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Navigating climate change

Damned if you do, damned if you don't… it's not easy!

Whether climate change is addressed or not, society faces greater risks ahead. The question is, will they be based on rising temperatures or the attempts to contain it?

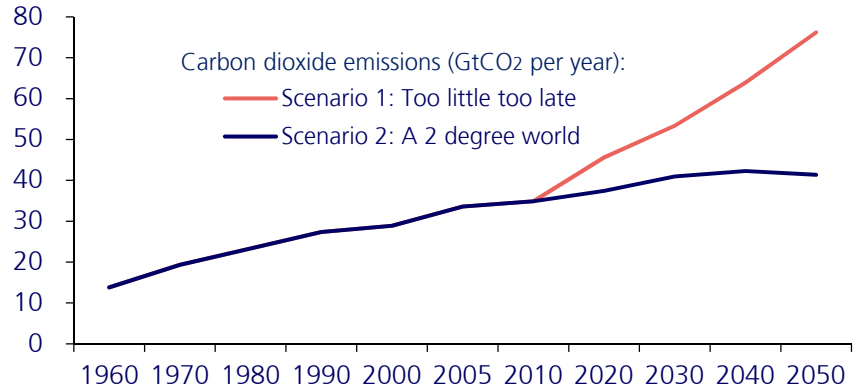
With so much research and scientific evidence being produced, we have devised a simple framework that helps to focus on the critical developments over time that will determine which risks are becoming more or less likely.

Source: iStock by Getty Images

The global economy needs to be transformed over the coming decades to reduce greenhouse gas emissions and avoid catastrophic changes to the climate. Otherwise, a further build up in the concentration of carbon dioxide in the atmosphere, leading to rising temperatures, is inevitable. This will increase the occurrence of severe weather events and dramatically change regional economic prospects. Measures to avoid such a devastating outcome, however, will need to have a material impact on the economic and corporate landscape and will therefore carry their own risks. Either outcome will also offer opportunities, so understanding which type of risks are more likely will be critical from a business perspective. To guide the process of assessing these risks and opportunities, as well as the potential impact that the changing climate will have on economic prospects, we have devised a simple framework that is built around two scenarios, positioned at opposite ends of the spectrum. One scenario is based on the failure to act on climate change, with a steady rise in temperature and rising 'physical risk', such as storms and flooding. The other assumes that effective measures are taken to reduce carbon emissions. Temperature rise is successfully kept below 2°C relative to pre-industrial levels by 2100, consistent with the main aim of the COP 21 climate agreement in Paris, but this carries with it a number of 'transition risks', such as the banning of assets and imposition of tariffs.

The two scenarios represent opposite outcomes on climate change and are easily distinguishable, but in reality the next decade will be characterised by profound uncertainty around climate change policies, new technology, and the behaviours they drive and, as a result, what direction is most likely. To help navigate this uncertainty, we have developed a score card that attempts to measure progress and commitment in critical areas, and detect changes in direction.

Carbon dioxide emissions: Time is against us



Source: Intergovernmental Panel on Climate Change; scenarios correspond to RCP 4.5 and 8.5 respectively

Scenario 1 - Failure to act: Business as usual

In the failure to act scenario, governments and businesses do too little too late to tackle climate change, with temperature rising steadily to well above 2°C. Climate change models show that this leads to rising physical risk, with increased likelihood of extreme weather events, flooding, storms and draught, and an indirect impact on health and

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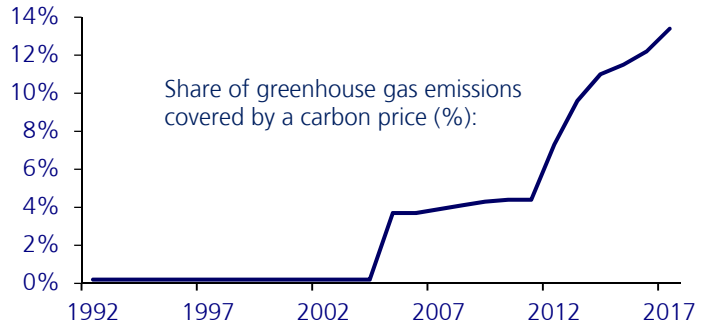
Still far away from a global price on carbon



Source: World Bank Group

resources such as water and crop yield (IPCC's RCP 8.5 scenario, forecasting a mean temperature and a sea increase of 3.7°C and 0.63 meters, respectively, can serve as a reference point). The risk of unpredictable and potentially catastrophic events also rises if tipping points for abrupt and irreversible climate changes are reached, for example due to the melting of permafrost or the ice cap. The presence of these tipping points adds an additional layer of uncertainty around the long-term impact of climate change, both on the physical and the economic environment.

Over the near to medium term, however, physical risk is likely to remain limited, also in a failure to act scenario. Current estimates indicate that physical risk begins to rise more materially beyond the next couple of decades, though regional variations will be large.

Transition risk will also be limited, as policies to reduce carbon emissions fail to be implemented on a global scale, though they can still be material in specific regions. Fossil fuels remain the dominant component of the energy mix, and subsidies to the sector stay in place, while efforts to establish a global price on carbon fail. Measures to encourage renewable energy investment are patchy, and there is a failure to adapt energy systems to large scale and integrated use of renewables.

Risk premia do not fully reflect climate change related risk currently. Over time, we anticipate prices for exposed assets to adjust in response to major weather or flooding events. This may very well drive significant volatility in asset prices over the coming decade, as climate change becomes increasingly certain in this scenario.

As the frequency of extreme weather events increases, policy will become focused on adapting to climate change. Adaptation measures are more likely in high density and developed areas where potential losses are large, amplifying regional variations in vulnerability and risk premia. We also anticipate financial regulation to adjust, to increase the resilience of the financial system to climate change related events.

Regional variation in physical risk is expected to be large, and emerging markets with limited resources will generally be more exposed to climate change than developed markets, reflecting higher physical exposure and less capacity to adapt and protect their economies. China is an exception, given its ability to undertake large scale projects and the current prioritization of climate change on the political agenda. The value of assets that are exposed to extreme weather events will, however, be higher in wealthier and more developed regions, raising the potential for disruptive losses, particularly if measures to increase resilience are initially delayed, or if tipping points are reached.

In a 2°C scenario, adaptation and protection measures will present opportunities as investment needs will be sizable, particularly in infrastructure, but also to secure water and energy supplies, protect coastal zones, and build resilience around food supplies.

Scenario 2 - A 2 degree world: Change ahead

At the other end of the spectrum is a 2°C compliant world, where measures are taken to make progress towards a low carbon economy, with the temperature rise from pre-industrial levels kept at or below 2°C by 2100 (IPCC's RCP 4.5 scenario, forecasting mean temperature and sea level rise of 1.8°C and 0.47 meters, is a reference point). Physical risk is contained relative to the failure to act scenario, though not eliminated, and some regions will be more exposed than others. In the near to medium term, this scenario is dominated by transition risk, as far-reaching changes to the global energy system are needed to reduce the carbon footprint, and every part of the economy will be affected. Independently of the precise pathway to reach a 2°C compliant world, the transition will be disruptive, as significant asset price moves are required to shift resources to the renewable sector on a global scale. The transition will be particularly costly if action is initially delayed, so timing is critical when assessing transition risk.

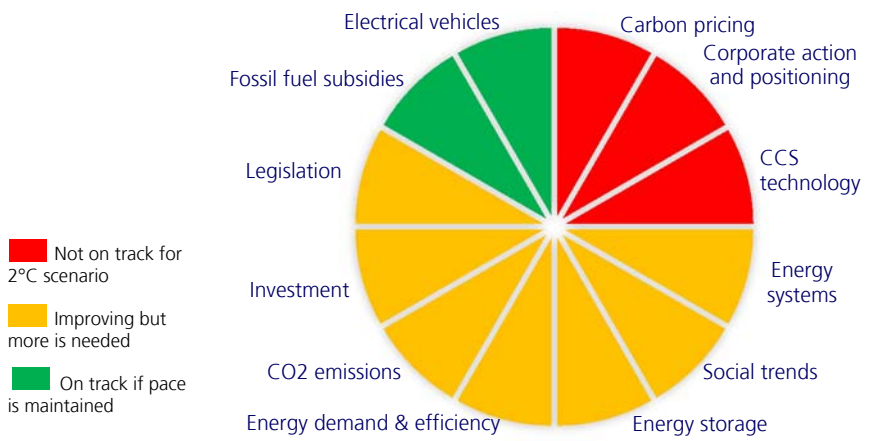
Cost effective solutions such as energy efficiency and switching from coal to gas powered stations will need to be prioritised initially, to leave the door open for a 2°C world. Over time, comprehensive reform of global energy systems with adjustments to storage, grid and network inter-connections, is required to facilitate decarbonisation of electricity generation. Transportation and housing are other key emitters, and dramatic changes will need to take place; the IEA estimates that penetration of electrical vehicles and electrical heat pumps both need to be scaled up by a factor of 100. Riskier solutions, including carbon capture and storage (CCS), which aims at trapping waste carbon dioxide before it reaches the atmosphere, will also be required, however, to offset carbon emission in sectors which are difficult to decarbonise, including aviation and heavy transportation. Nuclear power will also remain an important source of energy in a 2°C scenario.

A global price on carbon will have to be established, and we expect it to be disruptive; The World Bank indicates that a price of USD 80-120 per ton of carbon dioxide emissions is required to achieve a 2°C path. To put this in context, only 13% of global emissions are priced today, with a price of only around USD 10. Global fossil fuel subsidies, which currently amount to over USD 300bn annually, will need to be removed.

Some unburnt fossil fuels will eventually become stranded and undeveloped in a 2°C compliant world, with assets suffering from premature and unanticipated write-downs, as a result of policy actions and unfavourable demand conditions. This presents a strong incentive for suppliers to maximise extraction over the next decade or so. We anticipate that this will put downward pressure on the price of fossil fuels, potentially delaying the necessary transition of the energy sector.

While transitioning to a low carbon economy will be disruptive, there will positive effects on

Score card: Slow progress in critical areas



Source: Zurich Insurance Group, Datamaran, World Bank, IEA, BP, MSCI

the broader macro environment as well, as it will create opportunities across the global economy and multiplier effects will be large. Indeed, successfully tackling climate change is likely to represent such a major leap that it could conceivably put it on a par with other historical transformations.

While these potentially fundamental changes will pan out over the longer term, near term opportunities will be sizable. Countries have to develop a coherent energy policy around renewable energy, to allow for an accelerated expansion of renewables in power and heat. This requires large scale investment to increase storage capacity and integrate green energy into the grid system, creating opportunities for investors and businesses. Estimates by the UNFCCC and the IEA imply that cumulative investment finance of more than $90tn will be required over the next 15 years (or 115% of annual global GDP), with roughly half of that needed for the energy sector alone. The investment needs for a 2°C world are expected to dwarf the adaptation investments that are required in the failure to act scenario.

Score card of key indicators: Monitor critical development over time

To help navigate the intricate uncertainty of climate change, we have developed a scorecard of key indicators, which takes as a starting point our view that far-reaching change is needed to achieve a 2°C world. Rapid progress is required around **policy** and **technology**, and **sentiment and behaviours** have to change. The score card attempts to measures developments in each of these fields, using quantitative data and drawing on a range of climate change scenarios by the IPCC and the IEA. The following requirements are, in our view, critical to leave the door open for the 2°C scenario:

Policy measures: National and regional legislation to make and enforce binding climate change commitments; a global price on carbon; a phasing out of fossil fuels; transformation of global energy system to support large scale use of renewable energy.

Technology and emissions: A rapid rise in the share of renewable energy in the energy mix; progress on energy storage, renewable power and electric vehicles; achievements of near-term targets for carbon dioxide emissions, global energy demand, and energy efficiency; tangible progress on CCS technology.

Sentiment and behaviour: Increased public and private investment in climate change research and clean energy; favourable corporate action and positioning; social trends driving actions to tackle climate change.

What we observe currently is that, while progress has been made in most of the areas, more needs to be done to move in the direction of the 2°C scenario. Carbon pricing remains patchy and inefficient, and the national contributions agreed in the Paris agreement have not yet been reflected in legislation. In our view, good progress in other areas is not sufficient to offset this.

Conclusion

Based on our framework, we assess that the likelihood of being on a 2°C trajectory is relatively low, given slow progress in the two critical areas of carbon pricing and legislative change. Consequently, physical risks will increase over time, while near-term transition risks are likely to be patchy, but relatively low in comparison.

It is to be hoped that technological breakthroughs, such as in carbon capture or electricity storage, can significantly alter the profile of climate change and the commensurate risks and opportunities that present themselves. If not, the longer it takes to adequately tackle global warming, the greater the efforts and disruption will be needed in the decades ahead to counter the rise in extreme weather events.

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