Disclosure of climate-related financial risk

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In light of underwhelming progress at COP-24 (the annual United Nations Framework Convention on Climate Change (UNFCCC) Conference Of the Parties (COP) in Katowice 2018), it is increasingly improbable the Paris Agreement's ambitions will be achieved. Instead, it seems more likely that recommendations from the Financial Stability Board (FSB) will be the primary catalyst for effective action on climate change mitigation. Projections of the economic cost of climate change have always been somewhat dire (e.g. Stern (2006)); and have been mostly ignored by policy makers. However, the FSB have recommended financial risks due to climate change should be disclosed by all publicly listed companies. This is driving the financial sector to seriously consider the implications of climate change, and the results are likely to be sobering. With an understanding of risk comes investor pressure to minimise the risk, and this may well drive mitigation efforts above and beyond those achieved via the 'heads-of-state' level Paris Agreement.

Publicly listed companies are legally required to disclose material risks to their investors. This disclosure is especially relevant for banks, insurance companies, asset owners and managers when evaluating the allocation of trillions of dollars in investor capital. In 2017 the FSB released the final report of the Task Force on Climate-related Financial Disclosures (TFCD), which stresses that climate change is a material risk (and/or opportunity) that should be disclosed—preferably alongside other risks in annual reporting. The TFCD proposes a framework for climate risk determination and disclosure (Figure 1), where risk is classified into two main types: *transitional* and *physical*. Transitional risks are those that may impact business models through changing technologies and policies: examples would be a carbon tax, or stranded assets associated with redundant fossil fuel exploration and extraction. Physical risks are those associated with climate change itself: these could be chronic risks such as sea level rise, or acute risks such as more extreme storms, floods or droughts.

While climate change is expected to impact most businesses, even current exposure and vulnerability is not being adequately disclosed by most organisations. The Australian Securities and Investment Commission (ASIC) report in 2018 looked at climate risk disclosure in Australian companies and found that very few were providing adequate disclosure, thereby exposing themselves to legal implications; and more importantly, by failing to consider climate change as a risk, were potentially putting investor capital at risk. Companies that are attempting to disclose climate risk are typically doing so inconsistently, and with high-level statements of little use for investor decision-making (ASIC 2018). Quantifying organisational vulnerability and risk under climate change is a non-trivial task. Adequate implementation of the TFCD recommendations will likely occur over a >5 year timeframe (Figure 2). Initially companies are expected to develop some high level information on general risk under climate change. As research progresses, disclosure should become more specific.

Understanding risk in terms of weather and climate has long been of interest to the insurance sector, but is now something expected to be understood and disclosed by all sectors. The Actuaries Institute have recently developed *The Australian Actuaries Climate Index*, which tracks the frequency of occurrence of extremes in variables of interest, such as temperature, precipitation, wind speed and sea level. The index provides a general level of information drawn from a distribution of observed variability. However, climate change will cause a shift in the distribution of events, meaning this information is of limited use for projections. The relationship between a warming climate and the frequency of extreme weather events is likely to be complex and peril and location specific. Quantifying physical climate risk requires an understanding of the physical processes driving climate variability, the technical expertise to work with petabytes of available data, and the capacity to run regional climate models for dynamical downscaling—these skills are typically restricted to research organisations and universities.

Useful risk disclosure will come from using the best available information to represent both past and projected climate variability. This means using a combination of observational and model based data. Exposure and vulnerability will need to be determined using weather station observations and reanalysis data. This will need to be organisation-specific and developed within the context of assets, operations, and physical locations. Risk projections can then be developed, and this should be done using scenario analysis across multiple time horizons: short, medium and long term. Short-term projections can be developed using established vulnerability together with seasonal forecasts. Medium- and long-term projections should be based on global climate model (GCM) projections developed within the framework of the Coupled Model Intercomparison Project (CMIP). These are the scenario-based industry-standard climate model projections used for the IPCC reports. The IPCC Fifth Assessment Report (AR5) was based on the CMIP5 suite of simulations. The next generation of simulations (CMIP6) are underway and should become publicly available from 2019-20 onwards. Projections of organisation-specific risk will need to be developed by downscaling GCM projections. The best results are likely to be achieved through a combination of statistical downscaling, dynamical downscaling, and machine learning.

Risk Frontiers utilises projections within its suite of natural catastrophe (Nat Cat) loss models to investigate how losses may change in the future under different climate scenarios. Risk Frontiers adapts its Nat Cat models, developed for the insurance industry to assist decision makers in estimating and managing catastrophe risk, to assess the impact of projected changes in weather-related hazard activity due to climate change as well as changes in vulnerability and exposure (Walker et al. 2016). In November 2018, The Geneva Association reported on the benefits of the integration of climate science and catastrophe modelling to understand the impacts of climate change stating that "Cat modelling is more relevant than ever". With Nat Cat models being the ideal tool for this type of analysis, Risk Frontiers is strongly positioned to address the need for physical climate risk disclosure.
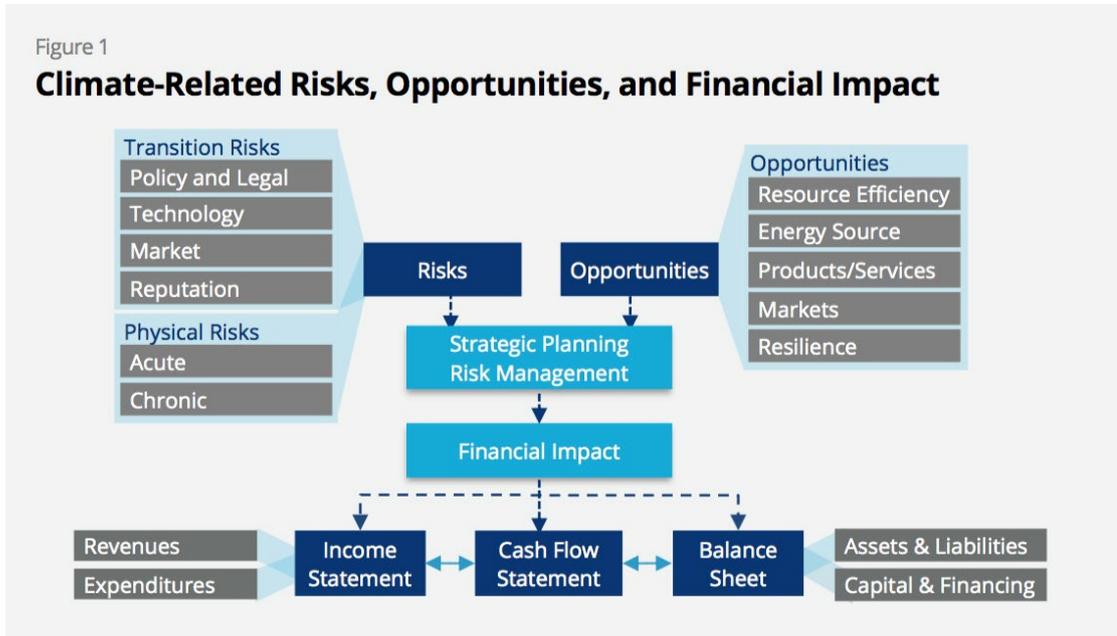
Figure 1
Climate-Related Risks, Opportunities, and Financial Impact

Figure 1 Factors identified in the TCFD report contributing to financial risk and opportunities under climate change (TFCD 2017).

Figure 12
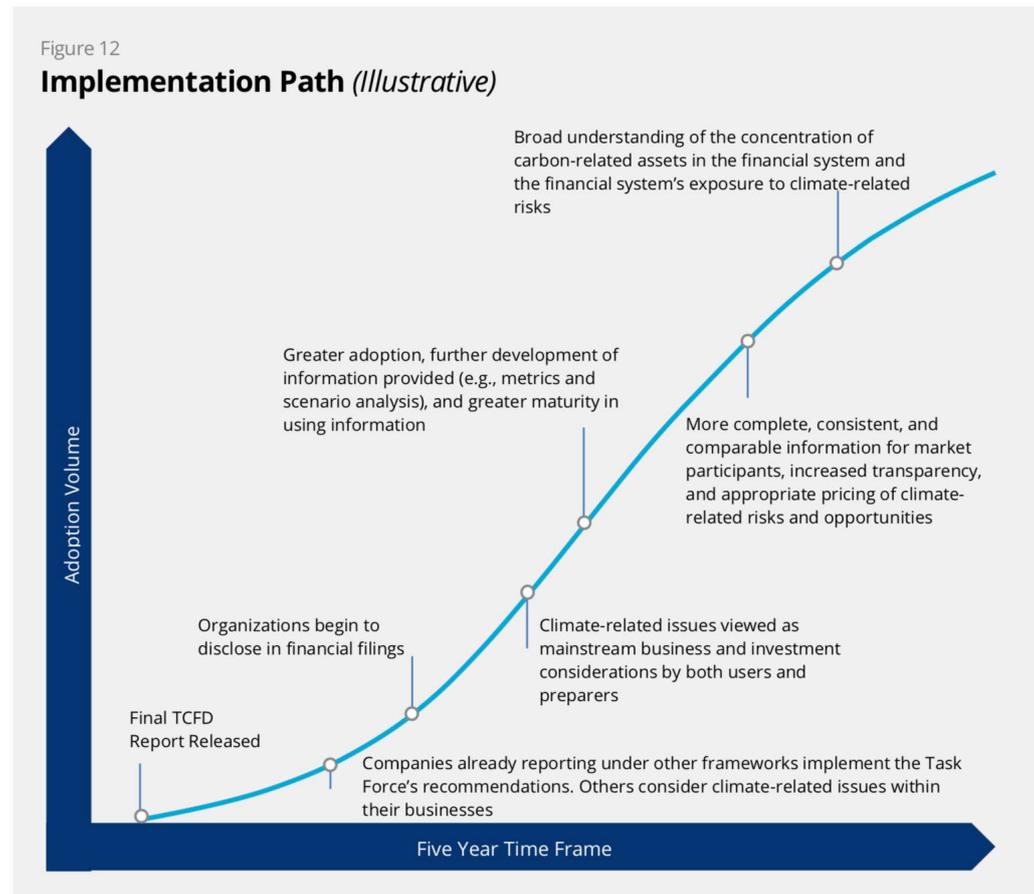# Implementation Path *(Illustrative)*

Figure 2 Milestones in the implementation of the TCFD (TFCD 2017).

References

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