



# Contents

2

Introduction

---

8

Thematic / Low Carbon Solutions

---

3

Practical steps

---

10

Engagement and  
Active Ownership

---

4

Divestment

---

11

Integrating Climate Change Risk

---

6

Carbon footprinting

---

12

Conclusion

---





# The Climate Conundrum Introduction

Climate risk is rising up the agendas of asset owners faced with both the growing prospect that more stringent climate regulation will impact portfolio returns and increasing scrutiny from beneficiaries and other stakeholders. The global agreement to limit temperature rises to two degrees over pre-industrial levels, reached in Paris last year, will require much more stringent policies and legislation than we have seen to date. On the other hand, while climate risk has become an issue asset owners can no longer ignore, understanding and analysis of how it is best measured and managed remains nascent. This paper lays out our perspective of the main strategies available to investors.

# The Climate Conundrum

## Practical steps

Incorporating climate change risk into investment decisions and oversight is increasingly understood to be integral to fiduciary duty, rather than contradictory. Meeting the commitments global leaders made in Paris will require regulation and policy changes on a scale far greater than the efforts made to date. Limiting temperature rises to two degrees over pre-industry levels will mean cutting global greenhouse gas emissions by around 60% through 2050. Adding the effects of population growth implies an approximate 80% reduction in emissions per capita over that period. The average global citizen today has a footprint similar to the Portugal average. This will need to fall to today's Yemini level, over a period in which global incomes are set to more than triple. Change on that scale will touch every area of the economy and all corners of financial markets.

While climate trends tend to be framed as long-term, multi-decade changes that will unfold gradually, the early years of a transition will be the most critical. The turning point in dismantling traditional fossil fuel energy infrastructure and building a lower carbon global economy would drive a rapid realignment in valuations and capital flows, even if those changes take much longer to play out.

It is unclear whether political leaders have the stomach or ability to implement the policy changes that will be needed to drive that transition. However, it is also clear that the likelihood of them doing so is rising and that the prospect is likely enough that prudent investors at least have a view of what that transition would mean for their portfolios and plan accordingly.

It is therefore important for fiduciaries to demonstrate that they have identified and evaluated climate change risks in their investment portfolios, how these risks might impact investment returns in the short- and long-term and their strategy to effectively manage the risks.

This question – how to best protect value in the face of fast changing climate policy and capital flows – is a different one to that often posed to investors asked to play an active role in encouraging that transition. The two need not be contradictory but neither do they always result in the same conclusions. Our focus is on protecting value rather than promoting change.

So how can asset owners identify and manage climate risks, and what are the implications? We summarize some of the main options available, and the potential catalysts and considerations for these approaches in the table below.

### Practical steps

Divestment	Carbon footprinting	Thematic / low carbon solutions	Engagement and active ownership	Integrating climate change risk
Reducing or eliminating exposure to specific fossil fuel- intensive companies or sectors	Measuring the carbon footprint of a portfolio with a view to managing risk	Investing in the technologies and solutions enabling the transition to a low carbon economy e.g. renewable energy, energy efficiency solutions, green bonds	Using share ownership rights to actively engage with company management to seek greater transparency on carbon emissions, carbon price assumptions and plans for decarbonization	Understanding and quantifying the climate change risk within a portfolio, and integrating the results in forecasts and investment decisions
<ul style="list-style-type: none"> <li>– Stakeholder and/ or public pressure</li> <li>– To align with investment values</li> <li>– To try and influence public policy</li> <li>– To reduce risk of stranded assets</li> </ul>	<ul style="list-style-type: none"> <li>– Regulatory reporting requirements (e.g. French energy transition law)</li> <li>– Public commitment to measuring and disclosing data e.g. as a result of signing the PRI Montreal Pledge</li> </ul>	<ul style="list-style-type: none"> <li>– Risk management (diversify/hedge carbon risk in portfolio)</li> <li>– Reallocation of capital (proceeds from divestment)</li> </ul>	<ul style="list-style-type: none"> <li>– Divestment is not an option</li> <li>– Concerned about stranded assets</li> <li>– Desire to influence carbon intensive companies to adapt their business model for a low carbon world</li> </ul>	<ul style="list-style-type: none"> <li>– Risk management</li> <li>– Seeking investment opportunities</li> </ul>

Source: Schroders

# The Climate Conundrum

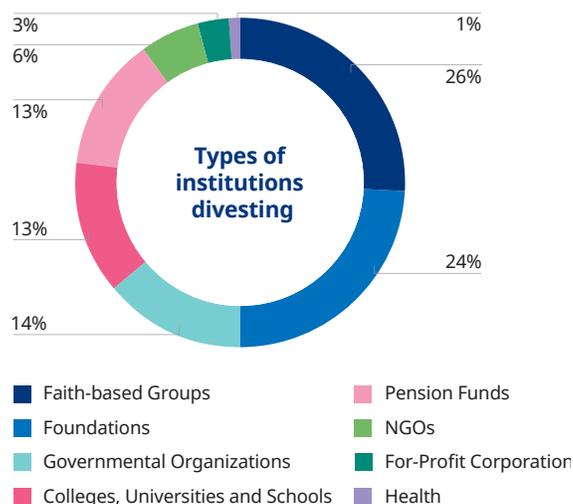
## Practical steps/Divestment

Divestment	Carbon footprinting	Thematic / low carbon solutions	Engagement and active ownership	Integrating climate change risk
<ul style="list-style-type: none"> <li>- Clear, measurable approach</li> <li>- Easy to communicate (although we note “divestment” is a broad church of tangible strategies)</li> </ul>	<ul style="list-style-type: none"> <li>- Transparent and apparently consistent approaches have emerged with numerous providers</li> <li>- Easy to communicate</li> </ul>	<ul style="list-style-type: none"> <li>- Pure play exposure</li> <li>- Can help to hedge against the negative effects of transition risk within overall portfolio</li> </ul>	<ul style="list-style-type: none"> <li>- Ability to join forces with other shareholders to engage collectively and exert greater pressure on companies</li> </ul>	<ul style="list-style-type: none"> <li>- A more complete understanding of climate risk across asset classes and the potential impact on portfolio value</li> <li>- Ability to identify investment opportunities, not just mitigate risk</li> </ul>
<ul style="list-style-type: none"> <li>- Asset owners lose the ability to influence companies to change or promote investment goals</li> <li>- Less portfolio diversification, different sector and country exposures, higher benchmark risk</li> <li>- Where to invest the divested proceeds for a similar or better return?</li> </ul>	<ul style="list-style-type: none"> <li>- Challenges with reliability and comparability of data</li> <li>- Most carbon footprinting tools only look at Scope 1 and Scope 2 emissions, but fail to consider the emissions produced by the end product</li> <li>- Different methodology and assumptions across service providers can result in sizeable differences in results</li> </ul>	<ul style="list-style-type: none"> <li>- More concentrated exposure</li> <li>- Less portfolio diversification</li> <li>- Higher volatility</li> </ul>	<ul style="list-style-type: none"> <li>- Difficult to measure the impact of individual engagements</li> <li>- It takes time for companies to effect change</li> <li>- Engaging companies on activities that comprise substantially all of their business is typically less effective than on discrete activities</li> </ul>	<ul style="list-style-type: none"> <li>- Complexity of approach, varying across investment strategies</li> <li>- Difficult to explain or demonstrate</li> </ul>

Since its genesis in 2011 on a few US college campuses, the divestment movement has continued to gather momentum globally, with 544 institutions now committed to divesting \$3.4 trillion and 50,000 individuals committed to divesting \$5.2 billion.<sup>1</sup>

While the decision to divest is one of the easier strategies to measure and communicate, deciding where to draw the line for exclusions in the first instance is a challenge in itself. Divestment strategies range from simply excluding entire fossil fuel sectors such as coal or oil and gas, to excluding only upstream companies involved in exploration and extraction, or they may even extend to excluding financial institutions that provide financing for exploration and development. Strategies may also involve the implementation of a materiality or threshold-based screen of carbon exposure, for example, the exclusion of all companies with more than X% revenue exposure to fossil fuels.

Figure 1: Types of institutions divesting



Source: www.gofossilfree.org/commitments, June 30, 2016.

1 Source: www.gofossilfree.org/commitments June 30, 2016.

# The Climate Conundrum

## Divestment continued...

Depending on the extent of exclusions applied, this will alter the size of the investment universe, the sector and country exposure, volatility as well as return characteristics. Investors should be aware that benchmark risk (tracking error) is almost certain to increase if large proportions of the market are excluded from investment universes. While that risk need not be a deterrent, it will require investors to evaluate managers' performances in more detail.

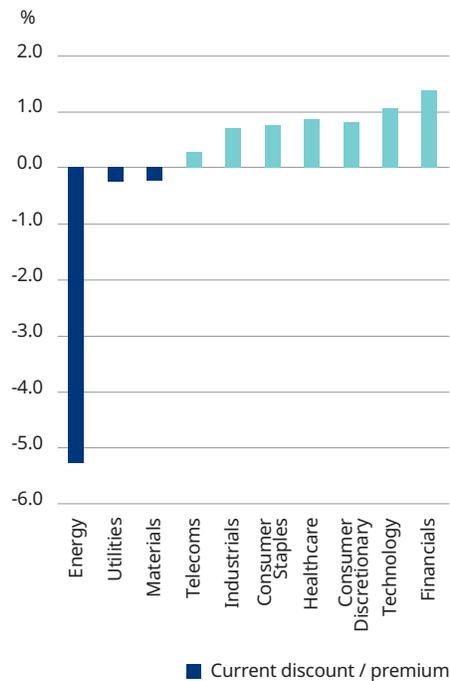
The following charts illustrate the differences in sector and country allocation between the MSCI All Country World Index ex Fossil Fuels, which excludes companies that own oil, gas and coal reserves, and the MSCI All Country World Index. The effect of excluding approximately two-thirds of energy stocks is a higher exposure to the financials and technology sectors. In terms of country exposure, the fossil fuel exclusion reduces the UK exposure, while increasing exposure to the United States and Japan.

It is important that asset owners are clear on their investment beliefs and why they need or want to divest as this will impact the scope of exclusions and the risk/return profile of their "fossil fuel free" portfolio. Depending on the circumstances, divestment may not be an option.

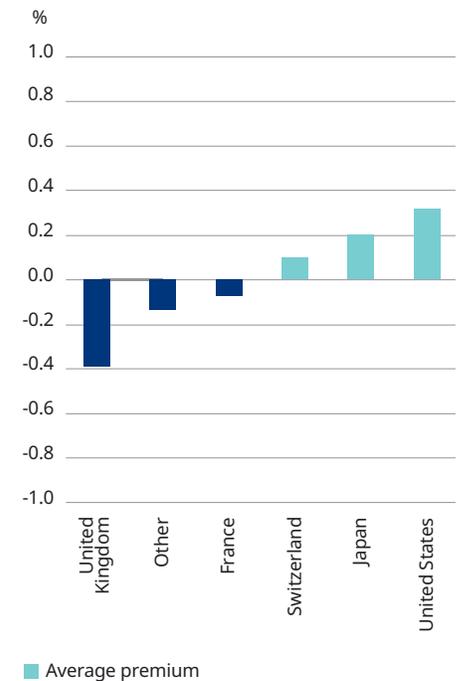
### Organizations who have adopted this approach:

- Rockefeller Brothers Fund (US)
- Stanford University (UK)
- University of Glasgow (UK)
- Norwegian Government Pension Fund (Norway)
- AP2 (Sweden)
- California Public Employees' Retirement System (US)
- World Council of Churches, British Medical Association (UK)

**Figure 2: Differences in Sector allocation - MSCI ACWI ex Fossil Fuels vs MSCI ACWI**



**Figure 3: Differences in Country allocation - MSCI ACWI ex Fossil Fuels vs MSCI ACWI**



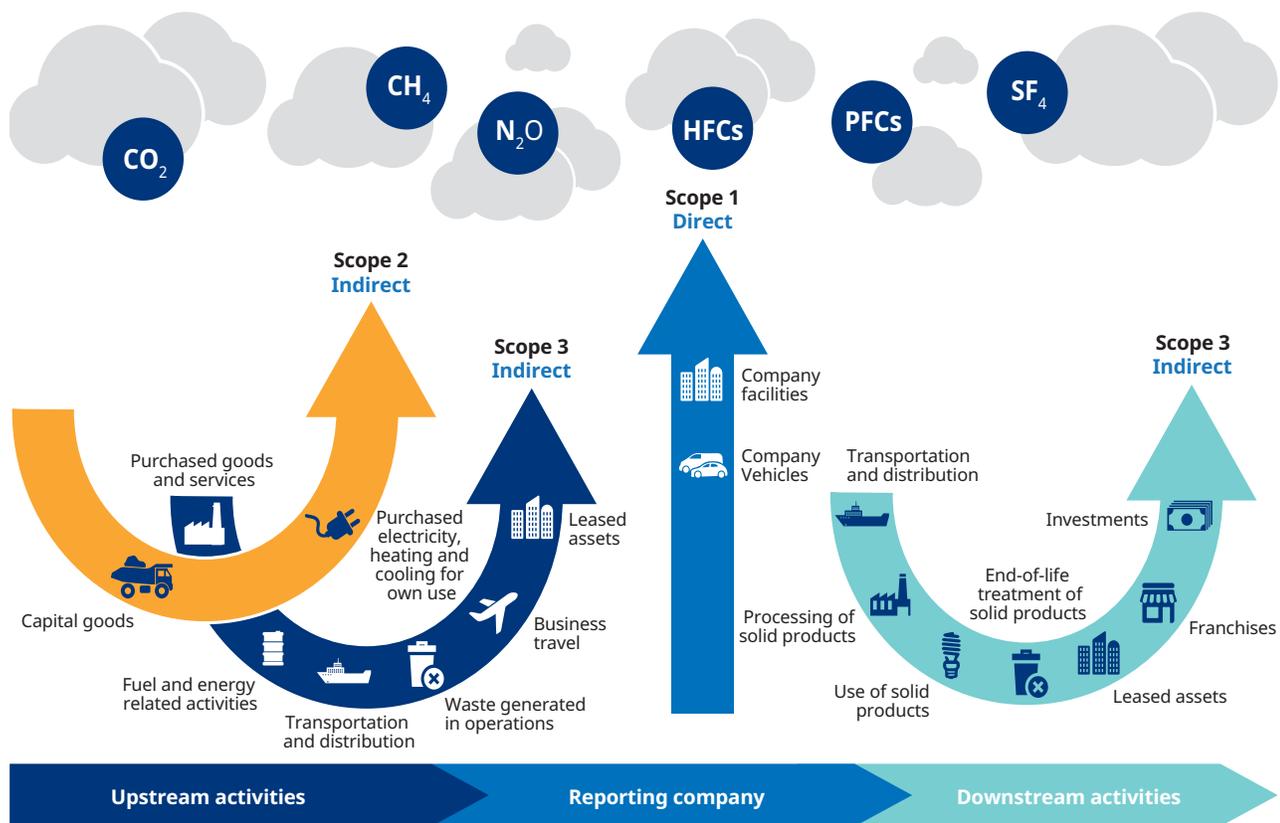
Sources: Schroders, MSCI, June 30, 2016.

# The Climate Conundrum

## Carbon footprinting

Following the launch of the UN Principles for Responsible Investment Montreal Pledge in 2014, carbon footprinting has become an increasingly popular tool to identify and manage a portfolio's exposure to carbon risk and, indeed, is viewed by some as a shortcut to understanding a portfolio's low-carbon credentials. The benefit of the approach lies in its perceived simplicity – a portfolio's carbon footprint is nothing more than the weighted sum of the greenhouse gas emissions of all the companies held within the portfolio.

Figure 4: The 3 scopes of corporate Green House Gas (GHG) emissions



Source: The Greenhouse Gas Protocol, 2011 cited in: "Portfolio Carbon" UNEP FI Investor Briefing July 2013.

- Scope 1 emissions: direct emissions from owned or controlled sources
- Scope 2 emissions: indirect emissions from the generation of purchased energy
- Scope 3 emissions: all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions

# The Climate Conundrum

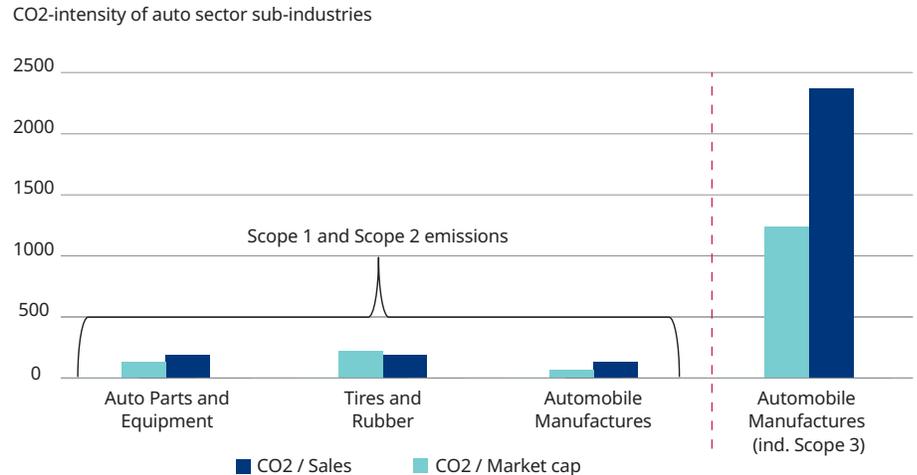
## Carbon footprinting continued...

### The hidden safety risks companies aren't disclosing

To date, over 120 investors with \$10 trillion in assets under management have committed to measuring and publicly disclosing the carbon footprint of their investment portfolios on an annual basis. While the approach seems simple, there are several challenges to consider:

- Data lacks reliability and comparability
  - different carbon footprinting services estimate intensities two or more fold different for the same companies in some instances, despite apparently similar sounding methodologies
- Double counting – emissions may be counted more than once in a portfolio if, for example, Company A's output is used as an input to Company B; Company A would report the emissions as Scope 1, while Company B would report the emissions as Scope 2. For example, a portfolio consisting of a coal miner selling to a power generator which provides energy to an industrial company would count the same emissions many times
- Poor disclosure – companies are more likely to disclose Scope 1 and Scope 2 emissions (roughly half of large cap companies now do so), but very rarely disclose Scope 3 emissions which can be material (see Figure 5) and are rarely included in footprint calculations
- Which carbon footprint provider to use – yourSRI.com, Trucost, South Pole Carbon, Bloomberg, ET Index, INRATE, Ecofys, Sustainalytics or Oekom? Each will have its own methodology which will yield a different end result
- Which measurement metrics to use? While an apparently unimportant difference, using sales or market value as the denominator when calculating carbon intensity can lead to very different conclusions; the footprints of industrial companies are two to three times heavier than retail companies when using market values rather than sales
- Different sources of carbon will face different regulatory and financial risks, most obviously depending on where they are released and whether climate regulations are in force or likely in those areas

Figure 5: Carbon footprint of autos sector sub-industries



Source: "Carbon 15" Exane BNP Paribas, April 9, 2015.

Whether to track carbon footprints against a benchmark or a specific reduction targets?

- Some companies may have a high impact on reducing future emissions via the products they produce, yet have a high carbon footprint. In this case, it makes sense to look at the carbon savings over time to understand the net impact on emissions

Given the aforementioned challenges asset owners need to be clear on why they are seeking to measure the carbon footprint, what their investment beliefs are, and what they are hoping to achieve in order to select the most suitable provider and metrics to use. While carbon footprinting is useful, it is not a complete tool and it is important to be cognizant of the shortcomings highlighted above.

### Organizations who have adopted this approach:

- PFZW (The Netherlands)
- ABP (The Netherlands)
- PGGM (The Netherlands)
- Norwegian Government Pension Fund
- FRR (France)
- ERAFP (France)
- AP Funds (Sweden)
- CalSTRS (USA)
- CalPERS (USA)
- Environment Agency Pension Fund (UK)
- AP1, AP3, AP4 (Sweden)
- Hesta (Australia)
- BT Pension Fund (UK)

# The Climate Conundrum

## Thematic / Low Carbon Solutions

A significant shift in global capital allocation will be needed to limit global warming to no more than two degrees Celsius and achieve net zero carbon emissions in the second half of this century. According to the International Energy Agency (IEA), approximately \$13.5 trillion will need to be invested in low carbon technologies and efficiency solutions by 2030 to realise the climate change pledges made by global leaders in the lead up to the UN Climate Conference in Paris.

That redirection of capital flows will reshape the global energy mix, which in turn is likely to be reflected in the structure of financial markets. As investment leaves traditional fossil fuel energy infrastructure and moves into clean energy and energy efficiency areas, significant opportunities are likely to emerge for investors in thematic / low carbon solutions such as renewable energy, energy efficiency and green bonds. We provide a brief summary of each, see figure 6.

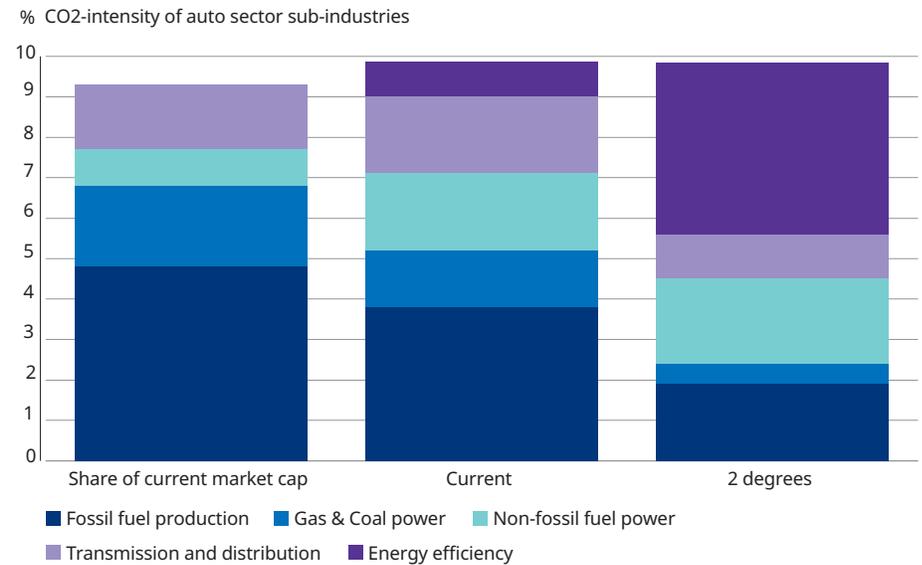
Investments in renewable energy have continued to grow, driven by the technological progress, continuing fall in costs and supportive climate change policies. Since 2004, a total of \$2.3 trillion has been invested in renewables, with a record \$286 billion invested in 2015, more than six times the amount invested in 2004.<sup>2</sup>

Energy efficiency solutions have the potential to deliver approximately 40% of the emissions reductions required by 2050 under a two degree warming scenario. Opportunities to improve energy efficiency can be identified in a wide range of sectors and processes, including construction, transport and industrial processes.

The commercial and residential buildings sector is the largest contributor to global greenhouse gas emissions – it accounts for approximately one-third of global greenhouse gas emissions and 60% of global energy consumption.<sup>3</sup> There is therefore significant scope to save energy and reduce emissions by focusing investments on improving the energy performance and green credentials of new builds and retrofitting existing stock. The IEA estimates that global investment in improving building efficiency is projected to reach over \$125 billion.

The transport sector is also a major contributor to climate emissions, especially road transport. To help improve the energy efficiency of the sector, investments may

**Figure 6: Energy infrastructure mix to change significantly**



Source: IEA, Thomson Reuters Datastream, Schroders, Q1 2016.

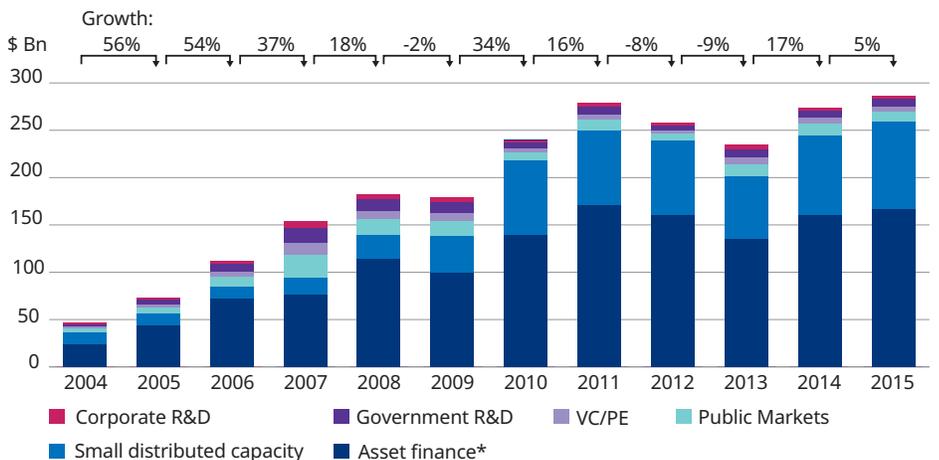
be directed to hybrid and electric vehicles, battery storage technologies, powertrains, transmission systems, semiconductors, aerodynamics and lightweighting materials.

Industrial processes tend to be highly energy-intensive, however energy efficiency can be improved considerably through technological improvements,

automation, precision operation, electrification of heating and processes, and reduction in wasted energy.

Insofar as most of these investments will be made by companies, governments or individuals directly, the opportunities for investors will be much smaller than the headline investment projections imply.

**Figure 7: Global new investment in renewable energy by asset class (\$ billion)**



\* Asset finance volume adjusts for re-invested equity. Total values include estimates for undisclosed deals. Source: UNEP, Bloomberg New Energy Finance, issued March 24, 2016.

2 Global Trends in Renewable Energy Investment 2016, UNEP and Bloomberg New Energy Finance.  
3 United National Environment Programme, <http://www.unep.org/sbci/AboutSBICI/Background.asp>

# The Climate Conundrum

## Thematic / Low Carbon Solutions continued...

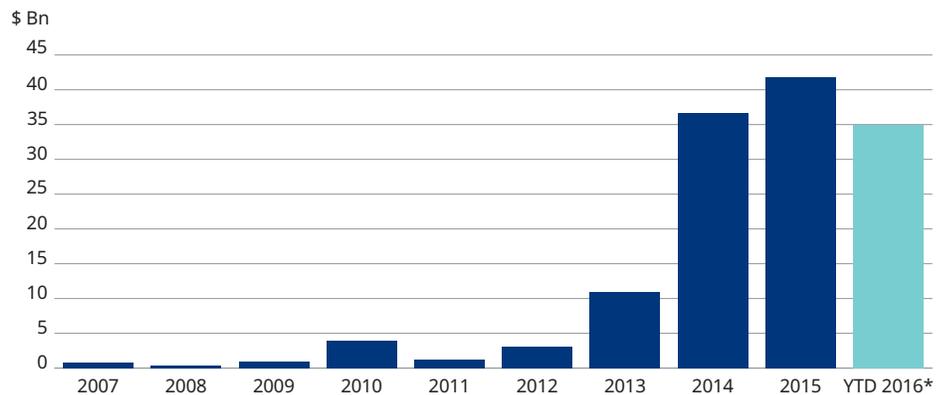
The first green bond was issued in 2007 but it was only in 2014 that the market really took off (see Figure 8). Since then, the number of green bonds issues has barely kept up with demand. Already in the first half of 2016, 114 green bonds totalling US\$35.5 billion have been issued,<sup>4</sup> with most issues heavily oversubscribed. At present, there are \$118 billion of green bonds outstanding, but the Climate Bonds Initiative estimates that the market is significantly larger with an additional \$576 billion in "climate-aligned" bonds, defined as bonds in which proceeds are used to finance low carbon and climate resilient infrastructure but do not have a specific green label.

The insatiable demand for green bonds looks set to continue, though it remains to be seen whether they have a real sustainability impact or are simply normal bonds with a green promise and feel good factor.

### Organizations who have adopted this approach:

- CalSTRS (US)
- CalPERS (US)
- New York State Common Retirement Fund (US)
- BT Pension Fund (UK)
- PFZW (The Netherlands)
- PensionDanmark (Denmark)
- APG (The Netherlands)
- Environment Agency Pension Fund (UK)
- AP1, AP2, AP3, AP4 (Sweden)

Figure 8: Growth in green bonds market



Source: Climate Bonds Initiative, June 30, 2016.

4 Climate Bonds Initiative, June 30, 2016.

# The Climate Conundrum

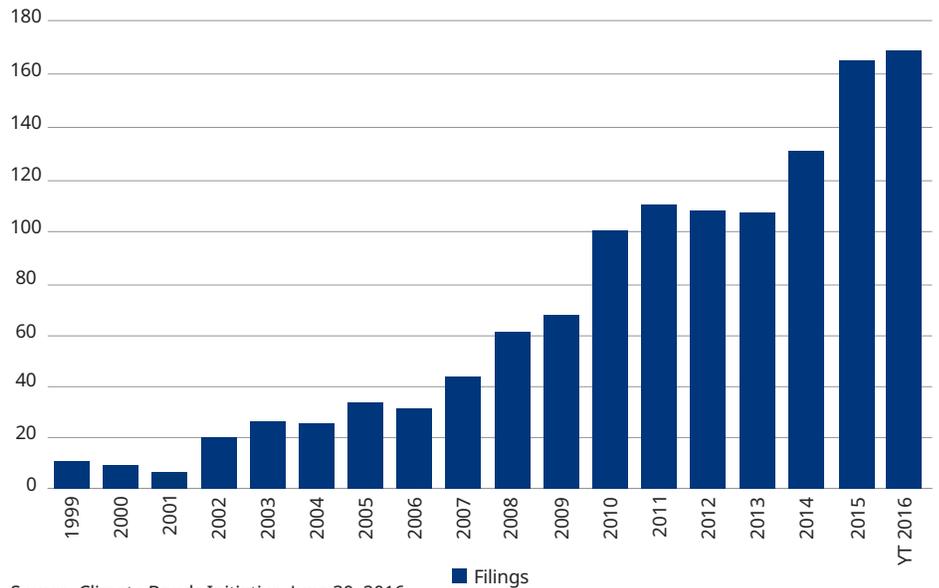
## Engagement and Active Ownership

Asset owners and investors can leverage their share ownership to actively engage with company management on the topic of carbon risk to push companies to disclose relevant information and develop a credible plan for decarbonization. This may involve requesting disclosure of greenhouse gas emissions data, meaningful carbon reduction targets, the assumed carbon price used in forecasts, greater transparency on the different climate change scenarios assessed and stress testing of the company's business model for those scenarios and/or implementation of a robust plan to manage climate change risk.

As Figure 9 shows, investors have increasingly used shareholder resolutions to address the issues of climate change and sustainability over time. The resolutions filed have ranged from requests to limit greenhouse gas emissions, to issuing sustainability reports, setting targets for renewable energy sourcing and reporting on alignment with a two degree goal. While we are only half way through 2016, the number of climate change resolutions has already exceeded the total number filed in 2015, and we expect this number to continue to soar by year end.

In the UK, a number of asset managers and asset owners have joined forces to use their collective power to engage with the ten largest UK-listed utilities and extractives companies on their low carbon transition plan as part of the "Aiming for A" initiative. The coalition is pushing for greater transparency and disclosure on how climate change is impacting their businesses, how the companies are managing their operational emissions and how they will evolve their asset portfolios to ensure future climate change resilience. Resolutions have already been co-filed and subsequently approved at BP, Royal Dutch Shell, Rio Tinto, Glencore and Anglo American.

Figure 9: North American shareholder resolutions related to climate change (1999 – 2016)



Source: Climate Bonds Initiative, June 30, 2016.

### Organizations who have adopted this approach:

- The Wellcome Trust (UK)
- Norwegian Government Pension Fund (Norway)
- ABP (The Netherlands)
- Church Investors Group (UK)
- Local Authority Pension Fund Forum (UK)
- The Pensions Trust (UK)
- Universities Superannuation Scheme (UK)
- Yale University (US)

# The Climate Conundrum

## Integrating Climate Change Risk

Understanding and quantifying the climate change risk within a portfolio, and integrating the results in forecasts and investment decisions is perhaps the most complex approach given the uncertainty regarding the extent of future global warming. Nevertheless, the consequences are potentially significant and should therefore be considered.

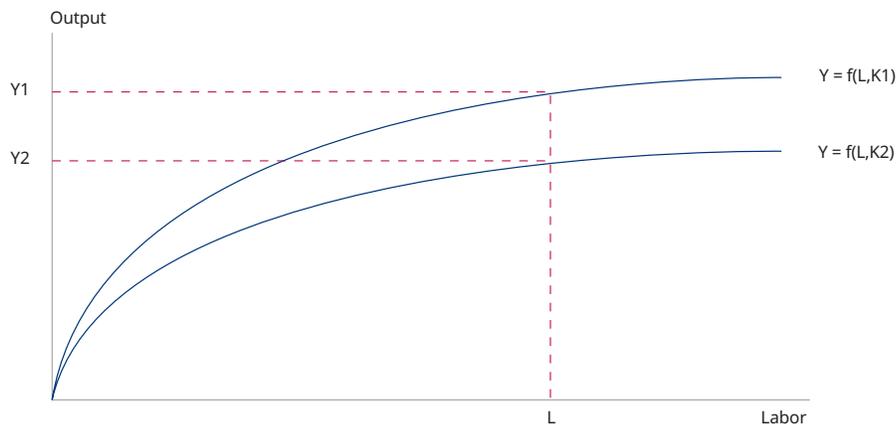
In the longer term, global warming is likely to lower global economic output due to the negative impact of more severe weather events on capital stock and productivity (see Figure 10). According to our Economics team, global GDP could fall by 1% p.a. in the most severe global warming scenario.

Higher global temperatures are also likely to result in higher food and energy costs, in addition to higher insurance premiums. Furthermore, developing countries are likely to suffer disproportionately relative to developed countries as many have naturally warmer climates, are more reliant on climate sensitive sectors and have fewer resources to cope with extreme weather events.

At the company level, asset owners need to understand how climate change will impact different sectors and sub-sectors and which companies are most exposed to policy and regulatory risk. Since the 1990s the number of laws and policies directly related to mitigating and adapting to climate change has grown exponentially, with the total number doubling every five years since 1997 (see Figure 11). The number of climate laws has risen from fewer than 60 in 1997 to over 800 in 2014 and this trend is likely to continue with the need to address climate change growing in urgency and importance.

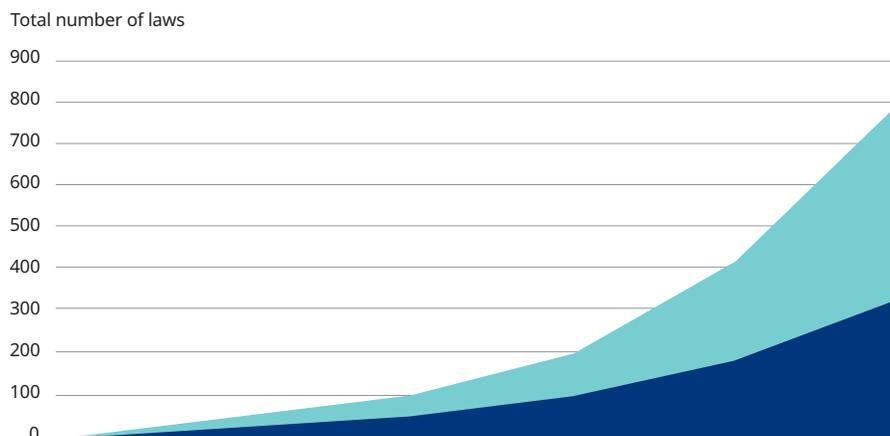
The extent to which companies prepare and respond to these changes will determine the resilience of their business models and the impact on valuation and risk. Those companies with credible mitigation and adaptation plans and a stronger competitive positioning will be better placed to deal with the risks (and opportunities) presented by climate change. Without this knowledge, it is difficult to evaluate the likely winners and losers and how this will impact overall portfolio risk and value.

Figure 10: Impact of climate change on global output



Source: Schroders. For illustrative purposes only.

Figure 11: Total number of climate change laws and policies across 99 countries



Source: The GLOBE 2015 Climate Legislation Study: A Review of Climate Change Legislation in 99 Countries.



# The Climate Conundrum Conclusion

There is no one size fits all solution to managing carbon risk in an investment portfolio. The best solution will depend on an asset owner's beliefs, objectives and unique circumstances. Before selecting a strategy, assets owners should be clear on what they are trying to achieve and why, and understand the challenges and investment implications of the different approaches. In our view, it may be that the best approach is to combine some or all of the above mentioned solutions to achieve the optimal outcome.

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