



Seeing **Beyond** the Tragedy of Horizons

An
Investor
Perspective



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1 Introduction

This article offers a perspective on climate risk management from one of the world's largest insurance companies and institutional investors (see Appendix 1 for more about Aviva plc).

While the transition to a low-carbon economy brings significant risks, not transitioning would bring forth physical risks that present long term existential issues to many of the companies listed in stock markets around the world today, including insurance. A policy shock transitioning to a sub two degree economic trajectory too quickly could also cost investors in fossil fuels tens of trillions.

We argue that, at the microeconomic level, long term investors should consider how physical risks of climate change and so-called 'transition

risk' could impact their portfolios, particularly those with a fiduciary duty to others. In addition, as the greatest risk is the physical risk associated with a failure to transition, at the macroeconomic level, the world's institutional investment community has a financial interest, as well as a fiduciary and moral duty to future generations, to promote a rapid, yet well managed, transition to a net zero climate economy.

Structurally, the first part of this article sets out suggested actions at the microeconomic level. The second part covers the macroeconomic policy engagement role of investors and civil society beyond.

2 Background

In November 2016, the bustling Moroccan city of Marrakech is hosting the 22nd Conference of Parties (COP22) to the United Nations Framework Convention on Climate Change (UNFCCC).

Policy-makers and politicians will discuss how they can meet the targets set out in the historic Paris Agreement, which was negotiated at the COP21 summit in December 2015 and took effect in November 2016. The agreement commits governments to hold global temperatures at less than two degrees Celsius above pre-industrial levels, and to pursue efforts to limit the increase to 1.5 degrees.

The ratification of the agreement came about in record time and much more quickly than many observers had expected: 192 UNFCCC members, including the US, China and the European Union, have agreed to its terms and set Intended Nationally Determined Contributions (INDCs) to emissions reduction targets. This represents a significant step forward in the battle against climate change. Limiting human-induced global warming will help curb extreme weather events, protecting communities, ecosystems and economies from irreparable damage.

2.1 Physical Climate Risk

Many investors have little idea that we collectively owe a debt of thanks to the policy-makers involved in the swift ratification of the Paris Agreement. According to research commissioned by Aviva from the Economist Intelligence Unit (EIU, 2015), a rise in global temperatures of six degrees between 2016 and 2100 would inflict \$43 trillion of losses on investment portfolios discounted to present day value (using government discount rates), which is around 30% of the entire stock of manageable assets.

This isn't just because floods, wildfires and droughts will damage physical assets, but also because environmental changes will result in weaker economic growth, which will have knock-on effects on financial markets. The analysis also concluded that much of the impact on future assets will come through weaker growth and lower asset returns across the board. The study found that asset managers cannot simply avoid climate risks by moving out of vulnerable asset classes if climate change has a primarily macroeconomic impact, affecting their entire portfolio of assets. In effect, total global output will be lower in a future with more climate change, rather than one with mitigation, and accordingly the size of the future stock of manageable assets will also be lower.

The EIU's research makes clear that if the temperature rise is restricted to below 2°C; these projected losses would be considerably reduced.

2.2 Policy Risk

Nevertheless, the transition to a low-carbon economy is unlikely to be smooth, and it may bring new investment risks. As the attendees of the UN Conference in Marrakech thrash out plans to achieve the objectives of the Paris Agreement, they are likely to hone in on the nitty gritty of regulation and policy. While these negotiations won't grab the headlines as the Paris Agreement did, they will be just as important – and investors should pay close attention.

As a measure of the potential financial impact of the Paris Agreement, in 2015 Barclays conducted an assessment of the impact of a strong deal at Paris. They calculated that the fossil fuel sector stood to lose \$34 trillion in revenues over 2014-2040 using two degree scenarios, with the oil industry accounting for \$22.4 trillion of this, gas for \$5.5 trillion and coal for \$5.8 trillion (Barclays, 2015).

Consequently, investors are currently left navigating between the twin risks of run-away climate change on the one hand, and run-away policy risk on the other. Pensioners, savers and investors globally need policy-makers and politicians to manage a rapid but well-managed transition to a low carbon economy.

2.3 Policy response

The Paris Agreement aims to strengthen the global response to the threat of climate change by *“Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change”*. Importantly in this context Article 2.1 (c) commits governments to *“Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development”*. However, it is not yet clear precisely how governments intend to measure this, let alone implement it.

Insights are available. In a 2015 report, the UK Prudential Regulatory Authority (PRA) identified three principal climate-related risks to the insurance industry, and these have broader relevance across the financial markets. As well as physical risk to investment assets from climate change, the report cites liability risk, which is related to the potential effects of compensation claims on carbon extractors and emitters, and transition risk, which refers to the impact measures to tackle global warming will have on companies and markets.

2.4 Transition risk

Transition risk is perhaps the most pressing for investment organisations over the short and medium-term. Transition risk falls into three broad categories, including the implications of policy and regulation, technological innovation and their impact on broader demand and supply dynamics. The effects will differ across and within different asset classes, and it is worth noting these drivers may result in both negative risks and opportunities for investors. The most acute challenge is clearly the potential for a significant and rapid re-pricing of assets, set out above. As opportunities, Barclays (2016) notes that wind and solar are now the cheapest energy source in most emerging markets, and that they are expected to become cost competitive in mature markets too. They forecast a \$200 billion capital goods industry for the wind and solar industry by 2020.

The Paris Agreement implies significant policy and regulatory measures are needed at both national and regional level. The estimated aggregate greenhouse gas (GHG) emission levels in 2025 and 2030 resulting from the INDCs are not yet consistent with the goal of limiting the global average temperature increase to less than 2°C. As a result, we expect further tightening of climate policy that will impact the energy, transport, industry and agriculture exposed sectors.

As Bank of England Governor Mark Carney pointed out in a 2015 speech on transition risk, companies likely to be affected are those principally in the natural resource and extraction sectors, but also those in power utilities, chemicals and industrial goods. Globally, such companies account for a third of equity and fixed-income assets. The implications for companies' valuations and investor returns are therefore significant.

In seeking to answer why more isn't being done to address it, Governor Carney set out his view that climate change represents a Tragedy of Horizons: *"the catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors – imposing a cost on future generations that the current generation has no direct incentive to fix. That means beyond the business cycle; the political cycle; and the horizon of technocratic authorities, like central banks, who are bound by their mandates."* The tragedy being that *"once climate change becomes a defining issue for financial stability, it may already be too late"*.

Meanwhile, the transition to a low-carbon economy is spurring technological developments that are profoundly altering the investment landscape. The drive to decarbonise has catalysed the development of new technology that can have a transformative and disruptive impact on the traditional dynamics of many economic sectors. Examples already exist in areas such as solar PV (or photovoltaic systems), which in some regions has reached grid price parity with the cost of the local electric grid; the development of energy storage solutions that address the intermittency challenge associated with renewable energy generation; and the transformation in functionality and economics of electric vehicles (see case study below).

The third category of transition risk concerns the dynamics of supply and demand. New policies and technologies – along with ongoing shifts in cultural attitudes as increasing numbers of people become aware of the risks of climate change – are likely to boost demand for green products and services, and to hit others that are considered damaging to the environment. Environmental, social and governance (ESG) factors will become ever more important, and investors or companies that disregard them are likely to be left behind.

3 The role of transparency in understanding climate risk

So how can investors position themselves to mitigate the risks – and take advantage new investment opportunities – that arise as the world shifts to a low-carbon economy?

Clearly, at the portfolio level, it will be important to incorporate transition risk into existing organisational procedures. As a first step in this direction, investors will need to develop a comprehensive picture of their portfolio companies' climate-related exposures. Unfortunately, many firms still fail to divulge the sort of detailed information that would make this possible.

Thankfully, new initiatives to encourage better standards of disclosure by companies and financial market participants are in the offing.

December 2015 saw the launch of the Task Force On Climate-Related Financial Disclosures (TCFD) under the auspices of the Financial Stability Board (FSB) and through the leadership of Governor Carney. Chaired by former New York City Mayor Michael Bloomberg, the Task Force aims to help companies understand the kind of disclosures needed by financial markets in order to measure and respond to climate risks. The TCFD will develop recommendations for voluntary disclosures related to physical, liability and transition risk for investors, lenders, insurers and other stakeholders, and is set to announce its first set of recommendations in December 2016.

Aviva welcomes this development¹. While the risks of adapting to a low-carbon future pale in comparison with the risks of doing nothing to tackle climate change, transition risk will present investors with various challenges over the coming years and decades. Much remains to be done, but initiatives such as the TCFD will provide companies and investors with vital tools with which to devise strategies to cope with the shift to a low-carbon future.

¹ Steve Waygood, Aviva Investors Chief Responsible Investment Officer, one of the authors of this report is a member of the TCFD. This is an Aviva report and has not been written on behalf of either the FSB or the TCFD. The views stated here are those of the individual authors.

Case study

Transition risk and disruption in the car industry

The automotive sector represents an illuminating case study for how transition risk is playing out, as new regulation, technology and changing supply-and-demand dynamics are already reshaping the car industry. Take the growing popularity of electric cars: while the electric vehicle market remains small, at below one per cent of new car registrants, it is already having a disruptive effect.

Top-down regulation to support electric cars, introduced by governments mindful of carbon emissions targets, is playing a key role. China, for example, aims to become a leader in the production of electric and hybrid vehicles. It is offering purchase incentives intended to increase these cars' overall market penetration and building widespread charging infrastructure.

Meanwhile, the European Union's Green Car Initiative, a public-private partnership, is supporting research and development into clean energies in road transport, which is delivering advances in battery technology. Battery costs have fallen by 73 per cent since 2008 to \$268 per kilowatt hour and are likely to drop still further over the coming years.

With supportive regulation and rapid technological advances, demand for electric vehicles amongst consumers is rising fast. Three days after electric car-maker Tesla unveiled its new Model 3 on March 31, 2016, pre-orders hit 276,000; more than 2.5 times Tesla's total vehicle sales since 2012. This figure is particularly impressive given that pre-orders require a deposit of \$1000 and the vehicles won't be delivered until late 2017 at the earliest.

The rapid emergence of electric vehicles as a viable commercial proposition is having wide-ranging financial effects, and not just on those manufacturers that remain wedded to the internal combustion engine. According to a report from Fitch Ratings, the rise of electric vehicles is a *"resoundingly credit negative for the oil sector [as a whole], as transport accounts for 55 per cent of oil consumption...in an extreme scenario where electric cars gained a 50 per cent market share over 10 years, about a quarter of European gasoline demand could disappear."*

Fitch's report warns of a potential "death spiral" as investors sell holdings in oil companies, making it more expensive for them to raise financing.

The effects of transition risk can also ripple out far beyond the obvious energy-related sectors. For example, prices for cobalt metal, a key component in lithium-ion batteries, are expected to increase 45 per cent by 2020 due to soaring demand for electric vehicles, according to consultancy CRU Group. This represents an opportunity for companies involved in extraction of the commodity. And new technology developed for electric vehicles may also have applications in renewable energy sectors, helping wind and solar power generators to overcome longstanding 'intermittency' issues and compete on a more even footing with traditional utilities.

4 Suggested portfolio level actions

Demand data, seek assurance, trust and verify

We believe asset owners should ask for information on (i) how their asset managers integrate climate risk into their investment process across all asset classes, including security selection, portfolio construction, and portfolio risk management. They should also (ii) seek credible data on the engagement that the asset manager has with the companies in the portfolio considered to be exposed to physical and/or transition risks, assuring themselves that the engagement is active, forceful and that it extends to the use of client voting rights at annual general meetings.

Checking the portfolio-level practices of the asset managers and the companies in which one invests is a logical place to start when mitigating the risks and exploiting the investment opportunities of climate change. However, it is not the logical place to finish.

5 Suggested macroeconomic actions for investors and civil society and beyond

We have argued that as the greatest risk is the physical risk associated with a failure to transition, the world's institutional investment community has a financial interest, as well as a fiduciary and moral duty to future generations to promote a rapid yet well managed transition to a net zero climate economy.

We believe that all stakeholders in the global economy have a role to play in requiring the tragedy of horizons, and this extends to investors as well as other stakeholders such as NGOs. In other words, what can we do to collectively re-write the tragedy of horizons?

In our assessment, we believe the following six key elements will be particularly important drivers of the success for the uptake of the TCFD recommendations, and therefore contribute to the management of a rapid yet stable transition to a lower carbon economy:

5.1 Longer academic horizons: promoting an increase in climate risk literacy among key market participants

The 2016 Phase 1 report of the TCFD report (TCFD, 2016) recognises that the global level of competence on these risks is currently low and much lower than it will need to be.

We believe that in the first year or two, up-take of the TCFD recommendations will be significantly impeded by a lack of sufficiently expert internal staff and external consultants. However, we expect that the 2019 reporting season will witness considerable deepening of the disclosure practices. Providers of training to executive and non-executive directors should be encouraged to include

substantive sections in the syllabus enabling better informed board oversight of the scenarios, more informed strategic debate, and enhanced risk disclosures. Universities should be encouraged to embed climate risk literacy into the syllabus of MBAs, and the rankings of these MBAs by the Economist, the Financial Times, The Wall Street Journal, etc, should assess them accordingly. Similarly, the Chartered Financial Analyst Institute curriculum committee should be encouraged to update the syllabus of chartered analyst and fund managers. This would create greater understanding of the scale of risks among the institutional investment audience.

5.2 Longer term corporate horizons: promoting a seismic shift in climate risk governance

We collectively need to promote the norm that good corporate governance includes the governance of long term climate risks that the company is exposed to.

Climate represents a strategic issue across geographies, sectors and time and it is appropriate that the board should equip itself to be able to govern these risks. We believe that it is important for boards to understand the risks that the business is exposed to, and to govern how the company may need to evolve in order to manage and mitigate these risks. Our analysis of the G20/OECD Principles of Corporate Governance (2015)², which underpin international governance codes, demonstrates that they provide a useful framework for climate risk governance. Our recommendations on climate-related governance disclosure follow Principle VI. D of the OECD Guidelines: *"The board should fulfil certain key functions, including: 1. Reviewing and guiding corporate strategy, major plans of action, risk management policies and procedures, annual budgets and business plans; setting performance objectives; monitoring implementation and corporate performance; and overseeing major capital expenditures, acquisitions and divestitures. ... 4. Aligning key executive and board remuneration with the longer term interest of the company and its shareholders."*

However, at the moment, the Principles have nothing to say on climate risk governance. We believe that the G20/OECD Principles of Corporate Governance should be enhanced to clarify that one of the functions of the board is to govern long terms risks such as climate change.

² http://www.oecd-ilibrary.org/governance/g20-oecd-principles-of-corporate-governance-2015_9789264236882-en

5.3 Longer term horizons by financial regulators: promoting climate risk accountings

Building on the guidance embedded within the 2017 TCFD report, the International Accounting Standards Board (IASB) should be encouraged to enhance the accounting disclosure framework for the extractive sectors, particularly oil, gas and coal to help companies better standardise the disclosure of embedded carbon in the physical reserves of the company.

Similarly, the International Organisation for Security Commissions (IOSCO) should be encouraged to work with the Sustainable Stock Exchange Initiative to help coordinate more consistent international listing rules on the disclosures of emissions by energy intensive companies. These initiatives by these institutions would lead to a significant improvement in the quality and quantity of disclosure in key sectors.

5.4 Longer term disclosure: public league tables of corporate climate risk disclosure

We believe that concurrent with the conclusions of the TCFD, the Carbon Disclosure Standards Board (CDSB), working closely with CDP, the Global Reporting Initiative, the International Integrated Reporting Council, the Sustainability Accounting Standards Board, and the World Business Council on Sustainable Development (WBCSD) should work together to build a multi-stakeholder initiative to assemble best practice corporate disclosure benchmarks.

These benchmarks will need to be calibrated on a sectoral basis, measuring the quality of disclosure on material climate risk disclosures. The multi stakeholder approach should help ensure that the disclosures both reflect and continue to build upon the guidance in the forthcoming TCFD recommendations. These best practice benchmarks could be used to evaluate relative corporate disclosures, comparing companies with peers in the same sector. The annual publication of these sectoral disclosure league tables will help to focus both the minds of corporate boards as well as asset owner and asset manager attention on lagging companies. This will help to ensure that leading companies will be rewarded for good climate risk governance and good disclosures. Conversely, lagging companies will be much more likely to be held to account for the poor quality of their disclosures.

The presence of sector benchmarks, corporate disclosure league tables and efficient and effective engagement by stakeholders, particularly institutional investors, should catalyse the race to the top that the world economy needs.

5.5 Longer term horizons by institutional investment intermediaries: integrating climate risk into investment

In view of the scale of the risks, investment intermediaries should make enthusiastic use of the additional data – once it comes out – embedding climate related risks into the institutional investment infrastructure as the quality and quantity of such data improved.

To encourage the adoption of this, the world's largest Credit Rating Agencies should be encouraged to update their published assessment methodology regarding how they factor in physical, transition and liability climate risks. This would make it extremely difficult for companies to issue debt and also say nothing about climate risk in the prospectus.

Sell side brokers should also be encouraged to use the increased availability of two degree scenarios to provide transition price forecasts for the value of the equity, in addition to the target price they considered most likely. In addition to the analytical benefits that this would confer on asset managers and asset owners, the practice of brokers evaluating the corporate two degree scenarios that the TCFD looks likely to promote should help ensure the veracity of the scenarios themselves. The difference between the broker target price and the transition price will give portfolio risk management software providers financial metrics as a proxy to measure transition risk. Investment consultants should be encouraged to use this measure in advising their asset owning clients.

Asset owners and asset managers have a duty to act in the best interests of their clients or beneficiaries. In some jurisdictions this is known as a 'fiduciary duty'. This duty can – and often is – misinterpreted by pension fund trustees and other investors as a duty to maximise short-term returns. They will therefore often not consider sustainability factors like climate risk, even though these factors could have a material impact on the value of their investments. Further guidance and interpretation on how to include sustainability factors into fiduciary duty would therefore significantly help disclosure.

Building on the comprehensive analysis and recommendations by the UN Principles for Responsible Investment (PRI, 2015) and the report commissioned by DG ENVI (European Commission, 2015), we recommend that the OECD strengthen the current G20-OECD High-level Principles of Long-term Investment Financing by Institutional Investors, by establishing a convention, which defines a common interpretation of fiduciary duty focused on the long-term, and that explicitly includes climate risk. We welcomed the announcement at COP21 that the OECD would be working broadly in the area of investor governance and look forward to the findings of their ongoing review.

5.6 Longer term fund management: the development of climate risk aware asset management system standards

The French Government working with UN Environment Programme (UNEP) has invited the International Organisation for Standardisation (ISO) to develop a standard for climate aware fund management.

This is a welcome step. However, the standard needs to be carefully constructed in order to ensure that it synergises with existing plans. First, it should be about financial institutions reporting on how they consider climate risk in general across all their investments, not just those financing activities related to climate change (which is the current proposal and conceivably much narrower, depending on how terms are defined). Second, the role of ownership, engagement, stewardship in general and AGM voting must be included and is currently overlooked. Finally, it needs to be shaped with input from the leading asset owners and managers, who should ideally sit on a technical working committee to develop a management system standard for climate risk aware fund management.

The development of voluntary asset management standards accrediting climate risk aware fund management will allow large quantities of asset owners to quickly and easily assess performance and express demand for asset management that integrates climate risk. It will also enable the end individual investor to assure themselves that climate risks are considered in their own pensions, savings and investments. And that the asset managers will be undertaking effective engagement on the issue on their behalf.

6 Conclusion

We have argued that, at the microeconomic level, long term investors should consider how physical risks of climate change and so-called 'transition risk' could impact their portfolios, particularly those with a fiduciary duty to others.

We believe asset owners should ask for information on: (i) how the asset manager integrates climate risk into their investment process across all asset classes, including security selection, portfolio construction, and portfolio risk management; and (ii) the engagement that the asset manager has with the companies in the portfolio considered to be exposed to physical and/or transition risks, assuring themselves that the engagement is active, forceful and that it extends to the use of client voting rights at annual general meetings.

In addition, as the greatest risk is the physical risk associated with a failure to transition, we have argued that at the macroeconomic level the world's institutional investment community has a financial interest, as well as a fiduciary and moral duty to future generations to promote a rapid yet well managed transition to a net zero climate economy. In respect of the promotion of better governance and reporting on climate risk management, the simple encouragement of greater disclosures of the risks associated with climate change should stimulate a considerable growth in climate awareness among the boards of many companies around the world. This, in turn, will help asset managers and asset owners assess and manage climate risks in their portfolio, helping to improve the scale and effectiveness of their engagement with exposed companies in their portfolios. And this, in turn, will help prepare the economy for the transition to a lower carbon footing.

Authors

Steve Waygood

Chief Responsible Investment Officer, Aviva Investors & Member, Financial Stability Board Task Force on Climate Related Financial Disclosure (TCFD)

And:

Stephanie Maier

Head of Strategy and Research, Aviva Investors & Chair of Corporate Programme, Institutional Investors Group on Climate Change.

Appendix 1

Aviva is one of the world's largest insurance and asset management companies, providing insurance, pensions, savings and investment products to 33 million customers across 16 countries in Europe, Asia and Canada. We can trace our history back more than three hundred years to 1696. We are a long-term business and must also create long-term returns for our customers and shareholders.

In June 2014, we published our Roadmap for Sustainable Capital Markets <http://www.aviva.com/media/upload/Aviva-Roadmap-to-Sustainable-Capital-Markets-updated.pdf> to set out how we can use 'capital markets that finance development that meets the need of the present without compromising the ability of future generations to meet their own needs'.

In July 2015, we published Aviva's Strategic Response to Climate Change <http://www.aviva.com/media/thought-leadership/climate-change-value-risk-investment-and-avivas-strategic-response/> setting out the five pillars of our approach for acting on climate-related investment risk over the next five years (2015-2020). This Autumn (2016) we have provided an update on progress made in the first year of our strategy http://www.aviva.com/media/upload/Avivas_strategic_response_to_climate_change_-_2016_update_ysSf6TN.pdf.

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