Strategic Asset Allocation: ESG’s new frontier

October 2019
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Strategic Asset Allocation: ESG’s new frontier

Executive Summary

Strategic asset allocation, or SAA, is about forming views of the long-term returns available from different asset classes and then building portfolios with the best expected risk-adjusted returns, subject to various constraints.

We believe SAA and ESG are closely linked. That’s because social change – changes associated with environmental, social and governance issues – should shape the way we allocate capital to generate long-term returns. The relationship works the other way too. We suggest that SAA can direct private capital to where it’s most needed to help alleviate our most pressing social problems.

This paper seeks to examine some of the more important aspects of this relationship and offers some practical investment solutions.

**Part I** looks at how ESG factors – aging populations, social inequality, workplace diversity, governance risks and climate change (as well as the uneven regulatory response to the risk of higher temperatures) – will have implications for long-term investment returns.

**Part II** takes a closer look at the challenges posed by climate change, how private capital will play a critical role in financing the global transition to a low-carbon economy, and where the investments must be made.

**Part III** discusses one way institutional investors might use the SAA process to support the transition to the low-carbon economy. We use three model strategic portfolios to show how a greater allocation to climate-aligned investments need not increase volatility, or lower expected returns. This chapter also discusses the limitations of SAA and the potential risks.

‘Strategic Asset Allocation: ESG’s new frontier’ is one of three papers focusing on climate change that Aberdeen Standard Investments will publish in the coming months.

Our Research Institute is producing ‘Going Green’, a comprehensive study that will demonstrate how different climate policies affect global greenhouse gas emissions. Going Green will showcase Aberdeen Standard Investments’ proprietary climate change modelling tool.

Meanwhile, ‘Investing in a Changing Climate’ will look at the evidence for global warming, examine the implications for asset owners and asset managers, as well as offer fund managers practical advice on how to play a part in the transition to a low-carbon world.
Strategic asset allocation, or SAA, is about forming views of the long-term returns available from different asset classes and then building portfolios with the best expected risk-adjusted returns, subject to various constraints.

SAA exists within a symbiotic relationship with environmental, social and governance (ESG) factors. ESG trends affect the way we invest, while SAA has the power to shape society.

Most investors accept that it makes sense to take account of ESG risks when evaluating a stock. We contend that ESG factors have a material impact on the long-term returns of asset classes. So this should also apply at the strategic asset allocation level.

Asset class returns are not static but undergo structural shifts over time. These changes are often the result of ESG factors. For example, large scale changes in the structure of society – aging populations, increasing inequality and shifts in the composition of the work force – matter when forecasting the long-term returns of bonds and equities.

The relationship cuts both ways. Social change impacts investment returns and capital allocation, but capital allocation affects society. In Part III, we show how an enhanced approach to SAA might increase the amount of capital available to finance socially and environmentally important projects, without compromising investment returns.

Many of the biggest challenges of our times are fundamentally problems of long-term capital allocation. A key example is climate change. In order to meet the goals set out in the 2015 Paris climate agreement, investors need to allocate an additional US$1.5 trillion per year to renewable energy and other low-carbon projects. What’s more, they need to do this within the next decade or so.

Climate change is not the only issue whereby weak capital flows are a problem. Similar capital allocation challenges must be overcome to achieve the UN Sustainable Development Goals, and in improving the prospects of ‘left-behind’ regions of developed economies which are often starved of capital investment.

Investors will not be able to fill these capital allocation gaps on their own. But an ESG-enhanced SAA process may enable them to increase the positive social impact of their investment portfolio.
“One of the biggest factors depressing our long-term view of equity returns is the structural slowdown in global economic growth rates”
Part I

How ESG affects SAA

There are several ESG factors that affect long-term asset class returns. Our analysis of these factors has led to substantial changes in our strategic allocation between, and within, asset classes. We expect them to become even more significant in the future.

Aging populations, inequality and interest rates

Perhaps the single most important challenge for strategic asset allocation today is the fact that interest rates remain stubbornly low. As a result, long-term government bond returns are also likely to be extremely low, particularly in Europe and Japan. In recent years, this has driven substantial shifts in strategic asset allocation.

What does this have to do with ESG? Many economists argue that interest rates are low because of a chronic ‘savings glut’. Essentially, too much global savings is chasing too few investment opportunities. This pushes down interest rates. The savings glut is caused by various factors, but according to some influential studies among the most important are two social factors (the ‘S’ in ESG): aging populations and income-inequality.

Put simply, the large baby-boomer generation has reached peak savings at the same time that sluggish global growth deters investment. In addition, income inequality means a greater share of incomes goes to the rich who tend to save a larger percentage of their incomes.

The weakening of global growth is also a major factor in declining interest rates. As we discuss in the next section, this is also a function of social factors.

These factors help explain why our forecasts for long-term returns for government bonds, and some related asset classes, are significantly lower than forecasts made 20 years ago. While there is still much debate about the persistence of long-term interest rates, our view is that these demographic and inequality drivers are likely to be long term. Lower expected returns will be with us for many years. As a result, we have significantly reduced our use of government bonds in our growth portfolios.

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Chart 1 – The extraordinary decline in bond yields

10-year nominal yields (%)

Source: Oxford Economics, August 2018

Note: Chart shows yield on 10-year maturity government bond in each country

Past performance is not a guide to future results


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*For example, Rachel and Smith (2015), Secular drivers of the global real interest rate
Demographics, diversity and long-term equity returns

Equally important is the impact of ESG factors on long-term returns for equities and other growth-dependent assets. One of the biggest factors depressing our long-term view of equity returns is the structural slowdown in global economic growth rates.

Standard ‘supply-side’ models of economic growth tell us the potential growth of an economy is a function of the growth in its labour force and improvements in labour productivity, both arguably social factors. A major demographic shift is occurring in many economies, resulting in shrinking working age populations. Productivity growth has also been pretty dismal since the financial crisis. Combined, these factors result in a substantial fall in potential growth in the global economy.

Lower growth rates mean less demand for products and services, resulting in lower revenue and earnings growth for companies. Other things being equal, lower earnings growth means lower expected equity returns. Lower equity returns mean we must lean more on alternative sources of return in strategic asset allocation. Once again, the ‘S’ in ESG is a key driver of SAA.

Surprisingly, perhaps, diversity in the workplace also has an important role to play in the potential economic growth story. Japan and some European economies have successfully mitigated the impact of their shrinking working age populations, by adopting policies that attract a greater share of older and female workers into the workplace. As the following chart shows (see Chart 3), labour force participation rates have risen in these two regions.

By embracing and encouraging more workplace diversity, these regions enjoy higher potential growth than they would have otherwise. Other countries, most notably the US, have been less successful at encouraging these kinds of diversity. Workforce participation there has fallen, retarding potential growth.

Governance and SAA

Corporate governance can also be very important for SAA. Perhaps the biggest event for asset prices within the last 80 years – the Global Financial Crisis – was largely caused by systematic failures of governance in the global banking industry.

The governance failings were numerous: the mis-selling of subprime mortgages, their indiscriminate bundling into ‘CDOs’, which were then incorrectly assessed by the credit rating agencies and bought by banks with poor risk controls, and without sufficient capital buffers to protect themselves against defaults. Then, once defaults started to occur, banks’ over-reliance on short-term wholesale finance resulted in widespread insolvency and bank failures.

These governance failures have had massive implications for SAA. The sluggish recovery from the ‘balance sheet recession’ which followed the crisis, and the reliance of central banks on quantitative easing (QE), have had dramatic effects on asset class returns. One of the lessons from the crisis is the need for long-term asset allocators to be more attentive to systematic governance risks, particularly in the financial sector. This is by no means easy to do, but it is possible to stress test portfolios against various financial shock scenarios.
Strategic Asset Allocation: ESG’s new frontier

There are other reasons to look at governance. In emerging markets (EM), corporate governance standards vary considerably between countries and have changed over time. Poor protection of minority shareholder interests often means high levels of share issuance, diluting returns for investors. This is a key factor behind our equity forecasts, and a drag on expected returns for EM equity.

Conversely, our forecasts for Japanese equities have been significantly boosted by the governance improvements we have seen in corporate Japan in recent years. Better governance, with greater emphasis on shareholder value, has resulted in structurally higher returns on equity and profit margins.

After languishing far below the rest of the world for decades, Japan has nearly caught up. This has also resulted in more cash being returned to shareholders via dividends and buybacks. Consequently, our return forecasts are over 2% per year higher than they would have been otherwise.

Climate change as a long-term investment risk

Environmental issues pose increasing risks for investors. Global warming poses both long-term physical risks as the climate changes, as well as nearer term risks as the energy sector shifts from fossil fuels to low-carbon alternatives.

In the long run, we expect: more severe storms; more frequent and severe droughts; more wild fires; rising sea levels and melting permafrost. Indirect effects include: increased political instability; conflict over water and other scarce resources; and mass migration from countries in the most climate-stressed regions.

This will affect the performance of some asset classes. For example, real estate and infrastructure in areas prone to flooding, storms and wild fires are at particular risk. Agriculture and forestry will be impacted too.

Physical climate risk also has implications for the insurance sector. We include insurance-linked securities in our strategic portfolios. These have experienced unexpected material losses due to wild fires that were arguably exacerbated by climate change.

Energy transition risks and opportunities

In the near term, the transition from a fossil-fuel economy to one powered by low-carbon energy sources will create bigger risks than physical climate change. To avoid dangerous climate change, most governments accept that more aggressive policy action is needed.

The world needs to halve its carbon emissions within the next 20 years if it is to meet the goals agreed in Paris in 2015.6

*UNFCCC (2015) Paris Agreement

Governance is, of course, not merely an issue for corporations. We devote considerable effort to evaluating the quality of governance of monetary and fiscal policy when gauging sovereign bond issuers, particularly in our EM debt portfolios.

Our view that central banks have a better control on inflation in many emerging economies is a major reason why we forecast relatively high returns for EM bonds (and why we are willing to make large allocations to them in our SAA portfolios).
There is a substantial risk of economic disruption in some important industries. A particular risk to consider is that of ‘stranded assets’ in the energy sector, as coal-fired power stations and other forms of fossil fuel infrastructure may have to be written off well before the end of their economic life.

However, it is important to be clear that energy transition risks are highly concentrated in certain sectors. As Chart 7 shows, some 90% of CO₂ emissions are attributable to just five sectors. The picture does not change that much when we take into account indirect emissions. Power utilities, oil and gas, transport, and some industrial activities are the main sectors at risk.

Direct emissions (Scope 1) and indirect emissions from consumption of purchased energy (Scope 2) are reported by many companies. Scope 1 and 2 emissions are defined by the Greenhouse Gas Protocol, the global standard for measuring emissions.
It is important to note that a large majority of companies emit relatively little carbon, and so are unlikely to be directly and heavily affected by more aggressive climate policy.

However, it is possible that abrupt shifts in climate policy may have significant second order effects, for example, on energy prices as a cost input, on taxation, inflation or economic activity, which all might make for wider consequences.

On the other, current policy commitments, as expressed in National Determined Contributions (NDCs), will fail to achieve these goals by some margin. So either governments are going to have to make their policies much more aggressive, or they will not achieve the Paris goals.

The best way for investors to deal with this kind of uncertainty is to consider alternative scenarios. For example, the current NDC scenario would take us towards a 3°C gain. An alternative scenario with a rapid escalation in low-carbon investment would keep us below 2°C. The latter could be much more disruptive to carbon-intensive industries than the former over the next 20 years. But the former could be more damaging in the long-run.

Climate scenarios provide a way to modify expected returns for the affected asset classes and sectors, with the potential for more resilient strategic portfolios.

Central banks and regulators around the world are increasingly concerned about the potential for financial instability associated with this kind of rapid shift in key sectors of the economy. The Bank of England’s Prudential Regulation Authority (PRA), for example, has published regulations requiring insurers to evaluate their exposure to climate risk, and to make use of scenario analysis to do so. UK and French regulators are imposing similar requirements on pension funds. This looks like a trend that will spread elsewhere.

ESG risk and SAA

The discussion above is not intended to provide a comprehensive survey, but merely to indicate the relevance of ESG factors to SAA. As we make clear in our annual Long Term Investment Outlook, we believe that ESG factors are among the most important drivers of long-term investment returns.

The strategic asset allocation we perform for clients is materially different as a result of taking these issues into account. The low interest rates and sluggish economic growth that result from aging populations and income inequality have forced us to rethink our SAAs. We now rely less on government bonds to achieve diversification and more on infrastructure, EM bonds and other alternative diversifiers. We expect our ESG research to result in further changes.

Energy transition risk is also fairly concentrated geographically. Some economies are highly dependent on fossil fuel revenues, and may suffer disruption if demand were to fall sharply. This will likely affect sovereign bond prices as well as equity and credit indices.

Other regions and countries may see changes to their current account positions when the need to import fossil fuels falls, as domestic renewable energy sources become more dominant. SAA decision-making will need to be sensitive to these changes.

There will be winners as well as losers in the energy transition, as low-carbon power generation, energy efficiency and other technologies enjoy a protracted boom.

The energy transition could have a substantial impact on investment returns, focused on the most affected asset classes and sectors. For strategic asset allocators, this may justify a long-term shift in portfolios from fossil fuel sectors to alternative energy sources.

Uncertainty and different scenarios

One of the biggest challenges of incorporating energy transition risk into SAA, is the uncertainty around the direction of climate policy. On the one hand, most of the world’s governments have agreed very ambitious overall climate goals - keeping global temperature increases ‘well below’ 2°C from pre-industrial levels.7 On the other, current policy commitments, as expressed in National Determined Contributions (NDCs), will fail to achieve these goals by some margin.8 So either governments are going to have to make their policies much more aggressive, or they will not achieve the Paris goals.

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7UNFCCC (2015) Paris Agreement
11The latest version can be downloaded from www.aberdeenstandardforecaster.com
“A defining feature of many of the world’s biggest challenges is that solutions require an increased flow of private capital. The most important example is climate change”
Part II

How SAA affects ESG: the case of climate change

The relationship works the other way too. SAA decisions can shape the environmental, social and governance impact of a portfolio and, as a result, influence society.

Investors typically think about asset allocation from the perspective of investment returns. But capital allocation decisions can also make a difference in people’s lives.

A defining feature of many of the world’s biggest challenges is that solutions require an increased flow of private capital. The most important example is climate change.

To achieve the climate goals agreed by the world’s governments, an additional US$1.5 trillion a year is needed to finance the transition to a low-carbon economy. Closing this gap needs to happen within a decade or so in order to avert dangerous climate change.

In 2015, at the United Nations Framework Convention on Climate Change meeting in Paris, most of the world’s governments agreed that dangerous climate change must be avoided. As we mentioned in the previous section, they agreed to try to keep global temperature rises ‘well below’ 2°C (and ideally within 1.5°C), compared to pre-industrial levels.

The world currently invests around US$350 billion a year in renewable energy. This is a long way below the level necessary to achieve the 2°C target, which will require an estimated US$609 billion. The 1.5°C target requires investment of US$730 billion per annum.

In addition, there needs to be large investments in energy storage (to smooth out intermittent renewable energy production) and power grid development, adding another US$650 billion to US$750 billion per annum.

Closing this gap will require a substantial increase in capital allocation, and most of this will likely have to come from private investors. Currently, the vast majority of capital used to finance renewable energy is being provided by the private sector. Governments account for less than 10%.

Of the private sector component, around a quarter is currently provided by institutional investors via equity and debt finance for infrastructure projects. Large power utility companies and specialist power developers account for the rest. To finance the renewable energy transition, the balance sheets of these companies will have to grow substantially. The ultimate source of capital will be from bond and equity markets, and so this investment is also financed, indirectly, by institutional investors.

Other decarbonisation challenges

While power sector decarbonisation is the biggest and most important short-term priority, capital investment is also required in other sectors.

A major shift that is required for the 2°C goal is large-scale investment in energy efficiency for buildings and industrial processes. This is estimated to require between US$636 billion and US$822 billion per annum, tripling current investment levels.

This capital will likely be supplied, in part, by real estate investors, retrofitting their existing portfolios. But capital expenditure will also be needed for new buildings. Capital expenditure for industrial energy efficiency will come from corporate balance sheets, financed indirectly by equity and bond investors.

The decarbonisation of transport is the third key requirement, with a switch to electric vehicles and mass transit systems over the next 30 years. This will require significant research and development expenditure from corporate balance sheets, as well as substantial investment in charging infrastructure. But the capital required for the purchase of vehicles will come from car buyers themselves, rather than from investors.

The other large decarbonisation challenge relates to land use and agriculture – preserving and extending forests and reducing agricultural emissions. There are significant capital investment requirements in both of these areas, although they are harder to quantify.

The emerging markets challenge

The geographic distribution of energy transition investment is not even. Asia’s large population and rapid economic development...
means it is likely to account for the majority of global growth in energy demand over the next 30 years. This region will consequently require the largest share of capital investment in low-carbon energy if the world is to hit its climate change targets.

Some 70% of total capital investment in low-carbon energy will need to be in emerging economies. In many cases, these countries lack large and deep capital markets. Political instability and underdeveloped legal systems often result in high risks and a correspondingly high cost of capital. These problems make for additional challenges in financing low-carbon projects.

**Capital investment as a solution to challenges beyond climate change**

While the focus of this section is climate change, it is important to note that increased capital flows are also necessary to achieve other UN Sustainable Development Goals – accelerating development in poor countries, while protecting an increasingly fragile environment (dealing with issues such as air pollution and water scarcity).

Increased capital investment is also a key part of the solution to the relative decline of ‘left-behind’ regions within developed economies, arresting the destabilising political consequences of economic inequality.

Even more broadly, McKinsey, a management consultant, argues that more capital investment in productivity-enhancing infrastructure may even help fix the productivity malaise that has contributed to the sluggish growth outlook.19

Scaling up capital investment to meet these various objectives could be a substantial economic opportunity, but it will not be easy. For climate alone, the world is currently providing well under half the annual capital investment necessary to achieve the Paris goals.

The question we now ask is whether institutional investors can play a role in closing the deficit, by increasing their asset allocation to the relevant low-carbon sectors.

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**Chart 8 – Electricity generation trends and investment requirements for 2°C scenario**

*Source: Irena 2019*

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13 UNEP 2018 Emissions Gap Report
14 UNFCCC 2015 Paris Agreement
15 Irena 2018 Renewable Power Generation Costs
16 Bloomberg New Energy Finance
17 McCollum, ibid.
18 Irena 2018 Global Landscape for Renewable Energy Finance
19 McKinsey Global Institute (2017) Bridging global infrastructure gaps: has the world made progress?
Part III

Increasing the climate impact of SAA

Outlined in Chart 9 are three alternative strategic portfolios: a traditional balanced equity-bond portfolio; and two more diversified portfolios.

| Chart 9 - Alternative strategic portfolios: similar returns, different climate impact |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| **Traditional balanced**                      | **Modern diversified**                        | **Climate-aligned**                            |
| Target return 5%                               | Target return 5%                               | Target return 5%                               |
| Asset classes | % asset class weight | % of portfolio allocated to climate opportunity | Asset classes | % asset class weight | % of portfolio allocated to climate opportunity | Asset classes | % asset class weight | % of portfolio allocated to climate opportunity |
| Equities | 55 | 1.7 | Equities | 30 | 0.9 | Equities | 25 | 0.8 | Climate opportunity equity |
| | | | | | | | | | |
| Rates | 10 | 0 | Rates | 10 | 0 | Rates | 10 | 0 | |
| | | | | | | | | |
| Credit | 35 | 1.1 | Credit | 40 | 1.2 | Credit | 30 | 0.9 | Green/ infrastructure bonds |
| | | | | | | | | | 5 | 3.5 |
| Infrastructure | 10 | 4.5 | Other infrastructure | 7 | 0 | Renewable energy infrastructure | 8 | 8 |
| | | | | | | | | |
| Real estate | 10 | 1 | Climate enhanced real estate | 10 | 3 | |
| | | | | | | | | |
| Portfolio expected return | Portfolio volatility | Climate solutions allocation | Portfolio expected return | Portfolio volatility | Climate solutions allocation | Portfolio expected return | Portfolio volatility | Climate solutions allocation |
| 5% | 7.9% | 2.8% | 5% | 5.8% | 7.6% | 5% | 5.8% | 21.2% |

Source: Aberdeen Standard Investments, September 2019

We constructed these model strategic portfolios using the standard steps in our SAA process. Using our basic macroeconomic scenarios, we forecast expected returns, volatility and correlation for each of the asset classes.

We employed these forecasts as inputs for a portfolio optimisation tool, to create an efficient portfolio with a targeted investment return of 5%, with some simple constraints on allocation.
The resulting portfolios are able to achieve the target return with similar volatility. Their real-world impact, however, looks very different. Even though the three portfolios have the same projected return and similar volatility, they allocate very different amounts of capital to climate solutions.

The traditional balanced portfolio allocates around 3% of its portfolio to climate solutions; the more modern diversified portfolio more than doubles this to over 7%, primarily via its allocation to infrastructure; the climate-aligned portfolio has more than 21% assigned to climate solutions, achieved mainly via inclusion of climate-specific asset class variants.

This raises an exciting possibility. It suggests that the SAA process can be modified to create strategic portfolios with significantly higher capital allocations to finance the energy transition, but without sacrificing expected risk-adjusted returns.

By taking this approach, investors may be able to help close the climate financing gap, without compromising investment returns, or conflict with fiduciary and regulatory constraints.

In the following section, we discuss this possibility in more detail.

**Evaluating asset class contributions to climate solutions**

By climate solutions we mean companies and projects that provide low-carbon energy and transport solutions that will allow societies to reduce global carbon emissions.

Utilities that generate power using renewable energy, battery technologies and electric vehicles, other decarbonisation technology companies, and energy efficient buildings would all fall into this category.

There are various ways of estimating the proportion of an asset class that is allocated to these energy transition-linked activities. We use MSCI ESG data to quantify the share of the MSCI World equity index that’s allocated to climate solutions, and make our own estimates elsewhere using fairly strict definitions.

There needs to be further debate and research on definitions and measurement of climate solutions. But however you measure them, we think it would be possible for many typical investors to choose portfolios with the same risk-adjusted returns, but higher allocations to climate solutions.

**Investment universe**

A key point to note about these sample portfolios is that some asset classes are much richer in potential climate solutions than others.

By some margin, the most important asset class from a climate point of view is infrastructure. Renewable energy, energy storage and smart grid, and low-carbon transport infrastructure are all critical to the energy transition. Today a substantial proportion (as much as 30% in new funds) of the capital allocated to private infrastructure equity and debt is invested in these segments. The proportion of listed equity and credit invested in climate solutions is significant, but much smaller – less than 5%. We would argue that standard government bonds have little direct role in financing the climate transition, although the policies of the issuing governments have a major impact.

Investors have a choice about which asset classes to include in the investment universe from which SAA portfolios are constructed. If investors include infrastructure in their opportunity set, they have greater scope to provide capital to the low-carbon transition. If they take the additional step of including specialised climate-aligned asset allocations, that scope expands even further.

Of course, the inclusion of an asset class does not guarantee it will find a place in the portfolio. Infrastructure still needs to earn its place on risk, return and diversification grounds.

Some investors are unable to make allocations to illiquid assets, which can be a barrier to investing in infrastructure. However, there are now liquid infrastructure funds which provide access to infrastructure (including renewable energy infrastructure) that are traded on a daily basis.

**Asset class definition**

The climate-aligned model portfolio includes the same asset classes as the diversified portfolio. But it also adds dedicated climate-aligned asset class variants alongside the standard versions.

- **Equity.** There are various ways to create climate-aligned asset class variants. For example, one could take a standard equity index and tilt it towards low-carbon opportunities, with a low tracking error. The result would be an index with significantly higher capital allocation to climate transition companies, but with similar returns.

  Alternatively, one could add a climate-solutions-focused equity allocation alongside the standard equity allocation. This could comprise: companies selling clean energy and clean energy technology; electric vehicles, battery storage and other low-carbon transportation; carbon-efficient industrial companies; and energy-efficient real estate.

  This option would require a careful evaluation of the likely performance of this equity portfolio, taking into account sector, regional and factor exposures. The climate-solutions opportunity used in the model portfolio above has slightly lower beta. Lower risk and better diversification characteristics offset the slightly lower returns, so it is still attractive from the point of view of portfolio optimisation.

- **Green bonds.** A similar approach can be taken with credit. Investors can add an allocation of green bonds – bonds issued by clean energy companies and renewables infrastructure projects – alongside standard credit. The green bond vehicle has slightly higher credit quality and longer maturity, resulting in a similar risk and return.
• **Renewables-focused infrastructure equity.** Infrastructure allocations tend not to be made on a market cap-weighted basis, but subject to investor discretion and, depending on investor preferences, for risk, return and diversification.

The climate-aligned portfolio includes an additional renewable energy infrastructure allocation that changes the characteristics of the infrastructure portfolio. Returns for many kinds of renewable energy infrastructure are lower than some forms of economic infrastructure, but can be higher than concession infrastructure (a type of public-private partnership employed in infrastructure development).

One attraction of renewables is the lower economic sensitivity of cash flows. As a result, clean energy infrastructure tends to have reduced lower equity beta than some other forms of economic infrastructure. This increases diversification, allowing the climate-aligned portfolio to rely less on lower-return bonds.

• **Sustainable property.** This property portfolio adds an allocation to high-sustainability-rated buildings, as well as more ambitious energy-efficiency retrofit programmes for standard property. The returns on such a property portfolio are expected to be similar to a standard property benchmark.

**Climate-tilted portfolios and returns**

As is always the case with SAA, there is plenty of room to debate assumptions. The biggest question for the climate-aligned portfolio is whether the specialist asset class variants will, as we have assumed, have similar beta-adjusted returns to their standard asset class counterparts.

Another question is whether, by increasing exposure to particular sectors (especially power utilities), the portfolio takes on too much exposure to policy risk and electricity prices (and too little exposure to other sectors).

Which risk exposures are strategically more attractive is partly a question of the probabilities investors assign to different energy transition scenarios (see discussion in the previous section). A more rapid energy transition means an over-exposure to clean energy utilities will pay off strongly. The reverse is true if governments renege on the Paris agreement.

A climate scenario-based approach helps make the case for an overweight position in climate solutions sectors. On a scenario probability-weighted basis, it is reasonable to assume higher expected returns from climate-aligned asset classes.

However, for the sake of simplicity, we have adopted more conservative assumptions for the examples above. No outperformance due to energy transition scenarios is assumed for the climate-aligned asset classes, and no penalty applied to fossil fuel assets. In a real-world optimisation exercise, these assumptions could obviously be adjusted.

Also, in the examples above, we have focused on increasing allocations to climate opportunities rather than reducing allocations to assets exposed to energy transition risks, given the discussion is focused on how SAA might close the climate finance gap.

But the approach we describe here could also be extended to consider reducing exposure to climate risk. These adjustments require rigorous implementation of scenario forecasting.

**ESG-enhanced portfolio optimisation**

There is an important additional adjustment that can be made to the SAA process: adding a third ‘climate opportunity’ dimension to the standard two-dimensional efficient frontier in optimisation, as Chart 10 shows. In modern portfolio theory, the efficient frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk, or the lowest risk for a given level of expected return.

**Chart 10 – Adding climate impact to the efficient frontier**

The standard portfolio optimisation process tests a large number of combinations of asset class weights, to find the one with the optimal position on the efficient risk-return frontier.

In standard optimisation tests there are typically several portfolios with similar risk-return characteristics, if uncertainty is taken into account. It is possible to add a second stage to the optimisation process, selecting from among the most efficient portfolios those that have the greatest capital allocation to low-carbon opportunities. This multi-objective optimisation approach, in effect, adds a third dimension (see Chart 10).

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23 Government bond issuance finances fiscal deficit spending by government. It is true that governments provide fiscal support for renewable energy and other low carbon activities, but this tends to be a very small fraction – perhaps less than 1% - of all government spending. Furthermore, the share of government spending that is underwritten by bond issuance, the fiscal deficit, tends to average less than 5% of government spending. So the amount of generic government bond capital invested in climate solutions is a small percentage of a small percentage.

24 There are a number of UK-listed renewable energy infrastructure investment companies: Greencoat Wind and Bluefield Solar, for example.

25 Mercers, HSBC [REF]
This approach is particularly useful if the asset class universe combines standard versions of asset classes as well as climate-aligned variants, where the latter have different risk-return characteristics (as in the climate-aligned portfolio discussed earlier). The optimiser is able to increase allocations to climate-aligned variants, but only to the extent that doing so generates equivalent risk-adjusted returns.

A key feature of this approach is that the optimiser is selecting between portfolios on the same location within the efficient frontier. This outcome is important for fiduciary investors such as pension funds and insurers.

It is now widely accepted that ESG investing can be compatible with fiduciary duty, but only as long as trustees believe that doing so is consistent with the long-term interests of beneficiaries. By only considering climate-aligned options that offer the same expected risk-adjusted returns, this optimisation process provides the necessary governance for ESG-friendly strategic asset allocations.

Needless to say, no investment process should be driven solely by mean-variance optimisation. There is a need to apply judgment, impose sensible constraints, and evaluate how the overall portfolio will behave. Investors need to consider risk exposures, for example, and consider other aspects of return distributions, such as drawdown risk.

The climate-aligned portfolio aims to diversify its exposure between asset classes, sectors and regions, but it is possible it might end up with too much exposure to a single sector or region. Sensible limits will need to be applied.

The debate about the role of SAA in allocating capital is just beginning, so we do not expect the previous arguments to be conclusive. But we hope to have at least established the possibility that the SAA process can be modified to create strategic portfolios with significantly higher capital allocations to finance the energy transition, without sacrificing risk-adjusted returns.

**Challenges of ESG-enhanced SAA**

We need to be careful not to claim too much for this approach. While an ESG-enhanced SAA process might, if widely adopted, significantly increase investor capital allocation to energy transition opportunities, it will not be able to close the climate finance gap on its own.

Investors will only be able to justify increasing their capital allocation to finance the energy transition if sufficient investable projects are available. Otherwise, there is a risk that existing opportunities will become overcrowded, prices will become too expensive and expected returns will fall.

It is important, therefore, that the growth in opportunities keeps pace with the growth in capital allocation. Given the rapidly declining costs of renewables, and ongoing government policy action, it seems likely that opportunities will grow rapidly over the coming years.

The growth in climate-aligned investment opportunities is a function of government policy, technological progress and investor creativity. Europe's governments have successfully attracted tens of billions of euros of private finance to fund the switch from coal to renewable energy generation over the past decade. They have done so through a range of subsidies, emissions-trading schemes and technology-specific regulations.

More policy support will be needed by governments around the world, if they are to achieve the commitments they made as part of the Paris agreement.

Technology is also important. The cost of solar and wind power have fallen 88% and 69% respectively over the last decade as technology has improved and economies of scale have emerged.

Prices are still falling and these technologies are increasingly achieving cost parity with fossil fuels (so they are less dependent on government subsidies). As technological progress continues on energy storage, electric vehicles and energy efficiency, we expect a similar increase in the scale of investment opportunities within these areas.

But the scale of investment opportunities is not just about governments and technology. Investors can play a vital role too. Renewable energy is a capital intensive technology. As a result, the commercial viability of renewables projects is often dependent on the cost of capital.

If projects are exclusively dependent on private equity investors with a high cost of capital, they are less likely to be viable. In recent years, creative investors have redesigned renewable energy projects so that they have become accessible to low-cost-of-capital investors. For example, projects can be subdivided into a high-risk, high-return construction phase, and a low-risk, lower-return operational phase that is more suitable for institutional investors. Insurance and credit enhancement play a similar role in de-risking renewable infrastructure debt.

There are also challenges arising from the fact that 70% of the capital investment required for the 2°C scenario will be in emerging economies, where political and counterparty risks often mean a high cost of capital is required.

Creative ways to reduce the risk of these projects, and lower the cost of capital, will be essential to attract global capital flows. For example, development banks and private sector insurers now offer to insure emerging market infrastructure projects against political risk, reducing the cost of capital.

**Engagement matters**

Shareholder 'engagement' will play an important role in creating low-carbon opportunities. Shareholders in global power utility companies are now engaging with the boards of these firms to encourage more ambitious energy-transition strategies.

Once a utility company makes a clear commitment that future capital expenditure will be focused in low-carbon energy, it
moves from being a climate problem to becoming a climate solution, and climate-aligned investors can finance its equity and debt requirements.

This applies to public policy engagement too. If investors find that renewables are uninvestable in a particular market, due to too much policy uncertainty, or poor energy market design, they can engage collectively with governments to encourage a more benign policy environment.

Policy engagement focused on removing specific investment barriers, backed by the credible promise of resultant capital flows, would be a useful contribution to national energy policy debates, particularly in emerging economies where long-term, low-carbon energy strategies are urgently needed.

The fundamental point here is that the number and scale of energy-transition opportunities is partly a function of the effort and imagination of the investment sector. This is especially so now that renewables have reached cost parity, and the economics of projects should not be inherently unattractive.

This takes us to the fundamental reason why a climate-aligned SAA approach matters. If a growing number of institutional investors set goals to expand the share of their strategic portfolios allocated to low-carbon opportunities, they will increase the pressures and incentives within the investment industry.

This will drive entrepreneurial energy, creativity and problem-solving across the investment value chain, in the form of product and service innovation, and asset management industry capital expenditure.

It is this, as much as the provision of capital itself, that will increase the pace of the energy transition and close the capital allocation gap.

Many investors have signalled an ambition to play a greater role in supporting climate targets and UN Sustainable Development Goals31. They currently do so by seeking to integrate analysis of climate risk (via the Taskforce for Climate-related Financial Disclosure); by engaging with companies to encourage more action (with Climate Action 100+); and by engaging with policymakers to foster a more supportive policy environment.

Climate-aligned strategic asset allocation could complement these activities.

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26 As law firm Freshfields Brukhaus Deringer puts it: where decision-makers face “a number of alternatives, all of equal attractiveness from the point of view of the overall investment strategy being pursued...the decision-maker would be entitled to select one alternative on the basis of its [non-financial] ESG characteristics, without thereby being in breach of his or her fiduciary duties or civil law obligations.” The optimisation approach described is intended to identify portfolios of ‘equal investment attractiveness’ and to prefer the one offering the most positive ESG outcomes. https://www.unepfi.org/fileadmin/documents/freshfields_legal.resp_20051123.pdf

27 UNEP 2018 Emissions Gap Report

28 Irena 2018 Renewable Power Generation Costs

29 IEA 2016 World Economic Outlook.

30 OECD 2018 Low carbon project pipelines.

31 For example, the 2015 Global Investor Statement on Climate Change made at the 2015 Paris Climate conference.
Conclusion

Strategic asset allocation (SAA) is often the most important investment decision that investors make because it has the largest impact on long-term returns.

If investors are serious about ESG integration, it is particularly important that they consider how ESG factors affect long-term investment returns. Our work suggests that these factors are among the most important drivers of long-term returns and therefore deserve to be incorporated into the SAA process. SAA analysis that integrates ESG effectively ought to deliver better risk-adjusted returns than SAA that does not.

But there is an even more intriguing opportunity. Many of the world’s biggest problems are a result of a failure to invest enough capital. The SAA process provides a way to begin to remedy this; for investors to channel their capital to increase its real-world impact. SAA also allows investors to do so in a disciplined way that avoids compromising expected returns.

To have maximum effect, this ‘high impact’ version of SAA must be coordinated with more ambitious government policy, and efforts to accelerate technological change, as well as to encourage investor ingenuity. It requires a shift in mind set within the investment community – investors must realise they do not just passively respond to market forces, but play a role in shaping a more prosperous and sustainable future.

This is a paradigm shift, but it is also a natural extension of the one that has seen ESG ideas become mainstream over the past 20 years.
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