

Decarbonisation: The Basics

INTERNATIONAL EQUITY TEAM | INVESTMENT INSIGHT | 2021

Climate change is often cited as a leading ESG priority for investors. It is the number one issue for asset owners in the Morgan Stanley 2020 Sustainable Signals Survey.¹ 95% already seek, or are considering, to address climate change via their thematic or impact investments.

Our team's ESG approach is focused on material issues that could threaten or enhance company fundamentals and/or the sustainability of returns. Our portfolio managers and Head of ESG Research engage proactively with company management, including seeking to understand environmental policies and practices that could materially affect the sustainability of returns.

Climate change is a big beast of a topic. What are the essential facts that are helpful for investors to know? What is believed to be the economic impact of climate change? What is meant by scope 1, 2 and 3 emissions, and why should businesses and investors care about measuring across the full value chain? What options are available to investors wanting to lower the carbon footprint of their portfolio? How can a high-quality equity portfolio help?

This paper, the first in our Carbon series, sets out to explore these five areas.

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“What options are available to investors wanting to lower the carbon footprint of their portfolio? How can a high quality equity portfolio help?”

¹ Source: Morgan Stanley Institute for Sustainable Investing Sustainable Investing Survey, March 2020.

1. Climate Change 101

Climate change is widely seen as the defining issue of our time. In recent years, the political winds seem to have truly shifted, as the public has grown increasingly vocal and the issue more urgent.

Climate science is not exact, given the number of assumptions scientists have to make about things they can't model exactly. Nonetheless, there is consensus that it is happening fast, it is man-made, we are not doing enough, and we should focus on preventing irreversible extreme damage.

What matters for investors, in addition to the direct physical impact of climate change, is the resulting changes in government policy, consumer behaviour and the impact on companies and their valuations (the 'transition risk').

The world is undoubtedly warming, and the Intergovernmental Panel on Climate Change (the most important global climate science body, comprising 195 member countries) expects us to reach 1.5°C above pre-industrial levels in only twenty years, if no action is taken (*Display 1*).

Scientists attribute rising temperatures to the human induced 'greenhouse effect.' Carbon dioxide accounts for most of it. As *Display 2* shows, current concentrations of CO₂ in the atmosphere are already significantly higher than for the past hundreds of thousands of years, and the speed and level of the increase suggest most of it is driven by human activity.

WHAT IS MEANT BY TRANSITION RISK?

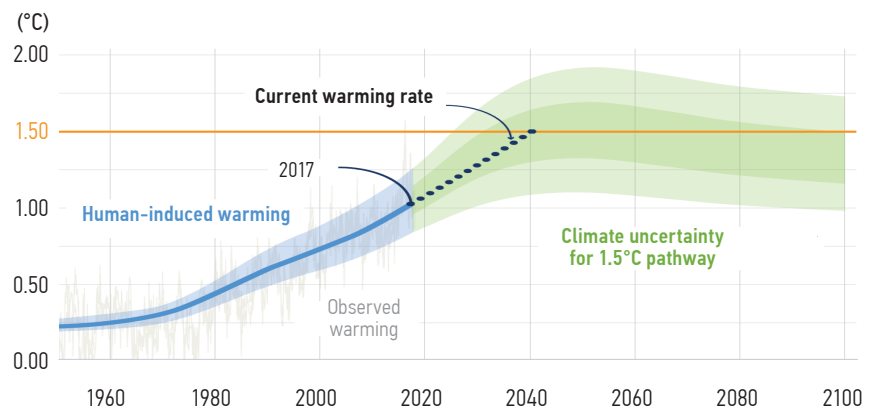
"While the physical risks from climate change have been discussed for many years, transition risks are a relatively new category... Transition risks can occur when moving toward a less polluting, greener economy. Such transitions could mean that some sectors of the economy face big shifts in asset values or higher costs of doing business... As companies disclose more information relating to climate change, financial firms will be able to make more informed decisions."

– The Bank of England KnowledgeBank: 'Climate change: what are the risks to financial stability?'

DISPLAY 1

IPCC expects global warming of 1.5°C to be reached in 2040

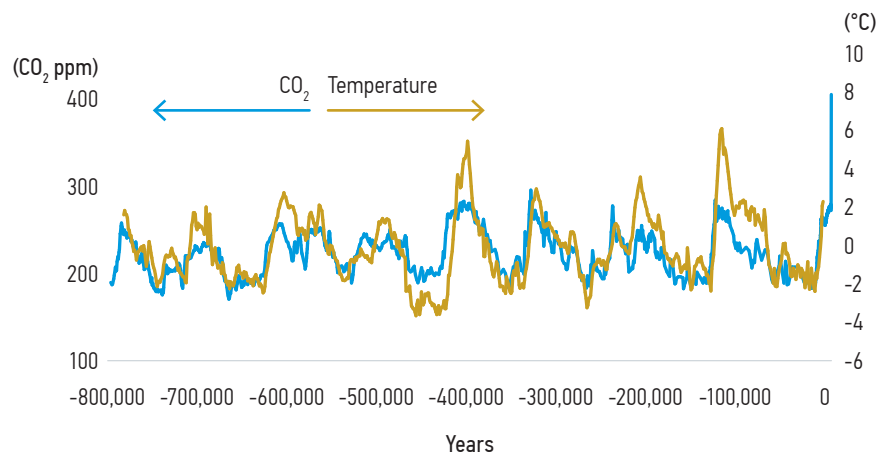
Global Temperature change relative to 1850-1900



Source: IPCC AR15 Report October 2018 – Global warming of 1.5°C

DISPLAY 2

CO₂ concentration and temperature over 800,000 years



Source: NOAA (National Oceanic and Atmospheric Administration)

WHY DOES IT MATTER IF THE WORLD 'ONLY' BECOMES 1.5°C WARMER?

Warming will not be evenly spread. The climate will become more unstable and weather patterns disrupted, with heatwaves in some places and hurricanes and floods in others.

The list of resulting direct physical climate change risks is long: damage to assets from extreme weather events and rising sea levels, water stress, crop failures and lower yields, lower fish catches, higher mortality and lower labour force productivity in hotter countries, among other effects.

But the bigger, longer-term concern is that at a certain point in the warming process, various natural feedback mechanisms will kick in, and warming will self-perpetuate and become unstoppable. These include the albedo effect (as polar ice melts, it reflects less light back into space), release of methane by melting permafrost and the Amazon rainforest dieback among other things. These outcomes are impossible to model exactly, which is why there are a wide range of climate scenarios.

Nonetheless, the damage would be irreversible, and our actions in the next few decades will dictate our planet's course for centuries to come.

TARGETING 'NET ZERO' BY 2050 IS NOW A GLOBAL IMPERATIVE

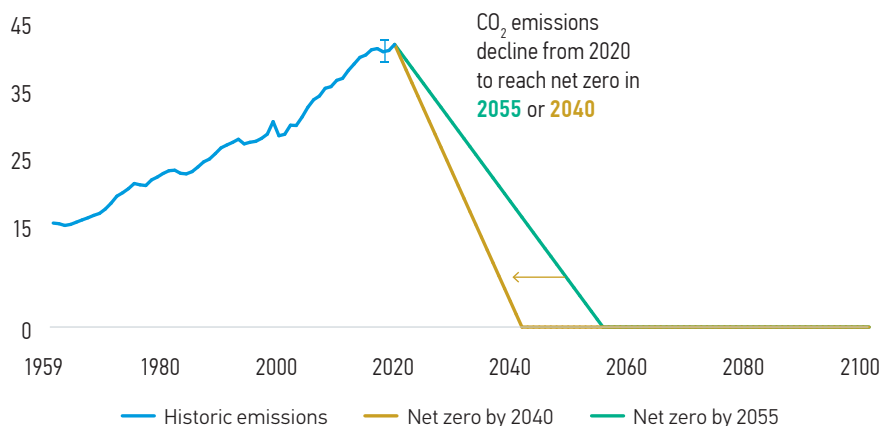
The consensus now is that we have to fully decarbonise—reach 'net zero'—by around 2050.

Display 3 models the drastic decline in CO₂ emissions required with immediate effect in order to reach net zero by both 2055 and 2040.

What many people do not realise is that these oft-quoted IPCC emissions reduction targets in most cases assume only a 50-66% probability of limiting global warming to agreed temperature targets.

DISPLAY 3

Billion tonnes CO₂ per year (GtCO₂/yr)



Source: IPCC AR15 Report October 2018 - Net global CO₂ emissions pathway

GLOBAL WARMING OR CLIMATE CHANGE?

“We often call [it] global warming, but it is causing a set of changes to the Earth’s climate, or long-term weather patterns, that varies from place to place. While many people think of global warming and climate change as synonyms, scientists use “climate change” when describing the complex shifts now affecting our planet’s weather and climate systems—in part because some areas actually get cooler in the short term.”

– National Geographic

“Natural feedback mechanisms will kick in, and warming will become unstoppable.”

“Experts believe we have less than 10 years to limit global warming to less than 1.5°C”

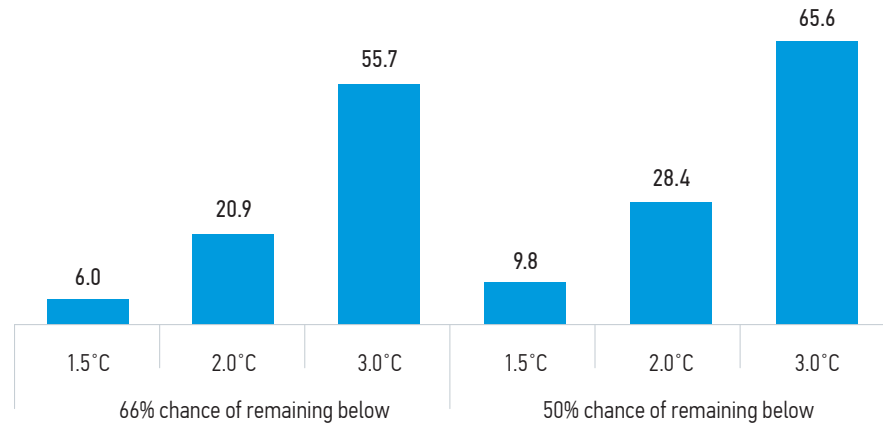
If the world wants to avoid potentially catastrophic climate change with 100% certainty, it has even less time to decarbonise. To limit global warming to less than 1.5°C, experts believe we have perhaps less than ten years, as the remaining ‘carbon budget’ (i.e. future emissions we are ‘allowed’ to produce before we reach the limit of CO₂ concentration in the atmosphere) is much smaller in that scenario (see *Display 4*).

2. What is the economic impact of climate change?

The economic impact of climate change is even harder to predict than its physical impact given the lack of historical precedent. The exact relationship between the economy and the earth’s temperature is still poorly understood and there is currently no consensus among economists. But we do know that the impact of rising temperatures on ecosystems and humans is not linear

DISPLAY 4

How many years of current emissions would use up the IPCC’s carbon budgets for different levels of warming?



Source: Carbon Brief data, BofA Global Research Graphic

and various tipping points (see *Display 5*) cannot be ignored.

A number of academic studies have tried to assess the overall impact of unmitigated climate change on global gross domestic product (GDP). Many of them arrive at a fairly modest global cumulative impact, less than 7% of global output in 2100, relative to a scenario of no climate change. This group of studies has been critiqued for various reasons.

Some more pessimistic studies arrive at a much greater impact: a loss of up to 50% of global GDP by 2100 in an ‘emissions-as-usual’ scenario, relative to no impact of climate change.

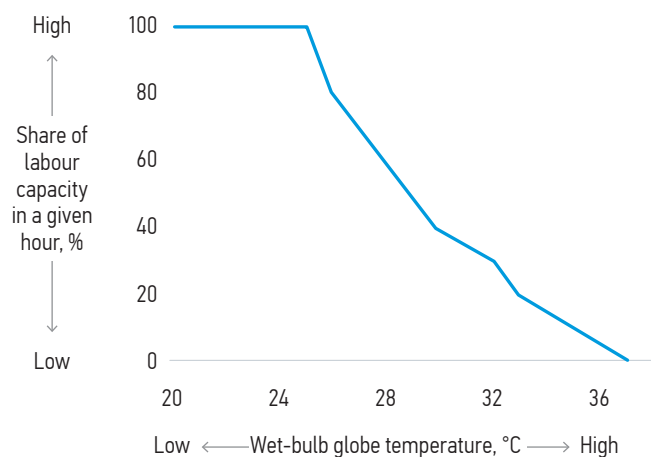
INCREASED INEQUALITY

The potential problem with looking at global GDP is that most of it is currently produced by richer, typically cooler countries. Some of them, for example

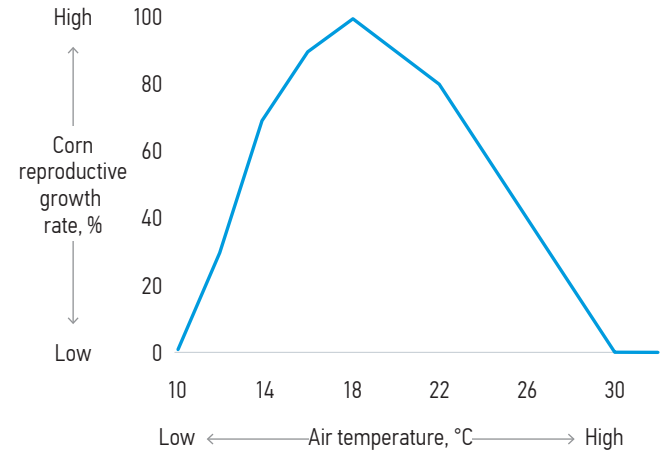
DISPLAY 5

Direct impacts of climate change can become non-linear when thresholds are crossed (schematic)

Impact of heat on outdoor labour



Temperature impact on corn-crop yield



Source: McKinsey Global Institute

Canada, may actually benefit in the medium term from global warming.

Most of the negative impact, however, is likely to be felt in poorer, hotter countries that contribute less to global GDP. Therefore the nominal impact on global GDP in terms of reduced economic productivity in largely poorer countries may understate the impact on the global population and thus the long-term social impact on the whole world.

For example, *Display 6* from a 2015 paper from Stanford and Berkeley universities, highlights the disproportionate impact of climate change on the poorest countries in Africa, Asia and Latin America. They estimate it could structurally reduce these countries' growth rate by over 1 percentage point a year. Such increased inequality and divergence, compounded for decades, would mean these countries never get out of the poverty trap.

A local climate emergency in poorer countries may create its own negative feedback loop—e.g. increased political instability and conflict, resulting in millions of climate refugees—which could spill over and further affect global sentiment and politics, trade, investment, and thus global economic growth.

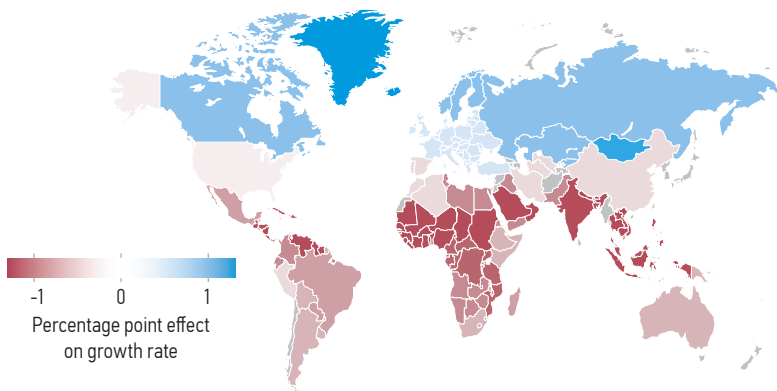
In summary, while the degree of economic impact is not clear at this stage, many experts believe that the direction of travel is lower growth and predictability. Given these are major drivers of equity market valuations, investors cannot afford to ignore climate change risk in their portfolios.

3. Emissions in more detail

The biggest sector in terms of emissions is power and heat generation, at 42%. Transport is the second largest at around 24%, and industry is third at 19%. This suggests that utilities and transport-related businesses would likely be most impacted by government policy and technological disruption, given they are the two largest contributors to global carbon emissions. We discuss the impact of this further in a later paper.

DISPLAY 6

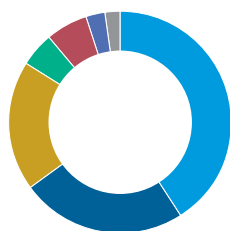
The impact of climate change on GDP is likely to impact disproportionately the world's poorest countries



Source: Global non-linear effect of temperature on economic production (Burke, Hsiang and Miguel, 2015)

DISPLAY 7

Electricity and heat contribute the highest proportion of global fossil fuel emissions



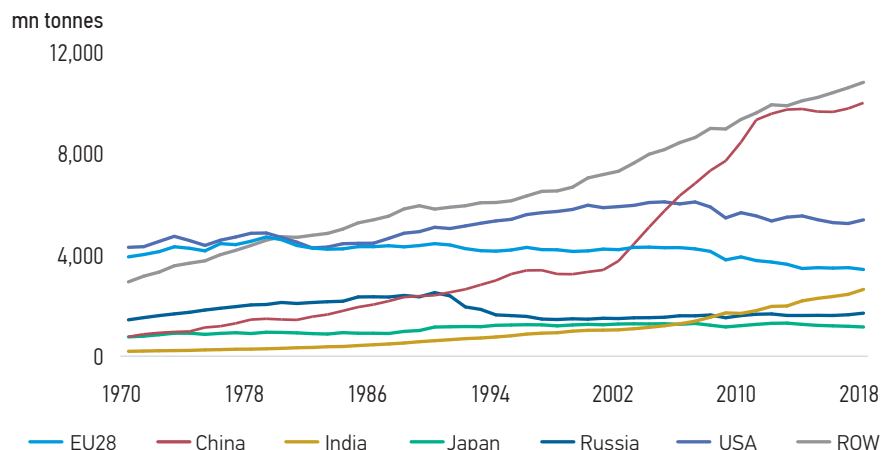
Electricity and heat production	41%
Transport	24%
Manuf. industries and construction	19%
Other energy industry own use*	5%
Residential	6%
Commercial and public services	3%
Other	2%

Source: IEA, Total CO₂ emissions 32.3Gt

* Includes emissions from own use in petroleum refining, the manufacture of solid fuels, coal mining, oil and gas extraction and other energy-producing industries.

DISPLAY 8

China's share of global CO₂ emissions has grown sharply while the EU28's has gradually declined



Source: <http://www.globalcarbonatlas.org/en/CO2-emissions>

By region, China is now the largest emitter, and has grown emissions substantially since 2000. What China does in terms of carbon policy is thus more important than many perhaps realise. The U.S. and the EU are now in second and third place respectively and their emissions have generally declined in the last decade or so (*Display 8*).

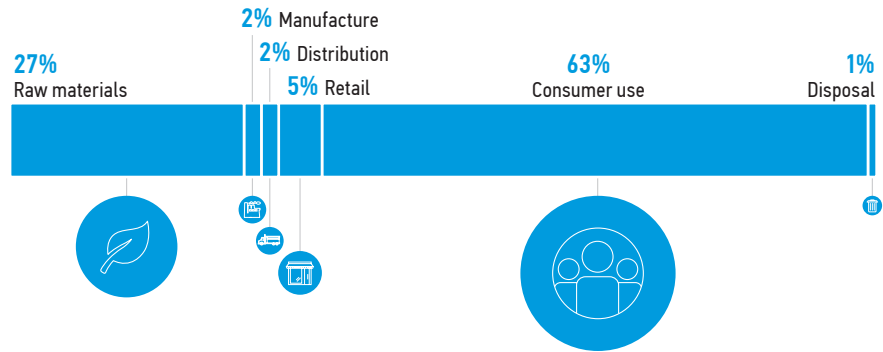
WHAT IS THE DIFFERENCE BETWEEN SCOPES 1, 2 AND 3?

Greenhouse gas (GHG) accounting divides all emissions into three scopes:

- **SCOPE 1** are a company’s own direct emissions (e.g. coal/gas power plant, cement kiln, steel furnace, its own trucks).
- **SCOPE 2** are emissions embedded in the organisation’s electricity purchases. They depend on a) how energy intensive the factory/production is and b) its electricity provider’s energy mix—whether renewables or fossil fuels. This is now a matter of choice in many countries.
- **SCOPE 3** (indirect emissions) relates to the supply chain (upstream) and customers’ logistics and product use emissions (downstream).

It is best to think of the three scopes as concentric circles, with Scope 1 in the middle followed by Scopes 2 and 3.

DISPLAY 9
Scope 3 accounts for 96%+ of Unilever’s estimated Greenhouse Gas (GHG) footprint



Source: Unilever, 1 July 2018-30 June 2019

“Around 80% of Scope 1 and 2 emissions in the MSCI World Index are concentrated in just three sectors—utilities, energy and materials.”

Scope 1 and 2 emissions are reasonably straightforward to assess and are regularly reported by most companies. Around 80% of Scope 1 and 2 emissions in the MSCI World Index are concentrated in just three sectors—utilities, energy and materials.

Scope 3 emissions are harder to quantify. They can be much higher than Scope 1 or 2, but historically, companies have not had much direct control over them. There is little comprehensive data available by company, and double-counting can also be an issue when comparing companies. For e.g. the same CO₂ emissions from aluminium produced for a Coca-Cola can

would go into the emissions calculation for the aluminium smelter (direct), the can manufacturer, the Coca-Cola bottler and the retailer (all indirect). Whose emissions are they?

In the example in *Display 9*, Scope 3 accounts for 96%+ of Unilever’s emissions, based on their estimates. 63% of total emissions are created by the consumer—e.g. turning on the kettle or using hot water. These emissions are driven by the energy mix of the consumer’s utility provider, not by Unilever. The company has limited control over its users’ or suppliers’ energy choices.

WHY SHOULD BUSINESSES CARE ABOUT MEASURING EMISSIONS ACROSS THE VALUE CHAIN?

As we have discussed, measuring Scope 3 emissions is challenging. However, if companies can better understand their full value chain emissions and identify where the risks are, it can help them set meaningful reduction targets, engage with suppliers and other partners, enhance their communications to stakeholders and in turn their corporate reputation. And, of course, in so doing they can play their part in the decarbonisation agenda. We discuss individual company actions further in a later paper.

4. Managing carbon in a portfolio: options for investors

In very broad terms, public equity investors concerned about carbon consider two main avenues:

I. INVEST IN PURE-PLAY DECARBONISATION COMPANIES OR TRANSITION ENABLERS

Investors may choose to invest in companies whose primary activities directly contribute to decarbonisation—such as the renewable energy sector. This ‘impact-like’ approach can be difficult to implement widely. Factset’s ‘Alternative Power Generation’ subset of companies constitutes a mere 0.24% of the MSCI World Index market cap (as at 31 August 2020). It is arguably also a lower quality segment of the market, which could affect long-term performance. According to Bloomberg, in 2019 companies in the S&P Global Clean Energy Index had an average return on capital of just 3.1% and a negative cash flow yield of -4.6%.

Due to the scarcity of such pure play companies another, related approach is to invest in companies that have small but growing exposure to business areas that contribute to energy transition, e.g. ‘mainstream’ industrials that provide smart grid or renewable energy equipment.

“The most meaningful way to measure the greenhouse gas impact of our business is to look across the whole lifecycle of our products. Accurate measurement and transparent reporting of our GHG footprint help us adapt our strategy, set ambitious targets and assess our progress... Climate change is a principal risk factor for both our business and society at large... Mitigating climate change starts by reducing our own environmental impact.”

– Unilever

While this approach casts a wider net, it is still a niche area. According to FTSE Russell, only 6% of the global equity market (by capitalisation) could be characterised as ‘green’ in 2017, which includes such transition activities. Similarly, MSCI estimates that only 15% of MSCI All Countries World Index companies have more than 5% of their revenues aligned with the draft EU Sustainable Taxonomy (March 2020).

Given their more niche and opportunistic nature, such investments often comprise a ‘satellite’ allocation within a core-satellite approach, and some investors deploy them as part of their ‘divest/invest’ strategy.

II. SEEK TO MINIMISE THE CARBON INTENSITY OF THEIR PORTFOLIOS

In contrast, a carbon reduction approach is immediately implementable. There

are an increasing array of options, particularly in the passive arena, from exclusions/divestment through to reweighting/optimisation and traditional selection.

Some investors have chosen to divest from companies owning fossil fuel reserves in order to manage stranded assets risk and make public their concerns about climate change. But others argue that this approach has its shortcomings. As it does not address current carbon emissions across other carbon-heavy sectors that do not own fossil fuel reserves (for example, utilities), it doesn’t result in the lowest carbon footprint.

In light of this, we have recently seen a proliferation of indices and ETFs offering low-carbon credentials. Weights in an index are tweaked based on individual companies’ carbon intensity, in order to give investors broad market exposure

MICROSOFT AND SCOPE 3 REPORTING

In January 2020 Microsoft announced its commitment to be carbon negative by 2030.

It also changed its carbon targets and internal pricing scheme to include all Scope 3 emissions. It noted that it has a lot of work to do around Scope 3 emissions management. The company is engaging closely with suppliers, and those partners with relatively higher emissions could find themselves at a competitive disadvantage.

(and therefore minimal tracking error to a standard benchmark) but with an optimised, reduced carbon footprint. This approach accounts for both current emissions and fossil-fuel reserves.

Index strategies are a route chosen by many investors, but this approach alone can dilute the desired result in terms of carbon impact. For example, in a sample of twenty Global, U.S., EAFE and European low-carbon ETFs (classified by Morningstar), the weighted average Scope 1 and 2 carbon intensity reduction versus the relevant benchmark was 49% (ranging from a 2% to 77% reduction). We think it is possible to do even better.

5. Reducing carbon exposure through a high-conviction, high-quality portfolio

As active investors, we naturally believe that investing in an index is not the best way to compound one’s wealth. For those seeking an active strategy, what may not be as obvious is that you do not have to explicitly invest in an environmentally-focused strategy in order to achieve a low carbon footprint.

We believe that investing in a concentrated portfolio of predictable, high-return-on-capital compounders, whose value is based on intangible rather than physical assets, is a proven way of significantly reducing one’s carbon exposure without sacrificing long-term performance.

A natural by-product of our high-quality approach is that our global strategies have a carbon footprint that is 90-95% lower than MSCI World on a Scope 1 and 2 basis, and around 80% lower on a Scope 1, 2 and 3 basis.

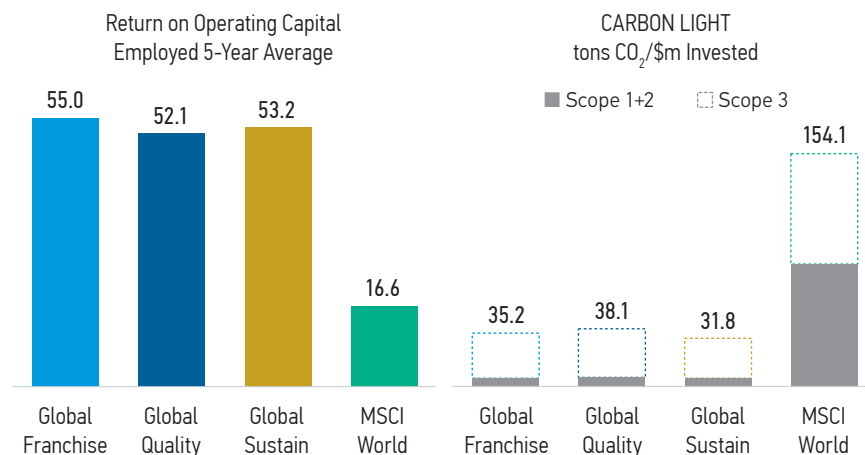
In fact, there is a strong inverse correlation between returns on operating capital employed (ROOCE, the metric we focus on when assessing company quality) and carbon intensity. High-quality, high-ROOCE companies are not only steady compounders but also have a structurally lower carbon footprint. Pollution is a capital-intensive exercise.

WHY IS THIS THE CASE?

For the purposes of the carbon theme, most of the high-quality companies we hold can be classified in two ways.

- **THE FIRST GROUP** comprises companies that provide purely ‘intangible’ services—software and IT services, consulting, scientific

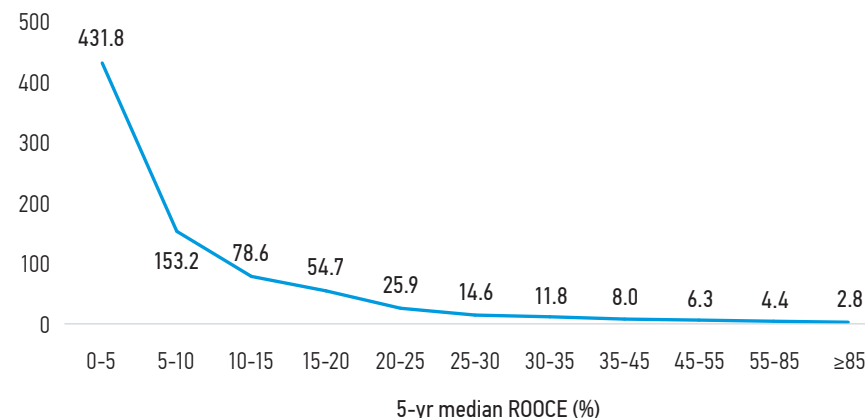
DISPLAY 10
Our high-quality global portfolios show a strong inverse correlation between ROOCE and carbon intensity



Source: Morgan Stanley Investment Management, Trucost. As at 31 March 2021. MSCI ESG Research MSIM defines a portfolio’s carbon footprint as the carbon emissions (Scopes 1, 2 and 3) of a portfolio per million dollars invested. All the emissions in a portfolio are summed up based on the investor’s ownership share, using reported or estimated emissions data.

DISPLAY 11
Pollution is a capital-intensive exercise

Median CO₂ intensity (scope 1 & 2) per \$m invested



Source: Morgan Stanley Investment Management, based on MSCI World constituents.

databases, media content, etc. As they do not sell physical products, by definition their total (Scopes 1, 2 and 3) carbon footprint per unit of revenue is low and is limited to their offices, data centres, and staff travel.

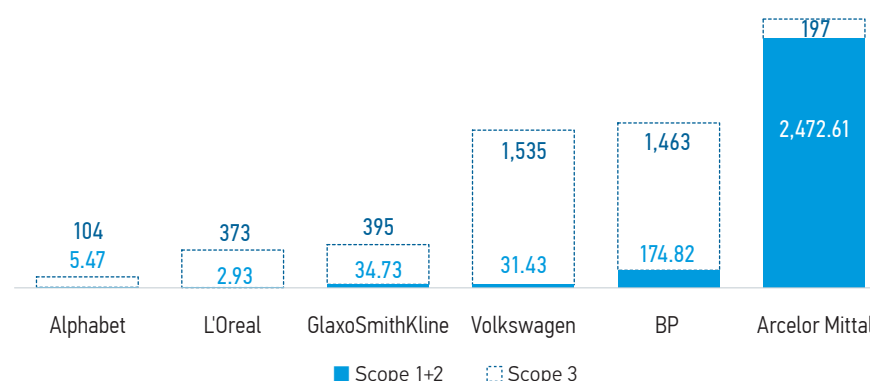
- **THE SECOND GROUP** does sell physical products (e.g. consumer or health care products), but is not involved in the carbon-intensive procurement of the raw materials. These companies do operate factories and distribution fleets, but their Scope 1 and 2 emissions per \$1mn of sales are still significantly lower than the overall index, as they operate in the high-value-added, low-carbon, middle part of the supply chain.

These companies may have significant *indirect* Scope 3 upstream supply chain emissions (e.g. raw materials and packaging), and therefore our focus is on how companies manage them. Nonetheless, their products typically have no (taking a pill, having a drink, applying skin cream) or relatively low (taking a shower or cooking) product use-related (Scope 3 downstream) emissions, compared with more energy-intensive activities, such as driving a petrol car, or flying. As power generation decarbonises, thanks to the growth in renewables, and households switch to green energy, these emissions are likely to decrease.

REDUCED SENSITIVITY TO CARBON PRICING

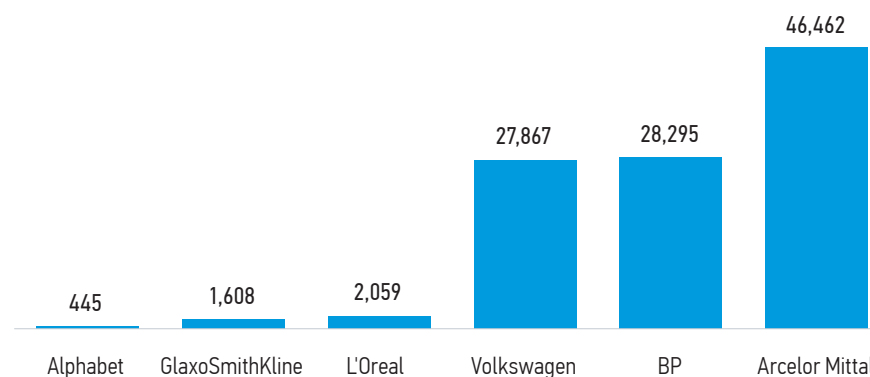
This lower carbon-to-sales footprint is the first reason why compounders' exposure to carbon risk is significantly lower than average. They also enjoy higher profit margins than most 'brown' companies, which further reduces their profits' sensitivity to carbon pricing. As illustrated in *Display 12*, Arcelor Mittal's profit sensitivity to carbon price is 300 times higher than Alphabet's and 22.6 times higher than L'Oréal.

DISPLAY 12
Scope 1+2+3 CO₂ intensity, tons per \$1mn sales



Estimated total CO₂ profit intensity (tonnes per \$1 million of adjusted EBIT, Scope 1, 2 + 3)

BP, VW and Arcelor EBIT numbers are 10-year averages.



Source: Bloomberg, data as of 2018.

It is fashionable to talk about the cloud providers' power-hungry data centres, but despite the remarkable growth of the cloud, major software companies' Scope 1 and 2 intensity remains very low, and they have also made great strides in powering their data centres with renewable electricity. Alphabet is now one of the largest direct purchasers of renewables. Also, although these companies' own energy consumption has grown, net net they have reduced energy intensity of computing for everyone, as the cloud offers significant energy savings compared to on-premise computing. Covid-19 has further accelerated this trend.

Furthermore, because the companies we hold benefit from low price elasticity, significant pricing power and the non-discretionary, recurring nature of their revenues, carbon pricing of total lifecycle emissions is likely to have minimal impact on demand for their products.

LOWER RISK OF STRUCTURAL DISRUPTION TRENDS

Last, but not least, they are not likely to suffer from decarbonisation-driven technological and policy disruption, unlike the industries in the carbon cross-hairs (e.g. autos, metals, fossil fuels). There is less pressure to replace their products and services with lower-carbon options. In the example above, a shift to electric vehicles will directly impact oil and auto companies, whereas decarbonisation of household energy is unlikely to negatively impact Unilever's products directly. Instead, it will make their use more environmentally friendly.

Look out for more in our Carbon series, including:

The Impact of Decarbonisation: government policies, tools, and industry impact

Contributions to Decarbonisation: corporate policies, targets and engagement case studies

Conclusion

Policymakers are increasingly focused on the urgency of climate change reform. Ignoring climate risk in portfolios has become a risk in itself, and the transition to a low-carbon economy is likely to mean the relative opportunity set changes. Stakeholders are also playing a greater role in asset owners' ESG approaches: the 2020 Morgan Stanley Sustainable Signals Survey found that constituent demand is now the most important factor driving the adoption of sustainable investing, followed by the financial return potential.

Asset owners are faced with a surfeit of choices to address climate change in a portfolio. We believe that one compelling way to compound shareholders' wealth in the long term and achieve a low-carbon footprint is by owning high-quality companies with sustainably high returns on operating capital. And in so doing, address stakeholders' growing concerns about one of the most pressing issues for our planet.

Risk Considerations

There is no assurance that a portfolio will achieve its investment objective. Portfolios are subject to market risk, which is the possibility that the market value of securities owned by the portfolio will decline. Market values can change daily due to economic and other events (e.g. natural disasters, health crises, terrorism, conflicts and social unrest) that affect markets, countries, companies or governments. It is difficult to predict the timing, duration, and potential adverse effects (e.g. portfolio liquidity) of events. Accordingly, you can lose money investing in this strategy. Please be aware that this strategy may be subject to certain additional risks. Changes in the worldwide economy, consumer spending, competition, demographics and consumer preferences, government regulation and economic conditions may adversely affect **global franchise companies** and may negatively impact the strategy to a greater extent than if the strategy's assets were invested in a wider variety of companies. **ESG strategies** that incorporate impact investing and/or Environmental, Social and Governance (ESG) factors could result in relative investment performance deviating from other strategies or broad market benchmarks, depending on whether such sectors or investments are in or out of favor in the market. As a result, there is no assurance ESG strategies could result in more favorable investment performance. In general, **equity securities'** values also fluctuate in response to activities specific to a company. Investments in **foreign markets** entail special risks such as currency, political, economic, and market risks. **Stocks of small-capitalisation companies** carry special risks, such as limited product lines, markets and financial resources, and greater market volatility than securities of larger, more established companies. The risks of investing in **emerging market countries** are greater than risks associated with investments in foreign developed markets. **Non-diversified portfolios** often invest in a more limited number of issuers. As such, changes in the financial condition or market value of a single issuer may cause greater volatility.

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