline in terms of making sure that we look at a whole host of issues relating to E, S, G and that analysts in different parts of the organization can have tools that bring a greater degree of consistency.

Liquidity has always been important at Moody's. We now have tools that bring a lot of consistency in terms of how every single analyst at Moody's looks at it. That's reflected in our speculative grade liquidity analysis and also our liquidity risk assessments. So just echoing the points that had been made earlier, number one, we've always looked at issues related to the E, S and G, we may not have called them that, but we will increasingly do that because it helps communicate better with the market, number one.

And number two, as Gail has mentioned, almost everything that we do and all of our assessments come back to what's a fundamental for all credit analysis. And that is generating cash, being able to service your debt. And that's kind of the lens through which we looked at the F-150, that's kind of a lens through which we looked at governance issues at Ford and GM. That's also the same kind of lens that we use when we look at things like battery electric vehicles. What impact does it have on cash flow? What impact does it have on fundamental credit quality? And we're simply going to become much more rigorous and transparent in communicating those issues that have always underpinned the rates.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Thanks Bruce. And I mean just to follow-up with you a little bit, one of the consistent messages here is that it's about the materiality, about the effect on cash flows. And with regard to governance, I know you said to me earlier that every taxi driver knows about the VW scandal,

right? From your perspective, from a GE perspective, how does that play out? How does that fit into your assessment of credit worthiness?

<<Bruce Clark, Senior Vice President, Moody's Corporation>>

I think it's specifically Volkswagen?

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Correct, yeah.

<<Bruce Clark, Senior Vice President-Corporate Finance, Moody's Corporation>>

Clearly one of the more important issues that we looked at, we spent a lot of time assessing. And again, I'm not the analyst on Volkswagen so one degree of separation removed from it. But sitting down and assessing in committee with literally about 13 people all of whom have probably 10 years of experience from credit quality, assessing the degree of either skepticism or credibility to which – that we issued describe to what Volkswagen is communicating with us. And what happened with that scandal was a very important issue from the standpoint of looking at the company's credibility.

Now we did it within the context of – for this group of ES&G, that's what we do with virtually every credit that we rate. I mean, if you can be in a rating committee and you will have people who've been around Moody's for a long time, who will remember what companies have told us about their financial strategy, their operating strategy and it gets very much to the heart of credibility. And we were looking at that an awful lot with Volkswagen. What was their credibility? How much trust we placed in their statements about what they were going to be doing with electrification and so forth. So it was a very, very important issue in that rating committee.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Thank you. Thank you. I want to open it up to the audience, to see if anybody has any questions? I know, Swami, do you want to say…

<<Swami Venkataraman, Senior Vice President-ESG, Moody's Corporation>>

Again one last word before. I don't know how many of you sort of grasp the point that Chris made before and Bruce also they sort of reiterate it throughout, the importance of financial materiality. I mean, ES&G issues have a lot of different issues in them. And oftentimes, various ESG people who are interested in ESG issues are interested that companies should do x or y, even though because that x or y could have an impact on how it influences society around them. Even though it may not have a financial impact on the company, right and that is a valid objective, a lot of ESG data and analysis providers look at those things.

Our companies influencing the society around them by doing certain things, but some of those may not have any financial impact on the company. So when we look at ESG issues, our focus will be on financial materiality to the credit quality of the company. So you will find our approach to ESG to be different in that respect from many other ESG, sort of data and research providers. I just wanted to highlight that point because our concern is going to remain very solidly focused on financial materiality, which may not be the sole concern for many other people.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Question, so I'll start here.

Q&A

<Q>: So at the equity side, it seems a lot of the new data that's out now is finally robust enough to be able to use it across comparing different companies. I would think your jobs are a little bit easier now, because you have a richer dataset. I don't mean, it's not an easy job, but how do you decide which of the data points are material on the financial side, when – so a movement on the equity side was that it was used to have to rely on the company to give you the data.

Now there's a bunch of young people that are just surfing the web and finding this information about the company and aggregating it to give us more data points. Is it similar on your side now, where you have a richer set of data that you can use for your analysis? And is it helpful through your lens?

<A – Swami Venkataraman>: So we are part of – also another body, our Chief Credit Officer is part of what's called the taskforce on climate related financial disclosure, which has come out with very detailed recommendations on what and how companies should be disclosing, for example, on climate change. And so we are a big rotary of better enhanced disclosure by companies because we still believe that, what companies disclose today in their 10-Ks or their 10-Qs does not go far enough to access many of these risks.

Our approach is we want to be fundamental analysts as we've been always saying throughout. So we may buy data from other people. But our approach to buying data is not just buying ESG data from other people. I think the ESG part of it, we want to do it ourselves besides what's material. We may seek to get data on the fundamental operations of a company that sometimes may be available for purchase but may not be available in an SEC filing so easily, that sort of thing. But I think the work on identifying ESG relevant factors will be ours internally. And we decide what we think is important to credit.

<A – Chris Fowle>: Other questions, Jill?

<Q – Jill Baker>: Thank you. Jill Baker with Terra Alpha Investments, just a point of clarification, what I'm hearing is sounds like there's still a large degree of subjectivity in your analytical work. And my question is, from the perspective of the E and ESG, which is what Terra Alpha is concerned with? We feel that there's a lot of specific science-based data available like

NASA and NOAA and the CIMP-5 data that's able to make projections about climate that countries used to plan.

And basically, I'm thinking of companies like Mercer and Guy Carpenter coming out with different internal projections for climate scenarios that they use to them guide their reinsurance clients and things like that. Do you guys have any internal models that deal with climate projections? You gave some very good one-off anecdotal observations on your various analysts but if you had a NASA projection that showed certain things about certain geographies, would that be helpful. And is that something that data is free by the way but is that something that you guys are rolling out internally?

<A – Swami Venkataraman>: Right. So one of the challenges with climate scenarios are is that – if we, as Moody's, if we use the climate scenario. So what we generally try to say is, when we do our climate change analysis, for example, we want to look at, let's say a two-degree long-term scenario, so that we have said publicly for a lot of sectors. One of the things we did was we wrote a report on identifying all sectors that have environmental risks. 85 sectors, $68 trillion of debt, this was 2015, the year the Paris Agreement was signed.

Since then about a dozen of those sectors are specifically climate change, environmental exposure, high-risk sectors. We've spent the last year in particular writing a detailed report on each of those sectors, talking about how climate change affects ratings in those sectors or could affect ratings in those sectors, so laying out a carbon framework, if you will, for each of those sectors.

Now we're taking the next step now and trying to go. So first we talked to – look at all the sectors, then we look at the highly-exposed sectors. Now we want to go down and look at every company within the highly-exposed sectors, that's the work that we're doing. But when we take up a climate scenario, one of the most important things for us, and we've said in these reports that we want to look at two degrees scenarios.

Now what does a two-degree scenario look like? The most important thing is if we have a two-degree scenario that says how much flooding there will be to affect a coastal city? We need to have that scenario provide something very consistent on what does a two-degree scenario do for the demand on oil and gas. Because we also rating oil and gas companies. And then what does the two-degree scenario do in terms of how much carbon can be put into the atmosphere, which in turn will limit caps on so many other different sectors.

So one of the most important requirements of any scenario analysis, there's plenty of those scenario analysis put out, Columbia University puts out a lot of those things as well. Is that just a weather prediction is not enough. It needs to go down and drill into how much coal, how much steel, how much cement, how much? Because that's what eventually goes into each of these ratings and they all have to be consistent. We can’t use one scenario. A beautifully designed scenario to do our public finance ratings because it gives us great information on how much flooding is likely to happen, if that same data source cannot provide us all these other things as well, because you have to be consistent across Moody's.

So what we're trying to do is standardize on the international energy agency scenarios. They put out a fairly detailed study that goes across different sectors, different types of commodities. It may not be the scenario that actually turns out to be, but at least it's something that's consistent. It's a lot of people accepted globally, that’s called the world energy outlook, they also – and so we sort of, that's likely the scenario that we will standardized on, because it gives us an ability to evaluate all the sectors on a consistent basis more or less.

<<Chris Fowle, Head of Americas, Principles for Responsible Investment>>

Great question. And we could spend the rest of the afternoon talking about scenario analysis in the context of climate risks and opportunities. But we're out of time. So I want to thank our panel.

<<Swami Venkataraman, Senior Vice President-ESG, Moody's Corporation>>

Thank you.