

# Taking a risk on the weather

**Swenja Surminski** looks at how the insurance industry is having to adapt to cope with the challenges of possible climate change and highlights some of the problems it faces

Insurance has for centuries been used as a tool to manage the risk of uncertain losses. This reduction in uncertainty is seen as an important mechanism driving our economic systems: without insurance many activities and processes would be too risky to undertake. Moreover, in the event of a loss, those affected might struggle to recover.

The success of the insurance mechanism depends on a proper understanding of risks, a sound investment strategy and the continued trust of customers. Climate change is expected to affect all three. For some companies, the impact can already be felt, with many insurers finding it difficult to analyse climate risks, particularly for their investment portfolios. Surely a sector with such a rich expertise in risk management knows how to deal with our changing climate?

It is certainly engaging with the issues. In 2015, the UK's Prudential Regulation Authority (PRA) published the first climate change report written by an insurance regulator, summarising the risks to the industry under three climate change risk categories.

**1. Physical risks.** These include losses arising from extreme weather events, with damage to houses, infrastructure, crops and other assets, as well as business interruption and sovereign risks due to budgetary shortfalls when a disaster strikes.

**2. Transition risks.** These arise from a move to a lower-carbon economy, which may have an impact on those insurers that invest in carbon-intensive assets.

**3. Liability risks.** These are linked to compensation requests from parties that have suffered from climate change, or related to duty of care through professional indemnity and company claims.

The insurance industry has come a long way since the late 1970s when a few experts working for global reinsurers started to warn that growing greenhouse gas emissions could push up the costs of natural disasters to unknown levels.

What began as a highly specialised research topic has now become an area of public engagement. Industry schemes include ClimateWise, the Munich Climate Insurance Initiative and the UN's Environment Programme Finance Initiative's insurance working group, as well as activities from national trade bodies and industry associations, such as the Geneva Association. For a sector often perceived as conservative, with slow innovation and little public visibility, this is quite an unusual journey. But it is hardly surprising, considering the scale of the challenge.

## Is the sector prepared?

The PRA report concludes that the UK's insurance industry appears fairly well placed to respond to current climate risks (PRA 2015), primarily because of the sector's experience with uncertainty, complex risks and companies' flexibility to review terms and conditions on an annual basis. With annual policy renewal they can withdraw from the market at quite short notice, which is why many underwriters seem fairly relaxed about these risks. Withdrawal from investment exposure is

potentially more problematic, but even there not impossible. However, withdrawing insurance cover comes with a high reputational risk, particularly in long established markets such as the UK, where flood insurance provision has become a very public and politically charged topic.

While this gives the sector a degree of flexibility, the overall business model as well as investment portfolios are likely to come under more pressure from climate change

unless companies, government and regulators do their homework and plan ahead. Identifying and analysing the current and future impact of climate change on insurers' operations is not straightforward. Insurers are struggling to anticipate the scale of climate change using existing risk assessment models and techniques. Efforts to factor the increase of loss events into insurance risk models have been hampered by the lack of data and prevailing uncertainties around the degree to which climate change is occurring, as well as the change in frequency and severity of extreme events

In spite of these challenges, there has been a significant shift in the way the sector calculates risk, at least on the underwriting side, but it has taken a long time. Today, some companies seem better prepared than others, judging from their technical capabilities, involvement in risk modelling and discussions with the science community and political decision-makers. Translating this risk knowledge into investment decisions appears even more difficult and will require new efforts by the industry and its partners.

But for the sector it is not enough to ensure its own resilience. What also matters is if and how society can tackle the underlying problems of rising emissions and growing disaster risks. Here the industry can play several roles: fostering a better understanding of the underlying issues, encouraging and incentivising behavioural change and supporting new technologies and risk transfer needs.

## Challenges for UK insurers

The London market is a hub for global insurance flows and is bound to feel the impact of a changing climate across the world. The challenges of climate change can already be seen in some areas – offering insights into whether and how UK companies are responding to the challenges.

### Flood insurance

This line of insurance is often regarded as the most technically challenging because of a lack of accurate exposure assessment and difficulty in estimating the probability of event occurrence and the potential losses faced (Botzen and van den Bergh, 2009). In 2009, the Association of British Insurers (ABI) estimated that there could be significant increases in UK flood losses and premiums during this

Insurers are struggling to predict the scale of climate change

century without strong efforts by the government and other stakeholders to reduce flood risk. In response, the industry has focused on improving the underlying risk data and its modelling capacity. Often this is by working with public authorities, as in the engagement of the ABI with the Environment Agency to improve the quality of flood maps in the UK (ABI, 2008). An improved understanding of flood risk is important but

## Flood Re is designed to secure affordable cover for those at risk

what use is it if the risks continue to rise and insurance becomes unaffordable?

A new “Flood Re” reinsurance scheme, designed to secure affordable cover for those at high risk, is due to start

operating this spring. [See pg 48 of this magazine.] Offering low premiums, the pool relies on a levy paid by all insurance customers. It has a proposed lifetime of 25 years but it is unclear if and how future risk trends, including climate change, have been taken into account when designing it.

New research (Surminski S and Eldridge J, 2015) shows that growing flood risks (with climate change, land use, urbanisation and population increases all playing a part) will make it difficult for schemes such as Flood Re to keep flood insurance premiums low. Flood Re is designed as a temporary measure, a tool to “buy time”, but in its current form the scheme will not help to address the underlying causes of flooding problems. This matters because if such schemes only transfer risk, they can generate moral hazard.

Moral hazard can arise at government level, where the existence of an insurance scheme may lower the urgency to prevent and reduce risks, or at the insured level, where the purchase of insurance may lead to a false sense of security. In theory, risk-based pricing should help prevent moral hazard and promote risk reduction behaviour, but evidence about how this works in practice is limited. Other stakeholders may be needed to reflect on how to reduce risk, such as property developers, home-builders and mortgage providers (Surminski, 2014).

Another subject that could become a challenge is access to flood insurance for SMEs. One survey, by the Federation of Small Businesses in 2014, shows that this is already a problem for SMEs that have previously been flooded and there is concern that this number could rise.

### Investment

The UK insurance industry is the largest in Europe and the third biggest in the world, managing investments of £1.9tn, according to the ABI. Investment decisions by insurers usually do not consider the climate risk knowledge gained on the underwriting side. The PRA notes that physical risks arising from climate change are likely to be particularly relevant to the investment portfolios and policyholders of life insurance companies. But a recent publication from the University of Cambridge (CISL, 2015) warns that financial markets may be affected well before the significant physical effects of climate change are felt, for example through the “stranding” of fossil fuel assets and technological changes.

As highlighted by the PRA report, there is a significant disconnect in the industry in this regard. It regularly happens that the investment arm of an insurer provides funds for property or infrastructure projects that a prudent underwriter would deem as too risky for disaster cover. This has been recognised by several companies, and is the subject of a range

of initiatives such as the R!SE Initiative and the industry’s pledge at the UN Climate Summit in New York in 2014 to increase its climate-smart investments.

### Engagement in new insurance markets

Insurers are under significant pressure to find growth markets in the face of stagnating and, in some cases, declining lines of business in established areas. Some companies focus on emerging markets and low-income countries that show significant under-insurance or no insurance at all. But insurance faces barriers in many developing countries, such as lack of financial infrastructure or inexperience with insurance products. The data needed to underwrite climate risk are also often not readily available, and there is no commercial case for private companies to develop such models on their own. This has led to an increased focus on public-private partnerships such as the Caribbean Catastrophe Risk Insurance Facility, the African Risk Capacity and the Pacific Catastrophe Risk Assessment and Financing Initiative, as well as micro-insurance and agricultural insurance.

In spite of all those schemes, there is limited evidence about if and how climate change has been accounted for when assessing current and future risks and calculating premiums. Making insurance through these schemes accessible and affordable already requires public sector support, usually through international donors and multilateral development banks. While private insurers have the ability to adjust pricing and underwriting on a yearly basis, walking away from these often high-profile pilot projects can harm a company’s reputation.

### What next for the industry?

The insurance industry has a considerable stake in greenhouse gas mitigation and adaptation. The exact scale of the influence of climate change on the sector will depend on uncertain factors, such as the physical changes in risk, the response of governments and regulators, the behaviour of insurers and those insured and the strength of global climate change policies. While many are outside the control of the industry, others are at least partly dependent on how the industry itself responds to the challenges of climate change (Ranger and Surminski, 2013). Raising awareness of risks, informing the debate with risk analysis, supporting and encouraging adaptation and mitigation policies, and anticipating changing underwriting risk levels and risk management practices are important for a forward-looking strategy.

The PRA also highlights the need to internalise climate risks within insurers’ own business decisions, noting the importance of appropriate governance of climate change risks, including discussion at emerging risk committees and the merits of in-house environment committees.

There are clearly opportunities for the industry. A rise in demand for insurance, the need for new products and tools and climate risk management services are a few of the potential growth areas that insurers might see. But unless the root causes of climate change and our growing vulnerability and exposure are tackled – for example through a clear commitment to reducing emissions, flood defence investment, better business continuity efforts and stricter building codes – the insurance industry could stumble. Insurance risk transfer is only designed to address liquidity needs in the immediate aftermath of disasters and to help fund the recovery process. Effective disaster prevention is clearly needed if compensation is to be accessible and affordable. This is not something that the sector alone can do, but it is something that the sector needs to drive – both on the underwriting and the investment side.

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**Swenja Surminski** leads the climate risk and insurance work at the Grantham Research Institute at the LSE. She has published widely and works closely with industry and policy makers at a global level. Prior to joining LSE in 2010, she spent more than ten years in the insurance industry working on climate and risks management, including roles at Munich Re, Marsh Mc Lennon and the Association of British Insurers

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# Fuelling the energy debate

**Diana Kool** discusses the potential impact of climate change on the global economy and financial markets, focusing on energy sources and the growth of renewable forms

The recent floods in the UK have concentrated minds on the climate change debate but the issues go beyond local politics. Whether or not individual policy makers believe that climate change is taking place – and that the world economy needs to adapt – the recent adoption of the 17 sustainable development goals (SDG) and the agreement reached at the UN Climate Change Conference (COP21) in Paris at the end of last year signal a potential step-change in global climate policy. They also signal changes in the global economy.

The SDGs propose targets for all countries equally, which include tackling climate change, gender inequality and human rights violations. In the past, developing countries were considered primarily as passive recipients of world aid. That has changed. One reason for this is that developing countries have gained much influence in the negotiations during the past decade. They took centre stage during the Paris climate talks, advocating stronger commitments to carbon emission reductions.

Far from being passive, many developing countries are already actively pursuing a low-carbon economy or have set out commitments to do so in their “intended nationally determined contributions (INDCs)” submitted before the Paris negotiations. INDCs are what a country, given its domestic circumstances, aims to do to combat climate change and limit future risks.

The thesis used to be that fossil fuels were the only path to alleviating poverty and boosting economic growth in the “global south”. Now it is being argued that their use would simply increase climate volatility, thereby deepening vulnerability to poverty.

Widespread energy access and energy security are vital for development. The World Energy Outlook 2015 estimates that 1.2bn people worldwide are without access to electricity, of whom 700m are in Africa, and that more than 2.7bn people rely on burning biomass for cooking, which causes harmful indoor air pollution. Those in developing countries who do have electricity are often subject to an unreliable supply and volatile prices. The International Energy Agency (IEA) suggests that between 250 kWh and 500 kWh a year should be sufficient for a newly connected household.

According to World Bank data, countries with an income per capita higher than \$10,000 have an annual electricity consumption of 3,880 kWh and more. Were developing countries to reach that consumption figure a year per person, global electricity production would have to climb 60 per cent. Were they to get to one half of the US level, which was 13,240 kWh in 2011, global electricity production would rise 130 per cent. With such a potential surge in energy consumption, how that energy will be generated, and financed, is a significant topic of debate. The biggest question on everyone’s mind is whether or not COP21 will really mark the end of the fossil fuel era.

Developing countries now have more influence in climate talks

The developed world built its energy networks, and its wealth, on coal, oil and gas. Some people have long argued that the “global south” might leapfrog the stages of energy use seen in the north. That idea was derided – until recently. Now it has begun to seem not only possible for the “global south” to develop using renewable energy but inevitable. If it does not happen, the economic cost could be significant. Mark Carney, the governor of the Bank of England, for example, gave a speech in 2015 warning insurers and investors of the potential losses of stranded assets and the costs of climate change-related damages, sending shivers through the global market.<sup>1</sup>

Carney is not alone in his concerns about the potential impact of climate change on the economy and on financial markets. A survey by the New York-based Institute for Policy Integrity (IPI) showed that many leading US economists believe economic models underestimate the impact of climate change; they support climate action in the form of carbon tax and green technologies.<sup>2</sup> Of those surveyed, more than three-quarters believed that climate change “will have a long-term, negative impact on the growth rate of the global economy”.

The basic question for economists, as the IPI survey pointed out, is how to “balance the costs of action and the likely economic damages from inaction”. There is already a transition to renewable energy sources, particularly in developing countries. The World Energy Outlook reports that renewable energy accounted for almost half of all new power generation built in 2014 and Fatih Birol, IEA executive director, commented upon the report’s publication that renewable energy currently accounts for 60 per cent of new investments. This is despite fossil fuel subsidies being four times higher in G20 countries alone than subsidies for renewable energy globally, according to the Overseas Development Institute. Moreover, growth in demand for solar energy has not slowed and solar power is becoming increasingly cost-competitive, even in the context of low oil prices.

From the current low of 30 US cents per watt for solar power, Deutsche Bank projects a further reduction in the cost of solar energy generation of 40 per cent over the next four years.

## Climate change ‘will have a negative impact on global growth’

According to the IEA, these cost reductions and the pledges made in the INDCs will lead to nearly 45 per cent renewable penetration by 2030 – up from one-third today.<sup>3</sup> It

should be noted that the growth of renewables has consistently outperformed the IEA’s estimates and that this is also expected in the future, particularly given the exponential growth rates that technological innovation can drive.

In order to implement the INDCs agreed at the Paris conference, an estimated \$13.5tn in investment is required. It is unclear what

1. Carney, M (2015), ‘Breaking the tragedy of the horizon – climate change and financial stability’. Speech given 29 September. Available at: [www.bankofengland.co.uk/publications/Pages/speeches/2015/844.aspx](http://www.bankofengland.co.uk/publications/Pages/speeches/2015/844.aspx).

2. Howard P and Sylvan D (2015), ‘Expert consensus on the economics of climate change’. Institute for Policy Integrity, New York University School of Law. Available at: [www.policyintegrity.org/files/publications/ExpertConsensusReport.pdf](http://www.policyintegrity.org/files/publications/ExpertConsensusReport.pdf).

3. IEA/OECD (2015), *Energy and climate change. World energy outlook special briefing for COP21*.

impact real scale in renewable energy technology would have on the costs – it should make them lower – but there are concerns that many of the world’s poor will continue to have to burn fuels such as coal, especially in parts of Asia. A report, published in the Proceedings of the National Academies of Science (PNAS) supports this conclusion, adding that ambitious climate change targets would probably become unfeasible if such a trend persisted.<sup>4</sup> Nevertheless, China and India, the two biggest coal burners, have cited the use of coal – albeit using more efficient technologies – in their INDCs. This has been widely criticised and the World Bank has rejected the idea of coal as a solution to ending poverty outright.

On the flipside, data collected by Bloomberg New Energy Finance show that China was the biggest investor in renewables in 2014 and 2015 globally and India recently announced the International Solar Alliance, committing itself to achieving 175GW of renewable energy by 2022 and 350GW by 2030, compared with 36GW current installed capacity. The country aims to push total power generation capacity from 275GW today to 850GW by 2030 to improve energy access and security for its population of 1bn.

Africa also aims to double its renewable energy in the next four years, with the help of funding from France. During the Paris climate talks, President François Hollande announced that France would increase renewable energy investments in Africa to €2bn between 2016 and 2020. These are positive signals, which could imply that the IEA has underestimated the lure of renewables over fossil fuels.

There are solid economic, social, political and environmental reasons to opt for renewable energy, specifically in developing countries. Where developed countries have to replace old energy infrastructure, many developing countries have a great opportunity to leapfrog to renewables. By so doing, they would avoid “locking in” high-carbon technologies in long-lived plant, equipment and infrastructure and also avoid the costs of the potential premature retirement of such infrastructure were low-carbon policies to be implemented. The “leapfrogging” is open to them because wind and solar are easily deployable, something that is important in countries that lack a large educated workforce and major infrastructure. Solar and wind do have relatively high upfront installation costs but they can generate power more cheaply over the lifetime of a project and prices continue to fall.

Finally, renewable technologies operate at much higher energy efficiency than coal or oil. The Copenhagen Centre on Energy Efficiency estimates that investment in improved efficiency of renewable energy generation and electrical machines and devices could lead to a 25 per cent reduction in demand for energy by 2030 alone. According to the International Partnership for Energy Efficiency Cooperation, more efficient heating and cooking appliances, and the use of more efficient energy sources in industrial processes such as concrete and steel production, represent a so-called “hidden fuel” that has the potential to contribute to up to half the savings in greenhouse gas emissions set by the G20.

A reduction in the cost of energy generation is not the only important economic impact of renewables. A recent study conducted by scientists from Stanford University showed that a renewable energy transition could save further \$25tn-\$50tn a year in health and climate costs, and that it could generate more than

4. Edenhofer O, Jakob M, Steckel J C, (2015), ‘Drivers for the renaissance of coal’. PNAS 112 (29), E3775-E3781.



22m more jobs globally than the fossil fuel industry.<sup>5</sup> Both factors are particularly relevant to developing countries because more jobs would contribute to economic growth and poverty alleviation. More importantly, it is relevant because most of the health and climate control costs that would be expected to come with a failure to tackle climate change would fall to the most vulnerable and least resilient developing countries.

From a geopolitical perspective, it makes sense for developing countries to wean themselves off fossil fuel imports, both to reduce their dependency on others and to lower exposure to geopolitical tensions. Because renewables can operate off the grid, countries can also use them to extend energy access to their most remote areas. With regard to the grid, an oft-quoted concern with renewables such as solar and wind power generation is that their supply fluctuates and can cause grid instability.

Such challenges are more procedural than fundamental, however. Improved battery capacity, power to gas systems, smart grid solutions and new sources of energy-generation, such as plant roots, algae and magnetic fusion, are already on the market or under development and could solve the intermittency challenges. It should also be noted that although coal, nuclear and shale gas can support steady power generation, they require regular supplies of water to do so, which can be a problem in water-stressed regions. Some areas may see greater benefit in having lower demands on their water supply than in having a lower risk of power outages.

A quiet revolution in renewable energy is already under way. But current commitments to the energy transition as set forth in the INDCs are not sufficient to keep warming levels under 2°C – the target set out in Paris. That is why there are calls for subsidies and investments to be moved – gradually – from fossil fuels to renewables; for tax breaks for the big polluters to be eliminated; and for a carbon tax or another measure to put a price on the externalities from high-carbon energy generation to be adopted. All of this will require investment in R&D to speed up innovation in, and further reduce the cost of, renewable and efficient energy technologies.

Why should rich, developed economies support that? Because, as the economist Joseph Stiglitz has noted, where companies are assessed on the basis of both their balance sheet and their income statement, countries only put together an income statement – GDP. GDP, however, does not capture what the World Bank calls “the accumulation and sound management of a portfolio of assets – manufactured capital, natural capital and human and social capital”.

5. Hanna V, Mormann F, Reicher D (2015), ‘A tale of three markets: comparing the solar and wind deployment experiences of California, Texas and Germany’. Steyer-Taylor Center for Energy Policy and Finance, 17 November.



At the same time, long-term sustainable development rests on the preservation of our ecosystem and so on the measurement of how well it has been managed, which is why we need to apply measures of wealth that go beyond GDP, in particular “natural capital valuation”. This approach gives more economic clout to the developing countries where many of the world’s most important ecosystems, such as forests, are located. Natural capital makes up 36 per cent of their total wealth, according to the World Bank. How much natural capital developed countries have is a trickier question to answer and is discussed in the World Bank’s Little Green Data Book.

A quiet revolution in renewable energy is already under way

Although low-carbon development is technologically feasible and economically attractive for the “global south”, the Paris climate deal and its INDCs are only the beginning. All countries will need to continue to sharpen their ambitions, intensify their targets and raise the speed with which they implement solutions about climate change.



**Diana Kool** is a post-graduate researcher in environment, politics and globalisation at King’s College London. She worked for the director-general enterprise and innovation at the Dutch Ministry of Economic Affairs to stimulate Dutch innovative solutions to global challenges. More recently she worked at the Green Economy Coalition as a part-time researcher. She is now involved in setting up an EU-wide conference featuring innovations, which will take place during the Dutch presidency of the EU in the first half of this year