



Institute
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Resource and Environment Issues for Pensions Actuaries: Supplementary Information on Resource and Environment Issues and their Implications for Sponsor Covenant Assessments

by the Resource and Environment Issues for Pensions
Actuaries working party

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Knowledge and experience of resource and environment topics is developing rapidly. The original version of this guide was finalised in September 2017, based on the state of knowledge at that time. The guide was reviewed in July 2019 and a small number of edits were made to remove outdated information and replace broken hyperlinks. However, it has not been updated to include all relevant developments since it was originally published. Actuaries are encouraged to keep abreast of resource and environment developments, for example by selecting “resource and environment” in their IFoA communication preferences.

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1 Introduction

This is the first supporting report for “Resource and Environment Issues: A Practical Guide for Pensions Actuaries”¹. That Guide explains where resource and environment (R&E) issues are likely to be relevant to pension schemes and the work of pensions actuaries. It is a first attempt at helping pensions actuaries to assist their clients in navigating the uncertainties associated with R&E issues, in collaboration with covenant and investment advisers. It is intended to raise awareness of the topic, encourage discussion and prompt further research. This report expands on the aspects relating to covenant assessments, ie assessments of the financial strength of sponsoring employers of UK defined benefit pension schemes, and provides further background information on R&E issues, focusing on the aspects most relevant to covenant assessments. Two other supporting reports provide more detail on the implications of R&E issues for setting financial and mortality assumptions².

This report is aimed at actuaries advising UK trust-based defined benefit pension schemes. Although covenant assessments are normally carried out by specialist advisers or by the trustees themselves, actuaries may support the trustees during the assessment process. For example, they may act as trusted advisers who help trustees to decide which adviser to appoint (if any), to question the employer and/or the covenant adviser on the information received and to incorporate that information in funding and investment decisions. Actuaries may also provide integrated risk management advice which draws together work done by the trustees’ covenant, investment and funding advisers. This report is intended to assist actuaries in carrying out these roles by demonstrating the relevance of R&E issues to the sponsor covenant and illustrating how they can be included in the covenant assessment process. It may also be useful to trustees, sponsors and other advisers of UK defined benefit pension schemes. The background information on R&E issues may be useful to a wider audience, although it does not cover all aspects that may be relevant from a non-covenant perspective.

R&E issues would rarely, if ever, be the main focus of a covenant assessment. However, they are illustrative of a more general challenge: a tendency for covenant assessments to focus on short-term, quantifiable aspects. The ideas outlined in this report therefore have wider relevance by suggesting ways in which covenant assessments can provide a more rounded, longer-term perspective with greater emphasis on qualitative information and consideration of uncertainties.

Trustees and their advisers will want to consider what a proportionate approach to incorporating R&E issues would be for their covenant assessment. This will depend on the scheme’s circumstances, including the extent of its reliance on the sponsor covenant, the materiality of R&E issues for the sponsor’s business model and the time horizon of its journey plan, as well as the budget available for the covenant assessment.

The next section of this report explains the relevance of R&E issues to sponsor covenant and outlines several initiatives which aim to encourage longer-term thinking by businesses and investors. Sections 3 to 5 provide background information on R&E risks to help readers understand which R&E risks might be relevant in the context of a particular sponsor covenant. Sections 6 and 7 then indicate how R&E risks can be incorporated in covenant assessments. Those readers who do not have a particular sponsor covenant in mind, and are just interested in the general approach to incorporating R&E risks in covenant assessments, may want to skip Sections 3 to 5.

¹ <http://www.actuaries.org.uk/documents/practical-guide-pensions-actuaries-0>

² <https://www.actuaries.org.uk/documents/considerations-setting-financial-assumptions> and <https://www.actuaries.org.uk/documents/environment-issues-pension-actuaries-implications-setting-mortality-assumptions>

2. Relevance of R&E issues to sponsor covenant

The Pensions Regulator has advised trustees that covenant assessments should be forward-looking and cover the short, medium and long-term (see Box 1). It expects trustees to understand the risks to the covenant and how the covenant may change over time, including as a result of changes in the industry in which it operates and the wider economy. Unless the sponsor faces significant near-term insolvency risk, it is often the outlook for the sponsor over the next 10-15 years which is most relevant to the pension scheme's covenant risk. However, for practical reasons, assessments tend to focus on relatively short-term financial projections, with less emphasis on longer-term and less readily quantifiable issues.

Box 1: The Pensions Regulator's Guidance

Extracts from "Regulatory guidance for defined benefit schemes: Assessing and monitoring the employer covenant" (August 2015) which point to the need for covenant assessments to consider the longer term outlook for the sponsor

"As well as assessing the strength of the current covenant, assessments should be forward-looking ..." (p6)

Key points for consideration include "What are the risks to the covenant and how may it change over time?" (p8)

"The financial assessment of the employer should cover the financial support the employer can provide in the short-term (within two years), medium term (two to five years), long-term (beyond five years) and in the event of employer insolvency." (p25)

Key points for consideration when assessing the financial support from the employer include "The markets in which the employer operates, the medium and long-term outlook for those markets and the employer's competitive position in those markets" (p25).

"trustees should understand the underlying sensitivities and pressures that may impact the employer's performance in the medium to long-term and form a view on how the covenant may change over that period." (p37)

"Scenario planning can be a useful tool to help trustees understand projections about long-term covenant risks and how these interact with investment and funding risks as part of an integrated approach to risk management." (p39)

As explained below, R&E issues are a potential source of material risks for businesses. R&E issues are therefore a relevant consideration for most covenant assessments. Indeed, covenant advice already takes account of R&E issues to some extent, eg for companies in the oil, gas and commodity sectors where they are obviously of immediate relevance. However, R&E risks may be overlooked where they are longer-term in nature or primarily arise through indirect routes such as supply chain exposure. Moreover, their importance may be underestimated – by both company management and covenant assessors – because they tend to be hard to quantify, have uncertain timeframes, may involve unpredictable discontinuities and lie outside the core expertise of most business people.

Taking account of R&E risks in covenant assessments may require a longer-term perspective than is typically adopted at present, placing greater emphasis on qualitative information and considering business resilience in the face of future uncertainties. Although adopting this perspective is challenging, it is increasingly recognised as important by businesses and investors (see Box 2). It might involve exploring the employer's risk management processes, including how the employer identifies emerging risks and factors them into business planning. This discussion need not be confined to R&E issues (which are in many ways just part of the changing landscape in which businesses operate) but could also consider wider social, political and economic trends. Hence the naturally longer timescales of R&E issues may be a helpful prompt for trustees to assess the long-term outlook for covenant strength more generally and may uncover other important issues to consider.

Box 2: Initiatives related to long-term thinking

Concerns are frequently raised that businesses and investors may be too focused on the short-term and that this may be damaging the long-term health of the economy and society. An increasing number of initiatives are seeking to address these concerns, including:

[Kay review of UK equity markets and long-term decision making](#) (2012) – A UK government-commissioned review. Concluded that short-termism is a problem in UK equity markets and encouraged asset owners to think of themselves as long-term investors rather than traders who exploit short-term market movements.

[Investment Leaders Group](#) (founded 2013) – A global network of asset owners and managers, convened by the University of Cambridge Institute for Sustainability Leadership. Aims to help shift the investment chain towards responsible, long-term value creation.

[Law Commission review of fiduciary duties](#) (2014) – Carried out on Kay's recommendation. Addressed the misconception among pension scheme trustees that their fiduciary duty requires them to maximise short-term financial performance and not take account of long-term factors.

[Investor Forum](#) (founded 2014) – Another of Kay's recommendations. Seeks to contribute to long-term investment performance by organising and facilitating dialogue between UK companies and their shareholders.

[Bank of England-led procyclicality working group](#) (2014) – Found that asset allocation by insurance companies and pension funds can exacerbate short-term market movements, potentially undermining the stability of the financial system.

[FCLT Global](#) (founded 2016) – Originated from a "focusing capital on the long-term" initiative led by the Canada Pension Plan Investment Board and McKinsey & Company. Developing practical tools and approaches that encourage long-term behaviours in business and investment decision-making.

[Tragedy of the Horizon](#) (founded 2015) – A research partnership between Generation Foundation and the 2° Investing Initiative which is exploring and addressing the short-term focus of capital markets to secure a more sustainable allocation of capital for the long-term.

3. Background information on R&E issues

R&E is used here as an umbrella term that encompasses all matters relating to the natural environment, energy and other natural resources. It includes the inter-related topics of climate change, water scarcity, pollution, biodiversity loss, and the price and availability of fossil fuels and other materials. As all economic activity is fundamentally reliant on the natural environment for energy and raw materials, R&E is a source of both risks and opportunities for businesses. In recent years, the World Economic Forum's annual Global Risks Reports have found that environmental risks feature strongly in experts' and decision-makers' concerns, and have highlighted the increasingly interconnected nature of global risks³. Knowledge of R&E issues is therefore important for covenant assessments.

Much has been written about R&E issues. The IFoA's own publications include "Climate Change for Actuaries: An Introduction"⁴, two volunteer-led literature reviews on "Climate change and resource depletion: The challenges for actuaries"⁵ and commissioned research on "Resource constraints: sharing a finite world" which presented evidence and scenarios relating to potential limits to growth arising from the availability of oil, coal, natural gas, uranium, land, water, metals and food⁶. Other general sources of R&E information include:

- The [Intergovernmental Panel on Climate Change \(IPCC\)](#)
- The [Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services \(IPBES\)](#)
- [The Economics of Ecosystems and Biodiversity \(TEEB\)](#)
- The [Global Environmental Outlook \(GEO\)](#) reports of the United Nations Environment Programme (UNEP)
- The European Environment Agency's [State and Outlook Reports \(SOER\)](#)
- The UK's [Committee on Climate Change \(CCC\)](#).

From a covenant perspective, the most useful publications are likely to be those with a business focus, such as:

- [PwC – Megatrends](#)
- [KPMG \(2012\) – Expect the unexpected: Building business value in a changing world](#)
- [UKCIP \(2010\) – A changing climate for business](#)
- [Task Force on Climate-related Financial Disclosures \(2017\) – Final Recommendations Report](#) (see section B in particular)⁷
- [SASB Materiality Map™](#) (an interactive tool that indicates the typical materiality of sustainability topics across different industries and sectors)
- [Moody's Investors Service \(2015\) – Environmental risks: Heat map shows wide variations in credit impact across sectors](#)

³ <https://www.weforum.org/reports/the-global-risks-report-2019>. The reports define a global risk as "an uncertain event or condition that, if it occurs, can cause significant negative impact for several countries or industries within the next 10 years".

⁴ <https://www.actuaries.org.uk/documents/climate-change-actuaries-introduction>

⁵ <http://www.actuaries.org.uk/research-and-resources/documents/climate-change-and-resource-depletion-review-literature> and <http://www.actuaries.org.uk/research-and-resources/documents/climate-change-and-resource-depletion-challenges-actuaries-review-1>

⁶ <https://www.actuaries.org.uk/documents/resource-constraints-sharing-finite-world-evidence-and-scenarios-future>

⁷ The Task Force on Climate-related Financial Disclosures, chaired by Michael Bloomberg, was established by the international Financial Stability Board to develop recommended disclosures to help financial market participants to assess and price climate-related risks and opportunities.

- [Transition Pathway Initiative](#) (assesses how companies are preparing for the transition to a low-carbon economy)
- [PRI \(2016\) – A practical guide to ESG integration for equity investing](#) (see the business-focused case studies).

Section 4 gives an overview of climate change, the R&E risk which has been researched, modelled and discussed most extensively. Climate change is likely to be the broadest and most wide-reaching of the R&E covenant impacts, but is not the only one. Section 5 illustrates a range of R&E risks to businesses. In practice, when considering R&E issues in the context of a specific business (ie the one which is the subject of the covenant assessment), it is likely to be useful to supplement this information with a tailored internet search which can locate the most relevant and up-to-date sources.

4. Climate change and mitigating actions

There is scientific consensus that warming of the climate is “unequivocal” and that human activities, particularly greenhouse gas (GHG) emissions, are “*extremely likely* to have been the dominant cause of the observed warming since the mid-20th century”⁸. GHG include carbon dioxide, methane and nitrous oxide, and are emitted by burning fossil fuels (to generate heat, electricity and for transport), livestock farming and deforestation. The latest IPCC assessment report warned that:

“Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks”⁸.

The Task Force on Climate-related Financial Disclosures (TCFD) identifies two main categories of climate risk: physical risks arising from climate change itself; and transition risks arising from efforts to mitigate climate change by reducing greenhouse gas emissions⁹. These risks can be thought of along a spectrum (see Figure 1). At one end, where little mitigating action is taken, fundamental changes to our climate system (including rising temperatures, changing rainfall patterns and more frequent and more severe extreme weather events) would be expected to cause massive social and economic damage. At the other end, climate change is limited by significant and rapid reductions in GHG emissions from transforming our energy, transport and land-use systems.

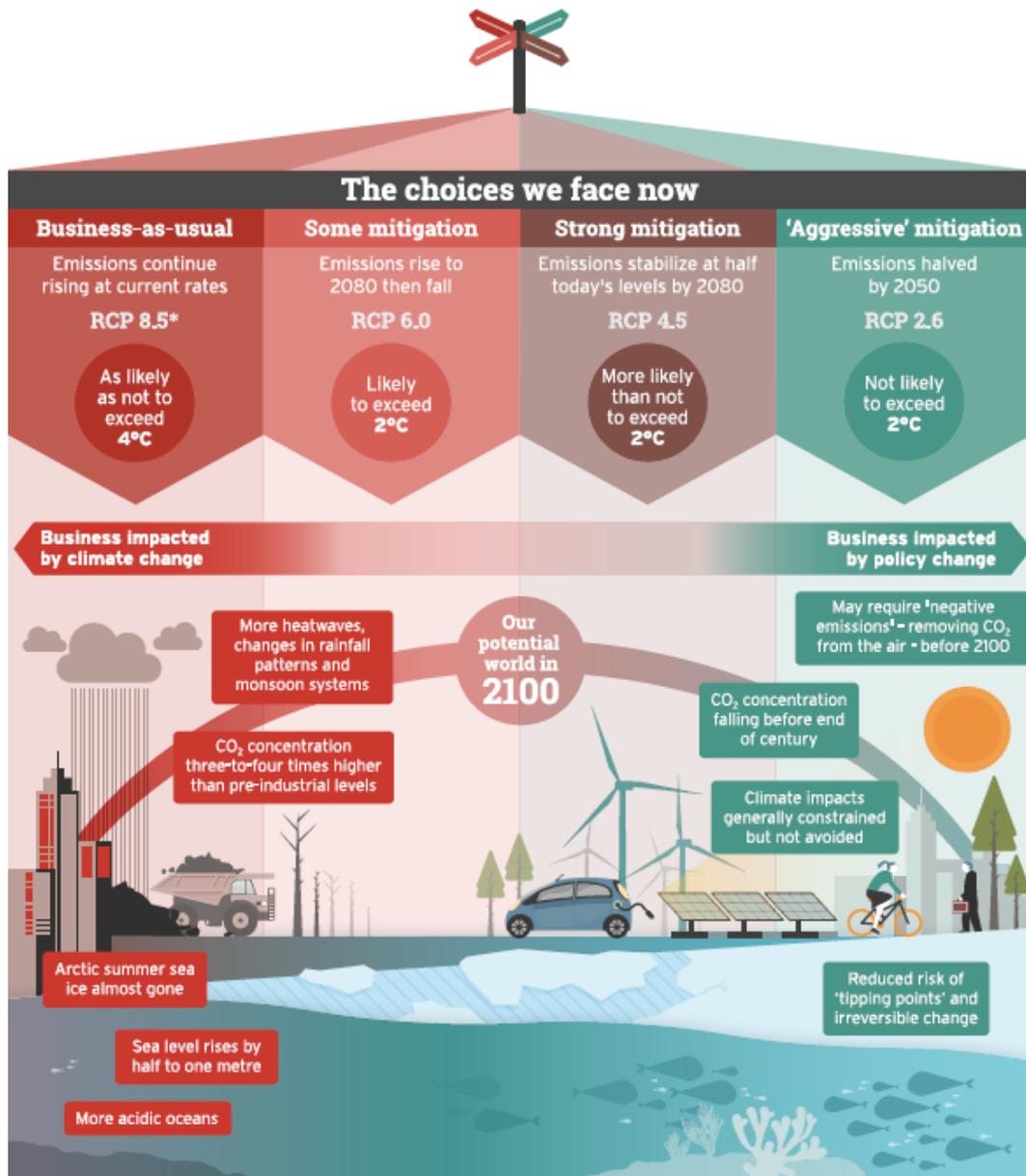
There is considerable uncertainty about society’s future position on this spectrum, and the precise nature and timing of the climate effects and mitigating actions. This is partly because of the unknowable human response to climate change and partly because of the complexity of the climate system itself, including the existence of “tipping points” beyond which we will experience non-linear and irreversible changes in the climate. However, it is clear that there will be significant change, which brings with it risks and opportunities.

⁸ IPCC Climate Change 2014 Synthesis Report <https://www.ipcc.ch/report/ar5/syr/>. The IPCC define “extremely likely” as more than 95% probability. https://wg1.ipcc.ch/SR/documents/ar5_uncertainty-guidance-note.pdf

⁹ See Section B of <https://www.fsb-tcfd.org/publications/final-recommendations-report/>

Carbon crossroads

The Intergovernmental Panel on Climate Change (IPCC) explores four potential futures depending what policies governments adopt to cut emissions



*The four RCP (Representative Concentration Pathway) scenarios each project a certain amount of carbon to be emitted by 2100, and as a result lead to a different amount of human-driven climate change. Climate change will continue after 2100 and elevated temperatures will remain for many centuries after human CO₂ emissions cease.

Figure 1. Trade-off between physical risks to business resulting from climate change and transition risks to business resulting from mitigating actions¹⁰

At the COP21 climate conference in Paris in December 2015, world leaders reaffirmed the goal of limiting global temperature increase to well below 2°C above pre-industrial levels, while pursuing efforts to limit the increase to 1.5°C¹¹. They agreed an aim of reaching peak GHG emissions as soon as possible and achieving zero net human-related emissions in the second half of the century. Each

¹⁰ Source: <http://www.cisl.cam.ac.uk/business-action/low-carbon-transformation/ipcc-climate-science-business-briefings/climate-science>

¹¹ <http://bigpicture.unfccc.int/#content-the-paris-agreemen>

country submitted climate action pledges, known as Nationally Determined Contributions (NDCs), and agreed to increase their ambition every five years. However, the initial pledges are unlikely to be sufficient¹² and it remains to be seen whether they will be met, particularly given Donald Trump’s decision to withdraw the US from the agreement¹³. Figure 2, prepared by a UK Government-funded climate change research programme led by the Met Office, illustrates the potential outcomes under three scenarios.

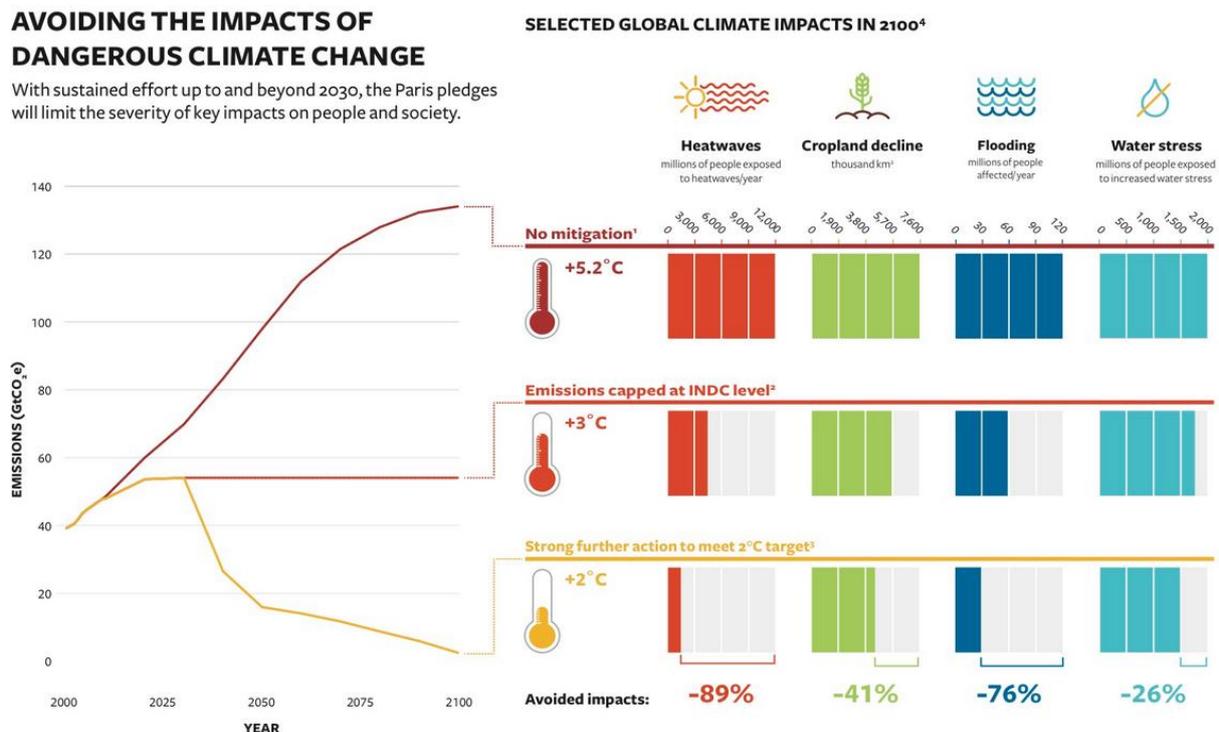


Figure 2. Potential global climate impacts in 2100 under three emission scenarios¹⁴

5. R&E risks to companies

5.1. Sources of R&E risks

This section illustrates some R&E-related risks that may affect companies. They are not necessarily new risks, but they are ones that may be relevant when conducting covenant assessments.

Energy prices

Heavy users of energy are particularly vulnerable to increasing and/or volatile energy prices. As well as changes in energy supply and demand, prices may be affected by taxes and subsidies. Carbon

¹² United Nations Environment Programme: Emissions Gap Report <http://web.unep.org/emissionsgap/>.

¹³ The agreement came into force on 4 November 2016, having been ratified by the requisite number of countries in record time. Other world leaders are standing firm on their climate commitments, including the EU, China and the other G7 countries. <http://www.bbc.co.uk/news/science-environment-40106281>

¹⁴ <http://avoid-net-uk.cc.ic.ac.uk/wp-content/uploads/delightful-downloads/2015/11/Avoiding-the-impacts-of-dangerous-climate-change-AVOID-2-INDCs-infographic.pdf>. The temperatures displayed represent median values for each scenario relative to pre-industrial times. Water stress and cropland availability will also be affected by land use decisions, eg concerning biofuels. The footnotes on the diagram describe the scenarios used:

1. No mitigation: RCP8.5
2. Emissions capped at INDC level: INDC pledges to 2030 and no backtracking
3. Strong further action to meet 2°C target: INDC pledges to 2030, with further large reductions in GHG to meet 2°C by 2100
4. Relative to a scenario with no climate change.

pricing (implemented through taxes and emission trading schemes) is widely regarded as an important tool in achieving greenhouse gas (GHG) reduction targets and its use is likely to increase¹⁵.

A permit to emit one tonne of GHG under the EU Emissions Trading System cost about EUR 6 in April 2016¹⁶. This had risen to EUR 29 by July 2019¹⁷, but is still much less than the USD 85 cost (in 2006 prices) of the resulting damage if we remain on a business-as-usual trajectory, as estimated by Lord Stern¹⁸.

Changes to energy supply

The COP21 NDCs imply a fundamental transformation of our energy system to low carbon energy sources. Indeed, this transformation is already underway¹⁹. This poses a major threat to companies that are reliant on fossil fuels, not only those involved in the extraction and processing of oil, gas and coal, but also those that are locked into fossil fuel infrastructure (eg petrol and diesel for transport, gas for heating).

The total carbon content of untapped fossil fuel reserves is estimated to be around three times the amount of carbon that can be burnt by 2100 if we are to have an 80% chance of keeping global average temperature rises below 2°C (2860 versus 975 gigatonnes of carbon dioxide)²⁰.

Changes in transport patterns

The NDCs also imply a fundamental shift in transport patterns. Alternative fuels such as electric vehicles are unlikely to be sufficient on their own, so reductions in distances travelled (eg localisation of supply chains) and switches in mode (eg more public transport, less flying) are also likely to be needed.

Globally, the transport sector accounted for 27% of final energy use in 2010, with baseline carbon dioxide emissions projected to approximately double by 2050²¹.

Water shortages

Water availability is a particular concern, with shortages already causing problems in places like California and Saudi Arabia. Problems relate to increasing demand and also changing supply as climate change starts to affect rainfall patterns. Agriculture is particularly vulnerable, exposing companies in the food, beverage and textile sectors to water shortages through their supply chains.

¹⁵ [CDP \(2015\) – Putting a price on risk: Carbon pricing in the corporate world](#)

¹⁶ <http://carbon-pulse.com/19177/> (accessed 13 July 2019)

¹⁷ <http://carbon-pulse.com/category/eu-ets/> (accessed 13 July 2019)

¹⁸ [Stern \(2006\) - Stern Review on The Economics of Climate Change](#)

¹⁹ <http://www.iea.org/topics/renewables/>

²⁰ [Carbon Tracker Initiative and The Grantham Research Institute, LSE \(2013\) - Unburnable Carbon 2013: Wasted capital and stranded assets](#)

²¹ [IPCC \(2014\) – Summary for Policymakers](#)

Puma, the sports goods manufacturer, mapped the use of water by its supply chain in 2010. Tier 1 suppliers (manufacturing) used 7% of the total; Tier 2 (outsourcing) 26%, Tier 3 (processing) 24% and Tier 4 (raw materials) 43%²². Direct water use in its own operations was negligible.

Crop yields

Agricultural output is affected not only by rainfall patterns, but also by temperature, soil fertility and land quality. As population rises and meat consumption increases, there is growing pressure on agricultural land. Not only is more marginal land being farmed, but existing agricultural land is being degraded due to practices such as mono-cropping and over-use of fertilisers.

“Overall soil is being lost from land areas 10 to 40 times faster than the rate of soil renewal imperilling future human food security and environmental quality.”²³

Property damage

Climate change is expected to increase the frequency and severity of extreme weather events such as floods and storms. These cause property damage which can disrupt business, not just directly but also through impacts on suppliers and customers. Insurance can mitigate these risks, but may increase in price or reduce in coverage (eg some risks may become uninsurable).

“The number of registered weather-related natural hazard loss events has tripled since the 1980s and inflation-adjusted insurance losses from these events have increased from an annual average of around US\$10 billion in the 1980s to around US\$50 billion over the past decade.”²⁴

Pollution (air, water and land)

The most serious effects of pollution may be to human health and wellbeing rather than economic production. However, businesses that are deemed responsible for the pollution may face clean-up costs, fines and reputational damage, as well as legislation to reduce future pollution.

The equivalent of around 40,000 deaths a year may be attributable to outdoor air pollution in the UK²⁵. Diesel cars are a major contributor to poor air quality in cities, despite their previous popularity on environmental grounds.

Non-renewable resources

These include base metals (eg aluminium, copper, nickel, zinc, lead and iron ore), precious metals and so-called rare earth elements. They are finite in supply and their use has generally increased exponentially as population and GDP has risen. There may be pressure to reduce waste, recycle more and develop alternatives.

²² [Puma's Environmental Profit and Loss Account for the year ended 31 December 2010](#)

²³ [Pimentel \(2006\) – Soil erosion: A food and environmental threat](#)

²⁴ [PRA \(2015\) – The impact of climate change on the UK insurance sector: A Climate Change Adaptation Report by the Prudential Regulation Authority](#)

²⁵ [Royal College of Physicians and Royal College of Paediatrics and Child Health \(2016\) - Every breath we take: the lifelong impact of air pollution](#)

Minerals are critical for many low carbon technologies. For example, gallium, indium, selenium and tellurium are needed to make solar panels, and zinc, vanadium and lithium are needed to make electric vehicle batteries²⁶.

5.2. Manifestation of R&E risks

There are various routes through which R&E risks can affect businesses, with both direct and indirect effects on their financial strength. For example:

- Cost and availability of inputs – due to interaction of supply and demand, possibly affected (positively or negatively) by government intervention
- Valuation of company assets – eg fossil fuel reserves (stranded assets), high carbon infrastructure, buildings on flood plains
- Legislative and regulatory change – mechanisms may be market-based (eg carbon taxes, emission trading schemes, renewable subsidies) or non-market-based (eg vehicle emission limits, bans on certain chemicals, water quality standards)
- Technological change and product evolution – eg rapid advances in renewable energy technology is reducing costs and threatening the cost-competitiveness of fossil fuels²⁷
- Changes in customer demand and social norms – prompted by environmental concerns, either voluntarily, or in response to, or anticipation of, policy changes
- Reputational damage – caused by failing to meet public expectations and/or legislative requirements
- Shareholder sentiment – businesses that are seen as environmentally risky or inconsistent with a low carbon future may become unpopular with investors (eg high profile campaigns are encouraging divestment from fossil fuels)
- Business disruption – eg caused by damage to business premises, infrastructure or the transport network, affecting the business directly or its suppliers and customers
- Fines and litigation risk – climate change is a new source of litigation risk as people affected by climate change, or organisations campaigning on their behalf, seek compensation²⁸.

When considering R&E risks to a particular business, it is important to think beyond the boundaries of its own operations and consider the risks it faces through its supply chain and customers, and through wider risks to the local and global economy. Conversely, a company with a good understanding of the environmental footprint of its supply chain is better placed to identify and manage R&E risks.

5.3. Examples of R&E risks to businesses

The R&E risks relevant to a sponsoring employer will depend on the industry in which it operates and its specific business model. This section outlines some of the risks that may be relevant for four industries, to provide more concrete examples of the issues outlined above. It may be a helpful source

²⁶ Jones, A. et al (2013) - Research Report: Resource constraints: sharing a finite world - Implications of Limits to Growth for the Actuarial Profession: The evidence and scenarios for the future

²⁷ <http://www.bloomberg.com/news/articles/2016-04-06/wind-and-solar-are-crushing-fossil-fuels>

²⁸ See, for example, the presentations from the IFoA event “Climate Change: Potential Liabilities for Business, Directors, Trustees and Insurers” held on 13 April 2016 (click on the Programme tab) <https://www.actuaries.org.uk/learn-develop/attend-event/climate-change-potential-liabilities-business-directors-trustees-and-insurers>

of ideas when identifying R&E risks to companies in a wider range of sectors, although the lists are by no means exhaustive.

Crude oil extraction

- Very sensitive to energy prices – eg volatile prices increase uncertainty about whether and where to explore and extract (and costs increase as best resources are exhausted)
- Legislation on GHG emissions may limit the extent of drilling possible or reduce demand for fossil fuels, leading to “stranding” of some of the oil reserves currently reflected on the company’s balance sheet (meaning their value may be significantly overstated)²⁹
- Demand for fossil fuels may also fall due to falling costs of renewable energy³⁰ and electrification of transport
- Cost and feasibility of extraction may be affected by water shortages arising from increasing demand and changing rainfall patterns³¹
- May face shareholder pressure to limit oil and gas activities and focus on greener technologies or return cash to shareholders
- Falling costs of renewable energy (as technology improves) may increase competitive pressures
- Poor safety and/or waste management practices may result in reputational risk and litigation (eg from oil spills)

Air transport

- Rising and/or volatile fuel prices may affect both manufacturing and operational costs
- Fuel and passenger taxes may increase to encourage reductions in GHG emissions³²
- Efforts by businesses and individuals to reduce their environmental impact may lead to lower passenger numbers than would otherwise have been the case³³
- Switching to more sustainable fuels may pose technological challenges and early phase-out of existing technologies
- Disposal costs may rise due to stricter environmental standards, eg for decommissioned aeroplanes and cleaning aeroplane testing sites

Production of Information and Communications Technologies (ICT) equipment

- Vulnerable to changes in price and availability of materials, including rare earth metals
- Global production and distribution model may face rising transport costs and increased risks of supply chain disruption from natural disasters

²⁹ See “Changes to energy supply” in Section 5.1.

³⁰ Renewables are already the lowest cost solution in many geographies. <https://www.bloomberg.com/news/articles/2016-04-06/wind-and-solar-are-crushing-fossil-fuels>

³¹ Extraction is water intensive. <https://webstore.iea.org/world-energy-outlook-2012-2>

³² The Carbon Offsetting Scheme for International Aviation (CORSIA) was agreed in 2016 to address any increases in annual carbon dioxide emissions from international civil aviation above 2020 levels. This is the first international climate agreement covering the aviation industry. <http://www.iata.org/policy/environment/Pages/corsia.aspx>

³³ Aviation causes a range of emissions, resulting in a significantly larger contribution to climate change than implied by its carbon dioxide emissions alone. Meeting the UK’s 2050 climate change target will be challenging if demand for air travel continues unabated. <http://www.eci.ox.ac.uk/research/energy/downloads/predictanddecide.pdf>

- Customers may demand products with lower energy consumption in use (directly and for cooling), especially data centre infrastructure
- Governments may require action to address short product life-cycles and burgeoning e-waste
- Faces continued restrictions and reputational risks relating to “conflict minerals”³⁴ used in manufacturing

Supermarkets

- Increasing transport costs, and increasing focus on “field to fork” impact³⁵, may encourage localisation of supply chains and distribution networks
- Changing transport patterns (linked to efforts to reduce greenhouse gas emissions as well as demographic change and urbanisation) could make out-of-town stores less popular
- May face economic and legislative pressure to reduce energy use in stores and depots
- Consumers may demand greater efforts to reduce packaging and food waste throughout the supply chain
- Changing temperature and rainfall patterns may affect food availability and prices (the current specialisation in certain food supplies is making some locations less resilient to climate shocks)
- Ability to deliver food with lower inputs and less environmental impact (eg addressing consumer concerns about deforestation) may become a key factor in competitive success

6. Including R&E issues in the covenant assessment

This section outlines how R&E issues can be considered at each stage of a typical covenant assessment process. The approach may be suitable for an in-depth assessment where R&E issues are material. In practice, a lower level of detail is likely to be appropriate in most cases. Trustees and their advisers may wish to adopt the suggestions below that are most relevant given the depth of their covenant assessment, the process being followed and the materiality of R&E issues for the sponsor. For example, they could ask some high-level questions about the employer’s risk management processes and how it seeks to achieve a resilient business given the uncertain context in which it operates.

6.1. Set scope of covenant assessment

Some initial consideration of R&E issues by the trustees will typically be needed to judge their relevance and hence whether it is proportionate to include them within the scope of work. Trustees may need the support of their advisors for this initial consideration.

The Pensions Regulator says covenant assessments should consider the employer’s financial support over the short, medium and long-term (see Box 1). R&E issues may be relevant over all timeframes, particularly the long-term. Short-term factors affecting the employer may be very different from long-

³⁴ Gold and sources of tin, tungsten and tantalum mined in the Democratic Republic of Congo and neighbouring areas.

³⁵ In some instances, such as Kenyan roses, it may make sense from a greenhouse gas perspective to grow the crop in the better climate and fly it to customers rather than grow it locally in heated greenhouses.

term factors, although it is also important to consider how short-term factors can evolve into more significant long-term issues³⁶.

Assessing the employer's long-term financial outlook is hard due to the associated uncertainties, but important due to the long-term nature of most pension scheme liabilities. Qualitative information and consideration of a range of narrative scenarios is likely to be more useful than "central" financial projections (which would rarely extend beyond the medium-term). General information on environmental, social and economic trends will provide important context when reviewing the company's long-term strategy.

6.2. Seek external advice (if appropriate)

If the Trustee board decides to appoint a covenant adviser, they may wish to consider potential advisers' expertise in R&E matters and their approach to the longer-term aspects of the assessment. This could include referring to R&E within any request for proposal, discussing R&E during selection interviews, and documenting the agreed approach to R&E in the appointment letter.

6.3. Obtain publicly available information

Trustees and their advisers may be able to obtain considerable R&E information from public sources, particularly for UK listed companies. This information may relate to the wider corporate group rather than the specific entity that sponsors the scheme, but is still likely to be relevant. R&E information may appear under headings such as "corporate responsibility", "corporate social responsibility" or "sustainability" rather than "environmental". This report uses "CSR" as shorthand for all of these.

Public information sources include:

- Annual report and accounts, particularly risk and CSR sections
- Separate reports on CSR
- CSR section of company website
- Environmental disclosures submitted to CDP (see <https://data.cdp.net/>)

In addition, a lot of generic information (including sector-specific information) is available online which can help identify R&E issues that may be relevant to the employer. Industry bodies and regulators may publish useful information, including some which may be entity-specific.

The information available may focus on short-term operational matters such as improving energy efficiency or provide localised case studies that illustrate the company's environmental initiatives. For the long-term covenant assessment, a more strategic and risk-focused perspective is likely to be needed. Whilst each case will be different, a good indicator of the maturity of a company's approach to CSR is often the extent to which CSR is integrated within the business strategy and day to day operations.

6.4. Request information from employer

To the extent that it is not available publicly, the trustees or their advisers may wish to ask for:

- The employer's assessment of the main environmental risks faced by the business over the short, medium and long-term
- Details of the employer's approach to identifying, assessing and mitigating these risks

³⁶The "All Swans are Black in the Dark" report from the Tragedy of the Horizons project demonstrates how non-cyclical, non-linear, long-term risks may be overlooked when financial analysis focuses on the next 1-5 years. <http://www.tragedyofthehorizon.com/All-Swans-Are-Black-in-the-Dark.pdf>

- The employer’s CSR policy plus any specific environmental plans and targets
- Environmental performance information, especially Key Performance Indicators (KPIs) reported to management (eg carbon emissions, water use, waste)³⁷
- An overview of the employer’s long-term strategic plans and how it seeks to achieve a resilient business given the uncertain context in which it operates (including environmental, social and economic trends)
- Information about the employer values and culture, particularly in relation to environmental issues, risk management and time horizon.

Some of this information may be better suited to face to face discussion than written responses, particularly the more uncertain and qualitative aspects.

6.5. Discuss with employer

Trustees typically have a longer time horizon than most other stakeholders in the business, so are well placed to question how the employer manages R&E risks and encourage better practices in this area. Indeed, simply asking the questions may prompt greater consideration by the employer.

Face to face discussion of the qualitative information they have obtained will help trustees to assess its credibility, eg whether R&E risks are considered in a way that affects business decisions or whether only lip service is paid to them.

Possible topics for discussion include:

- Where does accountability for CSR and R&E risk management reside within the organisation?
- How effective are the employer’s processes for identifying, assessing and mitigating R&E risks?
- Are there any apparent gaps in the employer’s description of the R&E risks it faces?
- How well does the employer understand its exposure to R&E risks through the supply chain?
- How does its R&E risk exposure differ from that of other group entities (especially if information has been supplied at group level)?
- How does the employer develop its long-term business plans? What sensitivities and “what if” scenarios have been developed?
- Has the employer considered possible future worlds (10+ years) and the resilience of its business model under these different futures?

6.6. Collate information and draw conclusions

Information on the employer’s exposure to, and response to, R&E risks forms part of the overall assessment of the covenant. The trustees may reach different conclusions depending on the scheme’s funding level, the length of the recovery plan and the timeframe considered. For example, the employer’s business may seem financially strong in the medium-term but have significant environmental risk exposure which weakens the long-term covenant.

The covenant assessment will influence various aspects of the scheme’s management. Analysis of R&E risks may highlight uncertainty in the long-term outlook for the employer, which (all else being equal) could lead to:

³⁷ The TCFD’s Implementation Annex provides illustrative climate-related metrics for four sectors (energy; transportation; materials and buildings; agriculture, food and forest products). <https://www.fsb-tcfid.org/wp-content/uploads/2017/06/FINAL-TCFD-Annex-062817.pdf>

- Greater prudence in the technical provisions;
- Shorter recovery plan (if this is affordable); and/or
- More cautious investment strategy.

R&E risks are well suited to consideration within an integrated risk management framework. For example, the main R&E risks to the covenant could also be material to some of the companies in the scheme's investment portfolio. Trustees may wish to explore with their investment managers how to reduce this risk exposure (and engage with their managers more generally about managing the portfolio's exposure to R&E risks). They could also ask their advisers to develop scenario analysis to help them understand how their scheme's funding position, investments and covenant strength might simultaneously be affected by R&E risks³⁸.

6.7. Keep under review

R&E issues can form part of ongoing covenant monitoring, for example:

- Regular data on the employer's environmental KPIs
- Periodic updates on the employer's progress against its environmental targets
- Discussions about any changes in the employer's assessment of R&E risks
- Tracking economy-wide developments, eg climate change policy.

7. Conclusion and action points

This report has given an overview of R&E risks as they relate to businesses and demonstrated how they can be incorporated when assessing the financial strength of the sponsor covenant. This is likely to involve a longer-term perspective, greater emphasis on qualitative information, a focus on risk management, and consideration of business resilience in the face of future uncertainties.

Risks to the covenant from R&E issues will vary considerably between companies, so the treatment here is necessarily illustrative rather than exhaustive. A thorough assessment of the risks to a particular sponsoring employer would require in-depth R&E and covenant expertise which is not typically possessed by actuaries. Nonetheless, actuaries can support trustees in this process by helping them to formulate questions for their employer and/or covenant adviser, critically review the answers received and allow for any risks in their funding decisions.

Here are some suggested actions for actuaries who advise UK defined benefit pension schemes:

- Learn more about R&E issues to be equipped to discuss them with your clients.
- Investigate which R&E issues are particularly relevant to your clients, given their business sector.
- Encourage trustees to raise R&E issues in discussions with their covenant adviser and the employer.
- Help trustees adopt an integrated risk management approach that includes R&E risks.

³⁸ Section D of the TCFD's Final Recommendations Report assists in developing climate-related scenarios <https://www.fsb-tcfd.org/publications/final-recommendations-report/>



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