

Keeping it Cool

Do you DCF? Discount Climate Facts

We expect climate-adjusted cash flow analysis to become more commonplace in the future...

...as investors are on the hook to deliver on climate pledges

Standard discounted cash flow methodology provides the basis



Executive summary

Do you DCF? Discount climate facts

Companies contribute to, and are affected by, climate change. Portfolio managers are under increasing pressure to demonstrate how they factor this into stock selection. We suggest a solution.

Climate-adjusted cash flow: The goals of the Paris Agreement, financial regulation and asset owner demand are pushing for more transparency on capital allocation. This means that shareholders have to be ready to defend high carbon holdings. We take existing discounted cash flow valuation methodology and apply a climate lens to revenues, costs and investment in order for portfolio managers to be able to capture climate factors. This analysis builds on our previous report '[Keeping it Cool - Assessing Climate Risk](#)', 12 September 2016.

Tactical inertia: Ultimately, the end goal is to design a way to capture the value of future income generation potential, profitability and real assets of companies in the face of uncertain responses to climate change. Identifying the types of climate risks, opportunities, and disruptive factors is not difficult, but quantification of them is. Uncertainty over the scale and timing of these factors, and expectations that climate change plays out over a long time in the future, have led to inertia on valuation in our view.

Data dilemma: Well prepared companies know and disclose how much CO₂ they emit, so they know how much they contribute to warming. The trouble is only half of the MSCI ACWI index constituents disclose CO₂ data. Disclosure is the first step to a robust corporate strategy.

Risky business: Revenues, costs and investment are the key drivers here. We think that climate factors must be taken into account more thoughtfully when deriving future cash flows. This necessarily involves adjusting future *revenues* (up or down in light of climate factors), future *costs* (with potential disruption and technology), and *investment* (according to long-term business strategy or regulations). Each of these will be affected by the climate in the future, and this has a knock-on effect on the cash flows which form the basis of company valuation.

Corporate engagement: An iterative process of engagement is the only way of getting it right. We consider it important for investors to seek information on climate data and climate strategy. For corporates, when they are in dialogue with investors they can refine climate data to make it more useful and comparable. We believe this two-way flow of information will help both investors and corporates be better prepared for the lower-carbon economy of the future.

Bringing the future into the present: We argue that future climate consequences are not adequately captured in current equity market valuations, mainly because of uncertainty on the scale, magnitude, and timing of climate change as a disruptive factor (for the value and income generating potential of assets). The report aims to provide more clarity for climate relevance in valuation, and to identify future growth potential.

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Valuing 2°C plans

- ▶ Deriving a climate adjusted value means re-visiting revenue, cost and investment assumptions using company 2°C disclosure
- ▶ Analysing the resulting cash flows provides a climate adjusted DCF
- ▶ This leads to valuation multiples that provide a climate adjusted sense check on whether the risk reward of holdings remains intact

Adjusting models for 2°C

The hard part: Translating company climate narrative into tangible value

In this report, we look at how to capture climate using the commonly used DCF technique. We set out how to differentiate between the climate credentials of companies, based on a sector generic investor engagement template, derived from our thinking around corporate climate management (Figure 2, page 10). Corporate climate management ranges from operational factors the board can control to strategically how well the company is identifying and preparing for long-term climate risk, opportunity and impact. This narrative provides a good start, but the crucial (and hardest) step is to translate that into identifying whether the firm is well-positioned to generate incremental value going forward given climate factors. Based on the ways that climate impinges on revenues, costs and investment, we think that adjusting these and looking at scenarios around cash flow is the answer.

“Cash flow scrutiny is the key to unlocking the climate adjusted value driver for a company

Equity portfolio managers cannot avoid coping with risk and uncertainty. We think the reason that this type of climate adjusted thinking hasn't been prevalent before is because of the uncertainties around the scale and timing of climate impacts; i.e. not because of a lack of knowledge on what the disruptive factors might be. While this is still a challenge, we think the optimum way to assess the value change is to create scenarios of revenue, cost and investment to benchmark against existing 'business-as-usual' forecasts.

Use different growth rates to estimate adjusted revenues

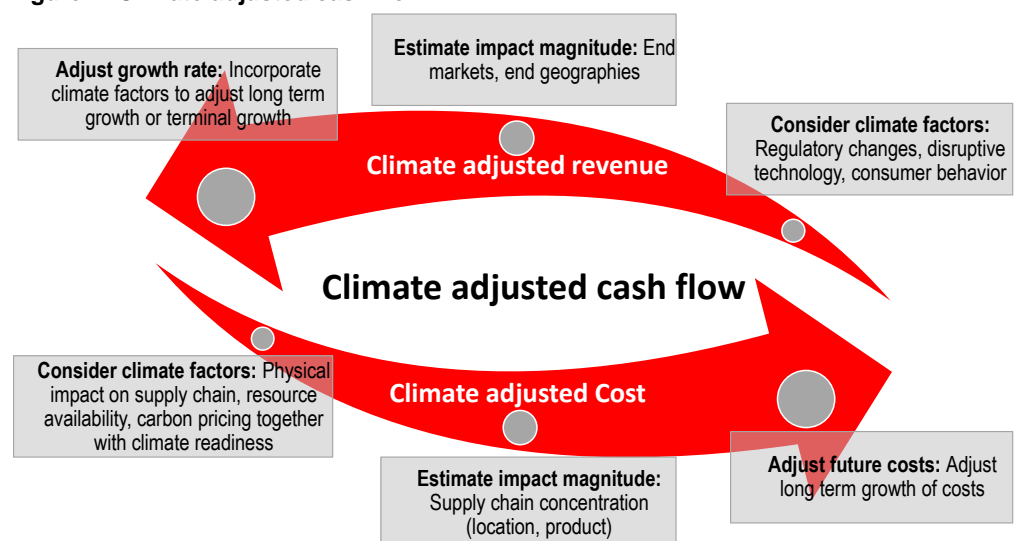
Climate adjusted revenues: Obviously future revenue growth is a function of many different factors, and estimating further into the future makes revenue potential less clear. In a climate context, we think the scale of the climate effect on revenues mostly becomes greater over a longer time horizon. As an illustrative example, the results in our report '*A global energy vision for a 2°C world*', 7 February 2017 (Please contact your HSBC representative or email Research.Direct@hsbc.com for more information on how to access the full report), show that global demand for all types of energy feedstocks rise to 2030, but then coal consumption plummets for a 2°C world. Clearly energy consumption will play out differently on a regional basis, but this illustrates the point that historical norms might not be a good indicator of future trajectory when taking climate into account.

A future revenue growth scenario might take a restrictive regulatory environment due to climate change into account, or disruptive technology (i.e. substitution to low-carbon products for instance), or changing consumer behaviour (away from high-carbon incumbents). Taking the company strategy into account, these scenarios could play out and should thus be taken into consideration when determining the 'long-term growth' or 'growth into perpetuity' numbers. It may be that these numbers are merely tweaked by shaving the growth rate, but climate would be part of the thought process, and hence would provide an added rationale for holdings. Adjusted cash flows would then flow from these "climate-considered" revenues.

Adjust costs for climate related inflation

Climate adjusted costs: At the same time, a company's costs are also a function of many different factors – raw material availability, processing and transportation costs, substitution etc. We think a similar scenario-based adjustment should be made when modelling costs out into the future. For example, physical climate risks could affect a company's supply chain, manufacturing facilities or points of sale. Hence scenarios should take into consideration the possibility of a climatic event affecting costs. Cost implications from climate are also more immediate as the world moves to scaling up carbon pricing. Regimes are coming into place this year that are tightening regulation on addressing climate. As such, we think the modelling of cost streams should take climate change into account, through scenarios or otherwise. Coupling this with what corporate management disclose on climate readiness, it makes sense to adjust costs (and cash flows). It may be a case of either increasing or decreasing the rate of cost growth in the future by a few basis points – but again, climate is taken into account. Similarly, these "climate-considered" costs would affect cash flows.

Figure 1: Climate adjusted cash flow



Source: HSBC

Capital deployment that takes transition and physical risk into account

Climate adjusted investment: Finally, we look at investments – or, more specifically, where companies invest shareholder capital. Although this is closely aligned with overall corporate long-term strategy, we think where capital is actually deployed is an indicator of preparedness for both transition and physical climate risks. Whilst we realise that companies may not precisely disclose their investments, insight may be garnered from new divisions, R&D spend, asset upgrades (retrofitting), and the way management guide investors about future prospects. For example, if a company's investments lean towards high-carbon activities or inefficient technologies then this is likely a sign that they are not prepared for climate change, in our view. The opposite would be true for a company moving into more low-carbon initiatives, products and activities, and who are investing to "climate-proof" physical assets. Taking this into account, we think it could affect the longer term cost of capital for companies as the markets or lenders

(financial institutions) may demand a higher return for the added climate risk of lending to unprepared companies. In the WACC (weighted average cost of capital), this could be done by either adjusting the cost of equity/debt, or by adding a climate adjustment factor to capture the climate risk/opportunity.

A 2°C DCF

Using the different forecasted values, compare and contrast with business as usual

Putting this all together, climate adjusted revenues, costs and investments would feed into valuations through the usual discounting cash flow modelling. Firstly, the future cash flows (either one specific year in the future, a plausible scenario, or the rate used for “into perpetuity” calculations) have been adjusted by taking climate change into account. In other words, the cash flows are different (up or down) from business-as-usual because climate thinking (transition and physical risks as well as potential benefits) have been incorporated. These future cash flows are then discounted back at a discount rate which also incorporates climate strategy.

Box 1: Discounting for a 2°C world

$$DCF_{climate} = \frac{CF_1}{(1+r)} + \frac{CF_2}{(1+r)^2} + \dots + \frac{CF_n}{(1+r)^n}$$

Where CF are cash flows based on climate adjusted revenues and costs.

Where r is a WACC which has been adjusted for climate strategy (based on investment)

Because the timing and magnitude of climate events are unknown, not every CF value needs to be adjusted. We think it is sufficient, to begin with, to adjust just one of the future years – and then adjust more when more climate data is known, or if there is more clarity on incoming regulation etc.

WACC (weighted average cost of capital) ordinarily equates to cost of equity plus cost of debt. A climate adjusted WACC would add a “climate adjustment factor” to this – based on whether the return sought by equity investors or lenders increases or decrease because of “climate strategy” as evidenced by investments.

$$WACC_{climate} = \frac{E}{E+D} K_e + \frac{D}{E+D} K_d (1 - tax) + K_c$$

Where E is the market value of equity, D is the market value of debt, K_e is the cost of equity, K_d is the cost of debt, tax is the corporate tax rate, K_c is the climate adjustment factor.

Capital market effort for 2°C

The successful outcome for addressing climate change delivered in Paris had a variety of drivers, but we think the most important were twofold:

1. A revamped negotiating process which involved countries deciding themselves what they could bring to the table in terms of reducing emissions and adapting to the consequences. Previously the approach was top down and prescriptive which kept resulting in stalemate.
2. A process which embraced action outside of the UN Framework Convention on Climate Change (UNFCCC). That is the role of so called ‘non state actors’ – business, civil society, investors, cities and states – was embraced in the Paris process.

The second point is important, because it signals acknowledgement that governments can only take solving climate change so far with policy intervention. There are several investor initiatives specifically on climate change, such as the investor network on climate risk in the US and the Institutional Investors Group on Climate Change in Europe, as well as the global network of Social Investment Forums.

In March 2017, the Global Sustainable Investment Alliance (GSIA) published its 2016 review. It found that there are now USD22.89trn of assets which are professionally managed under responsible investment strategies, a figure which has grown around 25% over two years. This represents just over a quarter of all assets which are managed professionally. The report looked at seven main strategies including 'ESG integration', screening and engagement. There was also wide disparity between geographic regions with over half of European assets having an RI strategy, to just over a fifth of US assets, down to less than one percent in Asia ex-Japan. Nevertheless, all regions and all strategies have seen growth over the past few years.

USD23trn

of assets under RI strategies

What next? Impact

With a growing emphasis on responsible investment, there is also a move towards assessing the impact of investment decisions, in terms of how much the financial decision contributes towards the aims of the Paris Agreement. Data is even more limited here, but we expect this type of analysis to become commonplace in the future.



Frontier thinkers are attempting to quantify the impact of their portfolio holdings in terms of avoided CO₂ or saved water use

One reason for this is that even if all the country pledges are fully implemented the resulting temperature rise will be between 2.7-3.6°C. Shareholders that can demonstrate they saved CO₂ by holding one stock over another will be in a better position to win the mandates that are focused on this issue in our view. Assessing impact brings challenges in itself as well as we show in Box 2.

Box 2: Science based targets; Less CO₂ versus CO₂ for 2°C

Releasing less GHG is beneficial, but is not the same as reducing GHGs to a level consistent with limiting temperature rises to 2°C. This is a key challenge for target setters, and has led to some companies aligning carbon targets to scientific or 'net zero impact' goals.

Generally accepted climate science is published in regular cycles by the IPCC, of which the latest set of reports (AR5) were published in 2013-14. Setting a science-based target means that the reductions or changes made by a country, corporate or individual, are grounded in the IPCC conclusions and consistent with the 2°C goal. Although any reduction is welcome, the science requires a 40-70% reduction in emissions from 2010 levels by 2050 in order to be consistent with a 2°C world.

A challenge with climate action is that many climate targets may contribute towards *lowering emissions*, but not be enough to actually deliver a 2°C world. The distinction between less CO₂ and CO₂ consistent with limiting temperature rises to less than 2°C drills down to an assessment of relative and absolute emission reduction. For instance, making a steel facility process efficient enough to minimise CO₂ per tonne of steel produced is positive on a relative basis, but subsequently doubling steel doesn't help with an absolute reduction in CO₂ emissions, and delivery of a 2°C world.

This kind of capital allocation transparency is also important for the success of the Paris deal itself, since much of the implementation is based on the trust that countries will do what they said they would in their pledges. We expect continued momentum from investors in this space.

Cash flow forecasts under the spotlight

As with all valuation techniques, the many variables are subject to a degree of judgement as to their value – the same is true with incorporating climate: how much could revenues decline after a given climate event? How much could costs increase and for how long? How much should the WACC be adjusted if the company does not reveal any of its investments? We do not think that this framework is perfect. However, we think it is a useful baseline framework to incorporate climate thinking into company valuations. This involves looking at the impact of climate change (positive or negative) on revenues and costs – which affects future cash flows, as well as adjusting the WACC through the signals given by a company via its long-term investments and climate strategy. Adding a climate scenario is the most sensible and straightforward way to include a discussion of the climate elements in our view. This can be compared with the value from the original forecasts. Over time, we expect climate thinking to be integrated into business as usual forecasts.

Equity markets and 2°C

- ▶ Investors are moving forward with including climate considerations into equity market investment decisions
- ▶ Environmental integrity and data gaps are the key challenges; we expect these to be overcome by academics and regulation
- ▶ The aim is to differentiate between companies by capturing future climate risks and opportunities in today's stock valuation

Climate exposure in equities

Climate accountability is shifting to investors, particularly asset managers

The impetus for investors to take climate considerations into account when valuing equities is increasing. Since the December 2015 climate talks, which resulted in a global consensus to speed up the response to climate change, the climate action community has shifted from lobbying government for more policy to lobbying asset owners and managers for financial market initiatives. Many institutional investors voiced support for addressing climate change in advance of the climate talks in December 2015. In one such initiative, the Montreal Carbon Pledge, investors pledged to measure their carbon footprint and by the Paris talks, 117 investors had signed up. Another initiative, the Portfolio Decarbonisation Coalition aims to encourage organisations to measure, disclose and take action to decarbonise their investment portfolios. By the Paris talks, the PDC had formed a coalition of institutions worth USD3.26trn.

US3.26trn

AUM of investor coalition to decarbonise

Now the Paris Agreement has been ratified, climate accountability is shifting to investors to demonstrate they meant what they said in relation to decarbonisation and financing a low-carbon transition. We have previously noted that governments, corporates and investors all have specific tasks in relation to delivering the global agreement. Finance remains a delicate subject in the annual climate talks and is returning to focus as political action on climate change takes a back seat. Going forward, if there is limited evidence of 2°C aligned financial flows this will give lower income countries a 'get out clause' to rescind on their country pledges in our view. In essence, the finance community is the glue that holds the deal together.

However, 'finance' is a large category and we believe that the different types of entities within finance also have key roles in a climate context which are pertinent to their responsibilities as capital managers. This report is primarily aimed at equity portfolio managers. In our view, one of their priorities is to take investment holding decisions by integrating a risk reward profile that takes a changing climate into account.

**Finance provides the connectivity for climate deal delivery****Varying degrees of climate knowledge across the finance landscape**

Anecdotally, we are seeing a polarisation of knowledge and awareness on climate change across the asset owner and asset manager investor landscape. Some investors were already relatively advanced in their climate thinking before Paris, and the agreement allowed them to be more vocal on their climate focus with a lower risk of green wash accusations. Others are at a much earlier stage of thought. In addition asset owners are increasingly using their influence as the clients of many asset managers to enable higher standards of climate disclosure, as well as risk and resilience assessment.

A common challenge for all investors addressing climate change is the need to balance environmental integrity (i.e. avoid the risk of green wash accusations) with data availability. By this we mean that in theory it is relatively straightforward to identify what **should** be done in terms of methodology to factor in climate – reduce exposure to companies that are high contributors to warming the climate and assess how all companies will be impacted by the effects of warmer temperatures – but it is much harder to identify **how** that can be done based on limited data, which makes company differentiation within a sector problematic for instance. In addition, identifying the timing and materiality factor for day-to-day stock price moves is difficult, if not impossible to value. We think the best way to capture climate value is to forecast a set of ‘climate adjusted’ estimates to compare with business as usual estimates. We discussed this idea in ‘Valuing 2°C plans’.

The overarching scientific standpoint and direction of travel on climate change is in place from the Paris Agreement, (see Box 3), and the solutions to mitigate climate change by reducing emissions are well known and are centred on becoming more energy efficient and decarbonising the energy system.

Box 3: The purpose of the Paris Agreement (Article 2)

1. This agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:
 - a. Holding the increase in 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, recognising that this would significantly reduce the risks and impacts of climate change;
 - b. Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production;
 - c. Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate resilient development.
2. This Agreement will be implemented to reflect equity and the principle of common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.

In our view identifying the **types** of risks and opportunities relating to climate change is relatively straightforward. In fact, this analysis builds on our report ‘[Keeping it cool – Assessing climate risk](#)’, 12 September 2016 report by broadening out from a risk framework to a comprehensive methodology, where risk is just one element. The challenge is that limited data and uncertainty on the timing of events makes **quantification and likelihood** of them difficult to value, and therefore comprehensively integrate their risk-reward profile.

“ Identifying types of climate risk is relatively straightforward, but *quantification* of them is a challenge

This means it is difficult to capture the relative value accretion or destruction of climate across sectors and markets, and by extension to compare and contrast between equities. We expect comparison to become easier in the future as broader initiatives, such as the implementation of the recommendations of the task force on climate-related financial disclosure, become mainstream. In the meantime, developing a comprehensive methodology for factoring in climate now puts asset managers on the front foot to respond to more detailed climate questions from asset owners.

Financial flow transparency supports the implementation of the Paris Agreement

The Paris agreement is placing new demands across the finance industry as a whole in relation to carbon reporting and climate impact assessment. The primary aim for institutional asset owners is to generate returns in excess of long term pension liabilities to meet the liabilities of the members of the pension schemes that they represent, which means climate is relevant to them. In this context providing transparency on decision making and capital flows has become more important. While asset owners are crucial for setting the parameters for awarding mandates that reward long-term climate thinking, asset managers are tasked with valuing climate factors in the context of day-to-day trading decisions to meet quarterly return aims.

Capturing the 2°C value factor

Ultimately, what we are trying to achieve with this analysis is to design a methodology that captures the value of future income generation potential and profitability of companies in the face of uncertain responses to climate change. Two key questions relating to capturing a value for climate change issues appear simple:

- ▶ How do companies contribute to warming the climate?
- ▶ How are companies affected by a warming climate?

In theory, identifying these answers should give a basis to identify the value of both. The practical reason why the answers haven't been fully factored into equity valuation before now is uncertainty on the timing, scale and magnitude of actions to address the climate problem, as well as the consequences of warmer temperatures. Here we outline the key concepts, to be explored further in the next chapter. To start with, Figure 2 provides the basis for how to think about corporate climate management – from operational factors the board can control, to strategically how well the company is identifying and preparing for long-term climate risk, opportunity and impact.

Figure 2: Incorporation of climate change issues into business management



Source: HSBC

Disclosing on operational climate and social and governance factors is improving

Companies contribute to climate change on an operational basis

To date, much of the corporate response to climate change factors has been based on becoming operationally efficient. In other words, companies have been focused on minimising their contribution to climate change by setting CO₂ reduction goals, scaling up energy efficiency and implementing broad sustainability initiatives. They have done this through in-house and supply chain operational processes, with company GHG accounting a primary means to measure the contribution to warming the climate – we look at this in more detail on page 23.

“ Companies have focused on minimising their contribution to climate change by setting CO₂ reduction goals

This type of CO₂ disclosure should mean that investors are able to measure and compare operational carbon data as a way to differentiate company positioning on climate factors, and this remains important in our view. However, it has been difficult to incorporate the benefit of adopting this approach into relative valuations because the data has been inconsistent across time periods, sectors and geographies.

Top-down management to deliver strategic positioning is becoming more important

Companies are impacted by the consequences of climate change

A strategic vision on climate factors is also important as a means to identify the companies that are aligned with and can handle a 2°C world. This type of thinking means taking a more holistic approach to the business as a whole to identify where disruption outside of their control could occur, such as flooding in the supply chain, or licences to operate revoked because of environmental factors such as water availability, or the implementation of weather related force majeure circumstances. Essentially, this means drawing up more comprehensive contingency plans and stress testing the business. Going forward, we expect companies to focus more on assessing how to minimise the impact of climate change on the business. These are climate drivers that are outside of their direct control, but that can be managed by long-term vision and strategic positioning.

“ Companies are starting to assess if their ability to operate and grow will be impacted by climate change factors

This is a difficult issue for investors to assess since few companies set out whether they incorporate climate factors into planning and strategy, and even if they do, they don't disclose in the normal round of financial reporting. However, we expect this to develop over time into a key engagement area for investors. The aim for investment managers is to value this degree of differentiation between their portfolio holdings to pick the winners. We assess this in chapter 4, but before we go into companies in more detail we identify the broad top down considerations from a sector perspective.

As at 30 March 2017 the market capitalisation of the global equity market was USD40trn. This reflects what investors think the value of companies listed on the various exchanges is today, based on future growth potential. We argue that future climate consequences aren't adequately captured in current equity market valuations because of uncertainty on the scale and magnitude of climate change as a disruptive factor for the value and income generating potential of assets. This methodology aims to make it more straightforward to assess the relevance of climate for future growth potential.

USD40trn

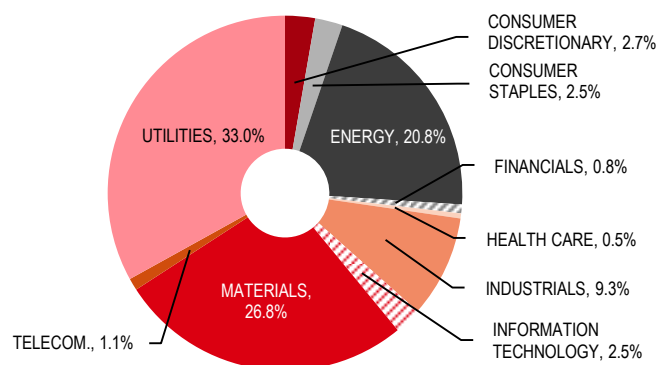
Size of global equity market

Differentiating between sectors based on their contribution to warming is a good start

Sectors and 2°C; CO₂ and impacts

In our view the first step for equity portfolio managers tasked with factoring in climate change is to understand which sectors contribute most to warming the climate. As a general rule of thumb, the more energy intensive a sector is in terms of processes and operations, the more CO₂ it will be responsible for. Carbon accounting itself is not a straightforward topic. In short however, the generally accepted means to assess company CO₂ is broken into three categories, direct and indirect emissions, where direct consists of CO₂ produced by the company, and indirect consists of purchased sources, and those that come from products.

Chart 1: Measuring sector emissions

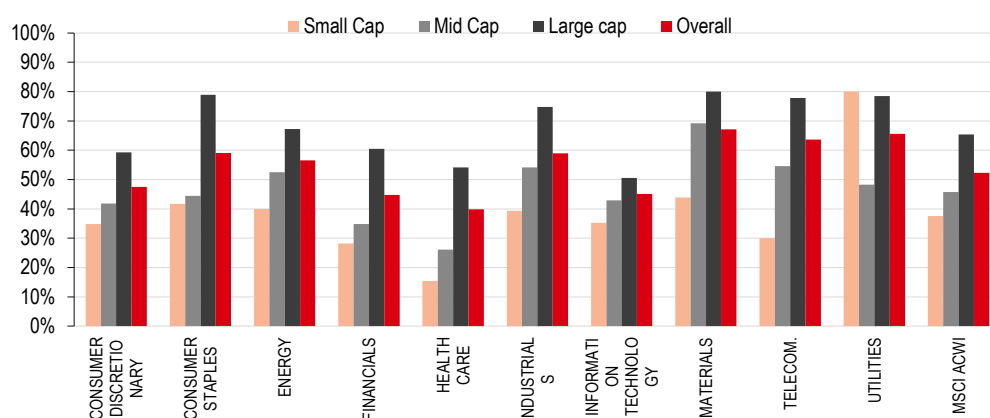


Source: Thomson Reuters data, MSCI ACWI Index

It follows that the energy and industrial sectors tend to be at the top of the list of carbon emitters as shown in chart 1 above, which summarises the contribution of sector CO₂ emissions to the overall index based on data from the constituents of the MSCI ACWI index, a popular benchmark index comprising c2500 companies worldwide. We think this provides a fair representation of the sector differences for the contribution to climate change, but a closer look at the underlying data reveals a key challenge for individual stock differentiation – lack of disclosure. For instance on the MSCI ACWI index, only 52% of companies have disclosed CO₂ data for 2015 (the most recently available year).

52%

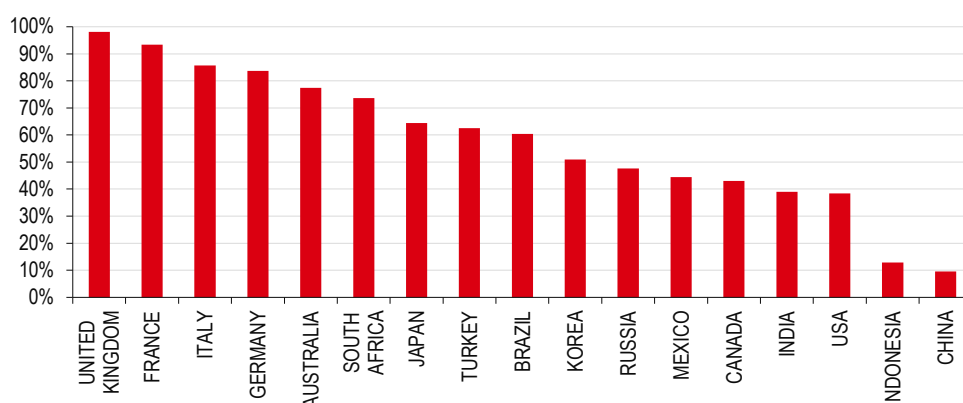
CO₂ disclosure rate for MSCI ACWI

Chart 2: Sector disclosure of CO₂ emissions

Source: Thomson Reuters

Chart 2 also shows that disclosure varies according to the size of company, with the largest companies generally better. Taking only large caps in the MSCI ACWI for instance, there is a 65% disclosure rate. There are several reasons for the disappointing disclosure rates, such as inexperience in GHG accounting and regional norms on reporting, but an important factor in our view is that it is not mandatory under company reporting requirements in many jurisdictions. The drivers for companies to report on a voluntary basis have been mostly shareholder and NGO initiatives. We think these have been relatively successful so far, but there is still a lot of work to do to get corporate CO₂ fully accounted for.

There also tends to be a discrepancy in data availability depending on the type of activity of the company because companies in higher polluting sectors have been under more shareholder and civil society pressure to report. In addition, in regions where pricing policies have been implemented companies have had to build CO₂ inventories to understand the impact.

Chart 3: Disclosure trends vary by country

Source: Thomson Reuters

One clear pitfall is the inability to compare companies purely on the basis of disclosed CO₂ volumes. Essentially most carbon reporting tends to include an associated normalisation factor, termed carbon intensity. Carbon Intensity captures the CO₂ embedded in an economy, sector or company. The idea is to enable comparison of different sized entities e.g. carbon intensity of GDP, carbon intensity of revenues etc.

As temperatures rise, the impacts mean that weather events that were previously considered extreme become more common. This has a disruptive impact on sectors and industries as their ability to operate may be impaired.

Pressure on investors to demonstrate climate awareness is rising

Investors are coming under pressure to demonstrate they are doing what they said they would in terms of pre-Paris pledges to finance the low-carbon transition and decarbonise portfolios. This is leading to the need for more thoughtful climate strategies from equity portfolio managers to justify and defend portfolio holdings in high carbon sectors. The key points to bear in mind for climate assessment are how much the company contributes to warming the climate and how much it is impacted by a warming climate. In practical terms, these questions are difficult to answer and therefore hard to factor in to equity valuation, because of uncertainty on the timing, scale and magnitude of actions to address the climate problem, as well as the consequences of warmer temperatures.

Mapping 2°C risks

- ▶ Climate risks come from action to reduce GHGs, changing weather norms relating to warmer temperatures, and reputational factors
- ▶ Sectors that contribute a lot to climate change are utilities, oil and gas, cement, steel, metals and mining, chemicals, and transport
- ▶ Sectors more exposed to climate change consequences are real estate, insurance, consumer goods, food producers and retailers

Mapping 2°C risk across sectors

Identifying types of climate risks is straightforward; attributing value to them is complex

In the previous chapter we set the high level narrative for how equity markets are exposed to climate factors. In this chapter we provide more detail on the types of climate risks that are relevant for sectors. In our view the **types** of main risks relating to climate change factors are straightforward to identify and are well known in our view. They relate to how much action will be taken to limit the rise of Greenhouse gases in the future and what the physical and social impacts will be from warmer temperatures. A large volume of academic, think tank and public sector organisation reports have focused on this, as well as more recently, the litigation and reputational factors relating to wilfully producing emissions.

Climate risks are difficult to quantify however because significant uncertainty exists on the likelihood, timing and magnitude of the risks playing out, and in our view this has led to investor inertia on explicitly valuing them.

“ Inertia on valuing climate risks exists because of uncertainty on the magnitude and timing

Expectations about the timing, and uncertainty on the magnitude of climate risks makes life complicated

We think this is partly down to an expectation that climate change plays out a long time in the future, so there is no need to think about it now. We disagree with this sentiment, and think that the point of identifying and considering climate risk now means that if and when climate surprises happen, such as the implementation of a very high carbon price, or 1 in 100 year magnitude storm happening two years in a row, the response mechanism has already been worked out. In addition, looking at climate risk is not a one off assessment as the nature of the risks will change. See Box 4 for the interdependency of climate risks.

In the past 18 months, work by the insurance sector and the Bank of England has led to a commonly accepted categorisation of climate risks between transition, physical and liability. Transition risk arises from the process and rate of adjustment from a high-carbon economy towards a lower-carbon economy, physical risk is associated with the impact of climate-related physical events (such as extreme weather or slow-onset events) and liability risk is the potential

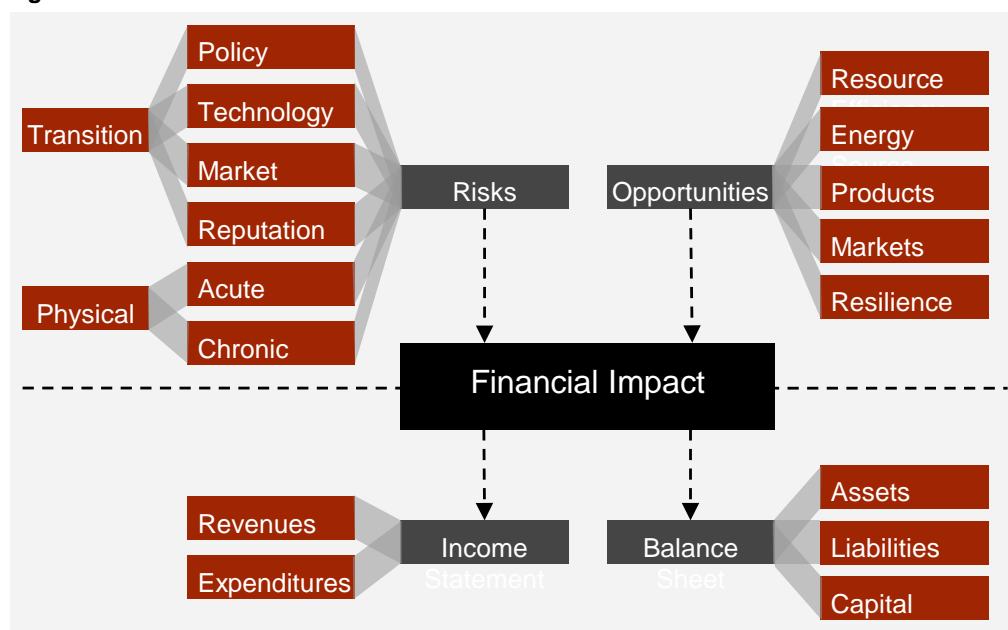
for future litigation proceedings in relation to financial loss as a result of negligence, such as ignoring the risks of climate change, deliberate inaction, or wilful action which is taken despite awareness of the harm that excessive emissions might cause.

Box 4: Climate risk and interdependency: The interdependency of climate risk refers to how the likelihood of the different types of climate risks change in relation to each other. For instance, as a hypothetical example, if the economics of battery storage become globally compelling quickly, e.g. over the next two years, renewables would be a more attractive power source and the transition risk for fossil fuel based utilities would be high. This could result in a quicker than anticipated phase out of fossil fuels in power, so lower annual emissions could result, meaning that the future physical, e.g. rising sea levels, consequences of climate change are less disruptive. Other climate-related risk factors could include the impact of carbon pricing on profitability and regulatory drivers impacting the demand for products.

Essentially, the speed and scale of mitigation action today has an impact on the likelihood and scale of adaptation risk in the future. The inter-dependency between transition risk and physical risk (i.e. that addressing one lowers the likelihood of the other), means that avoiding all climate risk is almost impossible in our view. Our baseline view is that initiatives to limit greenhouse gases will be taken and that the disruptive consequences of warmer temperatures will be felt.

In addition, a significant development of the last twelve months is the promotion of improved risk disclosures from companies, prompted by work from the task force on climate related financial disclosure. The task force, set up by the Financial Stability Board, provided the summary figure of how to incorporate climate risks and their financial relevance. We expect the drive for companies and investors to be more transparent about climate risks to continue.

Figure 3: Task force on climate related financial disclosures



Source: Financial stability board task force on climate related financial disclosures

Sector contributions to CO₂

If you can't identify it, you can't mitigate it

Translating the top down types of climate risks into a bottom up risk assessment for sectors, and ultimately companies, allows for differentiation between winners and losers. Going back to the original premise that the response to two questions form the basis of how to identify value at the company level, here we look at the ways that sectors contribute to and are affected by a warming climate. In accordance with the main consensus on carbon accounting we have split the categories into scope 1, scope 2 and scope 3 risks.

Table 1: Sector contribution to greenhouse gas (GHG) emissions

Sectors	Direct contribution to GHG's Scope 1	Indirect contribution to GHG Scope 2	Other indirect sources Scope 3
Energy	<ul style="list-style-type: none"> ▶ Fossil fuel use for power generation ▶ CO₂ from flaring ▶ CO₂ from venting ▶ Fugitive emissions in oil & gas upstream ▶ Stationary combustion in refining process ▶ Fugitive emissions during coal mining 	<ul style="list-style-type: none"> ▶ Electricity use in petroleum refining and coal processing 	<ul style="list-style-type: none"> ▶ Production of input material (feedstock), like hydrogen gas used in refining process ▶ Production of capital goods and machinery ▶ Electric Transmission & Distribution losses ▶ GHG emissions from industrial waste
Metals & Mining	<ul style="list-style-type: none"> ▶ Iron ore smelting using coking coal ▶ Diesel use in machinery for mining, processing ▶ Diesel use in vehicles for transport of raw materials 	<ul style="list-style-type: none"> ▶ Electricity use in secondary steel making and electrolysis process for aluminium making ▶ Electricity for stationary machines 	<ul style="list-style-type: none"> ▶ Production of input materials (feedstock) like coke and pellet in steel sector ▶ Transport of raw material and finished goods account ▶ GHG emissions from industrial waste
Chemicals	<ul style="list-style-type: none"> ▶ Heating fuel use in boilers ▶ CO₂ from venting of gases ▶ CO₂ from incineration of by-products ▶ GHGs from chemical processes, like N₂O emissions from adipic and nitric acids 	<ul style="list-style-type: none"> ▶ Electricity intensive products like high density polyethylene & low density polyethylene (HDPE & LDPE) 	<ul style="list-style-type: none"> ▶ Production of petroleum feedstock ▶ Transport of raw material and finished goods account ▶ GHG emissions from industrial waste
Utilities	<ul style="list-style-type: none"> ▶ CO₂ from fossil fuel use in steam turbine and natural gas use in gas turbine 	<ul style="list-style-type: none"> ▶ Electricity use in water filtration & supply, waste water treatment and municipal waste disposal 	<ul style="list-style-type: none"> ▶ Production of feedstock like coal and natural gas
Consumer Goods	<ul style="list-style-type: none"> ▶ Hydro-fluorocarbons (HFCs) and other GHGs from use of refrigerant in food processing and FMCG companies ▶ CO₂ from use of heating fuel in boilers 	<ul style="list-style-type: none"> ▶ Electricity demand for production processes 	<ul style="list-style-type: none"> ▶ Production of raw material ▶ Transportation of finished products ▶ Deforestation for supply of feedstock ▶ Waste generated from company operations
Industrial Goods	<ul style="list-style-type: none"> ▶ Use of diesel in mobile machinery and company vehicles ▶ CO₂ from heating fuel in boilers 	<ul style="list-style-type: none"> ▶ Electricity demand for production processes 	<ul style="list-style-type: none"> ▶ Production and transport of raw material ▶ Transportation of finished goods ▶ Waste generated from company operations
Financials	<ul style="list-style-type: none"> ▶ No significant direct emission 	<ul style="list-style-type: none"> ▶ Electricity use for running workstations, HVAC system and lighting 	<ul style="list-style-type: none"> ▶ Business travel
Transportation	<ul style="list-style-type: none"> ▶ CO₂ from combustion of fossil fuel in internal combustion engine (ICE) 	<ul style="list-style-type: none"> ▶ Electricity demand for EVs and rail transport 	<ul style="list-style-type: none"> ▶ No significant scope 3 emissions
Information Technology	<ul style="list-style-type: none"> ▶ No significant direct emissions 	<ul style="list-style-type: none"> ▶ Electricity demand for maintaining data-centres, IT infrastructure and office HVAC and lighting 	<ul style="list-style-type: none"> ▶ Business travel forms a large share of the total GHG emissions in the sector
Real Estate	<ul style="list-style-type: none"> ▶ Use of oil and gas for heating and as cooking fuel ▶ Diesel fuel use to run machinery in building construction 	<ul style="list-style-type: none"> ▶ Electricity demand for lighting and running home appliances and HVAC 	<ul style="list-style-type: none"> ▶ GHG from solid waste & water effluents ▶ Production of building materials, like cement

Source: HSBC, Company CDP filing

In summary, scope 1 emissions are those the company has direct control over, scope 2 are emissions from purchased activities, and scope 3 are other indirect emissions that come from activities the company needs to operate, but purchases or outsources.

The table above is useful because it shows the composition of GHGs between direct and indirect ownership and therefore enables assessment of where the most risk lies to the company. For instance, if the biggest climate contribution comes from buying electricity, addressing the climate factor means becoming operationally more efficient so as to guard against power price inflation because of a carbon tax for instance. If it is from direct emissions, the climate strategy is to minimise CO₂ per unit produced, since this reduces any potential carbon cost.

“ Sectors directly contributing the most to GHGs are utilities, oil and gas, metals and mining, chemicals, transportation and industrial goods

Sector exposure to 2°C impacts

The consequences of climate change are associated with changing norms across the planet, for instance sea level rise and extreme weather events. These changes impact real estate and infrastructure and are disruptive for day-to-day operations. Clearly they are difficult to predict.

Table 2: Sectors are impacted by the consequences of climate change

Sectors	Types of disruption resulting from physical events
Energy	<ul style="list-style-type: none"> ▶ Damage to infrastructure (rigs, pipelines, tankers, refineries, nuclear plants etc.) from storms, sea surges, sea level rise ▶ Thermal power generation inability to operate because of water scarcity or warmer water.
Metals & Mining	<ul style="list-style-type: none"> ▶ Supply chain disruption to input materials and water and energy availability ▶ Flooding to mines and plants
Chemicals	<ul style="list-style-type: none"> ▶ Disruption, for instance lack of access to feedstock supplies such as fossil fuels ▶ Damage to plants from sea level rise and storm surges ▶ Water intensive processes face scarcity
Utilities	<ul style="list-style-type: none"> ▶ Power infrastructure, grids and cooling technology disrupted by extreme events ▶ Higher generation demand due to extremes of temperature reduces maintenance time
Consumer Goods	<ul style="list-style-type: none"> ▶ Supply chain disruption, damage to manufacturing facilities and retail stores ▶ Commodity production – cotton, wool, leather – affected by floods, droughts and heat
Industrial Goods	<ul style="list-style-type: none"> ▶ Power, energy supply and materials supply chain interruption
Financials	<ul style="list-style-type: none"> ▶ Project cost escalations due to increasing risks of climatic events ▶ Elevated levels of payout events for re-insurance businesses ▶ Higher cost of business continuity ▶ Credit write down risk from cash flow disruption to companies
Transportation	<ul style="list-style-type: none"> ▶ Service disruption due to infrastructure damage (bridges, canals, ports, rail lines). ▶ Delays to services because of extreme storms
Information Technology	<ul style="list-style-type: none"> ▶ Physical damage to buildings and equipment, including servers, broadcasting towers, transmission and power supply ▶ Increased saline corrosion of coastal infrastructure
Real Estate	<ul style="list-style-type: none"> ▶ Coastal, river basins and inland areas face flooding from sea level rise, storms and hurricanes ▶ Damage to old buildings from extreme temperature and altered water table levels ▶ Water services to buildings disrupted by scarcity ▶ Energy supplies interrupted because of grid infrastructure disruption

Source: HSBC

Risk types are straightforward, quantifying them is difficult

In our view identifying types of climate risk is relatively straightforward, and comes from moving to a low-carbon economic framework, adjusting to warmer temperatures and being accountable for action that is detrimental to the climate. The problem comes from trying to quantify the disruptive nature of these risks (and opportunities), as there is uncertainty on the timing and scale of them. We've set out how sectors contribute to the climate and how they are physically impacted from changes which highlights what sort of 'unexpected' events could take place, now the challenge is to differentiate between them.

Assessing 2°C plans

- ▶ For equity index trackers, divesting completely from high CO₂ sectors is impractical, stock differentiation is a necessity
- ▶ Well prepared companies know and disclose how much CO₂ they emit, they know how much they contribute to warming the climate
- ▶ Companies are impacted by a changing climate, identifying how much disruption they can withstand is a key resilience indicator

Differentiating between companies

What makes a company best in class on climate?

Having mapped risks and sources of GHGs by sector and identified the different ways that sectors are impacted by a warming climate, the next step is to differentiate company climate approaches in the same sector. We think this is important, particularly for high carbon sectors, because many investors cannot deviate too far from index representation, or completely exclude holdings from the sectors most exposed to climate risks.

We think that climate factors, and how they affect future wealth preservation potential and the resilience of future returns, is taking on more significance for asset owners, and by extension, investment managers. At the most extreme, investors are subject to regulation that requires them to disclose on the risks of climate, the carbon footprint of the portfolio, and disclose how the capital allocation choices they make today are contributing towards moving away from a high-carbon economy (and therefore helping to confront and solve the climate problem rather than exacerbating it).

Having a well-thought out climate strategy is also important from a company perspective so as to appeal to the broadest possible range of capital providers in our view. We are seeing increasing evidence that it is becoming business critical for investment managers to signal to their asset owner clients and to their portfolio holdings that they are climate aware, by accounting for and assessing climate risk and resilience. At the very minimum this indicates that the direction of future capital allocation is low-carbon biased, so companies are likely to be asked questions about their own climate strategies in the future.

“ A well thought out climate strategy enables companies to appeal to the broadest possible range of capital providers

Figure 4 repeats the diagram on how companies can incorporate climate considerations into management for companies that we first looked at in chapter 2. Considerations range from the micro factors that the company can manage, such as operational resource use, to the global macro elements that are interlinked, complicated and beyond company control, such as how climate policy in one region will impact supply chains and trade flows in another. These types of issues will impact companies' ability to operate in the future, but companies can also position themselves to take advantage of these types of changes.

Figure 4: Incorporation of climate factors into business management



Source: HSBC

We believe the crucial point from an investor perspective is to identify where companies are positioned along the management of climate considerations figure above, to assess how fit for purpose the company is for a 2°C world. The further companies are to the right hand side the more likely they are to be able to continue to generate income and add value to the asset base in the context of changing climate drivers. On the left hand side the benefit of adopting operational management of these factors is cost control, in the middle its risk mitigation, and companies at the right hand side of the scale demonstrate 2°C fit for purpose.

“ Companies positioned to the right in Figure 4 are more likely to be fit for purpose in a 2°C world

Previously we saw that only 52% of MSCI ACWI companies provide CO₂ data, which is the bare minimum starting point on the left of Figure 4 above in our view. This shows that there is a lot of work to do, but also that relying on data disclosed by companies alone will not be enough to provide the types of differentiation equity portfolio managers need. In our view the best way to get more clarity on company positioning is to devise a company engagement strategy. We set out a template for the key questions to identify whether companies are at the left or right and side of Figure 4 in terms of managing climate factors below.

Investor engagement template

Our investor engagement template provides a framework to identify how well companies are positioned for climate issues, to allow investors to differentiate between them. While each company could have many different types of climate considerations to manage depending on the size of the company and type of business, we think these engagement questions apply generically across sectors. The questions get progressively more detailed in a way that teases out more information on how thoughtful the company is on climate issues.

Operational Management

- ▶ What is the scope and methodology used to account for CO₂ emissions?
- ▶ Who in the organisation has accountability for setting, measuring, managing and reporting CO₂ goals? How are these derived?
- ▶ What other climate and sustainable development related resource issues are taken into account on an operational basis?

Holistic Risk Management

- ▶ What proactive steps does the firm take to identify the climate risks inherent in its business?
- ▶ Who in the organisation has governance and accountability for risk management?
- ▶ How are climate related risks managed?
- ▶ What are the impacts of climate related risks on the business?

Strategic Planning

- ▶ What is the process for addressing company viability under a 2°C economic framework?
- ▶ Who in the organisation has governance, ownership, and accountability for planning?
- ▶ Has the firm considered whether there are any activities that it undertakes or ways in which it operates that could undermine strategies put in place to improve climate exposure?

This engagement template is designed to be generic enough for all companies and all investor time horizons. A pitfall with this is that the company response to these questions (as published in the annual report for instance), might lead to a difference of investor opinions as to the position of the company along Figure 4, depending on their own views on how efforts to address climate change will play out in the future (see box 5). This means that the climate adjusted cash flow estimates (discussed in the first chapter), might be wildly different between stock analysts.

Box 5: Company comprehensiveness versus investor climate expectations

The central idea with this report is that the equity markets today do not fully capture the potential of climate factors to disrupt future growth potential, with inadequate disclosure just one of the reasons why climate is not fully captured in cash flow projections.

Our investor engagement template above provides straightforward guidance for equity portfolio managers to be able to differentiate between the climate attitudes of the companies they hold. This is particularly important for stakes in sectors that generate revenues from high carbon goods and services, such as energy and utilities, and can be used as means for shareholders to justify and defend their exposure to the sector in the context of their own mandate, tracking error etc. Nonetheless, even the 'best' company responses might not provide the 'right' (when 'right' means giving full visibility for shareholders to capture climate factors) outcome in terms of addressing climate change through capital allocation.

For instance, in a hypothetical example, a high carbon company could adopt a best in class approach of fully reporting on scope 1 to 3 emissions, set ambitious science based CO₂ reduction goals, have great systems in place across businesses to anticipate and manage contingency for risk with board level accountability, as well as have a strategic vision of what will make the company fit for purpose in the future. All this is disclosed to the market through the annual report and active investor relations engagement. This is the type of response that would place the company at the far right of the diagram in figure 4 in terms of differentiation versus sector peers.

A shareholder could also believe that the company is doing well on its climate strategy and disclosure, but has a different view on the speed and scale of action to address climate change, and could conclude that the company is not strategically prepared for a fast transition scenario. On that basis the investor believes the company is more in the middle of the diagram.

The point here is that company disclosure is crucial to enable stock pickers to differentiate within a sector, but there might be unintended consequences. The first is that companies become disillusioned with the investor interpretation of their best in class approach and stop disclosing, and the second is that when improved disclosure leads to a more accurate assessment of risk and reward it might not lead to outcomes that enable a 2°C economy. Some investors could end up thinking that high carbon companies are undervalued given their own risk appetite and climate attitudes.

Nonetheless we believe a more comprehensive climate disclosure approach is necessary as a means to provide transparency for capital allocation.

Operational carbon management

- ▶ What is the scope and methodology used to account for CO₂ emissions?
- ▶ Who in the organisation has accountability for setting, measuring, managing and reporting CO₂ goals? How are these derived?
- ▶ What other climate and sustainable development related resource issues are taken into account on an operational basis?

The old adage: what gets measured gets managed

Company accounting for carbon has come a long way since the Greenhouse Gas Protocol Initiative published its first Corporate Accounting and Reporting Standard in 2001. However, despite the best efforts of a variety of collaborative projects and initiatives, carbon inventories are still not routinely understood and completed for all listed companies.

“ Despite longevity of GHG accounting it’s not routinely completed by companies

The most commonly used carbon accounting frameworks are the Greenhouse Gas Protocol, and the Sustainability Accounting Standards Board, (SASB), which are compared below.

Table 3: Comparison of Frameworks to account for Greenhouse Gases

	Sustainability Accounting Standards Board (SASB)	WRI / WBCSD Greenhouse Gas Protocol Standards
Description/ Framework	<ul style="list-style-type: none"> ▶ Aims to identify climate risk and financial impacts ▶ Recognises industry specific factors ▶ Develops metrics for corporate issuers to disclose cost effectively 	<ul style="list-style-type: none"> ▶ Helps companies to prepare a GHG inventories ▶ Simplifies and reduces the costs of compiling a GHG inventory ▶ Provides information for businesses to build an effective strategy to manage and reduce GHGs ▶ Aims to increase consistency and transparency in GHG accounting
Scope	Industry dependent (1,2 and/or 3)	1&2 (3 optional)
Standards for	Climate Metrics for investor perspective	Accounting methodology for company
Compatible with	<ul style="list-style-type: none"> ▶ CDP Climate Change Information Request ▶ CDSB Framework ▶ Climate Change Reporting Framework ▶ GRI G4 Aspect 	<ul style="list-style-type: none"> ▶ Voluntary GHG reduction programmes: e.g. Business Leaders Initiative on Climate Change (BLICC) ▶ GHG registries ▶ National and regional industry initiatives ▶ GHG trading programmes, e.g., EU ETS ▶ Sector-specific protocols developed by a number of industry associations
Accounting methodology	Climate risk metrics are for company performance Standards are quantitative and qualitative 78% of metrics are quantitative	Provides accounting for emissions based on total and partial ownership approaches
Sector wise approach	Yes; but uses compilation of existent based GHG accounting methodology	No; Source based approach; i.e. type of production/input (ammonia, cement etc. or CHP, purchased electricity, paper mills etc.)

Source: Scheme websites

In the risk chapter we split out sector emissions by the scope 1, 2 and 3 categories providing a useful snapshot. However, at the company level it is important to put carbon into context by reporting on carbon in relation to something else, for example revenues, or asset base, or cash flows. In addition, we expect more attention to turn to emissions associated with products e.g. electrical appliances and gadgets, and how companies can account for these.

Climate change and implementing the aims of the Paris Agreement are obviously not the only challenges the world faces. Other issues, like eradicating poverty and bringing education to all are captured by other initiatives, most notably the sustainable development goals. For some companies it may be equally relevant to address the key resource elements of these goals – such as water availability in communities. A best in class approach means that as well as CO₂ disclosure, companies address the issues most relevant for their business model.

Best in class approach includes comprehensive CO₂ accounting and long-term target planning

We think a best in class approach for operational factors comprises three points:

- ▶ Scope 1, 2 and 3 greenhouse gas accounting
- ▶ Comprehensive reporting of other resource uses relevant for the business, with particular emphasis on resource use that may impinge on ability to operate versus local communities (e.g. water use rights)
- ▶ Future target setting in way that is meaningful for the organisation e.g. climate or sustainable development goals.

More recently, some organisations have started setting science based targets (see section Valuing 2°C plans in this report).

Accurately accounting for carbon allows management teams to reduce costs (since for many companies most CO₂ emissions come from energy purchased through electricity and transport), therefore improving profitability. It also allows companies to compute sensitivity analysis around a potential carbon price.

Holistic risk management

- ▶ What proactive steps does the firm take to identify the climate risks inherent within its business?
- ▶ Who in the organisation has governance and accountability for climate risk management?
- ▶ How are climate related risks managed?
- ▶ What are the impacts of climate related risks on the business?

Best in class approach means defined process for assessing mitigation and adaptation risk and assigning accountability

Risk management in business is not a new concept, but climate as a risk to all businesses, as opposed to just a few carbon intensive sectors is a relatively new concept. In order to move from left to right along figure 4 the emphasis turns more strategic by taking different businesses and geographies into account. In the risk category, the key differentiator of company climate preparedness is what the risk identification entails and who is responsible for it. The idea here is that identifying the risks associated with a warming climate, such as increased policy action to reduce GHGs, or unpredictable and extreme weather events associated with a changing water cycle from warmer temperatures will minimise surprises in the future and enable companies to draw up contingency plans.

“ Manage risks to identify the warning signs of potential value disruption because of climate factors

We think a best in class risk management approach takes both mitigation and adaptation issues into account and puts these in context to the way the company generates revenues, what it means for its profitability and future cash flows as well as whether its ability to operate and access to capital will change in the future.

Does the company sell into carbon exposed markets?

Revenue: products and markets

For us, one of the biggest risks companies face in relation to climate change factors is how end markets are impacted by climate initiatives to reduce GHGs. If the company sells into markets that are producing high carbon products and services the means used to predict growth in the past (for instance, in line with GDP growth), might not be the norm of the future, as incentives to scale up substitute products, and policy levers pricing carbon, or consumer behaviour create demand destruction for high carbon goods and services. We looked at potential long-term energy demand in our report *'A global energy vision for a 2°C world'*, 7 February 2017 (Please contact your HSBC representative or email Research.Direct@hsbc.com for more information on how to access the full report).

Does the company source from climate vulnerable places?

Cost: supply chain, asset location

In our view the main point to consider here is the location of business critical operations and suppliers. Location matters for two reasons – firstly because the politics of climate are different by region and therefore climate mitigation action can be more stringent in one area than another, and secondly because of the potential for disruption. Climate vulnerabilities may not be obvious and are different from business to business. The aim here is to identify which regions are business critical for operations, and apply a climate risk overlay. This includes thinking about factors like warehouse locations, whether the product is weather dependent (e.g. agricultural commodities), or if transport networks could be subject to disruption. The outcome of the risk assessment could include investment for climate resilience (e.g. flood resistance), or greater insurance requirements, so company profitability could be come under pressure. We looked at G20 country vulnerability to climate factors in our report *'Scoring Climate Risk'*, 23 March 2016 (Please contact your HSBC representative or email Research.Direct@hsbc.com for more information on how to access the full report).

Is the company making 2°C compliant investment decisions?

Investment: return potential, access to credit

If the world plays out how we expect, i.e. that market and political forces progressively tighten on reducing greenhouse gases, and temperatures rise further so that the physical consequences of warmer temperatures become more severe, then some high carbon investment today will probably not generate the returns in the future that are expected today. In turn, this is likely to squeeze capital out of those companies. This in turn will change the company risk profile and change the terms of capital provision.

In the risk management section, the financial statement alignment is for revenues, costs, and investment flows, which directly translates into free cash flow forecasts. This in our view is the most important consideration to be able to calculate a climate adjusted forecast scenario.

Strategic positioning

- ▶ What is the process for addressing company viability in a 2°C economic framework?
- ▶ Who in the organisation has governance, ownership, and accountability for planning?
- ▶ How is climate factored into long-term investment decision making / financial Planning?
- ▶ Has the firm assessed whether there are any activities that it undertakes / ways in which it operates that could undermine strategies put in place to improve climate assessment?

The best in class approach anticipates if the business today is fit for purpose in the future

The holistic risk management assessment above identifies potential challenges with how companies might operate, and generate income in the future. The natural progression from the outcome of this is to work out what to do about the identified risk factors.

In our view this is the most difficult area for shareholders to assess, since companies often do not disclose a long-term strategy. However, we think the best way to take a stab at understanding future positioning is by monitoring capex trends, and look at whether firms are investing in a way that is fit for purpose in a 2°C world.

Are climate issues embedded through the business?

Another way to think about this is whether climate issues taken into account throughout all business lines and functions. A crucial factor here is governance. The best in class approach on responsibility for capturing climate factors in our view is ownership at board level, but also accountability in each of the different business and functions.

Companies that are best in class at managing climate exposure will already be taking decisions that enable them to continue to grow in the future on the basis of a low-carbon transition. This may not be visible because it is often not in stakeholder interest to broadcast the rationale for selling a division. We think it is useful for shareholders to have a pre-determined view on the speed and scale of transition to a low-carbon economy in order to quickly judge whether M&A activity or disposals make sense. In effect, strategic planning considerations are about shareholders translating the macro evidence that climate change is happening (e.g. evidence of melting ice sheets) into micro outcomes for company holdings.

The types of shareholder thinking for differentiating between companies in the strategic positioning category are based on deciding whether a business line will exist in the future. Equally, from the company perspective, a decision to reduce exposure to a particular business may not be down to expectations that no further revenues can be generated, it may be that profitability is undermined because the regional vulnerabilities to climate change have become untenable, for instance if days are lost by interrupted power supplies because of water shortages. One on one company engagement is the best way to identify the strategic position of the company in our view.

Conclusion

In the past, climate differentiation discussions mainly centred on a high-level commentary of which companies fitted into 'high-carbon' and 'low-carbon' buckets, according to operational carbon intensity, with carbon foot printing (the measurement of how much CO₂ is emitted by the company in the course of day-to-day operations) the main means to assess company willingness to understand and address operational climate factors. Times have changed and are moving towards a more sophisticated thinking around climate factors.

As investors are put under more pressure to demonstrate their own climate credentials, we expect them to be asked to provide increasingly robust rationale to defend portfolio holding decisions. This means deeper analysis of what companies are really doing to position themselves well for the future effects of climate change.

Disclosure appendix

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