

Financing the energy transition

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1. Introduction – the crisis in the energy industry

A key risk to banks, institutional investors and others holding financial assets is the potential impact of global warming on their holdings of energy assets. Global warming will also impact other, non-energy, financial assets. These impacts will reduce the value of investment portfolios and, at worst, could severely impact the ability of banks and institutional investors to finance the energy transition that will be required over future decades. In this chapter we consider how a shift from bank financing to bond market financing, some new regulations on banks and institutional investors, and some new approaches to risk allocation may minimise the impact of global warming on banks, investors and society.

Evidence that institutional investors are starting to think about these issues comes from a warning¹ on climate change issued by Schroders, one of the largest investment managers. Head of sustainable research Andy Howard observes that on the world's current path, global temperatures are likely to rise – not by two degrees above pre-industrial revolution levels, but by as many as four degrees. He goes on to say that a consequence is that investors may not be able to avoid the forces of nature colliding with financial markets in the years and decades ahead. His analysis suggests that 15% to 20% of corporate cash flow, on average, is at risk because of climate change. Within this average, up to 100% of cash flow may be at risk for particular assets.

This belief is echoed by Aviva Investors, one of Europe's largest investors. According to the *Financial Times*,² Aviva Investors has warned more than 1,000 companies globally that they face shareholder backlash at their annual meetings next year if they fail to disclose publicly the risks posed to their business models by climate change. The large insurer has said that it will vote against the annual reports and accounts of companies that fail to embrace recommendations set out in June 2017 by the Task Force on Climate-related Disclosures, a group backed by the Financial Stability Board at the Department for Business, Innovation and Skills. Steve Waygood, an Aviva investment officer, noted that:

The transition risk, the physical risk and litigation risk will be very material for some sectors. This isn't about people's conscience, or the panda or the polar bear. It's about people's pockets.

1 "Schroders warns over climate change risk", *Financial Times*, FTFM, 17 July 2017.

2 "Aviva Investors demands greater climate change disclosure", *Financial Times*, 20 July 2017.

Governments around the world are also considering the impact of global warming on the long-term (systemic) sustainability of the financial system – as evidenced, for example, by an EU report³ on ‘sustainable finance’. In the foreword to this report, the EU vice-president for Financial Stability, Financial Services and Capital Markets Union and the vice-president for Jobs, Growth, Investment and Competitiveness include this paragraph:

The commitment to hardwiring sustainability into EU policies and cross-cutting initiatives is already ingrained in the Mid-Term Review of the Capital Markets Union Action Plan. But a deeper re-engineering of the financial system is necessary for it to become truly sustainable from an economic, social and environmental (ESG) perspective. (emphasis added)

In our view, sustainability of the financial system means two things. First, that the finance industry should be structured to ensure that it can make the fullest possible contribution to sustainable and inclusive growth of the global economy while taking full account of ESG factors. This will require a substantial shift from intermediation through depository institutions (banks) to intermediation through debt capital markets to spread risk more widely. Second, ensuring that if climate change impacts more suddenly and severely than expected on global real assets, that the resulting fall in value of the corresponding financial assets does not damage the financial system so severely that it is unable to achieve the first objective. This will be achieved also by spreading risk through the capital markets as well as the banking system, but equally important will be a reduction in investment by both banks and capital markets in financial assets which are backed by carbon-generating real assets.

Ensuring that the financial system can continue to contribute to the sustainable growth of the world economy requires that it makes some adaptations, which we discuss below. These adaptations should also minimise the risk that the financial system becomes unable to perform its main function due to a systemic financial crash arising from global warming.

The manifestation of climate change risks may, in practice, result in a low, medium or high level of impact on the economic system and on human welfare. The global economy might be able to cope with the low- or medium-risk scenario, but the high-risk scenario would be one in which the banking system and capital markets will have become so weakened as a result of the impact of climate change that, unaided, they will be unable to support the level of new financing needed.

At the lowest level of impact, financing for carbon-based energy projects may simply become unavailable in the decade ahead, at least in the West. This risk is not a ‘black swan’ risk as it can be seen already from the evidence of institutional investors exiting their existing carbon-based investments and refusing to allocate funds to new ones. The risks of holding investments in fossil fuel activities (‘stranded assets’), including oil, gas and coal reserves, gas liquefaction, fossil fuel-fired power generation including combined cycle gas turbines (CCGT), space heating and transport assets to which investors are now paying ever more attention, are dramatically greater than at the time the first edition of this book was published in 2011.

3 EU High-Level Expert Group on Sustainable Finance, *Interim Report*, July 2017.

This trend away from investment in carbon-producing assets is being accelerated by regulatory requirements now being imposed on insurance company asset portfolios in a number of countries to force them to avoid the risk of being invested in 'stranded assets' and the consequent possibility of financial loss. Comparable regulations are also likely to be imposed on pension funds and banks. All the major systemic financial risk organisations (including the central bankers in the Basel Committee) are analysing the impact of a sudden fall in value of carbon-based assets and hence the potential for a dramatic climate change event setting off another financial crisis.

At the medium impact level, a move to a more rapid decarbonisation than at present as a way of achieving a new steady state of 'acceptable' carbon emissions (ie, much less than the four degrees scenario) may require carbon capture and storage (CCS) on a large scale in the short term. A large reduction in atmospheric carbon release will require a dramatically increased level of investment in alternative technologies (ie, non-carbon based) and may also have to include CCS from the atmosphere. However, as we explore below, the banking system alone will not be able to provide this level of financing. It will require the participation of the capital markets on a much larger scale than has been the case to date. It is the increase in capacity (liquidity) and hence cost of finance that capital markets can bring, and the additional spreading of risk that results from extending capital market financing, that makes it so important to work towards greater use of bond markets.⁴ New mechanisms to alter the pattern of risk allocation in project financing, as discussed below, will also be important. State support is also likely to be required, whether in the form of guarantees or actual financing.

At the highest impact level, there is the possibility of a 'climactic' climate event – a sudden shift in the speed of climate change impact on Earth. This is also not a black swan risk. Its impact will be on not only physical aspects of life on Earth, but also financial. First, it could make much of our existing infrastructure – ports, some railways, some low-lying towns, water supplies and of course much power generation infrastructure and gas-related assets – no longer viable for use, thus resulting in a huge write-off of assets by the pension fund, insurance, banking and asset management industries, as well as by households to an extent well beyond the impact of the current debate on 'stranded assets'. At the same time, it would create a demand for capital for new infrastructure and non-fossil generating capacity from a banking and capital market industry that would have been severely damaged by such a crisis.

The solution to global warming is often discussed in terms of the power generation sector and the elimination of coal and oil power generation. However, gas (CCGT) power stations, while not as polluting as coal, still generate 50% as much carbon dioxide (CO₂) as coal for a given output of electricity. Natural gas is also the main source of energy for space heating of commercial, industrial and domestic

⁴ A good technical guide to bond market financing for sponsors and developers is the *Guide to Infrastructure Financing* produced by AFME and co-authored by the authors of this chapter in conjunction with the AFME/ICMA Infrastructure Working Group of industry professionals; www.afme.eu/en/reports/publications/guide-to-infrastructure-financing/.

buildings. However, not only is such natural gas combustion a large contributor to total greenhouse gas production, in cities it is also a major source of local air pollution (nitrogen oxides or NOx), adding to that of petrol and diesel vehicles. This type of pollution is a hazard to health and thus, in the long term, natural gas assets such as gas extraction, liquefaction, pipelines and local distribution networks are also under threat.

2. **Fundamental factors reshaping the financing of the energy industry**

Some of the fundamental factors that are impacting the financing of energy-related assets include the weakening of utility company balance sheets as a result of grid access priority to renewables, bank regulatory changes, subsidy to renewables, ever-more leveraged balance sheets of utilities, and the loss of monoline insurance facilities. On the asset manager side of the equation, the impact of a long-term low interest rate (low yield) environment on institutional investors in both debt and equity markets has been to cause them to seek higher yielding financial assets of which clean energy-related project finance assets (debt and equity) are one example. This is the good news for the transition.

At the same time, the beneficiaries of investment institutions' financial asset holdings (pension policy holders, long-term savers, students benefiting from endowment funds etc) are increasingly holding their agents (institutional investors) to account in terms of ESG factors and especially in relation to carbon-emitting investments. Bank customers may also have regard to the extent to which their bank is financing what they see as environmentally damaging assets, particularly as a result of new regulatory rules on transparency of lending which enables an analysis of the banking book. This is also good news for the transition process.

The key to whether ESG factors, in particular environmental factors, will determine the financial and real investment strategy of banks and investors could depend on the approach to ESG factors taken by the two major powers in the world – China and the United States – and specifically by their presidents. Unexpectedly, perhaps, President Trump's threatened withdrawal from the Paris agreement has seemingly strengthened President Xi's resolve to make his country the world leader in mitigating the impact of climate change. As an article in the *Financial Times* by Nicholas Stern has noted:⁵

China has recognised not only the grave risks of unmanaged climate change, to which it is very vulnerable, but also the great attractions of an alternative path for growth which is cleaner, more efficient, innovative and dynamic. At home, its most recent five-year development plan reflected profound changes to its economic strategy that incorporate sustainable development.

This change is also reflected in BP's 2017 Statistical Review,⁶ which reports that: *A dramatic decline in the use of coal resulted in global coal use falling by 1.7%. Chinese coal production fell by 7.9% in 2016, while the price of steam coal increased by over*

5 "China is shaping up to be a world leader on climate change", *Financial Times*, 20 January 2017 www.ft.com/content/3f1ba5ba-ddac-11e6-86ac-f253db7791c6.

6 www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf.

60%. China also enforced measures that restricted coal mines to operate for a maximum of 276 days of a year.

It must be noted, however, that China's drive for investment overseas, in Asia and Africa in particular, is in part driven by a desire to obtain minerals – coal, oil and gas – for domestic use, which is not conducive to reducing carbon emissions. According to an article⁷ in the *New York Times*, Chinese corporations are building or planning to build more than 700 new coal plants at home and around the world, some in countries that today burn little or no coal. They report that four out of five of these coal-fired plants are to be in China. Provided city dwellers are not being directly affected by the emissions from these new plants, they are likely to be easily financed by the Chinese policy banks. In addition, there are few fiduciary or disclosure responsibilities for banks or investors as in the West.

In the United States, some observers wonder if the Trump effect will wipe out the shifts in energy mix that have been ongoing in that country for many years. This seems to us unlikely as many of the targets already set in the United States are based on shifts in energy use and the energy mix that are largely driven by market forces or environmental laws that a president is unlikely to be able to overturn. For example, energy efficiency – both domestic and residential – is likely to continue improving and an ongoing move from coal to natural gas, solar and wind will likely continue as their costs decline and will not be stopped by regulation. While natural gas is not environmentally friendly, as an interim solution in the United States, its CO₂ output per unit of power produced is approximately half that of coal, therefore providing short-term mitigation benefits. In addition, many cities and individual states such as California will continue with their climate-friendly policies regardless of what Washington might like during any particular presidency.

In the case of the United States, however, it has to be added that obtaining financing for new shale wells for oil and gas production (shale output is now said to be half the US total) has recently proved much easier than some expected, given the sharp decline in price for oil and gas and the traditionally high production cost of shale wells. Producers have, however, been able to reduce production costs better to match falling selling prices, and banks and high yield bond lenders have once again become willing to provide financing. More importantly, perhaps, has been the willingness of private equity funds to support development. Reuters reports⁸ that drilling joint ventures, called 'DrillCos', combine cash from investors such as the Carlyle Group LP with drillable-but-idle land already owned by producers. Investors get a promise of double-digit returns within a few years, while producers can raise output without spending more of their own cash. These ventures have raised \$2 billion in the last 24 months. DrillCos take control of drillable land and generally turn over 100% of the cash flow from oil and gas production to investors until they earn a 15% return. At that point, control reverts to the producer, with the investor's stake shrinking to about 10% of remaining production.

7 "As Beijing joins climate fight, Chinese companies build coal plants", *New York Times* online, 1 July 2017 www.nytimes.com/2017/07/01/climate/china-energy-companies-coal-plants-climate-change.html?_r=0.

8 "FinTech now financing: US shale firms get creative to pump more oil", *Reuters*, 13 July 2017. www.reuters.com/article/us-usa-shale-drillco-analysis-idUSKBN19Y17R.

2.1 Change in sources of equity for energy financing

In the last five or more years, there have been changes in the sources of long-term equity finance for clean energy and these are expected to continue. In the past, a high proportion of wind farms in Europe were financed on balance sheet by utilities which financed, built and operated them. Today, institutional investors have supplanted a considerable proportion of such investors, although these same utilities may subsequently operate such wind farms.

Much of this switch has resulted from the financial difficulties of many utilities and the fact that their balance sheets are already more highly leveraged than their investors are comfortable with. This has also affected the water industry in some countries such as the United Kingdom and resulted in some water companies being forced to undertake new investment through a regulated project company (see Thames Tideway project at 2.7(e) below).

The increase in the use of project finance and the technological improvements in wind power, specifically offshore, have enabled it to become more established as a relatively safe brownfield investment for equity and debt investors due to the increasing efficiency and lower cost of such technology and a greater experience of on-time and on-budget construction.

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