climate extremes
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Submitted to:
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Climate Disclosure Unit
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The Treasury
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PARKES ACT 2600

Re: Climate-related financial disclosure

By way of introduction, I am a climate change scientist who works specifically on physical climate risk. My comments therefore only apply to physical climate risk and not the very real challenges associated with transition risk. I have 35 years of experience in climate modelling, understanding the causes of extremes, and, crucially, what the climate science community can provide in terms of granular projections of future climate.

I strongly welcome Treasury's emerging focus on climate related financial disclosure. I do not want any of the following text to undermine my support for efforts to integrate physical climate risk into a business's broader analysis of the risk landscape in which they operate.

To begin, I wish to make some over-arching comments.

1. Uncertainty is a fundamental component of physical climate risk. Over Australia we know temperatures will continue to rise, but temperature is not a material risk to all business. We know rainfall will continue to intensify on average, become more variable leading to more floods in some regions, and more droughts in others. This is why most of my comments will relate to Question 13. While a great deal of data exists associated with how physical climate will change, it is essential for Treasury to understand that whether a specific variable will increase or decrease is fundamentally not known across Australia at anything approaching the degree of granularity most businesses would require. A solar or wind energy company does not know if sunshine will increase or decrease or whether wind will increase or decrease for example, and where a flood might occur more commonly, or where fire might impact settlements more severely. These are not currently predictable robustly at a granular level despite knowing that, on average, flood risk might increase or fire risk increase.

Consequently, while Treasury might seek to require disclosure of physical climate risk this is not always technically possible in a robust way. I would urge Treasury to "do no significant harm" (in the words of a recent Deloitte's report) in what is to be disclosed. It is very easy to provide copious amounts of precise information; but providing an *accurate* assessment of physical climate risk will require a great deal of time and may not be possible. I need to emphasise this last statement: it might not be possible for many Businesses to assess physical climate risk in a robust (or usefully reportable) way.

For example, a business has a physical footprint – it exists in a physical location, may obtain supplies from physical locations via supply lines and has routes to market that may involve roads, rail, shipping etc. Climate science can tell business, in general, that specific extremes might increase by 10% *on average.* That is, if one looks across Australia, or across a State, or even northern Queensland compared to southern Queensland, an extreme might be 10% more intense. It is not possible, however, to provide estimates for most extremes co-located with a business, or co-located with either supply lines or sales without considerable uncertainty. To make it clear, it is beyond existing climate science to provide, for example, robust estimates of how much change a specific business might expect associated with events that are currently rare co-located with that company's location, supply lines etc.

If businesses are required to report business risks based on these kinds of physical climate risks, reporting will necessarily be misleading in many cases. What will happen is Consultancy companies will fill the gap, provided legally defensible estimates of risk that businesses can use. However, these estimates will be of unknown quality, they might be misleading and not actionable. Reporting will therefore not lead to strategies that reduce physical climate risk. In short, a process will be created that costs business money, with little likelihood that actionable information will emerge that enables investors to assess risk. Ultimately, this does not lead to a more robust Australian economy.

I think there are ways around this – but they are necessarily bespoke to specific businesses and will require considerable time and effort to be implemented. At present, they are in the research domain and need to be connected to business which will take several years.

2. A very great deal of process and procedure documents focus on averages. TCFD, NGFS and so on mostly focus on how averages will change, or (in the case of TCFD) on events with roughly an annual return period. An event that happens, on average, once every 1, 5 or even 10 years should not be a material risk to the financial viability of a business given these are common events.

   In deriving material risk associated with physical climate risk there is no threshold value that can be pre-defined. Business X might be highly vulnerable to an event with a given magnitude, but Business Y might be resilient to that same event.

   Thus, Business needs to be able to assess what events are material to that business *before* exploring how climate change might materially affect that business. In my experience, very few Australian companies know their current exposure to physical climate risk to the degree that they can tell a climate scientist to examine how that specific risk might change in the future.

I appreciate the following is a very different approach for Treasury, but asking Australian Businesses to first report on the degree to which observed variability in physical climate impact their business (say, over the last decade) as a foundation for later exploring how climate change might affect their business would be an excellent way to introduce these issues.

3. Changes in a single physical variable are less important than compound events. For example, an increase in rainfall by 10%, or increases in wind gusts of 10% *in isolation* are unlikely to be material. However, if both occur simultaneously the impact can be considerable. An East Coast Low affecting the Sydney Basin is welcome (it replenishes water stores). Three East Coast Lows affecting the Sydney Basin within a few weeks could be catastrophic. The climate science community are now exploring these compounding events but they need to be embedded in risk assessments in the form of storylines or stress testing if exploring future climate risk. We have to use the storyline approach as we simply lack the predictive skill to know what will happen to these sorts of events.

In short, while Businesses reporting physical climate risk is the right thing to do, a crucial question is what science underpins the physical climate risks to be reported against. Perhaps most crucially, **uncertainty in how these physical climate risks will change in the future *cannot* be ignored.**

In terms of the questions we were asked to respond to:

Question 1. Please be aware that there is considerable risk to disclosure if a Business does not undertake a well-designed and bespoke assessment of its risk. It is not clear to me that the capability broadly exists to do this well, or that Businesses know (in general) those physical climate risks that are material to them. That said, understanding risks opens opportunities for managing the risk, and identification of new business opportunities. So, I do support climate-related financial risk disclosure but great care needs to be employed to ensure perverse outcomes are avoided.

Question 2. There are benefits for a phased approach to climate disclosure. The point of disclosure is to manage risk and that implies value in allowing businesses to properly assess risk. As noted above, in my view asking business to first assess risk to weather and climate changes experienced over the last decade would act as an excellent foundation for what needs to come next.

Question 3. This is perhaps mis-stated; how big a company is does not need to be correlated with how exposed it is to physical climate risk. For example, among the top 20 companies in Australia are Aristocrat Leisure Ltd and Afterpay Ltd and it is not clear to me how physical climate risk would affect these companies. You might consider picking specific sectors that are intrinsically vulnerable (agriculture, re-insurers, tourism).

Question 4. Australia has a remarkably variable climate, and extreme events vary dramatically year-to-year. How extremes will change both in terms of intensity and location is material to assessing Australian business risk. This is quite different from some other jurisdictions. My reading of the ISSB points to a focus more on how averages will change and in Australia I doubt that will generally be material. For example, while recent flooding in Lismore was associated with extreme rainfall, averaged over New South Wales the rainfall was not particularly extreme. There is no skill in climate models in terms of predicting future risk at the scale of Lismore. I will not unpack the contribution of thermodynamic and dynamic drivers of future rainfall unless you want me to, but

the short story is while we know extreme rainfall will intensify on average, we do not know if rainfall will intensify in a specific geographic location. This makes assessing business risk very hard.

Question 5. The single most important element of a new regulatory framework is very careful consideration of "do no harm" and the avoidance of perverse outcomes.

Question 7. Climate related financial disclosures should be auditable. At present, how physical climate risk is incorporated into risk assessments is opaque. How come consultancy companies utilise climate projections to create future risk assessments are "black box" and some consultancy companies offer physical climate risk assessments a decade ahead of what climate science thinks is possible. In short, there needs to be transparency on the physical climate risk of what was used, where it came from, how it was generated and how uncertainty is communicated. Rather than a regulator setting a standard, a business should state clearly what the definition of physical climate risk utilised was, why it was utilised and defend the decision making.

Question 8. I can only speak to the physical climate risk side of climate disclosures. In this context an auditor is unlikely to be able to determine whether this was properly quantified. It is perfectly possible to create an apparently robust assessment of physical climate risk, fed through a business to create detailed risk assessments, with the wrong sign (increase or decrease) in the physical climate risk. In my view, the specific underpinning assessments of physical climate risk to a business needs to be audited by an expert in future climate projection. I am not aware of any consultancy company with the capacity to do this, which leaves the assessment of a robust physical climate risk process challenging.

A detailed assessment of how we might move forward in this area was published recently – see Fiedler et al. (2021)[1].

Question 13. My comments here relate to physical climate risk.

I have written on the Network for the Greening of the Financial System[2]; in my view the methodology employed is deeply worrisome and I am by no means the only person to have raised fundamental concerns.

To assess a Business's exposure to physical climate risk requires granular data of these risks, the interactions between risks and how climate change influences those risks. It is trivial to create data layers containing large amounts of precise information. However, the fact I can tell you that our models predict an increase in rainfall over Canberra to 32 or 64 significant figures does not mean that the data are *accurate* although they clearly are very *precise*. The Commonwealth and several state jurisdictions are working towards better information around granular projections, but uncertainty is deeply embedded in these assessments. This uncertainty must be a fundamental part of any business's assessment of physical climate risk.

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[1] Fiedler, T., A.J. Pitman, K. Mackenzie, N. Wood, C. Jakob and S.E. Perkins-Kirkpatrick, 2021, Business risk and the emergence of climate analytics, 2021, *Nature Climate Change*, 11, 87–94, doi: 10.1038/s41558-020-00984-6

[2]Pitman, A.J., T. Fiedler, N. Ranger, C. Jakob, N. Ridder, S. Perkins-Kirkpatrick, N. Wood, and G. Abramowitz, Acute climate risks in the financial system: examining the utility of climate model projections, *Environmental Research: Climate,* https://doi.org/10.1088/2752-5295/ac856f.

To be clear, reporting of business risk cannot wait for the physical climate risks to be known with certainty as that might be decades into the future. However, assuming we "know" the physical climate risks is likely to be seriously misleading. Full disclosure of uncertainty has to be a fundamental component of any reporting.

Question 14. As noted, The Commonwealth and several state jurisdictions are working towards better information around granular projections.

The question of climate scenarios might be misinterpreted by me. I think of climate scenarios as emission scenarios. If this is what is meant, these do not matter through to roughly 2050 and existing scenarios are sufficient.

If you mean climate scenarios in the sense of how climate will change in a specific region I think of these as "storylines". These cannot be provided by government as the storyline needs to be developed in dialog between a Business and those knowledgeable about how climate will change in the region(s) the Business exists and with knowledge of what a Business is vulnerable to. Encouraging dialog of this kind, between Business and climate science could be a role for government.

In terms of potential structures, I make the following comments. When I examine regulators around the world that are exploring climate risk it is noteworthy that these regulators generally lack deep expertise in climate risk. So, for me it is less important whether ASIC or AASB or another organisation carries responsibility. What is necessary is that whoever carries responsibility has expertise in areas of physical climate risk.

In more general terms, climate change is not a sustainably issue. Mixing sustainability with physical climate risk is unlikely to be beneficial for properly assessing risk and ultimately finding ways to reduce this risk. Beyond that comment, the appropriateness of the structures is well beyond my expertise.

In summary, I am delighted to see Treasury moving forward in these areas. However, while benefits do outweigh risks, I would note that done badly Businesses will invest considerable effort in disclosing climate risk badly and in such a way that it will be very hard for the market to tease out what is real and genuine from greenwash, bad assumptions and misuse of data. The more transparent processes are, and the more open Business can be around disclosing the uncertainties in the methods and data used the better.

I am available to clarify any of the points I've made. If you would like copies of any of the papers cited please let me know.

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