

The Risks and Opportunities
of Climate Change

BUSINESS TRANSITION RISKS AND OPPORTUNITIES

Part 3
[Period/Date]

Overview

Business transition risks and opportunities refers to the market impacts driven by the economic, policy, technology and social changes stemming from the transition to a net-zero carbon economy and the need to adapt to changes in the climate system. It is the most complex and contested of the risks and opportunities associated with climate change because it involves predications about the future interaction between these significant forces.

The key questions for investors when considering climate change transition risks are:

1. Which companies and assets will have to make the greatest and most difficult changes during the transition to a net zero carbon economy and which are best positioned to provide solutions?
2. Which companies and assets will be impacted most, both positively and negatively, due to the worsening physical impacts of climate disruption?
3. What assumptions and methods of analysis need to be tested to ensure the above is being properly incorporated into investment decision-making and ownership practices?

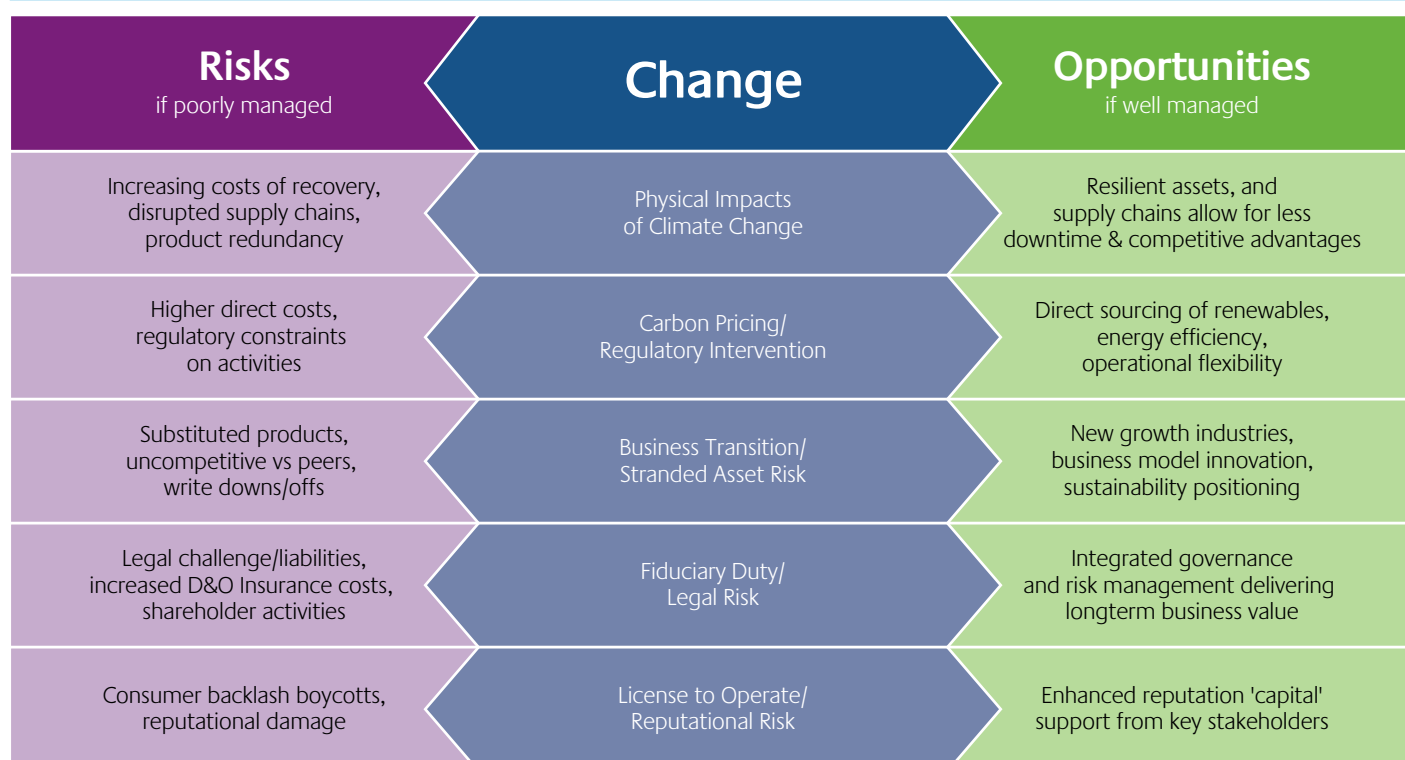
Changes due to the physical impacts of climate change and the ways businesses and investors are responding are covered in the first paper in this series. The second paper covers one of the key drivers of transition risks being the regulatory risks and opportunities associated with carbon emissions and related pollutants.

This paper considers the complex mix of these factors along with disruptions due to the pace of technological innovation and suggests ways investors can manage those issues. Later papers in the series will address the social licence to operate and legal risks that are possible for businesses that fail to manage transition risks effectively. The mix of these factors will pose significant challenges for many businesses including:

- Industries needing to change business models and practices or retool to fit within a low carbon transition. For example, the automotive sector shifting from fossil based fuels used in internal combustion engines to electric and hydrogen fuelled transportation.
- Assets losing value or becoming ‘stranded’ due to an inability to adapt to these changes. For example some fossil fuel assets, as demand shifts and lower cost alternatives become increasingly available.

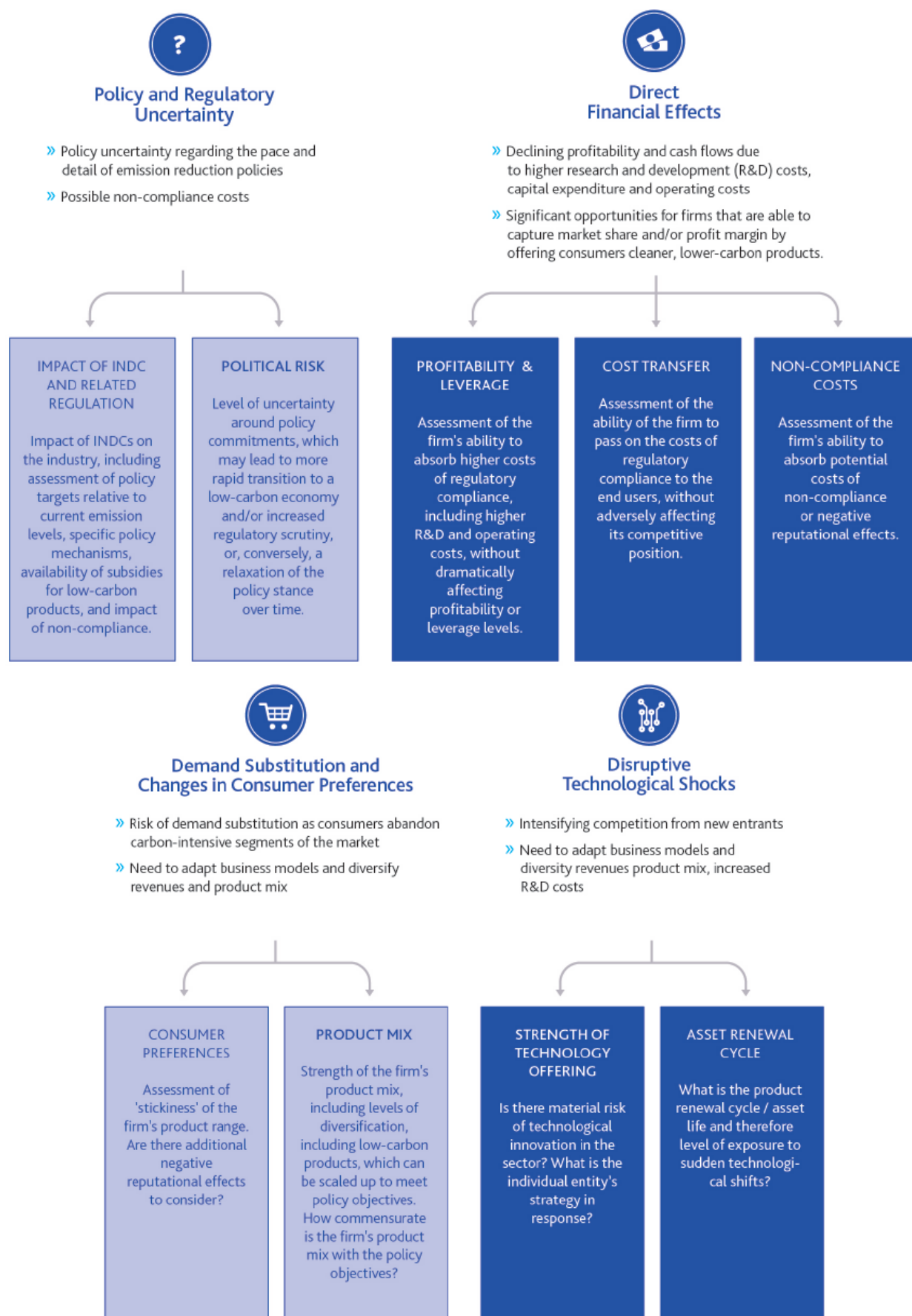
While much of the discussion around climate change and transition risks is focused on negative impacts, for some business these changes will offer significant opportunities as illustrated in Chart 1.

Chart 1: Risks & opportunities in a changing climate



A number of organisations, agencies and investors have developed frameworks for understanding the risks and impacts associated with climate change. Moody's has identified four primary categories of risk associated with net-zero carbon transition that it uses to assess the credit implications for corporate and infrastructure sectors.

Chart 2: Moody's transition risk categories



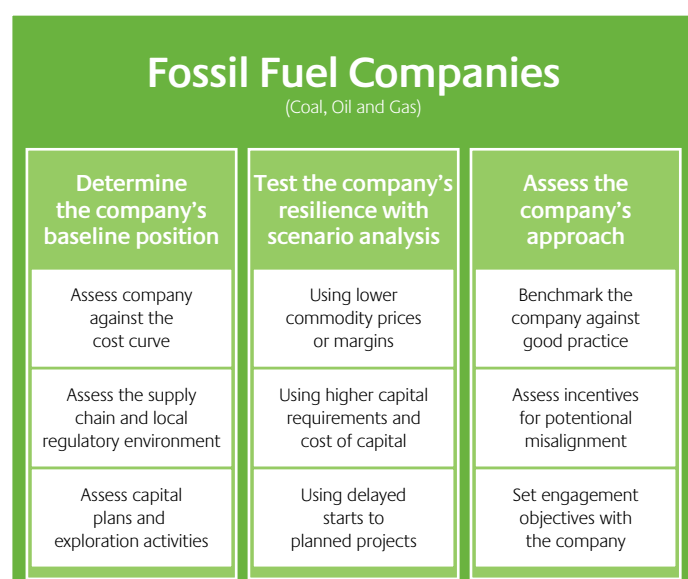
Source: Moody's – June 2016.

These frameworks aid risk analysis and can assist investors in identifying sectors which are most exposed. While these overarching risks can be generalised, individual companies will be affected in different ways due to industry, location and company specific factors (including management quality and adaptive capacity).

Sectoral impacts of transition risks

While fossil fuel related industries are often the focus of transition and stranded asset risks, other industries are also exposed. While some companies can manage these risks, some cannot. The three-step process developed in our Stranded Asset Tool Kit for fossil fuel companies, can be applied to understand these differences.

- Understand the company's baseline position
- Test the company's resilience with scenario analysis/ stress testing
- Assess the company's approach / management quality



Source: CFSGAM Stranded Assets Toolkit 2015.

In most cases the transition risks also result in significant opportunities where a company can position itself to benefit from low carbon tailwinds and avoid high carbon headwinds. For each company their capacity to adapt will be a critical consideration in understanding their resilience.

When considering transition risks across a broad range of sectors, some of the influences on the ability for a company to transition successfully include:

- **Capital intensity and lifecycle of products/assets.**
Companies with high capital costs and long lifecycles for plant and equipment may mistime capital investments requiring costly refitting or possible stranding of those assets in a rapidly changing environment. E.g. electricity generators, capital goods.
- **Embedded emissions of inputs to production process.**
High levels of carbon embedded in plant, equipment or inputs to production processes may result in higher costs, reduced availability or changing quality for those inputs due to regulatory or other market changes. E.g. construction, capital goods.
- **Emissions intensity of production process.**
Emissions intensive production processes will invite competition with low-emission alternatives developed or substitutes sought for the products. E.g. cement, fertiliser, livestock.
- **Substitutability of inputs and/or the final product.**
The inability to substitute those inputs that have high embedded emissions or the ability of customers to substitute a company's products for less carbon intensive alternatives could result in existing products becoming uncompetitive. E.g. vehicle manufacturers and meat and dairy products. Conversely, where substitutes are not readily available this may reduce transition risks in the near term e.g. steel, airlines.
- **Emissions intensity of products.**
Companies whose products are emissions intensive in the use phase will face increasing pressure from more efficient new products and shifting client demand. E.g. lighting and appliance manufacturers.
- **Change in demand driven by change in consumer preferences.**
Change in demand preferences by both business and retail consumers can accelerate the development of alternatives by competitors or result in the loss of a company's social licence to operate. E.g. thermal coal mining.

Opportunities exist across these areas for companies, as they do for managing the physical impacts of a changing climate as was discussed in the first paper in this series.

On their own any of the factors could be managed by a quality management team with a good long-term business strategy and planning; however, where this is not the case or where a company is faced with multiple headwinds, transition risks can result in significant financial losses and/or missed opportunities.

Considering the influences listed above, our climate change working group analysed 24 sectors and industry groups against the key risks and opportunities in transitioning to a net zero carbon economy. Our analysis found the most exposed industries groups to transition risks are:

Sector	Capital intensity of product/asset	Embedded emissions of inputs to production process	Emissions intensity of production process	Substitutability of inputs/final product	Emissions intensity of product	Consumer preference driving change in demand
Consumer discretionary - Automobiles and components	✓	✓	✓	✓	✓	✓
Industrials - Capital goods	✓	✓	✓	✓	✓	✓
Energy	✓		✓	✓	✓	✓
Materials	✓		✓	✓	✓	✓
Utilities	✓	✓	✓	✓		✓
Industrials - Transportation	✓	✓			✓	✓
Real estate	✓	✓		✓	✓	✓
Consumer discretionary - Consumer durables and apparel		✓		✓	✓	✓

Transition risk and scenario analysis

Transition risk has started to play out for some companies and sectors. Moody's (2016) believes that credit quality for coal mining, coal terminals and unregulated utilities is already being impacted. For other sectors, the credit impact could become material over the medium to longer term (three to five years or more). For these organisations, the timing and magnitude of transition is unknown. This presents a challenge for understanding the potential impact of climate change on their business, strategy and financial performance.

To appropriately incorporate the potential effects, organisations need to consider how risks and opportunities may evolve and the potential implications under different conditions.

The Taskforce on Climate-related Financial Disclosures (TCFD) recommends companies and investors use scenario analysis to test whether business strategy will prove resilient to the economic, social and environmental changes related to climate change. Some scenario analysis focuses on emissions generated by the business itself and from the energy it purchases/uses (known as 'Scope 1' and 'Scope 2' emissions). However, it is also important for companies to understand the life-cycle of their products and any downstream and upstream ('Scope 3') emissions which may present head winds or tail winds.

A number of scenarios have been criticised due to misaligned and unrealistic assumptions, challenging these is an important stewardship responsibility for investors.

The attached case study shows how these risks and opportunities are playing out for the electricity sector as an example.

Investment implications

Throughout this series we have mapped the different climate change related risks to specific actions investors can take to engage with the issue in a holistic way.

We have recognised that this has varying degrees of practicality for different types of investors and different asset classes. For example, assessing the risks related to the physical impacts of climate change for a direct property portfolio with five buildings is more straightforward than as a minority shareholder with a portfolio of 60 multinational corporations. This is where the work of investment managers and ESG research firms will be vital in assessing and reporting on these risks and opportunities.

Transition risks blend physical impacts of climate change, regulations, technology, legal duties and reputation, and so can pose highly specific risks at an asset or company level, some of which are manageable while some are not.

However, investors can employ various strategies to incorporate transition risks in a manner that makes sense for their asset class or investment style.

Including transition risks in assessments of companies and their assets

The way transition risks will affect companies and sectors will vary depending on how and where they do business. Companies in the same industry can have vastly different challenges.

For example, Canadian-based aluminium manufacturer Alcan International (part of Rio Tinto) uses hydroelectric power and produces lower-emissions aluminium than many of their competitors who rely on emissions intensive coal powered electricity. While from a carbon emissions perspective this positions Alcan well, these facilities may face challenges from the physical impacts of climate change if it disrupts the flow of water into hydroelectric facilities.

These nuances mean sector or country level assessments may be overly blunt and penalise those companies best positioned to contribute to and benefit from the transition to a net-zero carbon economy. A company-level assessment framework allows investors to better understand and manage company specific transition risks. Scoring methodologies can be developed which allow these risks to be assessed across a portfolio.

Frameworks such as the one we described in this paper or as has been developed by Moody's can be used to better understand these issues. Incorporation of physical risks and additional factors for some highly exposed industries, similar to those used in our stranded assets framework, could also be considered. These need not be excessively complicated and can often be achieved by considering existing information in different ways. For example, traditional quality metrics like debt-to-equity as a proxy for adaptive capacity.

Integration is key to successfully managing transition risks and opportunities

Ultimately, to be sustainable and effective, investors need to develop processes and frameworks that are consistent with their investment beliefs and that integrate seamlessly with their investment processes. Testing and retesting beliefs and processes in this context is also important given the changing environment. John Maynard Keynes quote is apt here “When I find new information I change my mind; what do you do?”

For some investors performing bottom up company analysis is not possible, in which case the growing number of ESG research providers who offer ratings that capture transition risks may be a viable alternative. These ratings can be a helpful tool however they do remain a relatively new area for providers which will require further development and industry engagement.

Given the evolving nature of information and tools, engaging with initiatives like the Transition Pathway Initiative run by the Grantham Institute or using tools such as the Paris Agreement Capital Transition Assessment Tool (PACTA) can help investors grow their collective understanding and develop processes that are fit for purpose. It is important for investors to recognise that the whole industry is on a journey to better understanding these issues.

Test balance sheet, income and cash flow assumptions

Financial assumptions for companies exposed to transition risks should be carefully scrutinised as not all transition risks are obvious.

For example, while car manufacturers will need to alter their production processes to switch to electric vehicles, downstream impacts from this change could be even more significant. This is because electric vehicles have fewer parts and require minimal servicing compared to internal combustion engines, this in turn will have impacts for car servicing and spare-part sales. What on the surface may seem like a balance sheet consideration may in fact be more material in P&L and cash flow statements.

Similarly, tightening pollution standards will shift the financial position of some companies. Following new mercury standards for US power stations introduced in 2012, a number of plants chose to close rather than upgrade to meet the new standards. For some, this brought forward costs associated with site remediation, which may not have been fully reflected on company balance sheets.

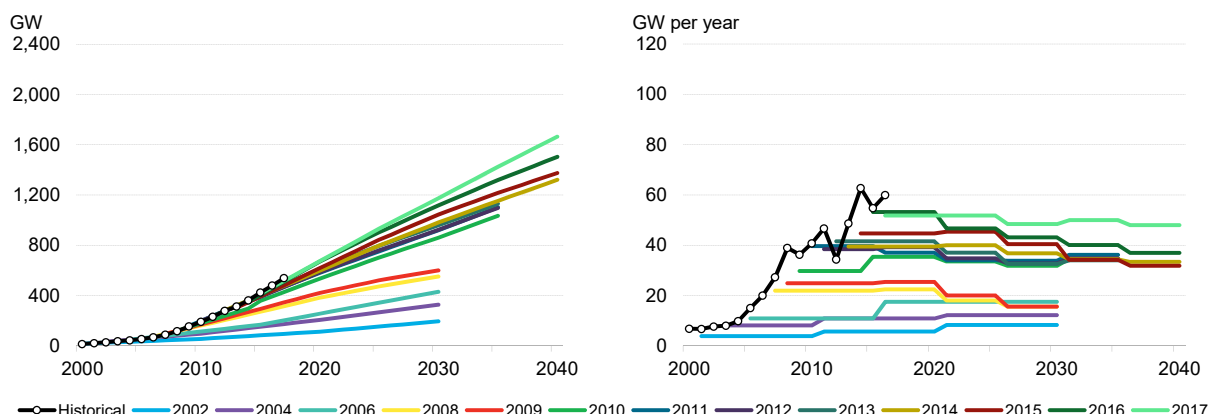
Conversely, many companies can achieve significant savings through energy efficiency, changing production processes and investment in lower cost clean energy alternatives.

Understand changing demand for goods and services

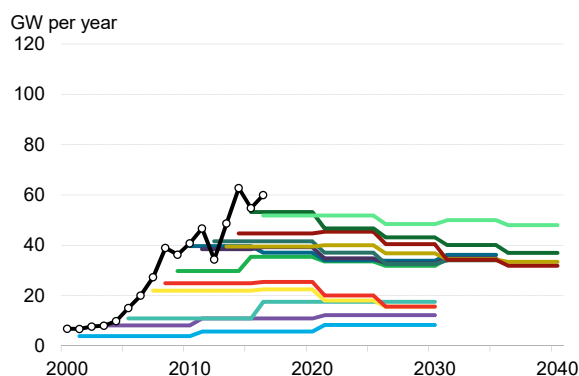
Demand is and will continue to change in unexpected ways for different products and services. Applying a climate change lens can help test the assumptions behind forecasts, particularly where they are not consistent with Paris objectives or other drivers of transition risk. For example, the IEA has consistently underestimated the adoption and penetration of renewable energy technologies despite their exponential growth rates.

Difference between IEA scenarios and actual renewable energy growth

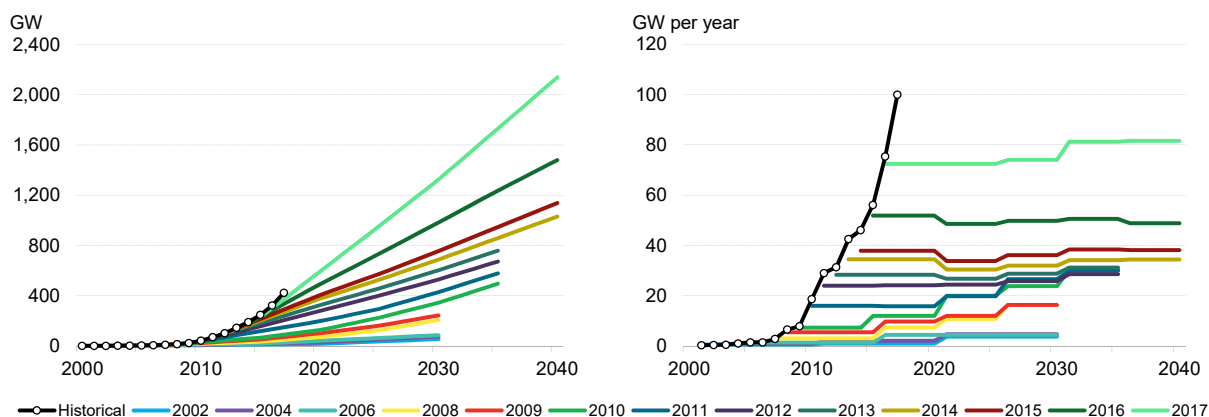
Global cumulative wind installations



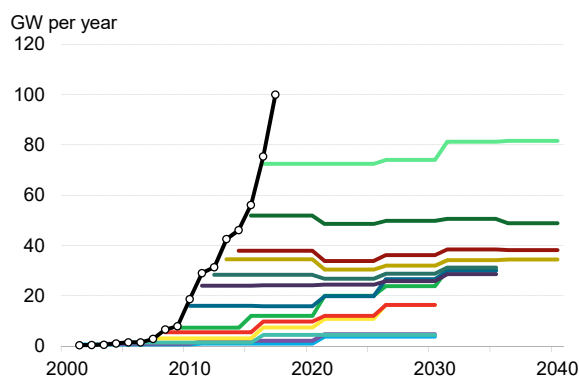
Annual wind additions



Global cumulative solar installations



Annual solar additions



Source: Liebreich Associates, IEA World Energy Outlook.

While changing demand is most often discussed in terms of energy, it is relevant for many companies' products and services. For example, Tata Consultancy Services has a framework called the TCS Energy Value Ecosystem that covers a host of next-gen energy infrastructure including but not limited to; connected home, home energy, district generation forecasting and integration, and electrification of mobility.

The broader drive towards green finance further supports these business strategies as Green Bonds and other financing structures are developed to fund these activities, at the same time high carbon alternatives face higher costs of capital.

Companies across value chains are affected by these shifts. While on the surface battery manufacturers like LG Chem are well-positioned for the shift to electric vehicles and storage, a diverse range of companies are benefitting from the transition in transport. For example¹:

- **Ansys** software is used throughout the auto supply chain and including Plug-in Hybrid Electric Vehicles ('PHEV's). This helps everything from reducing battery cost and increasing life to eliminating catastrophic battery failure, minimizing rare earth usage and many other key roles.
- **Henkel** through their adhesives business supplies specialist products to the entire auto market, including EVs and battery cells.
- **Nordson** supplies fluid-dispensing systems for EV battery production.
- **SGS** conducts environmental simulation tests which helps to understand required EV charging infrastructure.
- **Spectris** automotive segment, particularly through the growth in hybrid and EV, has been an important driver of their test and measurement business for some time. Furthermore, last year they acquired VI-Grade which is a global supplier of vehicle simulation solutions and services.
- **Tech Mahindra** not only supplies smart grid services including renewable integration, micro grids and EV charging but through their stake in Pininfarina hopes to generate \$500m from hybrid and EV revenues over the coming 3 years.

Scrutinise supply chain risks and ease of substitution

Investors should consider supply chain transition risks including the substitutability of inputs into final products. As stated previously in 'sectoral impacts', companies who are unable to substitute inputs with lower carbon alternatives could see product demand or input costs effected.

Products that have emissions intensive production processes will also attract competition from companies that are innovating around a low carbon future. These changes can be as unexpected as the growth in 'meat' produced from plant proteins that have the same characteristics and flavour as animal based products.

Financial institutions also face potential risks, as a failure to consider these issues when lending or investing may cause unexpected losses as assets become stranded or industry dynamics change.

Financial contagion is possible as businesses and consumers are subject to increased costs of insurance and in some cases the withdrawal of coverage. Changing physical risks will impact property valuations that could in turn have knock-on effects to banks' lending portfolios as loan to value ratios rise beyond their risk appetites. The timing difference between insurance contracts, which are renewed annually, and bank lending, which can have terms lasting decades, threatens to squeeze unprepared financial institutions.

It is due to risks like these that 34 central banks and supervisors – representing five continents, half of global greenhouse gas emissions and the supervision of two-thirds of the global systemically important banks and insurers – joined forces in 2017 to create: the Network for Greening the Financial System (NGFS).

Engage with company management and other stakeholders

The nature of the risks described above will require high quality company boards and management teams who can navigate increasingly narrow paths to a net-zero carbon economy, while adapting to changes that cannot be avoided. Investors play a critical role in this regard both in setting expectations and, for equity holders, voting for directors, remuneration and other resolutions.

Asking companies to produce disclosures aligned with the Task Force for Climate Related Financial Disclosure (TCFD) is a good first step for improving the information investors need to engage with companies effectively.

Even investors who, due to their investment approach, may not normally engage with companies, can ensure they meet their stewardship responsibilities through collaborative initiatives like the Climate Action 100+ which is the largest coordinated engagement effort ever undertaken by institutional investors.

Support for and sponsorship of climate change shareholder resolutions, particularly for passive investors, is another important lever investors can pull.

Engagement with governments, regulators and clients is also needed for shifting the financial system so that it favours low carbon investment while generating long-term value for underlying investors. Initiatives like the sustainable financial system work being undertaken in the EU, Canada, China, New Zealand and Australia among others are needed to accelerate this shift.

Conclusion

Achieving the Paris agreement targets and transforming the economy is a financial, social and environmental necessity which investors are important agents in delivering. For long-term investors these objectives are inextricably linked to financial objectives.

While the term "transition risk" implies a steady and somewhat gentle process, this is not likely. There is a continuum between the catastrophic impacts of climate change and the significant disruption and innovation required to reduce emissions in line with the Paris Agreement. Investors must be able to demonstrate they are taking appropriate steps to navigate these issues and increasingly must demonstrate they are making a positive contribution.

Long-term investors, like the companies they invest in, are faced with the challenges of making decisions in this rapidly changing environment. Developing assessment frameworks and challenging assumptions will help investors make better decisions. Engagement with investee companies will set clear expectations and ensure they are being met. While advocacy with governments and other stakeholders is needed to shift the financial system so that it can play its full role in delivering climate action.

¹ Please note these company examples are owned in Stewart Investors Worldwide Sustainability Fund, are for illustrative purposes only and are not an investment recommendation.

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