December 2021

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Global Macro Insights

Towards a disorderly transition: Tracking the credibility of climate commitments

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Executive summary

- "Our addiction to fossil fuels is pushing humanity to the brink. We face a stark choice: Either we stop it — or it stops us," UN Secretary General Antonio Gutierres said at the COP26 summit. While COP26 made some headway on climate commitments, the battle to constrain warming to 1.5C above pre-industrial levels by the end of the century is yet to be won, making the path to the Paris goal narrower than ever.
- The speed at which the world progresses on its journey towards a net zero carbon economy is dependent on policymakers, the targets and policies they set for reducing emissions, the willingness of companies to adapt, as well as the development and adoption of technologies that can assist in this change. Or at least buy some more time.
- Tracking this journey will give us an indication of which of the six climate scenarios developed by the Network for Greening the Financial System (NGFS) is the most likely to happen. To do so, we have developed a climate credibility tracker focusing on the three core elements of corporate action, policy action and technological change. By tracking these transition enablers, we will be able to assess the credibility of the climate targets and pledges that increasing numbers of countries and companies are adopting.
- Firstly, for assessing the credibility of corporate action, we introduce Fidelity's proprietary Climate Rating covering 1,600 companies in our invested universe for now. The rating focuses on three core areas: net zero ambition, climate governance and capital allocation to the transition. We find that most companies are setting targets and taking measures to somewhat mitigate their impact on climate change, but are struggling to align their activities to a net zero path. The regional breakdown shows a wide disparity, with Europe and North America standing out, while those companies in Asia Pacific (ex Japan) and EMEA/LATAM are lagging.
- Secondly, in tracking technological change, we focus on game-changing technologies in the green transition that can potentially make optimistic climate scenarios more realistic. By monitoring the stage of development and diffusion of key technologies, their penetration rates and costs, we can identify tipping points which could lead to accelerated transition.
- Finally, for policy credibility, we have designed a framework that assesses the top five emitters' actions on carbon pricing, political environment, policy incentives and international cooperation. On these metrics we also observe much disparity among regions, with the European Union scoring highly for its head start on developing carbon pricing mechanisms, while Russia and India receive a low credibility score for lack of political will and incentives to transition to a net zero carbon model.
- Our assessment of policies, corporate actions and technological progress to date leads us to a preliminary conclusion that a disorderly transition scenario is the most appropriate contender for our Capital Market Assumptions (CMA) base case, of the six climate scenarios in the NGFS framework. This envisions a world in which policy action on climate is delayed and/or is disruptive to economies and markets and is uneven across regions and sectors. This in turn results in increased physical and transition risks that translate into a potentially volatile environment for key macro indicators and a different set of CMAs to the one commonly used today.
- Our next step will be to link this analysis to our CMA machinery, which feeds into our strategic asset allocation (SAA) framework.

Introduction

Tackling the climate change crisis requires nothing short of a major transformation of the world's economic model with particular focus on energy systems. The 26th UN Climate Change Conference of the Parties (COP26) may prove to be a pivotal moment in this transformation but the reaction to the outcomes has been mixed. While there were signs of tangible progress, the policy commitments and pledges made so far are still well short of what is required to put the world on the path to net zero by 2050 (Climate Action Tracker, November 2021).

Nobody knows for sure how climate change will play out in the 21st century, but we do have a variety of scenarios. Those provided by the Network for Greening the Financial System (NGFS) are used by major central banks to conduct climate stress tests and are likely to become the industry standard for assessing the effects of climate change on our economic and financial systems.

In our first climate change white paper on this topic Planetary risk: Mapping climate pathways to macro and strategic asset allocation (July 2021) we laid out the conceptual and practical considerations of incorporating these scenarios into our climate aware capital market assumptions (CMAs). These will feed into the next generation of our strategic asset allocation (SAA) framework.

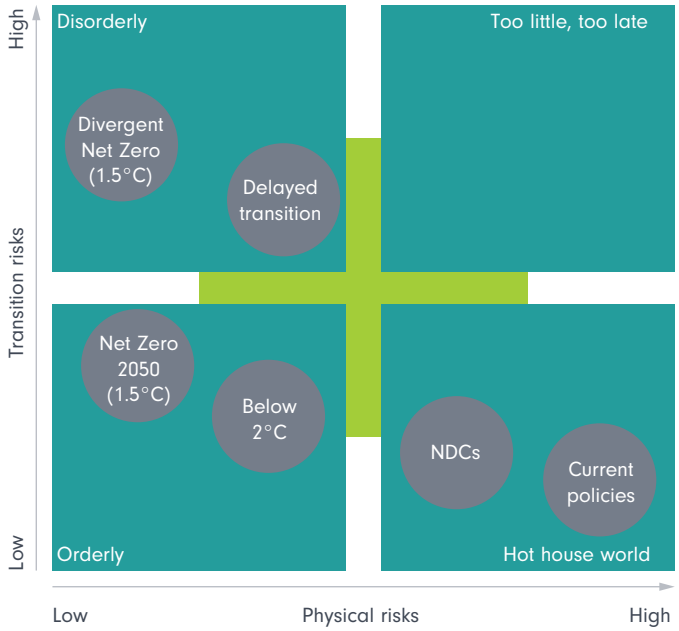
Not all scenarios are created equal, and some are more likely to occur than others. A strategic approach to asset allocation requires us to assess the credibility and likelihood of the various climate change scenarios and is a critical component of this CMA exercise. And so, in this paper, we lay out our thinking for structuring such an assessment, based on the roles of technology, policy and corporate actions, which are essential in facilitating a net zero transition.

We do know the world is rapidly approaching its 1.5C warming target relative to pre-industrial levels. Taking into account the uncertainty over the trajectory of national emissions policies, technological advances and the price of carbon, we conclude that the most likely climate scenario the world is facing today is that of a disorderly transition, whereby policies to cut greenhouse gas (GHG) emissions are delayed and/or diverge across countries and sectors.

Six scenarios to assess the future

The six NGFS scenarios are based on the physical and transition risk dimensions of the climate change challenge (Chart 1). Physical risks refer to the damage to the planet's economic and life supporting ability as temperatures rise and transition risks encompass the implications for the economic and financial systems as policies and actions of the key stakeholders including corporates, investors and citizens change. The scenario set is also defined on the basis of whether changes to the economic system come through in an orderly or disorderly manner - determined by the timing and the degree of policy ambition and coordination - which can result in very different transition pathways, even if the ultimate temperature increase outcome is the same.

Chart 1: The NGFS scenario framework: six scenarios for climate pathways



Source: Fidelity International, NGFS Climate Scenarios for central banks and supervisors (June 2021), November 2021.

Carbon price assumptions are key policy differentiators across the scenarios. Given the centrality of fossil fuels in the current global energy stack and the wider role of emissions in driving economic growth coming from our current economic model, trajectory of carbon prices plays a crucial role in assessing the medium-term impact on the macro variables across the various regions. Indeed, the impact on inflation is particularly pronounced in the orderly transition scenario throughout the 2020s given the assumption of immediate introduction of global carbon pricing, while the GDP impact is benign on aggregate. Under the delayed transition, however, the impact on inflation is postponed to the 2030s but still significant, while the resultant GDP cost is much higher. Understanding the different trajectories for key macro variables under the six scenarios is critical to building robust asset market return and risk projections.

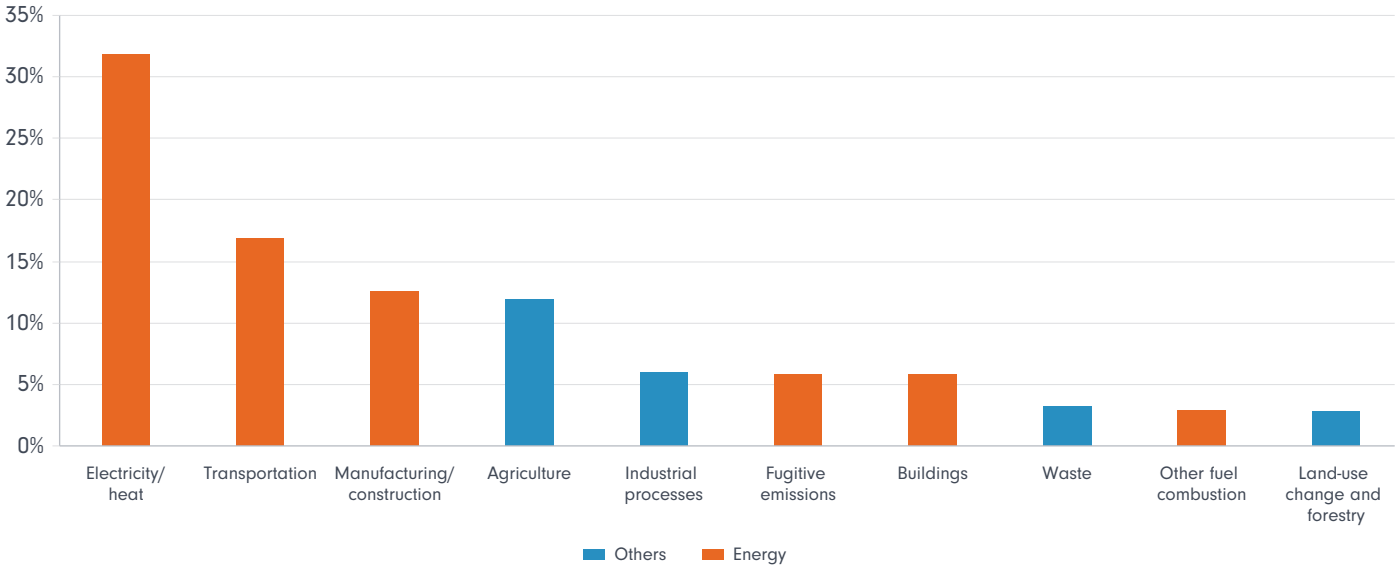
Unpacking the climate change challenge and its relevance for base case assessment

Transforming the global energy system will not be easy. Chart 2 shows the emission contributions from various sources, revealing the breadth and scope of energy system transformation which will be needed to hit the net zero 2050 goal.

As we look to assess the credibility and in turn the likelihood of the various climate change scenarios, the linkages of the various factors which span the climate change challenge are important to lay out. As Chart 3 shows, the temperature increase above pre-industrial levels by 2100 is the ultimate metric in climate change science. The average global temperature is already estimated at 1.2C above pre-industrial levels, making the path to the Paris goal of 1.5C narrower as ever. Climate science has now unequivocally shown the link between the projected temperature pathways and human activity - here represented by GHG emissions in the second top level of the pyramid. As the challenge of climate change gets clarified and internationally agreed towards the goal of first reduction and then net elimination of emissions, the sources of emission contributions in the third level of the pyramid map the nature and scale of technological transformation needed to achieve the net zero goal. Technology, in terms of the speed of its adoption and its effectiveness in reducing emissions, is deeply interlinked with policy, corporate action and associated behavioural changes which altogether can be defined as transition enablers in the foundational layer of the pyramid.

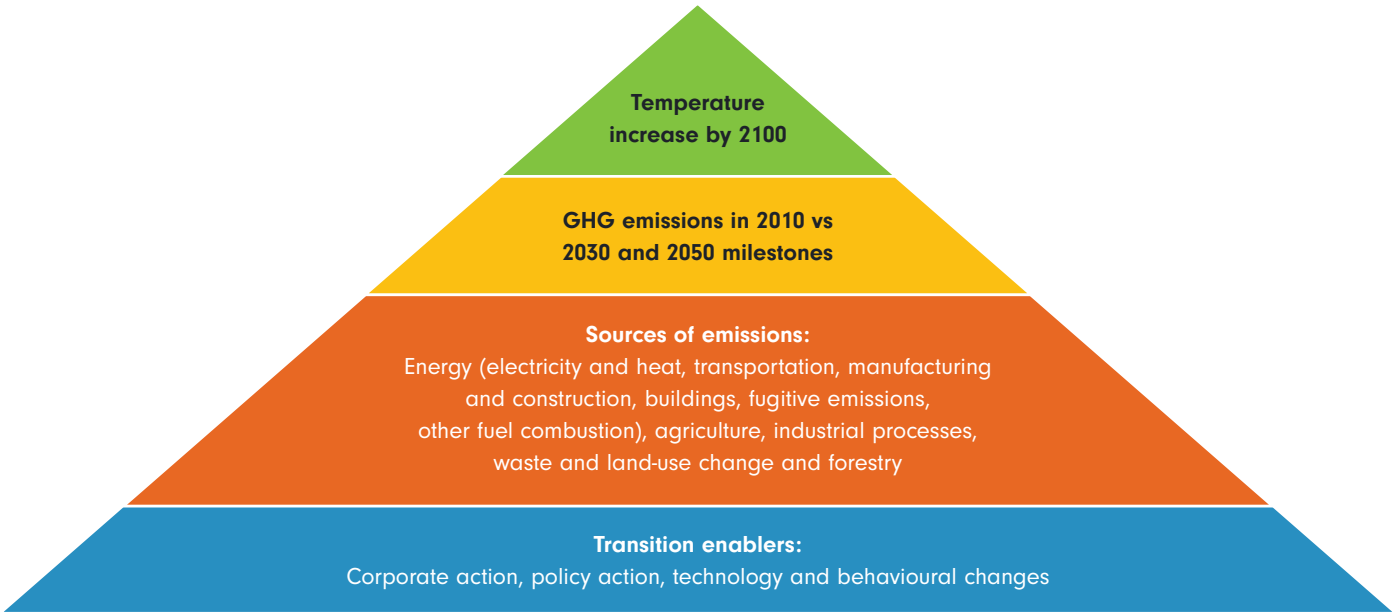
Chart 2: The energy sector is the biggest contributor to global GHG emissions

% share of global GHG emissions



Source: Fidelity International, Climate Watch (2018), November 2021.

Chart 3: The climate transition pyramid - transition enablers are key for determining the climate change pathway

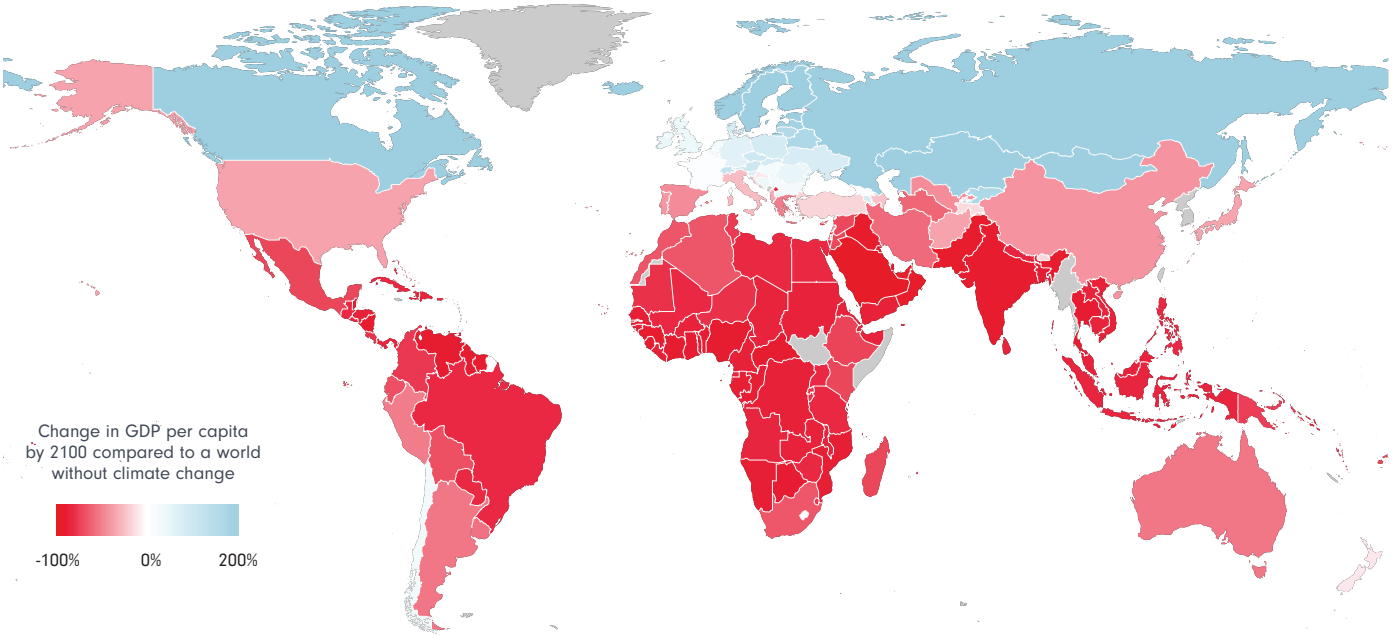


Source: Fidelity International, November 2021.

Carbon prices aim to connect the ecological cost of emissions to their economic cost. The carbon price trajectories, underpinning the different scenarios, which can only be driven by policy changes, are linked to the state of technology and its adoption. As technology improves, the world can afford a lower carbon price to achieve the net zero goal. On the flip side, higher carbon prices incentivise innovation and adoption of technological solutions needed to solve the climate change challenge. Ultimately, the transformation of our energy systems would need a planetary level technological shift and policies adopted by government are a key enabling force.

The regional differences, in terms of vulnerability to climate change and willingness or ability to provide and adopt solutions are equally important here. Chart 4 shows the projected physical damage to national economies under an RCP 8.5 scenario, which can be associated with the NGFS's hot house world. The map paints a highly

Chart 4: Projected physical impact from climate change is highly variable across geographies, with southern hemisphere extremely vulnerable

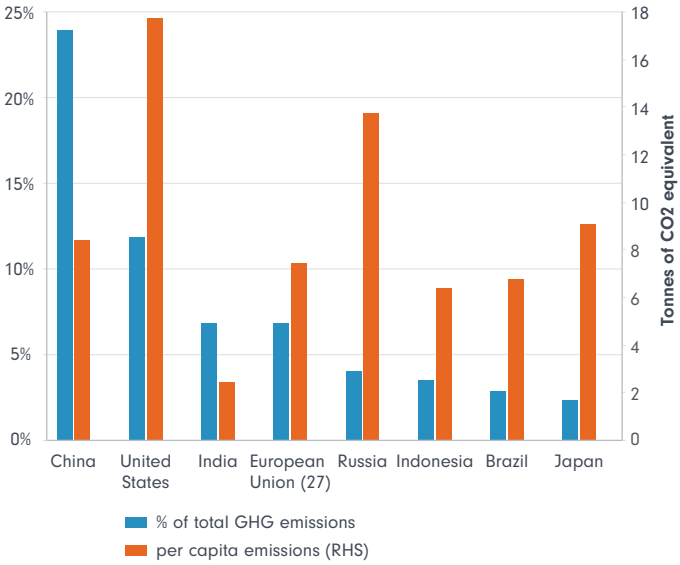


Source: Fidelity International, Burke, Hsiang and Miguel (2015), November 2021.
Note: The above shows the effects on per capita GDP of the Representative Concentration Pathway 8.5 (RCP 8.5), which is a GHG concentration trajectory adopted by the IPCC. RCP 8.5 is generally taken as the basis for worst-case climate change scenarios where emissions continue to rise throughout the 21st century. The effects are determined by the Burke, Hsiang, and Miguel (BHM) damage function, which quantifies the nonlinear effect of temperature change on economic production.

differentiated picture with countries like Brazil and India facing a near wipe-out of their economies, whilst China and US facing a sizeable physical damage shock. This differential vulnerability is even more extreme for a number of island countries which raised their concerns on this existential crisis at the recently concluded COP26 summit.

When it comes to transition risks and burden sharing of global and regional policy changes, both the per capita emission rates (Chart 5) and historical emission trajectories have also become a serious point of contention as illustrated by the developments in Glasgow. While climate change is a global challenge, an appraisal of policy and technology developments in individual nation states is critical to a robust assessment of the credibility and likelihood of climate pathway base case.

Chart 5: While China and India are the largest EM emitters in absolute terms, their per capita emissions are smaller than those of advanced economies



Source: Fidelity International, Climate Watch (2018), November 2021.

Tracking the credibility of climate transition pathways

As illustrated by Climate Action Tracker (CAT) in Chart 6, current policies and actions coupled with national differences mean that achieving the broadly accepted goal of net zero by 2050 (NZ50) is anything but certain. In fact, it is the least likely outcome according to CAT, even relative to their optimistic scenario which still places the world on the 1.8C warming pathway.

To incorporate climate change into our CMAs we have to identify the base case climate pathway to be mapped onto macroeconomic and investment outcomes. Using the net zero by 2050 scenario as a base case would be a bold assumption given the highly ambitious and transformation changes needed to achieve it over the next two decades.

It would be more pragmatic to assess the likelihood of different climate pathways and assign probabilities to the six climate scenarios in the NGFS framework. This can become a highly complex exercise at various levels of granularity with huge uncertainty at every step. But at the very minimum, we need to (1) understand the underlying assumptions behind each scenario and how changes in those assumptions can affect the outcomes; (2) be able to map them to real world developments; and (3) assess those against some future milestones on a continuous basis.

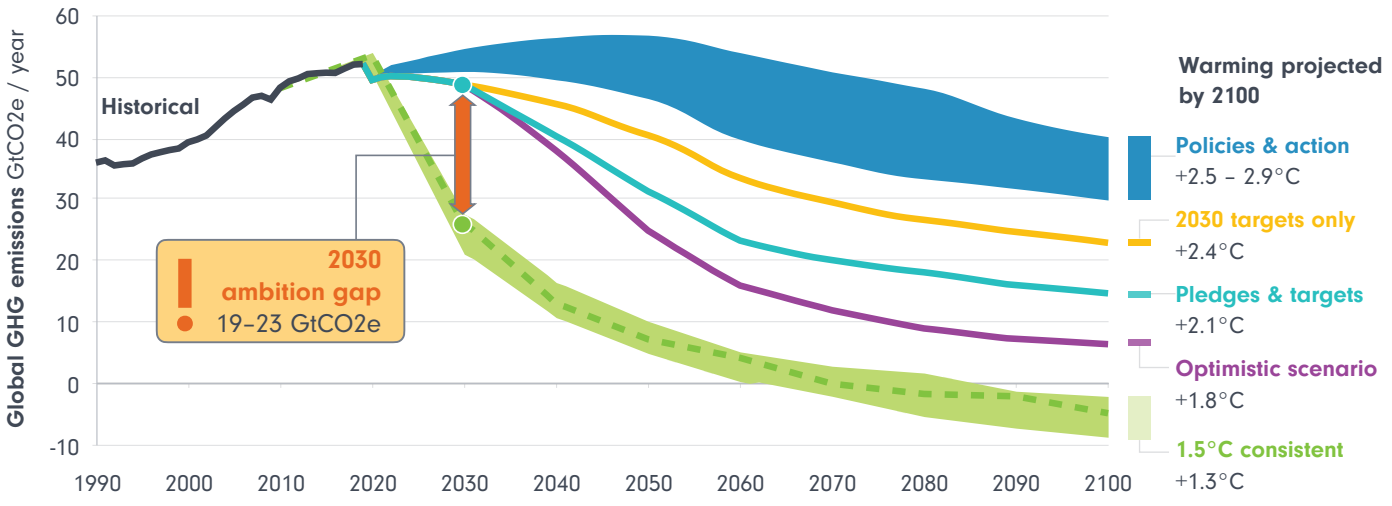
Crucially, we are not looking to track progress on GHG emissions reductions to date - a few highly competent sources such as the IPCC or CAT already do this important assessment in much more detail. We want to focus on tracking transition enablers, namely the policies, corporate actions, technologies that will influence the course for emissions and temperature pathways this century.

Unlike specific indicators measuring progress on reducing emissions such as, for example, the amount of CO2 removed annually through reforestation or carbon intensity of global cement production, the transition enablers such as policies, intentions and behavioural changes cannot always be easily quantified. But the advantage of such assessment is in being more forward-looking and timelier than any of the official sector or country indicators available for monitoring emissions pathways. Indeed, as we approach the end of 2021, most of the data is still as of 2018 or 2019 vintage at best.

Being able to track and assess the credibility of existing or upcoming policies and actions in real time, using our bottom-up insights, can give us an early insight into potential climate change outcomes and thus help us identify the more likely pathway the world is going to take over the next decade and beyond. Using some key assumptions underlying the NGFS scenarios (see Box 1 for more detail) and our own insights, we split the transition enablers we want to track into three broad categories, representing the foundational layer of the pyramid (Chart 3): (1) corporate action; (2) policy action; and (3) technology. We now turn to our proposal for tracking credibility in each of these areas.

Chart 6: The huge gap between reality and aspirations remains

2100 Warming Projections - Emissions and expected warming based on pledges and current policies



Source: Fidelity International, CAT (November 2021), November 2021.

Box 1: Key assumptions underlying NGFS scenarios

As we are using the six NGFS climate scenarios in our CMA work, we start by identifying the key assumptions underlying the differences between them. At a high level, the scenarios are characterised by their overall level of physical and transition risk (Table 1). The physical risk is represented by long-term policy ambition which is proxied by the temperature increase target by 2100 and associated pledges on emission reductions.

For the purposes of our credibility tracker, we are interested in transition risk categories and the assumptions underlying them. The transition risk is represented by shorter-term policy reaction linked to the timing and pace of policy implementation, **technological progress** linked to the pace of innovation and availability of relevant technologies, the availability of **carbon dioxide removal** (CDR) and, finally, **regional policy variation** linked to the degree of policy coordination across regions and sectors. Of course, these areas are not standalone inputs but are interconnected and influence one in a variety of ways.

Table 1: NGFS climate scenarios differ by the level of policy ambition, policy timing and coordination as well as technological change

		Physical risk	Transition risk			
Category	**Scenario**	**Policy ambition**	**Policy reaction**	**Technology change**	**Carbon dioxide removal**	**Regional policy variation+**
Orderly	Net Zero 2050	1.5°C	Immediate and smooth	Fast change	Medium use	Medium variation
	Below 2°C	1.7°C	Immediate and smooth	Moderate change	Medium use	Low variation
Disorderly	Divergent Net Zero	1.5°C	Immediate but divergent	Fast change	Low use	Medium variation
	Delayed transition	1.8°C	Delayed	Slow/Fast change	Low use	High variation
Hot House World	Nationally Determined Contributions (NDCs)	~2.5°C	NDCs	Slow change	Low use	Low variation
	Current Policies	3°C+	None – current policies	Slow change	Low use	Low variation

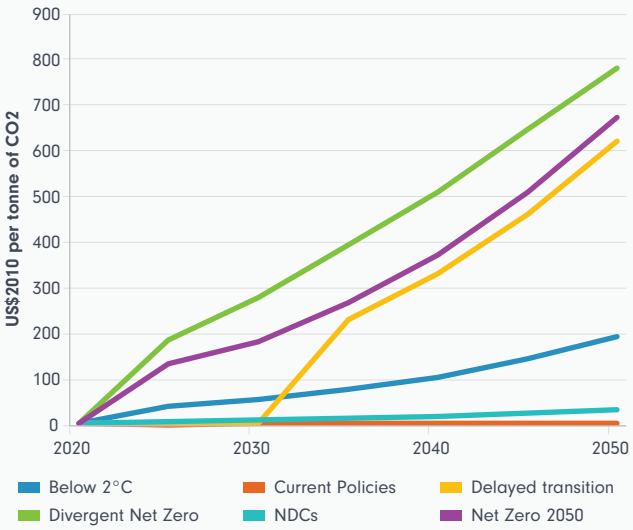
Colour coding indicates whether the characteristic makes the scenario more or less severe from a macro-financial risk perspective^

- Lower risk
- Moderate risk
- Higher risk

+ Risks will be higher in the countries and regions that have stronger policy. For example in Net Zero 2050 the EU, USA and Japan reach net zero GHGs by 2050, but globally only net zero CO2 is reached by this point. ^ This assessment is based on expert judgment based on how changing this assumption affects key drivers of physical and transition risk.
Source: Fidelity International, NGFS Climate Scenarios for central banks and supervisors, (June 2021), November 2021.

Chart 7: Carbon pricing is a key determinant of transition risks

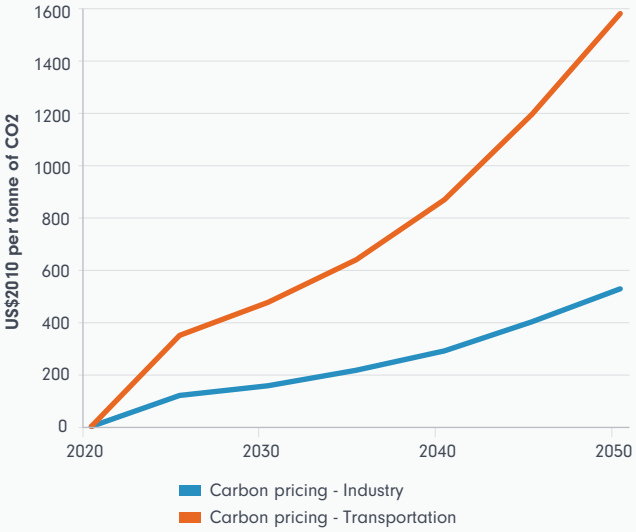
Carbon price development per NFGS scenario



Source: Fidelity International, NGFS Scenario Explorer (June 2021), November 2021.

Chart 8: Divergent net zero scenario assumes policy variation across countries and sectors

Carbon prices in Divergent Net Zero scenario



Source: Fidelity International, NGFS Scenario Explorer (June 2021), November 2021.

The key driver of **policy reaction** is the timing and scale of implementation of carbon pricing (Chart 7), with the orderly transition scenarios assuming immediate introduction of carbon pricing in line with the long-term emissions targets. The disorderly scenarios assume implementation is delayed until 2030 or differs greatly across countries. Because of the delay or divergence, the transition pathway required a more stringent rise in carbon prices to achieve long-term targets, resulting in higher GDP losses during transition relative to the orderly scenarios.

The **technology change** pillar makes assumptions about the speed of progress in areas such as renewables, nuclear, bioenergy, and end-use efficiency, among others. Progress is measured by the decrease in costs, which increases societal uptake of each technology, and the amount of energy generated.

CDR technology is represented by a separate pillar, explicitly capturing the availability of CDR with two alternatives, the choice of which has a particularly profound impact on mitigation trajectories. Medium CDR use assumes the same constraints on CDR options as for other technologies, including biophysical constraints, technological ramp-up constraints, exclusion of unsuitable and protected areas, and geological potentials. Low CDR use assumes constraints on CDR deployment at larger scale by, for example, explicitly limiting the maximum area available for afforestation or the maximum possible yearly injection rate for geological sequestration. Higher CDR availability in turn enables a more gradual phase-out of the use of liquid fuel across various sectors and end-uses. The overall speed of technological progress is inherently interlinked with policy ambitions and policy implementation.

Finally, the main assumption behind **regional policy variation** relates to the degree of policy coordination. All scenarios feature some form of regional differentiation, with risks higher in the countries and regions that have stronger policy. For example, in NZ50, the EU, US and Japan reach net zero GHG emission by 2050 but globally only net zero CO2 is reached by this point. In Divergent Net Zero, policy coordination varies across sectors too, where carbon prices for transport and buildings are assumed to be three times the carbon price in the supply and industry sectors (Chart 8).

These scenario assumptions point to a few clear candidates for transition enablers that have to be included in our tracker, such as carbon pricing, policy action and technology use across sectors and geographies.

Tracking corporate action credibility using FIL's proprietary Climate Ratings

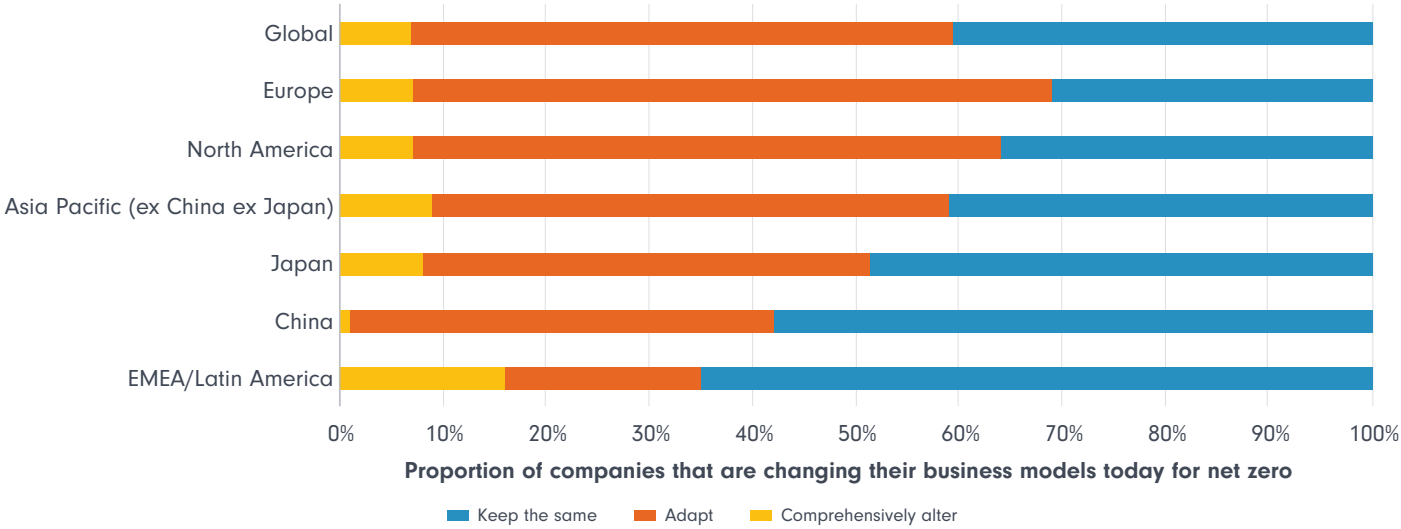
The credibility assessment of any climate scenario must take into account the vast commitments and actions made by corporates. Leveraging our fundamental research capabilities to identify climate related risks, net zero investments and targets for transition, affords us a bottom-up view on which companies, and ultimately economies, are in the best position to transition to net zero. Scrutinising company statements, metrics, targets and commitments is essential to judge where an economy is on its climate pathway.

To achieve a net zero economy, companies must evolve. Our latest analyst survey revealed that over half of companies globally have begun to adapt their business models for a pathway to net zero by 2030 (Chart 9).

Fidelity's proprietary Climate Rating focuses on three core areas: net zero ambition, climate governance and capital allocation to the transition. Each area consists of underlying factors that we deem critical developments for a company to achieve net zero. For example, setting intermediate emissions reduction targets is a positive step, but holding management accountable to this through performance-based remuneration lends weight to the company's targets.

Fidelity has implemented its Climate Rating on 1,600 companies in our invested universe, which stretches across a wide range of sectors and geographies; and is working to expand the coverage for the full research universe. Whilst Fidelity will continue to develop and roll out the Climate Rating over the course of 2022, aggregating the preliminary analysis provides a bottom-up perspective on the progress of the private sector against a net zero pathway. Using a uniform set of minimum criteria factors to rate companies into one of five categories, we observe the following breakdown.

Chart 9: Companies are starting to adapt their business models

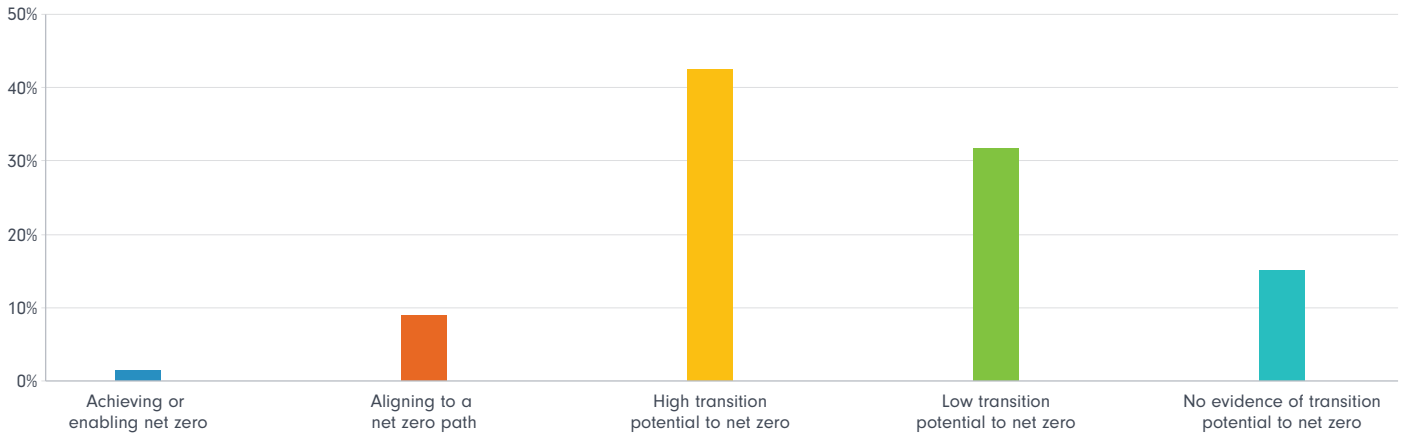


Question: "What proportion of your companies are acting today to change their business models for a pathway to net zero by 2030?" Chart shows the average responses.
Source: Fidelity International, Carbon pricing is coming but watch for greenflation, October 2021.

Most companies are setting targets and taking measures to somewhat mitigate their impact on climate change but are struggling to align their activities to a net zero path (Chart 10). However, the situation is not homogenous across regions.

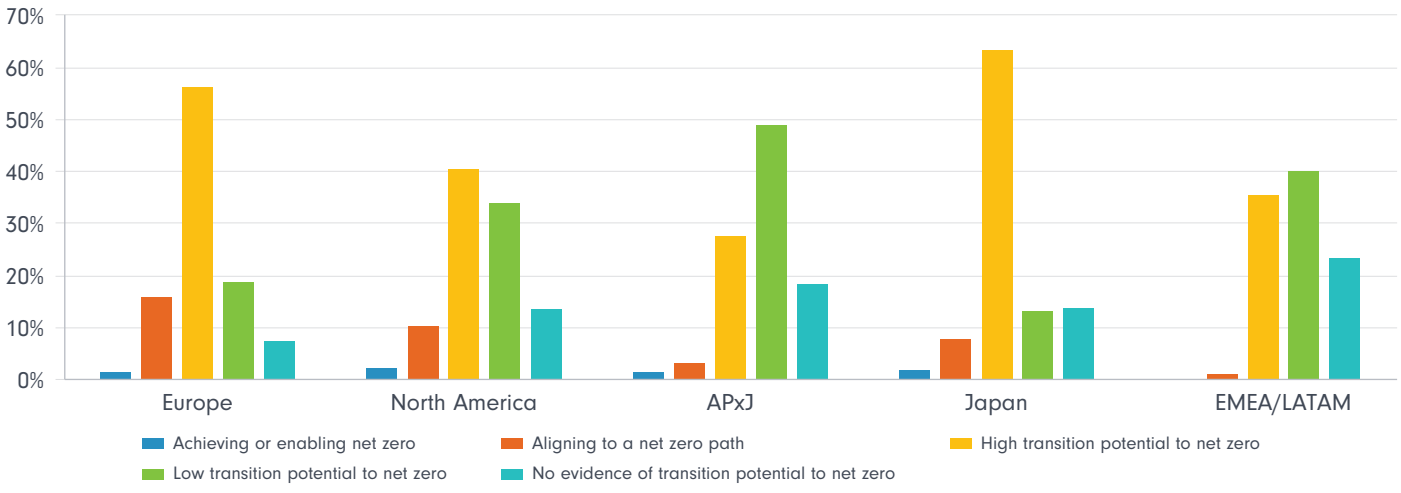
Europe and North America stand-out as having a meaningful proportion of companies already aligning to a net zero pathway - in stark contrast to Asia Pacific (ex. Japan) and EMEA/LATAM where companies lag in this respect (Chart 11). While perhaps not wholly surprising, the distribution gives an insight into which regions are more off track and where faster progress is needed to achieve net zero.

Chart 10: The majority of companies assessed so far show some potential for transitioning to net zero



Proportion of rated companies in each category under Fidelity's preliminary Climate Rating. Illustrative only and not intended to represent final ratings or final coverage universe.
Source: Fidelity International, November 2021.

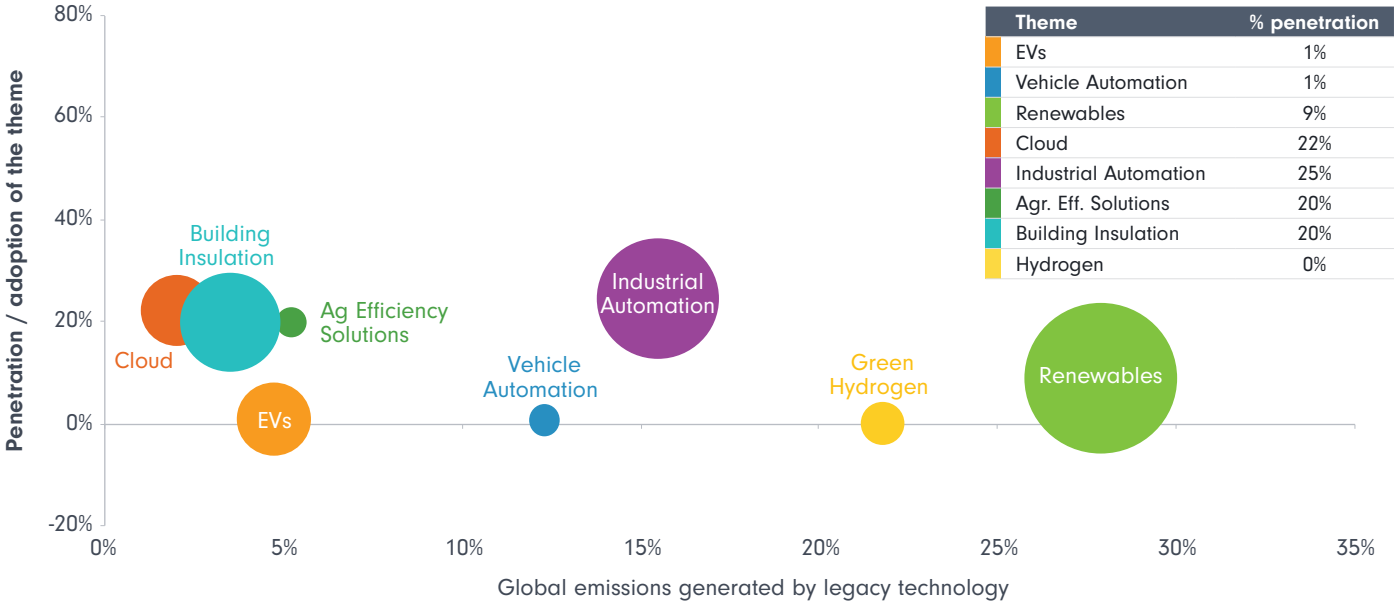
Chart 11: Progress on transitioning to net zero differs by region



Proportion of rated companies by region in each category under Fidelity's preliminary Climate Rating. Illustrative only and not intended to represent final ratings or final coverage universe. The coverage of the rating, as measured by the market capitalisation of the geographic universe, is so far concentrated in Western geographies. While the initial rating covers around 70% of the market cap for the MSCI North America (MXNA Index) and MSCI Europe (MXEU Index) indices, the coverage of other regions is lower.
Source: Fidelity International, November 2021.

Chart 12: Penetration of clean energy technologies and global emissions generated by legacy technology

Global emissions and technology penetration rates (as shares of global installed base)



Source: Fidelity International, 2021.

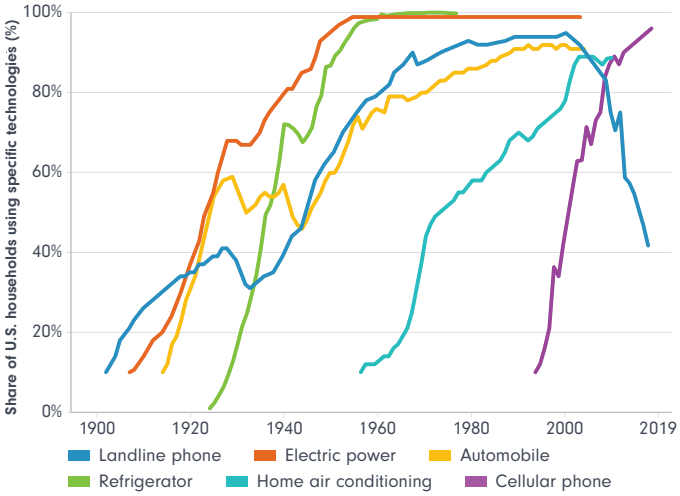
Bubble size refers to % total net assets invested in these themes as of 28 February 2021, in the Fidelity Funds - Sustainable Climate Solutions Pool. Pools do not constitute separate legal entities and are not directly accessible to investors. This is pool data and may vary from the fund. The themes list is not exhaustive and only indicative in nature. Building Insulation penetration relates to North America.

Tracking technological change

Technological progress raises the credibility of more optimistic climate scenarios and can be tracked in a variety of ways. Current penetration rates can provide some useful information about the future path of these technologies and their potential impact on global emissions. As Chart 12 shows, our company analysts estimate that global penetration rates of clean energy technologies (as shares of global installed base) such as EVs, vehicle automation and hydrogen are close to zero, with renewables still in single digits. Industrial automation, agricultural solutions and building insulation have moderately higher penetration rates, though estimates might vary widely depending on underlying assumptions and uncertainty given poor data availability.

To better understand the potential role technology enablers can play in the transition, we assess their position on the S-curve which can be used as a rough proxy for their growth trajectory. Past transitions driven by new technologies such as autos or mobile phones have tended to follow an S-curve trajectory (Chart 13), with slow pace of adoption initially followed by fast acceleration as technologies were deployed widely, partly helped by falling costs of production and adoption and policy support.

Chart 13: Historical examples of technology adoption dynamics



Note: EV = electric vehicle. S-curves rarely look like a perfect S, but these historical examples provide a general framework for viewing technology adoption dynamics.

Source: Fidelity International, State of Climate Action 2021, CAT (October 2021), November 2021.

Clean energy technologies also have the potential to follow the S-curve dynamic, with renewables being a prominent example of a successful move from development towards deployment. Over the last decade, a combination of government support and R&D advances in the private

sector contributed to strong growth in installed renewable energy globally. Advances in solar panel technology and wind turbine and blade efficiency drove substantial cost reductions, such that all-in costs (including capital and operating costs) have declined by over 80% for solar panels and over 40% for wind power in the last 10 years. Financial returns for many unsubsidised large scale solar and onshore wind projects are now more attractive than fossil fuel generation investment, further supporting the shift from fossil fuels into clean energy. Renewables now account for 83% of global net capacity additions annually, up from less than 50% in 2010.

The trajectory for renewables faces some obstacles, however, with the most significant related to the intermittent nature of wind and solar generation. Without large-scale battery storage that can ensure reliability of electricity supply, population centres will continue to rely on traditional forms of baseload generation. For most countries, this means either coal, natural gas or nuclear generation. Developing economies, including both China and India, are likely to continue to invest in new coal generation to support economic growth, with China targeting peak coal use in 2026.

Fidelity's bottom-up analysis suggests that Europe and the US could reach roughly 75% renewable generation, with Asia at 58%, by 2040, and that advances in battery storage over the next 2 decades could enable 100% carbon free generation by 2050. Whether these milestones are achievable depends on the pace of further breakthroughs in battery storage, renewable and electricity transmission technology, as well as government policy and private sector involvement.

In Table 2 we assess the S-curve stage of key clean energy technologies across the main sectors. According to the IEA, all the technologies needed to achieve the

Table 2: Technology enablers by sectors and their current S-curve stage

		S-curve stage	
Sectors	**Clean energy technologies**	**Development**	**Deployment**
Power	Bioenergy	Bioenergy with carbon capture and storage	
	Hydrogen	Hydrogen produced using electrolysis	
	Renewables	More advanced batteries to face fluctuations in production (seasonality, day/night)	Solar and wind, smart transmission mechanisms and further development of distribution grids
Buildings	Improved energy efficiency		Retrofitting building stock and NZ standards for new buildings. More efficient appliances
	Electrification		Heat pumps
Industry	Hydrogen	Green hydrogen - zero-carbon fuel produce by water electrolysis	Deployment of hydrogen plants
	Carbon capture, usage and storage (CCUS)	Carbon capture from carbon emissive infrastructures (from chemical and heavy industry plants)	
	Electrification		Digitalisation, automation and machine drive
	Novel technologies	New cement types and zero-carbon steel production technique	
Transport	Electrification	Medium-and-heavy-duty EVs, EVs in LDV fleet	EVs in LDV sales, electric busses
	New fuel types	Hydrogen fuel and sustainable aviation fuel (SAF)	
Agriculture	Boosting crop and livestock productivity		GMOs, irrigation technologies, monitoring systems, accurate weather forecast. Electronic identification for livestock
Other non-sector related technologies	Carbon capture, usage and storage (CCUS)	Direct air carbon capture	
	Land use and coastal zone management		Reforestation and coastal wetland

Source: Fidelity International, CAT (October 2021), IEA (May 2021), November 2021.

deep cuts in global emissions by 2030 already exist, with a proven track record for policies that can drive their deployment. But looking beyond 2030 to 2050, almost half the reductions in emissions in the IEA's net zero scenario comes from technologies that are still in the development phase. In some sectors, such as heavy industry and long-distance transport, the share of emissions reductions from technologies that are still under development today or yet to emerge is even higher.

As can be seen from Table 2, the biggest innovation opportunities today are in advanced batteries, hydrogen electrolysers and direct air carbon capture and storage. Indeed, these technologies can become game changers for the world's ability to reduce CO2 emissions from 2030 onwards. It is important to note that the NGFS climate scenarios do not currently include direct carbon air capture and storage, implying that if scalable and efficient deployment of such technologies is made possible in the future, more drastic reductions in emissions can potentially make the net zero transition more realistic.

Policies are crucial in speeding up progress of clean technologies along the curve. Standards are key in driving industry investment and encouraging consumer spending on most efficient technologies. Targets and competitive auctions can facilitate wind and solar adoption, critical for the electricity sector transition. Governments can also lead and incentivise green infrastructure investment, including, for example, smart transmission and distribution grids and new pipelines to transport captured CO2 emissions. A more equitable transition can also be achieved with policies that support low income households with tax credits or targeted subsidies.

At the same time, policies should also be used to help accelerate the phasing out of dirty technologies, through, for example, providing disincentives for the use of certain fuels and technologies, such as unabated coalfired power stations, gas boilers and conventional internal combustion engine vehicles.

The so-called Breakthrough Agenda launched at COP26 includes global goals to accelerate the development and deployment of the clean technologies and sustainable solutions, with the focus on making them "the most affordable, accessible and attractive option in each emitting sector globally before 2030". The goals are set for power, road transport, steel and hydrogen, with the IEA set to lead the tracking of global progress against these goals. This data combined with our own bottom-up and top-down insights should help us track technology enablers on a regular basis and revise the likelihood of climate scenarios accordingly.

Tracking policy action

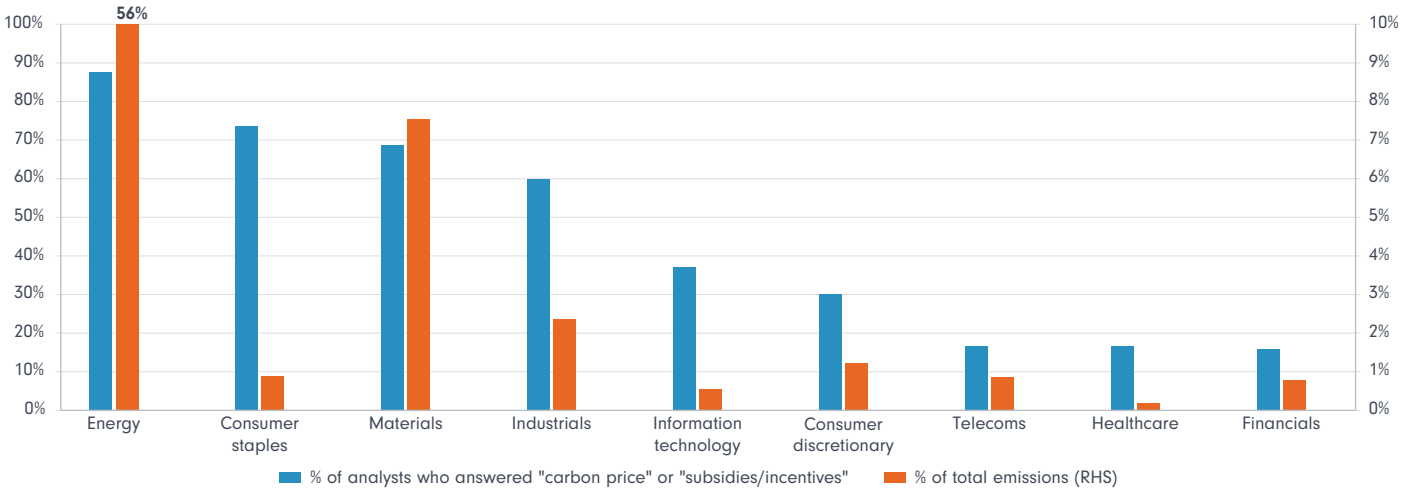
To assess the credibility of policy action and various net zero pledges that countries have made to date, we have designed a framework with four pillars: carbon pricing, political environment, policy incentives and international cooperation (Table 3). In **carbon pricing**, we assess the extent to which carbon dioxide and other GHG emissions are adequately priced versus what is necessary to meet NZ50. This can take the form of an explicit tax/emissions credit or through more implicit policy means. In the **political environment** pillar, we assess the extent to which there is broad political consensus on the need to tackle climate change as well as how each country/region's political framework aids or hinders the net zero transition. Under **policy incentives**, we assess how a country's fiscal, monetary and regulatory actions aid in the incentivisation of transitioning to a net zero world. Finally, in the **international cooperation** pillar, we look at how diplomatic cooperation and wider international governance regimes strengthen or weaken the credibility of policy commitments.

Within this framework, we assign greater importance to the carbon pricing, policy incentives and political environment pillars. The first two pillars are the two main levers governments can use to meet net zero targets. The political environment pillar assesses the motivation of governments to induce such changes and directly affects the introduction of measures captured by the carbon pricing and policy incentives pillars.

This relative importance of the pillars is supported by the assessment of our on-the-ground analysts. As can be seen in Chart 14, when asked "what is the one policy that governments could introduce that would help your company's transition to a low carbon economy", the vast majority of our analysts covering some of the most polluting sectors like energy, industrials or materials answered either "carbon price" or "subsidies/incentives".

Our analysis assigns high importance to policies that promote those technologies that can help accelerate the transition to a net zero world. So, for example, the EU gets a 'High' rating in the policy incentives pillar partly because of its transport emissions policies. These policies range from increasingly stringent CO2 emissions standards for vehicles to a variety of policies aimed at promoting the adoption of low-carbon vehicles. These latter policies include mandatory quotas for the share of low emissions vehicles sold and mandatory national targets for the deployment of EV charging infrastructure. In contrast, the US only receives a 'Medium' rating for policy incentives partly because its goals regarding technological deployment are much less ambitious. For example, President Biden has set a goal of making 50% of all new vehicles sold in 2030 zero-emissions vehicles (ZEVs). However, according to Climate Action Tracker, this is not aligned with the Paris Agreement, and that in fact 95-100% of new vehicles sold by 2030 should be ZEVs.

Chart 14: Most analysts in the energy, consumer staples, materials and industrials sectors consider carbon pricing and subsidies/incentives as the most impactful policies



Question: "what is the one policy that governments could introduce that would help your company's transition to a low carbon economy?".
Notes: Total emissions include scope 1, 2 and 3 emissions.
Source: Fidelity International, October Analyst Survey (2021), MSCI, November 2021.

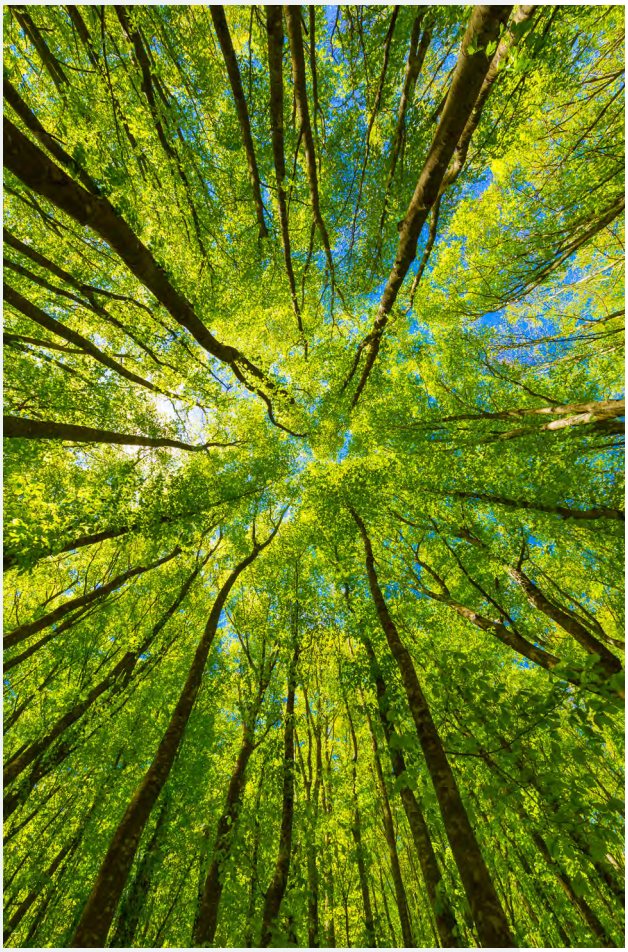
Table 3: Climate policy credibility tracker

	China	US	EU	India	Russia
% of World CO2 emissions and 10yr p.a. growth	28.0% (2.2% pa)	15.1% (-1.8% pa)	8.8% (-2.7% pa)	6.3% (3.8% pa)	4.6% (-0.2% pa)
Policy ambition	NZ by 2060	NZ by 2050	NZ by 2050	NZ by 2070	NZ by 2060
4 Pillars of Credibility Assessment					
Carbon pricing	Medium	Low	High	Low to medium	Low
Political environment	High	Medium	High	Low	Low
Policy incentives	Medium	Medium	High	Low	Low
International cooperation	Low to medium	Low to medium	Medium to high	Low	Low
Overall rating	Medium	Low to medium	High	Low	Low

Source: Fidelity International, Global Carbon Project (2020), November 2021.

We apply this framework to assess the policy credibility of the top five CO2 emitters globally – taken together, China, the US, the EU, India and Russia emit just over 53% of the world's CO2 emissions. As a result, we believe that this coverage provides a broadly representative sample of emitters to allow us to draw more global conclusions. Table 3 shows our assigned ratings for these key economies across the four pillars. Box 2 has more detail about the rationale behind the ratings.

Bringing all of these individual ratings together, we give the EU a 'High' overall credibility rating, China a 'Medium', the US a 'Low to Medium', and India and Russia 'Low' ratings. If these were the only five emitters globally, this would imply a 'Medium' rating for the world as a whole. This suggests to us that based on currently implemented and planned policies, NZ50 is currently out of reach, and should not be treated as a base case. This is consistent with those findings showing that even assuming full implementation of all announced measures including the new and updated NDCs and net zero targets, warming would likely be limited to 1.8C, with a range of 1.5C to 2.4C (Climate Action Tracker, November 2021). Moreover, the significant range between overall ratings suggests to us that transition risks are likely to be higher than the orderly transition scenarios in the NGFS framework. This set of ratings better maps to disorderly transition scenarios where policies are either delayed and/or diverge across countries and sectors.



Box 2: Assigning policy credibility ratings to top 5 emitters

Carbon pricing

For the 'Carbon Pricing' pillar, we have awarded China a 'Medium' rating as China has launched a national emissions trading scheme (ETS) this year. It so far only covers the power sector, with plans to expand to 7 other sectors. Even if China is in early stages of its ETS development, we believe its path is encouraging. We give the **US a 'Low' rating** as there is neither an existing national mechanism for carbon pricing nor plans to implement one. Individual state ETSs exist, but only cover 8% of the US total GHG emissions and the price for carbon on these schemes is universally low compared to the EU's pricing. **The EU is the leader in carbon pricing, and therefore receives a 'High' rating**. The EU's ETS covers more than 38% of its GHG emissions, is supranational and prices carbon relatively highly. Additionally, there are plans to expand it to shipping, and establish a separate ETS for road transport and buildings. Sectors covered by ETS aim to reduce emissions by 43% from their 2005 level by 2030.

We have awarded India a 'Low to Medium' rating. No ETS exists, but an alternative quasi-carbon pricing mechanism does; the Perform, Achieve and Trade (PAT) Mechanism. To date, this instrument has mainly been used to increase energy efficiency in the industrial sector, rather than explicitly target emissions reduction, but has laid the groundwork for full CO2 pricing, if India decides to go down that route in the future.

Russia received a 'Low' rating as no measures have been taken or are planned to begin pricing emissions.

Political environment

For the 'political environment' pillar, we give both China and the EU a 'High' rating. In China, there is clear consensus within the Chinese Communist Party on the need to tackle climate change. The fact that China is a planned economy with central control over key economic levers enhances the credibility of this consensus further. In the EU, there is clear consensus across the political elite, and decent consensus across the voting public (Pew Research, 2021), on the need to transition to a net zero world. **We give the US a 'Medium' rating**; while the current party in power is clearly keen to tackle climate change, there is still a lack of broader cross-party political consensus. This lack of consensus can be seen in the significant scaling back of green fiscal measures in the recently enacted Bipartisan Infrastructure Bill (BIB) and the currently proposed Build Back Better bill. Finally, **we rate the political environments of India and Russia both at 'Low'**. In India, the majority of the population believes the government is either doing the 'right amount' or 'too much' to tackle climate change (Pew Research, 2020) and in Russia, there are still no meaningful incentives for the political class to take climate change seriously.

Policy incentives

In the 'policy incentives' pillar, the only country/ region to be given a 'High' rating is the EU. Across all three policy sub-pillars of fiscal, monetary and regulation, the EU looks particularly well positioned to incentivise a green transition. On the fiscal side, at least €275bn from the NextGenEU Fund will be spent on climate action – with €152bn already approved for 12 nations. The ECB is the most advanced in thinking about how to integrate climate change into monetary policy, with multiple plans either presented or agreed to covering disclosures, financial stability and policy instruments. Finally, on the regulatory side, the substantial incentives for green investment (e.g. SFDR, the Green Taxonomy) make us comfortable with a 'High' rating for the EU.

We give the US and China both a 'Medium' rating for this pillar. Both countries have started incentivising a net zero transition. For the US, this can be seen in the recently passed BIB which will fund $138bn of clean infrastructure, plus $110bn in mass transit funding over the next 10 years. Beneath the Federal level in the US, 30 states have enacted mandatory renewable portfolio standards, and of these, nine states have enacted 100% clean electricity goals into legislation. In China, this can be seen in President Xi's announcement in April 2021 that China will "strictly control" and then "phase down" coal consumption over its next two five-year plans. Additionally, China's most recent NDC proposes a target non-fossil share of energy production at 25% by 2030 and renewable capacity of 1.2 TW by 2030. On the monetary side, the PBOC is currently doing a better job than the Fed at integrating climate change into its thinking, with a variety of tools and plans already announced. These include disclosure requirements related to green bonds and loans, and a lending tool to help companies cut carbon emissions. Conversely, the Fed has only just started thinking about integrating climate related financial risks into banks' stress tests (NYT, 2021).

Finally, we rate both India and Russia as 'Low' for this pillar. Neither country has an intention to get to NZ50 (India's target is 2070 and Russia's is 2060). As a result, neither so far provides any meaningful policy incentives to transition to a net zero world. Indeed, Russia still provides substantial amounts of fossil fuel subsidies on a per capita basis (OWID, 2019). Between the two, India is somewhat more advanced. Its 2021 stimulus was more climate-friendly with two-thirds of the spending targeted at green recovery initiatives. But with India still expecting to significantly expand coal capacity, it becomes impossible to rate it anything other than a 'Low'.

International cooperation

For the 'international cooperation' pillar, we award both China and US a 'Low to Medium' rating. We believe their joint declaration at COP26 to cooperate on climate change could presage a significant step up in engagement, but as of now, it is still mostly rhetoric. In China, there are no plans to decarbonize the Belt and Road Initiative and the country is still the top global source for coal financing (Shearer, Brown & Buckley, 2019). Additionally, China participated in changing the wording on coal at COP26 from "phase out" to "phase down". For the US, Climate Action Tracker (CAT) has described its support for international climate finance as "critically insufficient", demonstrating its failure to address the financing gap for low-to-middle-income countries.

We have awarded the EU a 'Medium to High' rating. CAT describes the EU's support for international climate finance as "insufficient", yet the EU is still providing significantly more financing than most countries. Additionally, the EU has started working on plans for a Carbon Border Adjustment Mechanism, demonstrating its continuing work towards the net zero transition on the international plane. Finally, we have awarded **India and Russia a 'Low' rating**. India also participated in changing the wording on coal at COP26, and the failure of developed economies to provide long-term financing to low-to-middle-income countries gives India little incentive to target an earlier transition. When it comes to Russia, the country does little to contribute to the international debate or governance of climate change.

Next steps - towards a new base case for CMAs

Despite some progress in a number of areas, the outcome of the COP26 conference keeps a wide range of warming scenarios very much alive. According to CAT, current policies put the world on track for 2.7C warming, with an estimated range of between 2C and 3.6C. Even assuming full implementation of all announced measures including the new and updated Nationally Defined Contributions and net zero targets, warming would likely be limited to 1.8C, with a range of 1.5C to 2.4C.

With huge uncertainty inherent in these estimates, the range of possible macroeconomic and by extension return and risk outcomes remains exceptionally wide. Based on our credibility assessment to date, spanning transition enablers such as technology, corporate actions and government policies, we believe that the more likely path for the world from here is that of a disorderly transition, whereby policies are delayed and/or diverge across countries and sectors.

This is no static assessment. As transition enabling policies and actions change, the base case can become more optimistic, under a more orderly transition scenario. But equally it can deteriorate towards a hot house world, if policies and actions prove insufficient. We aim to update the credibility tracker on an annual basis, using insights from our climate change ratings and policy monitoring work coupled with views from our sector analysts as companies and countries undergo the journey towards net zero. Such forward-looking, transparent and consistent assessment of climate scenarios will underpin our climate-aware CMA base case and the next generation SAA framework we look to unveil in 2022.

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Special thanks:

Special thanks to Marc Miron, Ben Moshinsky, Kitty Yang, Daniel Youles together with the wider Fidelity research and investment teams for their invaluable support and input.

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