

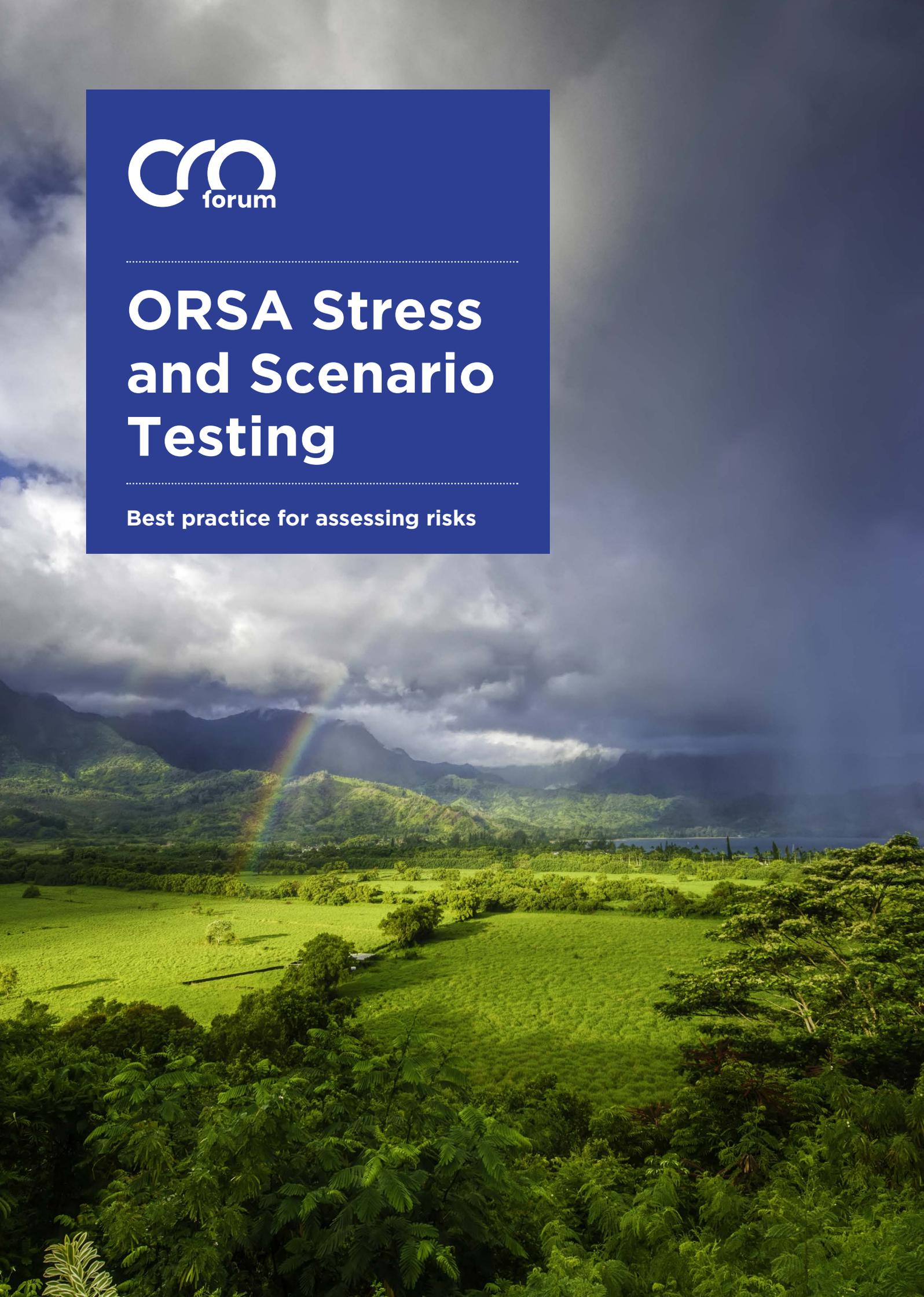


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# ORSA Stress and Scenario Testing

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Best practice for assessing risks



# Table of Contents

<b>Foreword</b>	<b>3</b>
<b>1. Executive Summary</b>	<b>4</b>
<b>2. Purpose of ORSA Scenarios and Stress Testing</b>	<b>6</b>
2.1 Setting the scene – Purpose of the ORSA within the regulatory framework	6
2.2 ORSA and the role of scenarios and stress testing	6
2.3 Objectives of ORSA scenarios and stress testing	8
2.4 Scope and main topics of ORSA scenarios and stress testing	8
2.5 Key aspects of scenario development and types of scenarios	9
2.6 Role of Scenarios in assessing the appropriateness of the capital requirements and setting internal capital targets	10
2.7 Role of Supervisory Authorities and shift in expectations	11
<b>3. Characteristics of ORSA scenarios</b>	<b>12</b>
3.1 Stress testing & Scenario analysis	12
3.2 Number of scenarios	14
3.3 Probability of scenarios	14
3.4 Changes in severity of scenarios from year to year in the ORSA	15
3.5 Timescales over which scenarios are assessed	15
3.6 Adversity based on probabilities versus adversity based on impact	15
3.7 Considerations for Group ORSAs	16
<b>4. Longer-Term Risks</b>	<b>17</b>
4.1 Context and Definitions	17
4.2 Principles	18
4.3 Instantaneous versus multi-year and inclusion of management actions	18
4.4 Translate long-term views into the projection horizons	19
4.5 Investments	20
4.6 Life and Non-Life	21
4.7 Case Study – Comparison between Modelling Climate Change Risk and Modelling AIDS Risk	22
<b>5. The role of management actions within ORSA scenarios</b>	<b>23</b>
5.1 Action toolkit – definitions	23
5.2 Typical actions companies have in their toolkit	24

# Foreword

In 2013 the CRO Forum published a paper<sup>1</sup> on Scenario Analysis that provided principles that could be used by re(insurance) practitioners to develop an appropriate set of scenarios and stress tests within their risk management framework.

Following the implementation of Solvency II on 1 January 2016 the use of stress and scenario testing has become embedded through the Own Risk and Solvency Assessment (ORSA) process. Similar ORSA requirements are also in place in most other global supervisory regimes.

This paper builds on the prior CRO Forum paper and provides an overview of the CRO Forum members' views on the development of the ORSA and the purpose and role of stress and scenario testing within it. This includes insights on current practices amongst CRO Forum members regarding the definitions, number, severity and likelihood of the scenarios chosen. We devote a chapter to CRO Forum members' views on how best longer-term risks, such as climate change, should be considered as part of the ORSA process. Finally, the paper provides insight into typical management actions that are considered within the scenarios in the ORSA process.



<sup>1</sup> Scenario Analysis, The CRO Forum December 2013

# 1. Executive Summary

Stress testing and scenario analysis are an integral part of the Own Risk and Solvency Assessment process. At its core, the ORSA process including the stresses and scenarios selected by re(insurers), should reflect their 'Own' view and assessment of the risks faced.

This paper sets out CRO Forum members' views on the most important considerations for the stress testing and scenario analysis conducted as part of the ORSA. We make a distinction between the ORSA process which is an ongoing part of the risk management framework and the ORSA Report which summarizes the most material impacts and aids strategy development.

We start in Section 2 by laying out the background and **purpose of ORSA scenarios and stress testing**. This includes the regulatory framework, the role of stress testing and scenario analysis and their place in the overall Enterprise Risk Management (ERM) process. In its simplest form, the objective of stress and scenario testing encourages the Management and the Board to think about what might happen in

the future and to assess how adverse developments might impact the business planning of the company.

The ORSA will analyse a range of scenarios to assess how material risks could impact the company and its solvency position. Typically, most ORSA scenarios will be less extreme than those used for recovery planning. Stress testing and scenario analysis also play an important part in assessing the appropriateness of the capital requirements and setting internal capital targets.

Section 3 provides details of the **characteristics of ORSA scenarios** and includes some results of a survey of current practices of CROF members conducted in March 2022. The paper covers the types of stress and scenario tests that are run (e.g. single or multiple risk, qualitative or quantitative analysis) and a description of how or why each is chosen. Survey results are used to highlight the wide range of scenarios that different (re)insurers use as well as the number of scenarios run and the differences in probabilities and timescales employed.



Section 4 details how to consider **longer term trend risks** that go beyond the Company planning horizon including a special focus on climate risk. The paper covers specific considerations for the ORSA of long-term risks, including how these are defined, how they may best be modelled, and how this may differ for specific lines of business.

As an emerging long-term risk, climate change risk is a particular focus, with consideration for how this will fit in alongside other risks included in the ORSA. Several principles are set out to consider in assessing the time horizon that should be used for ORSA stress testing: a longer time horizon increases uncertainty; scenario design should result in actionable results; the primary focus should be first order, quantitative results; and the ORSA should reflect the most material risks to the (re)insurer.

It is appropriate to consider climate change risk as part of the **ORSA process** to establish its potential financial impact over the business planning horizon and any potential longer-term impacts on the strategy of the (re)insurer. Where the impact is not material over the business planning horizon, we conclude that the analysis does not need to be updated every year. Thereby providing capacity for the re(insurer) to conduct analysis on other emerging or longer-term risks.

The **ORSA report** will present the financial impact of material risks over the business planning horizon. This may include the results of climate change scenarios. When a risk does not present as a material financial risk over the business planning horizon or to the long-term strategy then this would not typically be included within the ORSA report. However, given the regulatory expectations in relation to climate change, it is increasingly likely for the (re)insurer to include within the ORSA report details of the work they have carried out in assessing climate change risk and its potential financial and long-term strategic implications.

Finally, in Section 5 we consider the important topic of the **management action toolkit** and how these may be considered within the ORSA scenarios. Management actions cover a range of objectives including reducing capital resource outflow, sourcing new capital, de-risking the balance sheet and adjusting capital deployment. Based on the survey results of CRO Forum members a description of the types of management actions used is provided along with considerations of their feasibility, desirability and diversity.

### Key take-aways

- The ORSA report should primarily focus on a (re)insurers' own view of its risk profile, covering its material risks through a wide range of scenarios.
- The ORSA is not a mere report but entails a whole process and is an important mechanism of the risk management cycle of an (re)insurer. The ORSA report should therefore focus on material risks, produced in a reasonable timeframe with clear conclusions and be useful for business purposes.
- Stress testing and scenario analysis play a key role by providing relevant information on the potential strengths and weaknesses of the (re)insurer's strategy over the business plan horizon. There is a wide range of scenario types in which longer-term risks (such as climate change) are also considered by (re) insurers.
- Climate change risks and other longer-term risks should be treated within shorter term scenario analyses and stress tests of the ORSA report only if analyses show evidence that they could already be material over the planning horizon. Longer term results will be more uncertain, and therefore results and analysis might be more qualitative or explorative.

## 2. Purpose of ORSA Scenarios and Stress Testing

### 2.1 Setting the scene – Purpose of the ORSA within the regulatory framework

The European Insurance and Occupational Pensions Authority (EIOPA) defines the ORSA as follows<sup>2,3</sup>:

*“The entirety of the processes and procedures employed to identify, assess, monitor, manage and report the short and long term risks an insurance undertaking faces or may face and to determine the own funds necessary to ensure that the undertaking’s overall solvency needs are met at all times.”*

The ORSA is an integral part of strategy development, capital planning and the risk management process and needs to be considered when making strategic decisions.

As the ORSA is the undertaking’s own view and understanding of its risks, capital needs and funds held, it will aid the undertaking to assess the adequacy of its regulatory capital requirement to meet its individual risk position, whether it uses an internal model, the standard formula or a combination of both.

While the ORSA is a regulatory requirement, it is principles based and requires that the (re)insurer assesses all its risks using the most appropriate techniques and tools in line with its specific risk profile. Therefore, it is important to note that the ORSA is meant to be an own assessment which reflects the company’s unique risk management characteristics and profile.

### 2.2 ORSA and the role of scenarios and stress testing

Although the ORSA could be different between (re)insurers, some aspects of the ORSA are quite common:

- i) Identifying and assessing all material risks on a forward-looking basis;
- ii) Defining risk measures and methodology in line with the risk profile of the entity;
- iii) Conducting stress testing and scenario analysis;
- iv) Having an effective risk management framework in place to monitor and control risks and, where relevant, including management actions to mitigate risks if they materialize; and
- v) Having a risk management culture embedded within the company to support sound risk management and decision-making within the business.

In practice, the ORSA is a process which is indistinguishable from the risk management process, whose main conclusions are summarized in the ORSA report. Figure 1 below presents a theoretical Enterprise Risk Management (ERM) process to illustrate where the scenarios and the ORSA report belong.

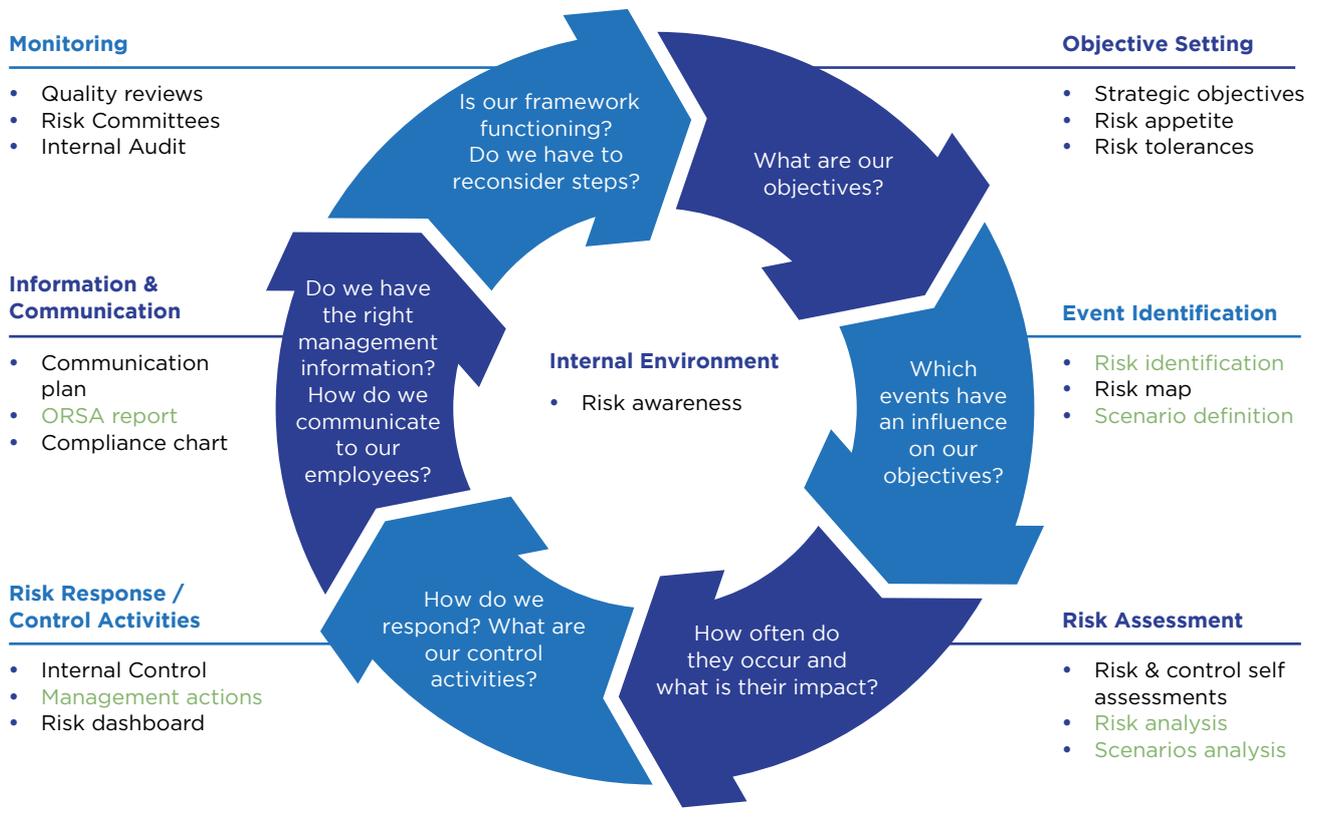
The work around scenarios forms a key part of the ERM cycle as part of the risk identification, risk assessment, risk response and Information and Communication activities. (Re)insurers need to identify all material, current and foreseeable risks relevant to their business that could impact strategy execution or threaten solvency.

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<sup>2</sup> The CEIOPS ORSA Issues Paper, May 2008.

<sup>3</sup> The IAIS Framework includes the definition “The supervisor requires the insurer to perform regularly its own risk and solvency assessment (ORSA) to assess the adequacy of its risk management and current, and likely future, solvency position”

**Figure 1:** Position of the ORSA scenarios and report within the ERM cycle (green elements show ORSA scenario elements)



Stress testing is the analysis of the impact of the adverse development of one or multiple risk factors, such as the assessment of capital requirements per risk factor. It includes sensitivity testing and is generally of a mathematical nature (i.e. 99.5% shock, basis point sensitivity, goal seek stress on breaching a financial target). Scenario analysis refers to the analysis of the impact of a combination of (adverse) movements in risk factors and generally includes expert judgement and practical experience with real-life events.<sup>4</sup> (Re)insurers are expected to subject the identified material risks to a sufficiently wide range of stress tests or scenario analyses to provide an adequate basis for the assessment of the overall solvency needs. Through stress scenarios, management is expected to gain a true understanding about potential impacts of the relevant adverse scenarios, and what mitigating actions the (re)insurer could take. Some (re)insurers choose to use pre-built management actions in certain scenarios so that if the event were to materialize, the (re)insurer could activate a series of pre-planned actions. Many (re)insurers select a subset of key scenarios out of their regular process for the ORSA report.

Each of the components displayed in Figure 1 form the building blocks of the ORSA and may be customized to meet both internal business needs and external regulatory requirements. It is a cycle, that is repeated at least annually as part of the ORSA process.

The ERM cycle encompasses all the risk activities performed during the year, whereas the ORSA report should focus on material risks, be relatively short, produced in a reasonable timeframe, with clear conclusions and useful for business purposes. As the ORSA is a process and not just a report, there are many points of engagement with Board members in the assessment of risk and solvency throughout the year, and not only at the end of the process for the annual approval of the ORSA report. Therefore, the report is not supposed to include all scenarios and risk analyses produced during the year. This is a common source of misalignment in terms of expectations with regulators who have increased over time the level of detail they expect from the report. Details of the full ORSA process are documented in the Record of the ORSA.<sup>5</sup>

<sup>4</sup> CRO Forum publication in December 2013 "Scenario Analysis" ([thecroforum.org](http://thecroforum.org))

<sup>5</sup> Guidelines on own risk and solvency assessment (ORSA) EIOPA guideline 5

## 2.3 Objectives of ORSA scenarios and stress testing

There is a wide range of scenario types, depending on the management objectives. Specific objectives include amongst others the following:

- Testing solvency and profitability adequacy over the business plan period;
- Providing insights into material risks the firm is vulnerable to;
- Analysing liquidity risk;
- Analysing non-quantifiable/unmodelled risks;
- Analysing risks related to business continuity or how management functions can be affected;
- Assessing adequacy of capital or internal models; and
- Eliciting whether the company will remain within its capital framework (i.e. having a sufficient solvency ratio, fulfilling business targets).

The main purpose of the scenarios is to help Management take informed decisions. It can be seen as a complementary tool to the financial and actuarial forecast based on a best estimate view. Scenarios allow for a structured thinking about rare and adverse events, but also help to think about alternatives to the central scenario.

Different types of decisions can be challenged or reinforced as part of scenario analysis, such as:

- **Strategic perspective:** Long-term decisions that in general require longer and extensive preparation, e.g. Strategic Asset Allocation and strategic reinsurance planning, changes in the target business mix and that results in a gradual improvement of the financial position;
- **Tactical perspective:** Decisions that require planning, but that can be implemented in the short to medium term, e.g. Tactical Asset Allocation. This would include certain forms of internal and external reinsurance and de-risking;
- **Emergency perspective:** Measures that can be taken quickly but generally tend to be more costly and may limit the options that Management can subsequently take e.g. changes in contracts and drawing down letters of credit.

Conducting regular scenario analysis over different time horizons is key to help Management to be better prepared in case of adverse situations. In practice, the ORSA scenarios should continuously trigger management decisions and actions. A (re) insurer should take, mitigate, transfer or terminate a risk depending on the situation.

The ORSA scenarios could also help to check the plausibility of stress scenarios in the internal

model results distribution. Therefore, it is important to assess the appropriateness of the capital or internal model as part of the ORSA. Validating capital models and assessing models is ensured by considering the adequacy of the model governance, as well as by looking at scenarios both for risks that are modelled as part of the (re)insurer's capital model (internal model or standard formula) and for risks that are not modelled explicitly.

## 2.4 Scope and main topics of ORSA scenarios and stress testing

The ORSA should analyse severe but plausible scenarios to assess how material risks could impact the capital position, i.e. it mainly focuses on the solvency impact on the company. In addition, (re) insurers might consider liquidity (risk) aspects in both scenarios and management actions to test if in stressed circumstances adverse developments might create combined impacts on solvency or liquidity positions.

Scenario analysis and stress testing considered over a time horizon in line with the strategic business planning period are conducted at least annually to assess whether the (re)insurer complies with its regulatory requirement under a wide range of scenarios that may negatively impact the (re) insurer's solvency. Figure 2 on the next page illustrates the relationship between the pillar 1 capital requirements and the ORSA scenarios.

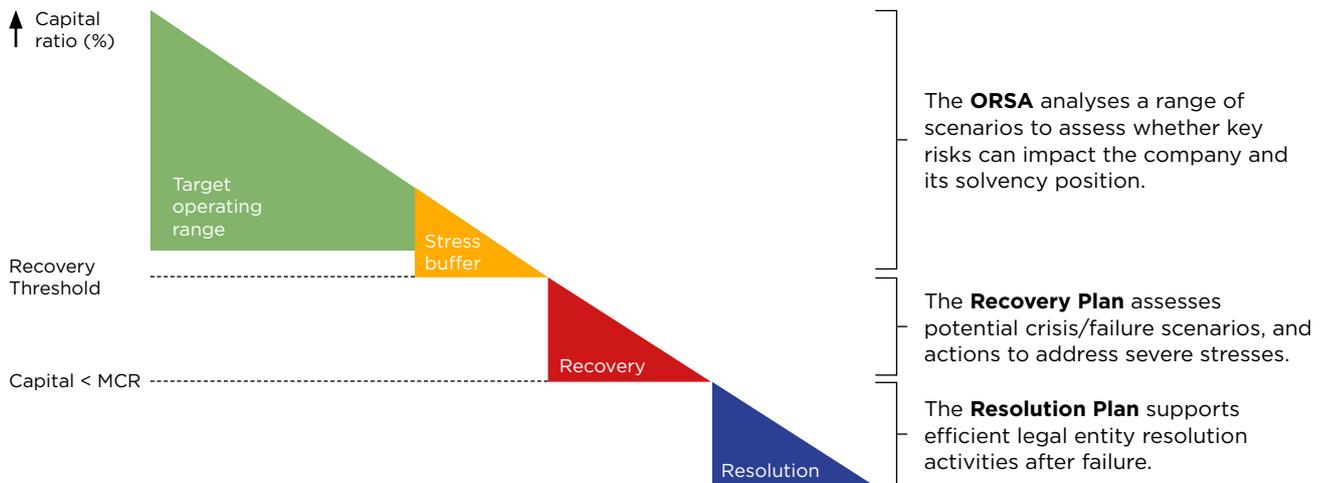
Scenarios should address the main risks the (re) insurer is exposed to, analysing insurer-specific vulnerabilities (including regional and sectoral characteristics), including severe outcomes and identifying interdependencies.

Scenarios can cover the following topics:

- Insurance shocks
- Financial market shocks
- Operational scenarios
- Legal/regulatory scenarios
- Catastrophe scenarios
- Business continuity scenarios
- Other (climate related, war-related etc.)

Typically, most ORSA scenarios will be less extreme than those used for recovery planning. However, regulatory requirements for the ORSA include reverse stress testing. This creates significant overlap between ORSA scenario analysis and scenario analysis in the context of recovery planning. Less extreme scenarios would be used to determine whether the company remains within its internal targets, e.g. for the Solvency ratio.

**Figure 2:** The scope of ORSA scenarios vs recovery plan and resolution plan



Upon falling below internal thresholds, appropriate management action would need to be defined. These management actions would typically form a subset of the management actions available for recovery planning.

Overall, the space between slight variations of the business plan (sensitivities), mild and severe stress and scenarios and reverse stress tests is continuous with no clear boundary.

### 2.5 Key aspects of scenario development and types of scenarios

On a regular basis, a (re)insurer’s strategy execution and solvency position are discussed and approved by the Board. In this context, scenario analysis and stress testing play a key role in the strategic decision making. To this end, the selection of stresses and scenarios should consider the current and forward-looking risk profile of the (re)insurer while allowing the inclusion of new scenarios where relevant (i.e. reflecting any new or increasing risks). In practice, it is a balance to find between previous year scenarios, technical adjustments and new scenarios.

Once the scenario scope is drafted, the Board is asked to discuss the various scenarios as to capture its views early in the ORSA process. If the Board agrees on the proposed scenarios, subject matter experts further define the specifics of the scenarios and calculate results based on the agreed narratives.

Scenario analyses and stress testing are conducted to quantify, acknowledge and formulate potential actions for scenarios pertaining to the (re)insurer’s main risks, outside the scope of regular risk

measurement tools e.g. sensitivities, limits and tolerances. When developing the stresses, an insurer can consider different types of scenarios:

- Single Risk Factor Stress Tests
- Multiple Risk Factor Stress Tests
- Reverse Stress Tests
- Scenario Analysis – Quantitative scenarios
- Scenario Analysis – Qualitative scenarios
- Exploratory Stress Tests

Description of these scenarios is further explored in Section 3.1.

The participants involved in scenario development vary; the key functions Risk Management, Actuarial and Compliance are usually involved early on (also in the process of identifying material risks). Then, depending on the type of risk and associated scenario, several other departments are included in the process. These are knowledgeable people covering various fields of expertise such as Business functions, IT, HR, Legal, Finance, and Investments and Asset Management.

## 2.6 Role of Scenarios in assessing the appropriateness of the capital requirements and setting internal capital targets

### 2.6.1 Measuring Performance Against Capital Targets and Solvency Limits

Companies set capital targets and solvency limits, sometimes expressed as a range. These are an important part of the company's risk management framework and strategic objectives. Capital targets and limits are often published with a lot of external attention applied to them. As a consequence, it is vital to have a capital target or limit that is appropriate for the business.

A key aspect of the ORSA is to test the resilience of the company's business strategy and an integral part of this is how robust the solvency position is. In practice it is often the solvency position that will act as a constraint to the fulfilment of the company's strategy under certain scenarios. This can be investigated by projecting how the solvency ratio or excess capital develops under different sensitivities, scenarios and stress tests and, in turn, compare this to the capital targets that the company has set. The outcome of this exercise can be used to review how resilient the company is to shocks and accordingly determine whether the internal capital target is appropriate for the (re)insurer to remain sufficiently capitalized.

#### Base scenario (best estimate, real world)

Best estimate, real world assumptions are used to forecast the base scenario. One of the natural outputs will be the solvency position under a regulatory measure or an internal measure. The results can be compared to the capital targets set in the capital management policy.

#### How Resilient do you want your business to be

Management may consider what level of volatility is acceptable in the solvency position of the company. For example, remaining within the target capital range even after a 1-in-x event. The ORSA scenarios can be calibrated to test this and help determine how appropriate the capital target is.

#### Fulfilling Strategic Objectives

In practice the solvency position is a key aspect of fulfilling strategic objectives. Falling outside the capital range or below a solvency limit may prevent a company from achieving its business objectives and may even require remedial actions to restore the company's capital position that are not aligned with the company's core objectives.

A target or limit that is too strict may trigger unnecessary actions that prevent a company from achieving its objectives, while a target or limit that is too weak may not provide adequate financial security to policyholders and other stakeholders.

An appropriate target or limit should find a balance between these two objectives. The scenarios defined in the ORSA can help to assess if the proposed targets or limits achieve the desired balance.

#### Reverse Stress Tests & Extreme Stresses

Capital requirements are set to cover extreme situations, so a capital target is not usually calibrated to cover one extreme event upon another. However, it is still useful to know what would need to happen for a company to breach its capital target, in other words a reverse stress test.

The outcome of this work may reveal that certain reverse stress tests are not as remote as the company is comfortable with. This could lead to a revision of the capital target or management of the exposure.

Extreme scenarios will often cause the company to breach its own capital targets or solvency limits. These can be useful to understand when setting appropriate targets or limits.

### 2.6.2 Appropriate Methodology

It is common for the ORSA process to cover the appropriateness of methodology choices to model risks and calculate capital requirements. Certain regulators require this, however, this is not universal across Europe. Whether or not such a section is mandated, (re)insurance companies may consider that how it decides to model risks is such a critical part of the risk management framework that the ORSA should comment on why the methodology choices are appropriate.

It should not be the intention of the ORSA to repeat work that is performed elsewhere to review the capital model, for example, model validation, P&L attribution and Use Test requirements. Rather the work performed in this section of the ORSA should be complimentary.

A primary question to answer is if the capital model captures all the material risks. Scenario testing can be used to investigate new and emerging risks and to help the company assess whether or not the capital model will capture and react in an appropriate way to a new or emerging risk.

## 2.7 Role of Supervisory Authorities and shift in expectations

Supervisory authorities have defined the ORSA framework in such a manner that it covers the areas of interest for supervision while still being first and foremost an internal tool reflecting the company's view on its risk profile. The ORSA scenarios should be focusing on material risks and major trends to drive the discussion with Management and the Board on high priorities envisioned over the strategic planning horizon.

Over the last few years, many supervisors have, however, increased the level of expectations with regards to the ORSA report and longer-term risks. The ORSA has become a central element of the (re)insurer's ERM and there is an overlap between the (re)insurer's own view of risks and the risks assessed as part of the regulatory requirements. Furthermore, regarding climate change risks, most supervisors are eager to review the concept of time horizon in the ORSA. EIOPA has issued an application guidance<sup>6</sup> on how to reflect climate change in the ORSA. In its paper, EIOPA sets out expectations on the integration of climate change risk scenarios by (re)insurers. Under the guidance, climate change scenarios would be required in the ORSA report even if no material impact would be expected within the strategic planning horizon of the company. This would represent a major shift in the ORSA principles.

The IAIS, in its 2021 application paper on climate change-related risks in the insurance sector, states that the ORSA is a useful tool for (re)insurers to assess risks arising from climate change and take appropriate actions. While it is noted that the time horizon should be consistent with the nature of the (re)insurer's risks and business planning, it also suggests extended time horizons may be suitable depending on the nature of the (re)insurer's business<sup>7</sup>.

In this context, the nature of risks (short tail vs long tail) forms a key element of the thinking process and the choice of the underlying methodologies. For longer-term business (e.g. life risks and non-life casualty risks), the usual methodologies can be adapted for the purpose of climate change risks since the inforce portfolio represents a significant portion of the risks. As a result, it is possible to materialize the potential long-term impact of climate change on current portfolio and make it tangible for Management.

For short term risks (e.g. natural catastrophes), the choice of methodology appears more complex since the risks that are currently on the balance sheet will be gone if we consider a long time horizon (10 years or more). In theory, this should favour the use of an innovative methodology for assessing climate change impact on short tail lines of business (e.g. dynamic balance sheet considering future new business) but the limitations of such approach are generally high<sup>8</sup> and the resulting output would not be actionable for the Board.

In the ORSA context, this is a potential source of misalignment in terms of expectations with regulators because such approach seems however relevant from a supervisory standpoint to analyse the evolution of a market as a whole (e.g. highlighting the potential risk of an insurance gap emergence in some critical areas).

Alternative approaches are therefore recommended for analysing climate change impact on short tail lines of business (for example, if longer term trends create short-term disruptive events, as described in chapter 4.4). In this case, longer term studies might trigger an updated parameterization of the quarterly/annual stresses reflected in the ORSA report (e.g. stresses on natural catastrophe risk or market risks).

The ORSA has become a powerful process which by nature is evolutionary. Scenario analyses for longer term risks such as climate change will naturally flow into the ORSA report's scenario analyses and stress testing over the strategic plan horizon if they show evidence that these risks could have a material impact already over this shorter-term time horizon.

<sup>6</sup> [EIOPA's August 2022 Application guidance](#)

<sup>7</sup> [210525-Application-Paper-on-the-Supervision-of-Climate-related-Risks-in-the-Insurance-Sector.pdf section 5.2](#)

<sup>8</sup> [A first assessment of financial risks stemming from climate change: The main results of the 2020 climate pilot exercise \(ACPR 2020\)](#)

# 3. Characteristics of ORSA scenarios

## 3.1 Stress testing & Scenario analysis

Stress testing and scenario testing are often used interchangeably since they both broadly refer to a firm's processes of assessing their ability to meet capital, financial and liquidity requirements in stressed conditions as well as in some cases assessing the operational and strategic implications.

The types of scenarios typically used were introduced in Section 2.5. Further detail on the characteristics of each type of scenario is set out below:

Type of scenario	Description
<b>Stress Testing - Single Risk Factor</b>	<p>Considers the sensitivity of the balance sheet (or other risk metric) to a specific change in an individual risk (e.g. +100bps flat increase in interest rates). The main limitation of this approach is that single risk factor stresses are unlikely to happen in practice. That is, risks in reality are correlated (e.g. equity and property market falls). These types of stresses also cannot analyse where risks compound (e.g. under a longevity stress and a lower interest rate environment on an annuity portfolio). Knowledge of the balance sheet is key to identifying these and it is important to cover these as part of multiple or all-risk stressing.</p> <p>For the stresses, parameters are primarily selected based on a statistical approach, using certain distribution assumptions, dependency structure between risk drivers and/or a specified confidence interval.</p>
<b>Stress Testing - Multiple Risk Factors</b>	<p>Considers the sensitivity of the balance sheet to a number of different (related or unrelated) risks. An example of this might be a market crash where there are falls in equity and property values, widening of credit spreads and falls in interest rates. It could also consider situations such as all risks being stressed concurrently possibly defined in terms of a 1-in-X all risk stress which is derived from internal model output. Historical scenario analysis can also be useful (e.g. the 2008/2009 financial crisis). Multiple risk factors stressing is useful to highlight how risks interact on the balance sheet, particularly in situations where risks are correlated or where losses can compound. Firms may find it helpful to explore combinations of key risks for different elements of their insurance portfolio as well as scenarios that cover all risks.</p>
<b>Reverse stress tests</b>	<p>A reverse stress test is a stress test that starts with the identification of a pre-defined outcome, with the objective to identify scenarios that would threaten the solvency of the (re)insurer's, i.e. what degree of stress the (re) insurer can withstand before the solvency ratio equals/falls below 100%. This gives no indication of the likelihood of occurrence. Multiple Risk or All-risk factors are likely to form part of any reverse stress testing analysis.</p>

Type of scenario	Description
<p><b>Scenario analysis – Quantitative Scenarios</b></p>	<p>Risks are translated into scenarios representing a set of plausible events, in the form of a specific narrative or event description, considering external developments such as macroeconomic, financial, demographic, ecological, political and technological developments. This could include natural disasters, conflicts, pandemics, cyber events. These events may be expected to have multiple impacts (e.g. causing insurance losses, operational interruptions and financial market implications). These can be based on historical events or plausible future events not previously observed.</p> <p>These add value in situations where there is a desire to explore the systemic impact of a risk developing through the exploration of dependencies. This analysis can be further widened beyond financial implications to look at operational and strategic implications to inform risk management activities.</p> <p>Quantitative scenarios are very useful for items that have a clear financial impact and when inputs can also be reasonably quantified. They help to add value as they can clearly show the impact in a quick and understandable manner. Quantitative scenarios also lend themselves to being displayed in a graph or table which can make the information easier for users to digest.</p>
<p><b>Scenario analysis – Qualitative Scenarios</b></p>	<p>When a scenario cannot reasonably be quantified, such as for reputational impact, emerging risks (that could be beyond the horizon used for capital planning) or business continuity, a more qualitative narrative and assessment are provided. Qualitative scenarios provide added value in two situations:</p> <ul style="list-style-type: none"> <li>• <b>Difficult to quantify risks</b> - There are a range of risks that are difficult to quantify. For example, a firm may rely on its strong brand image to generate sales and future profits. However, the value of the brand and the associated reputational risk are difficult to quantify in a way that is meaningful. Similarly, technology risk scenarios could consider the impact of a cyber attack and how sophisticated it would need to be to breach the defined risk appetite limits and subsequent impacts on customers.</li> </ul> <p>In such a scenario quantification of the loss may not be the key benefit to performing the scenario analysis. Instead, the value is gained from exposing the existing risk management practices to the scenario and identifying elements that are performing well and other areas where improvements can be made. These types of scenarios can link to operational resilience testing, but are typically more holistic in nature and can consider impacts over a longer time period.</p> <ul style="list-style-type: none"> <li>• <b>Sequence of events</b> - Scenarios which require a sequence of events to occur can also be more suitable to analysis via qualitative scenarios. These help the Board to understand how a severe loss could occur without applying an undue level of precision.</li> </ul>
<p><b>Exploratory stress tests</b></p>	<p>Aims to explore emerging risks that are typically beyond the horizon that is used for capital planning. Scenarios for these risks contain a high level of uncertainty, methodologies still need to be further developed and proper data collected. Outcomes are not meant to draw direct conclusions on the impacts on capital levels, but to rather explore potential pathways and to explore potential management actions.</p>

### 3.2 Number of scenarios

The survey of CRO Forum members highlighted that there is a wide range in the number of stress and scenarios included in the ORSA report.

There are many reasons why differing numbers of stress and scenarios would exist between firms. One reason is reporting philosophy. Some firms may take the approach of only reporting a small number (4 or 5) of the most important scenarios within the ORSA report while other firms may take an approach of including the majority (20+ ) of stress and scenarios that have been assessed. We may expect companies will perform many stresses as part of the ORSA process – with many of these frequent and instantaneous or focussed on short-term effects. The ORSA report then contains the more material or complex multi-year scenarios, including management actions.

There also might be genuine risk profile differences between firms that lead to a differing number of stresses or scenarios modelled. Reasons for showing a larger number of stresses or scenarios in the ORSA report may include:

- A higher number of key risks, product lines, business areas or geographical locations
- If there is significant non-linearity in risks that should be highlighted
- If there are specific combinations of risk that have a cumulative impact or are expected to be correlated.
- Having different firms in the group that are exposed to different risks where the particular solvency of an individual firm needs to be considered

Firms may also have larger numbers of stresses/ scenario to reflect specific Board or regulatory requests. The size and resources available to a firm may also impact the number of scenarios.

### 3.3 Probability of scenarios

There are different merits to running scenarios with differing severities. What is right for a firm may depend on its risk appetite, capital levels, the availability of group support, past ORSAs and the reliability of quantifying probabilities of scenarios for the risks involved. Firms may also choose to run different severities of the same type of scenario to demonstrate non-linearity on the balance sheet or to help build the narrative around the strength of the balance sheet to differing levels of multiple risk scenarios.

#### Higher likelihood lower severity scenarios

Higher likelihood lower severity scenarios are ones where the outcome might expect to happen relatively frequently (e.g. a 1 in 5-year event). Such scenarios are useful within the ORSA for providing a view on risks that the company is more willing to accept, e.g. where planned dividends would need to be reduced to shareholders or a risk appetite level would be breached. It can also be useful for firms where the solvency is weaker as this will demonstrate the sensitivity and risks to moderate stresses and the vulnerabilities that the firm faces as a result of this. For instance, it might be that a 1 in 5-year stress for a particular risk results in the SCR for a firm being breached, and the higher likelihood of this is likely to be better communicated using a lower severity stress that breaches the SCR than a higher severity one that also breaches the SCR but the Board understands to be more remote.

#### Lower likelihood higher severity scenarios

Lower likelihood higher severity scenarios are scenarios that are expected to be less frequent but have a higher impact. They can also be labelled severe but plausible. These higher severity scenarios might only happen once or twice over an insurance executive's career (say 1 in 20 or 1 in 30-year events). These scenarios are likely to form a core part of the ORSA scenarios for many firms, as it is key to demonstrate the resilience (or weakness) of the balance sheet under a range of severe events.

#### Very low likelihood extreme scenarios

In general, very low likelihood scenarios are not considered as useful for the ORSA and instead are expected to be covered within recovery planning. However, they may have some value for very well capitalised firms to demonstrate if they are resilient in extreme conditions or exposed to a particular risk noting the associated limitations around such scenarios being considered implausible by the Board and the financial modelling for such scenarios potentially being less reliable and more spurious.

In the CRO Forum survey conducted most firms indicated that the most severe scenario considered breaches regulatory solvency or the recovery planning trigger. Few firms consider an extreme doomsday scenario that threatens the Company's existence.

### 3.4 Changes in severity of scenarios from year to year in the ORSA

Firms may choose to select the same core set of scenarios from year to year. This has the advantage of showing how the risk profile of the balance sheet evolves over time against consistent metrics aiding Board understanding.

Some firms may choose to alter the stresses or the severity of stresses year to year. This might be in response to different financial market conditions or a change in the risk profile of the business.

Firms could calibrate their stresses through the cycle where the severity of a stress varies based on the position of the economic cycle. Firms could also calibrate stresses based on financial market stresses of moving to particular values e.g. the S&P 500 moving to a set value. These have the advantage of being anticyclical.

Where the risk profile of the business changes it is important to update the scenarios used and consider the severity. Even for a closed book of business the risk profile can alter in response to changing financial markets, interest rates and regulatory changes. This should initiate a review of the stresses used ensuring appropriateness for the new risk profile.

The CRO Forum survey results show that the majority of companies evaluate similar scenarios from one year to the next, while reviewing calibrations and incorporating new scenarios when relevant.

### 3.5 Timescales over which scenarios are assessed

Many firms select stresses based on an instantaneous impact. This provides key information on the balance sheet based on the present conditions. This approach has the advantage of being simpler to model, allowing an efficient use of limited modelling budgets.

Firms can also choose to implement stressing over a longer time period. This might be to reflect an evolving economic scenario or to reflect insurance losses occurring at different points in the future (possibly after capital distributions). This can also be useful to demonstrate how an instantaneous loss to the capital position might be offset by higher capital generation or management actions taken in the future. These scenarios provide additional insight over the instantaneous stresses where the risk or capital profile of the balance sheet is changing significantly over the business

planning period. It can also be used to indicate the cumulative effect of medium sized losses over a prolonged period. The limitations of this approach include additional resource requirements and a lower level of accuracy for longer durations.

For some types of emerging risks, e.g. climate change, firms may also wish to analyse the impact over a much longer time period (see chapter 4).

### 3.6 Adversity based on probabilities versus adversity based on impact

Internal models can be used to determine a particular probability of a movement in a risk factor being greater than a set level, e.g. a 1 in 25-year event. Defining stresses in this way has the advantage that as a firm's view of the risk changes then the calibration of the scenario is automatically updated. For multiple risk scenarios it is technically complex to calibrate using this method that gives a meaningful probability. Firms often instead consider a smooth scenario of the desired probability (say 1 in X-year) out of the internal model noting that this has limitations particularly if the risks considered are not the key risks of the firm.

A challenge of using the firm's internal model to derive probabilities is that it might not well model real -world events and underestimate real world events that can happen (in respect of probability, impact or interdependencies with other events). Other challenges are that internal models are typically calibrated to get accurate tail probabilities (1 in 200-year events) and may be less reliable in the middle of the risk distributions.

Specific defined event scenarios are the alternative to scenarios derived to a specific probability measure. These might be say a 100 bps interest rate stress or a 20% equity market fall. The advantage of these types of scenarios is that they do not require the assessment or statement of a particular probability (although quantification can support communication). This is also useful for scenarios where probabilities are difficult to estimate e.g. geopolitical scenarios. There is also an advantage that scenarios can be held the same from period to period and this consistency is helpful for showing the evolution of the firm's risk profile over time to the Board.

It is also possible to derive scenarios based on impact on the firm. This could be a scenario that would take the solvency to a particular level, e.g. risk appetite limits or 100% SCR coverage ratio. This is likely to be used as part of a firm's reverse stress testing.

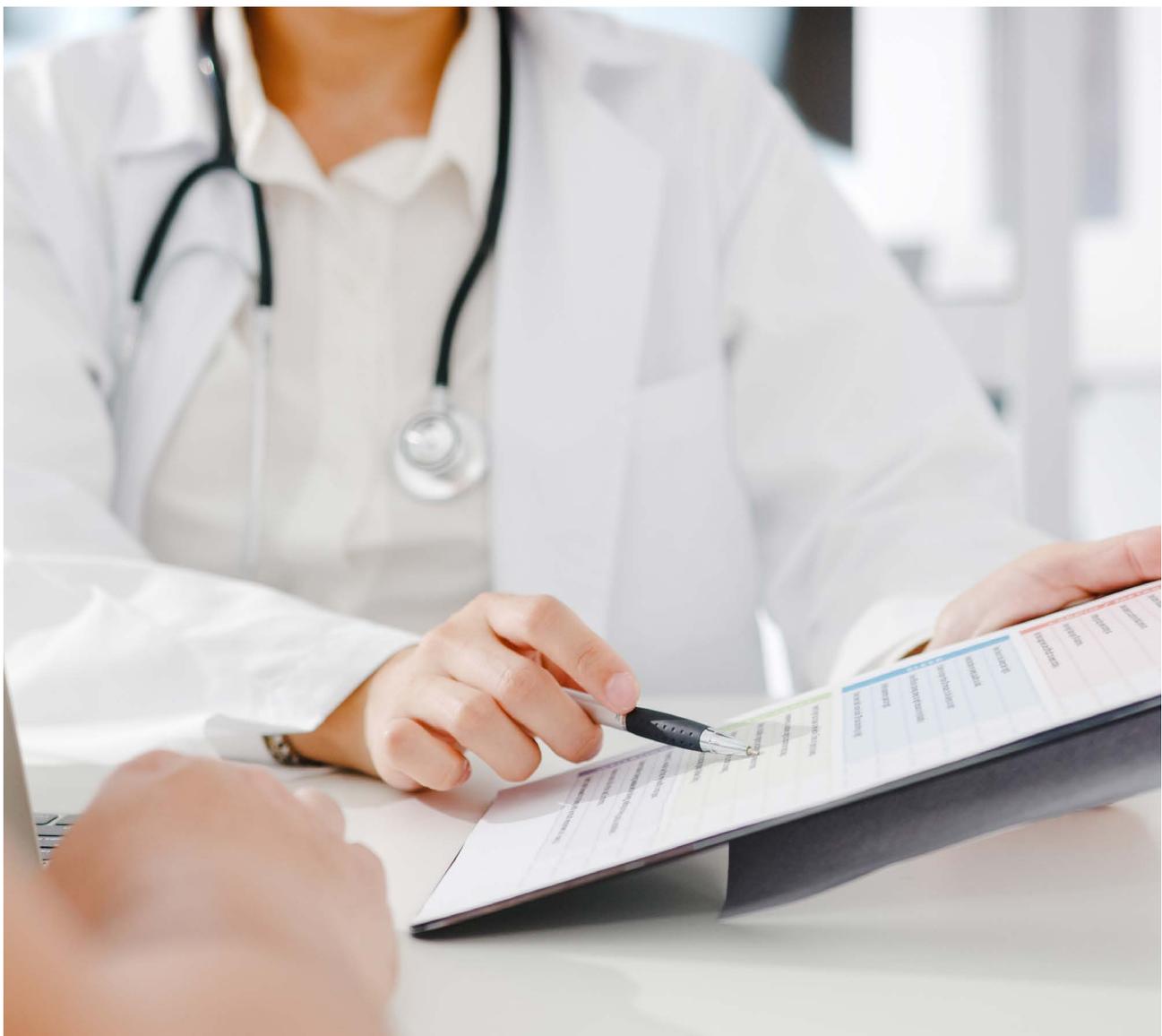
### 3.7 Considerations for Group ORSAs

Unless a waiver is in place, groups are required to produce a Group ORSA and solo entity ORSAs for each Solvency II (or equivalent) regulated (re) insurance entity. Each individual entity will need to ensure that the stress and scenario testing is appropriate for the entity's risks. For the Group ORSA more complex issues are likely to emerge. Namely dealing with different types of entity and regulatory regimes and solvency metrics; and the stresses to show in the Group ORSA report. Additionally, the Group will need to consider any impacts from stress and scenario testing to its non-insurance entities within the Group (e.g. asset management or banking).

Different regulatory regimes and solvency metrics can be approached by showing capital needs on a local basis and using a common economic capital basis that is consistent throughout the Group.

Challenges are likely to occur in the stress and scenario testing where one of these bases shows the need for additional capital in a solo entity. In this situation it is useful to show the impact of this on the Group capital position and if this gives rise to fungibility issues in the capital. The extent to which Solvency II equivalence regimes apply to the countries involved may impact the approach.

The stresses presented in the Group ORSA are likely to focus on the key exposures and risks at a Group level. This may mean that in the interests of parsimony, stresses demonstrating capital support required to solo entities are not presented. If this is the case it is useful to highlight the key risks that would lead to material capital support being required from the Group.



## 4. Longer-Term Risks

This section will develop the specific considerations for the ORSA of long-term risks, including how these are defined, how they may best be modelled, and how this may differ for specific lines of business, e.g. Life and Non-Life. As an emerging long-term risk, climate change risk is a particular focus, with consideration for how this will fit in alongside other risks included in the ORSA.

### 4.1 Context and Definitions

In its application guidance, EIOPA recommends that (re)insurers consider climate change risks beyond the one-year time horizon through the system of governance, risk-management system and their ORSA. EIOPA expect (re)insurers to assess climate change risk in the short-term and to assess the long-term risks of climate change using scenario analysis to inform the strategic planning and business strategy.

A survey of CROF members showed the business planning time horizons are mostly at the short-medium end of this scale: 3 years is the most common horizon and no firms use more than 5 years. Most firms surveyed only included stresses beyond the normal business planning horizon for climate change related risks, indicating that material climate change risks are important in considering long-term scenarios in the ORSA similar to other long-term trends when these become important in relation to the risk profile of the insurer.

In the insurance market, different definitions of short, medium, and long-term have been used for climate change risk scenario testing<sup>9</sup>. A summary of the observed time horizons:

- Short-term varies from 0-1 to 5 years, with a more frequent observed definition of 0-3 years.
- Medium-term: varies with the start date of 3-5 and end date of 10 years
- Long-term: starts from 5 or 10 years with various end dates of 10, 30, 40 to 50 years.

In contrast to the usual expectation of short-term, mid-term and long-term time horizons in the ORSA, time horizons from a climate change perspective tend to be considerably longer. In the context of

climate change stress testing, EIOPA mentioned the following time horizons:

- Current climate change: “up to today” records of the impact of climate change.
- Short-term climate change: projected view of climate change for the next 5-10 years.
- Mid-term climate change: projected view of climate change for the next 30 years (by mid-century).
- Long-term climate change: projected view of climate change for the next 80 years (by end of century).

Overall, the definitions of short, medium, long-term in climate change stress testing context varies within the insurance market and, generally, they are shorter than the time horizons of the projected view of climate change EIOPA defined in the Position Paper.

For climate change stress testing, CRO Forum recommends that insurers consider the nature of the risks to which they are exposed, and whether climate-change risks are sufficiently material and distinct in the overall risk assessment to warrant a different treatment, or whether the (re)insurer’s current practice in preparing the ORSA stress testing sufficiently allows for this risk already.

It would be expected that (re)insurers would align the parameters and approaches used as much as possible. Examples of other approaches are valuation of own shares, impairment goodwill testing and recoverability analysis of deferred taxes. It should be noted that deviations are possible because the perspective/objective and uses of the approaches are different.

<sup>9</sup> <https://www.cdp.net/>

## 4.2 Principles

To assess which time horizons should be considered, the following principles could be relevant.

### 1. The longer the time horizon, the higher the uncertainty.

The level of uncertainty will increase with the length of the time horizon. In case of climate change, future outcomes will be determined by a multitude of external factors, like demographic and economic developments, government policy to curb carbon emissions, technological change, and market sentiment. Additionally, the certainty of climate change stress testing calculations becomes less due to lack of data, the parameter uncertainty and the difficulty of quantifying the impact on the (re)insurers with the length of the time horizon. It is recommended to assess any correlation in long-term trends qualitatively.

As longer-term results will be more uncertain, therefore results and analysis might be more qualitative or explorative in nature. It will be more difficult to draw hard conclusions from them, but they do serve as input to setting business targets and changing the business model over time.

### 2. The design of the long-term scenario should be such that the actual conclusion will be actionable within the business planning horizon for the Board. A 'doomsday' scenario will likely not get much attention.

The objective of the ORSA is to assess the own risk and solvency position over a period of 3-5 years, where the Board can take management actions if required. Insurers can also do scenario testing to identify risks, not necessarily to always then take action. There should be a balance between being aware of the risk versus mitigating the risk via actions. In general, the design of a long-term scenario should be such that the actual conclusion will be actionable for the Board within the business planning horizon. Otherwise, there could be a risk that the longer-term qualitative assessments, that are beyond the immediate business planning horizon, constrain or distract from a focus on granular quantitative assessments on the business planning horizon. Especially, a doomsday scenario does not give the Board the possibility to take any mitigation actions and is therefore likely not adding value to the ORSA and will likely not get much attention. This is likely why most firms have not used the very long-time horizons as highlighted by the EIOPA paper assessing previous or historic scenario analysis to date.

In considering time scales it may be necessary to draw a distinction between the duration of the stress event and the impact, for example while climate change risks are likely to materialise over a very long -time horizon, for the purpose of the ORSA a focus on the impacts materialising over a shorter time horizon may be more suitable to ensure the conclusion is actionable.

This may differ between Life and Non-Life insurers, insurance and investment risk, (as discussed below), and shorter-term impacts may also be qualitative rather than quantitative (for example, in managing the reputational risk from not taking any action to address climate-change).

### 3. The long-term scenario should focus primarily on the first order effects and consequences in a quantitative manner.

The long-term scenarios should focus primarily on the first order effects and the consequences in a quantitative manner. The second order effects could be assessed and analysed more qualitatively.

### 4. The ORSA report should reflect the most material risks to the (re)insurer

The ORSA report is used to summarise the most material risks (short term and long term) to the (re)insurer, however it is part of a wider risk assessment process, and the report content should reflect the outcome of that assessment. Where a risk is not material it may not warrant a substantial mention in the ORSA report, although should still be included in the process, and may be better reflected elsewhere. (Re)insurers should be careful not to disproportionately reflect certain risks at the expense of others.

The materiality assessment should also be made in the context of the time horizon of the ORSA. Climate change risks and other longer-term risks should be included in the ORSA report only if scenarios and analyses show evidence that they could already be material over the strategic plan horizon and so may not be included in the report if they are only material over a longer period. Such analysis is often available from emerging risk monitoring.

## 4.3 Instantaneous versus multi-year and inclusion of management actions

Consideration of how scenarios are projected and whether management actions should be included is of particular importance for long-term scenarios and stresses.

In their 2022 discussion paper on principles for insurance stress testing, EIOPA considered that, for climate change stress testing, an approach of assessing intermittent intervals would be appropriate for best assessing impacts over time and also allowing for assessment of reactive management action, although noting that this may require complex modelling and so it should be considered only based on a cost benefit-analysis<sup>10</sup>.

The internal survey of CROF members indicated most respondents included in their ORSAs multi-year (the scenario presents a development of parameters to be applied over a number of years) and instantaneous (the impact of the scenario all occurs at the same time mostly the reference date of the stress test) shocks with analysis of management actions. Projected shocks were only used by a minority of firms.

In considering what to include in the ORSA, (re) insurers should therefore consider carefully whether long-term multi-year scenarios add any value, weighing up the resources required plus uncertainty around the modelling. As mentioned earlier, a key principle is that analysis should produce actionable results.

Particularly at this early stage in modelling development it may be more informative for the ORSA to focus on higher level analysis at longer durations, and in line with other risks keep a focus in the ORSA on the impacts in the usual business planning time horizon, although this could include consideration of management actions taken earlier to address a potential longer-term risk.

### 4.4 Translate long-term views into the projection horizons

As noted above, stress tests are generally either instantaneous or multi-year. Including long-term trends in both types of scenarios is equally difficult. Typically, the multi-year scenario encompasses a period of three years (see also the stress tests for Banks). The longer the duration assessed in the stress scenario, the more uncertain the outcomes (more parameters will have a significant influence in positive or negative sense). The outcome of assessing long-term trends has to generate a so-called actionable outcome for the Board.

Uncertainties can be seen regarding the so called first and second order (and even third order effects) of an event. The first order effects are generally effects on the balance sheet and business model which are a direct consequence of the event being

tested, while the second order effects are the effects of such event on more broader aspects influencing the business model and balance sheet at a later moment. Examples of these second order effects are the economic growth and functioning of markets. The second order effects are very sensitive to perspectives of how all the identified stakeholders would behave after the emergence of the tested event. As an example, after a hurricane, policyholders could be tempted to buy (more) insurance because they are not able to (financially) absorb another event, policyholders could move out of the area to avoid another hurricane, etc.

Even where a stress test may not result in a particularly large solvency impact under a stress test, there may still be a substantial change in the number of insurable policyholders, restricting the potential future market and viability of the (re)insurer. In relation to this point, Boards may consider at a jurisdictional level whether this could increase the protection gap for some markets.

The following section describes two possible approaches (non-exhaustive) for embedding the long-term trends in the scenario and stress testing exercise: a) Long-term trends generate short-term disruptive events; and b) vulnerability assessment in a stable environment (e.g. no change of other variables).

In both approaches, the (re)insurer would need to have a proper materiality assessment regarding the identified long-term trend. The materiality assessment is based on the current business model, on- and off balance sheet exposures. The long-term trend will evolve in time as more information becomes known, adaptation measures are taken, consumer/policyholder behaviour changes. Therefore, the (re)insurer performs the materiality assessment regularly or event driven.

### Long-term trends generate short-term disruptive events

In this approach, the (re)insurer assesses first how its business model can be impacted if the long-term trend would emerge. The (re)insurer uses a materiality assessment as performed in the ORSA to this end. The (re)insurer challenges each (material) line of business against the emergence of the long-term trend. The next step is that the (re)insurer defines possible disruptive events based on the vulnerability. The current Solvency position and projections are stressed against these disruptive events.

<sup>10</sup> [EIOPA methodological principles of insurance stress testing - climate change component.pdf](#)

Let's assume a (re)insurer which would have a material portfolio of motor third party liability ('MTPL') insurance. Any change in legislation regarding car use could have substantial impact on the business model and financial and solvency position.

Secondly, the (re)insurer would identify disruptive events having a major impact on the business model. For example, the publication of a report on increasing sea level rising results in a widespread panic. Policymakers react swiftly and without much warning by abolishing fossil fuel driven cars instantly. As the (re)insurer has a major portfolio in MTPL, the policy decision has a serious impact.

Thirdly, the (re)insurer uses this disruptive event as part of the stress test scenario and assesses the impact on the Solvency and Financial Position of the (re)insurer.

The Board of the (re)insurer assesses which possible management reaction could be taken to remedy the negative impact on the business model, the financial and solvency position in case of the disruptive event. The Board defines triggers which are monitored regularly. Triggers, if breached, result in management actions to pre-empt the negative impact. This is where a multi-year projection to stress testing could be useful to allow management actions to be modelled in response to trigger breaches, although as noted earlier this approach can be more complex and resource intensive.

It should also be noted that while this type of scenario (for example where an event results in the loss of viability in a whole line of insurance) is useful to consider, it may be too severe for the nature of the ORSA, and so may be better placed in a recovery plan, or as part of a Board's assessment of a jurisdiction or sector rather than an individual (re)insurer assessment.

### **Long term trends in an otherwise unchanged environment**

In this approach, the (re)insurer assesses the impact of the long-term trend on their business model similar to the first approach. In this assessment the whole balance sheet including guarantees and collateral is assessed. For example, in a certain geographical area, the occurrence of floods is such that that area is dangerous for living.

The second step is, that the (re)insurer projects their entire balance sheet (and Solvency position) forward to the moment in time the development is current or the likelihood is high. No change in investment portfolio, insurance portfolio and

premium levels nor any management actions is assumed. In the example mentioned, the (re)insurer would take stock of all the exposures (assets and liabilities) included in that area. For example, some buildings with mortgage exposures or insurance cover would be included in that dangerous area. The (re)insurer subsequently reassess the value of the asset exposure and the claim amount recognised on the balance sheet based on the state of the environment at that moment.

The outcome would likely be a negative hit on the solvency and financial position of the (re)insurer as assets could be stranded with a subsequent reduction in value and more damages would be paid to policyholders.

The Board assesses the vulnerabilities if current policies and business model continue to be applied without change. Actions, in the example mentioned, could be (non-exhaustive) to apply price differentiation based on the future emerging risk, encourage climate change adaptation measures (floating houses, no substantial living on the ground floors) or no sale of insurance in these areas.

## 4.5 Investments

The development of asset class valuations and capital market parameters under different climate change scenarios is a key parameter set for the stress testing of investments under climate risk. Some scenarios have already been published (e.g. Bank of England) but overall, a commonly accepted methodology is still in a nascent stage. These scenarios are particularly relevant (and difficult) for important capital market parameters such as currencies and sovereign interest rates, where the linkage to climate change is harder to establish than for certain (smaller) sectors such as fossil and green energies, transport etc.

Investments could suffer a significant loss of value as a result of either a sudden disruptive event or gradually over time. Examples of disruptive events are financial market crashes, geopolitical events, or legal changes (e.g. as a reaction to climate change). Generally speaking, the most appropriate risk mitigation against losses due to changes in market values would be risk-management of concentration risks in the investment portfolio. Scenario analysis is relevant to identify such concentration risks.

Stress testing (and climate risk assessment) is of particular relevance for illiquid investments (e.g. in infrastructure or agriculture) as these investments are held over a long time horizon and emerging risks are difficult to mitigate without a valuation



impact. The merit of stress testing for liquid assets over a long term horizon is less clear because these exposures can and typically are actively managed; to account for this, investment management actions can and should be included in the stress testing framework which increases the complexity of the analysis. Moreover, for diversified investors the impact of climate risk scenarios on asset performance is likely to be small unless one assumes that global capital market drivers are affected in the same way (i.e. the assumption of diversification is no longer valid).

Therefore, in considering long-term stress testing of investments, (re)insurers see the most value in concentrating on exposures where actions to mitigate risks or rebalance the portfolio are limited.

#### 4.6 Life and Non-Life

Due to the nature of the business, (re)insurers will have different considerations in their stress testing, and the time periods they focus on, with physical risks likely to affect non-life business more severely in the short-term, while for life (re)insurers, the shorter-term impacts are likely to be concentrated in transition risk (including the risk of stranded assets).

The survey of CROF members showed that, for climate change risk, currently almost all (re)insurers consider transitional risk in their ORSA, but physical risk was considered more for non-life business compared to life business, with physical and transitional risks both being considered beyond the usual business planning horizon.

In terms of managing longer-term risks, life (re)insurers have more experience, as many life products (whole of life, annuity) involve very long-term risks. It is therefore interesting that most firms did not use a longer time horizon explicitly for any risks other than climate change in their ORSA. Other risks mentioned that were included for longer time horizons included interest rate, longevity, sustainability, strategic and non-life reserve deterioration, indicating climate change is being treated as somewhat of a special case currently.

While climate change is an emerging risk with a high degree of uncertainty, many of the elements are similar to other risks (re)insurers already face, and so firms should be well placed to use their experience of other longer-term risks to inform their climate change response. The next section considers a case study drawing parallels between the impact of allowing for the risk from a new risk to mortality from AIDs/HIV and the current uncertainties surrounding climate change risk.



#### 4.7 Case Study – Comparison between Modelling Climate Change Risk and Modelling AIDS Risk

One comparison between a current and historic risk affecting (re)insurers is considered here between climate change risk, and mortality risk arising from HIV/AIDS in the 1980s. While climate change risk has a narrower focus on health and mortality, nevertheless there are several similarities from a life insurance perspective.

When data on HIV first emerged in the 1980s, despite the initial relatively small impact on mortality, it was considered this would be the “tip of the iceberg” with a large potential impact<sup>11</sup>. This corresponds to current assumptions that the physical impacts of climate change risk visible now will continue to increase<sup>12</sup>.

Similar modelling issues were present with long-term projections being necessary, but also acknowledged as having a high level of uncertainty<sup>13</sup>. It was also recognised that while simplistic models were not sufficient to fully capture the complex nature of the infection, complex models suffered from a lack of data to set parameters, limiting their usefulness<sup>14</sup>. These issues are also present in responding to climate change risk: while current impacts are small these are expected to increase, and modelling is difficult with complex factors and interactions at play<sup>15</sup>, and with risk extending well beyond usual forecasting timelines, the range of potential outcomes remains wide and uncertain<sup>16</sup>.

Both risks also have a geographical element to the impact, with HIV the USA was particularly affected initially with the most reported cases<sup>17</sup>, however, now African countries are by far the most affected accounting for two thirds of infections<sup>18</sup>, with richer countries able to devote more resources to tackling the problem, an issue compounded by the disease itself contributing to a lack of economic progress<sup>19</sup>. Climate change risk has a similar issue, where risks are highly correlated by geography, poorer countries have a much higher risk to their economies<sup>20</sup>.

Another comparison can be made in considering the wider social ethical and moral considerations. For HIV, while data alone initially suggested testing and exclusion of affected people, there was criticism of (re)insurers for underwriting which may exclude certain groups for insurance coverage or possibly providing incentives not to be tested<sup>21</sup>. (Re)Insurers recognised ethical, social and political issues must be considered alongside commercial considerations<sup>22</sup>. For climate change, there is similarly a risk that a pure reliance on data could result in certain groups being excluded from coverage, for example through living in certain areas less able to manage the risk, widening the protection gap<sup>23</sup>. This is where (re)insurers can work more widely in society, for example by partnering with governments to provide coverage, as seen in many countries through the provision of Flood reinsurance<sup>24</sup>.

<sup>11</sup> <https://www.cambridge.org/section 5.1.1>

<sup>12</sup> [opinion-on-climate-change-risk-scenarios-in-orsa.pdf \(europa.eu\)](https://www.cambridge.org/section 5.1.1)

<sup>13</sup> <https://www.cambridge.org/section 5.1.1>

<sup>14</sup> <https://www.cambridge.org/section 5.1.2>

<sup>15</sup> [Turning up the heat – climate risk assessment in the insurance sector \(bis.org\)](https://www.cambridge.org/section 5.1.2)

<sup>16</sup> [The Bank of England’s climate-related financial disclosure 2022 | Bank of England](https://www.cambridge.org/section 5.1.2)

<sup>17</sup> <https://www.cambridge.org/section 13.1.1>

<sup>18</sup> [HIV/AIDS | WHO | Regional Office for Africa](https://www.cambridge.org/section 13.1.1)

<sup>19</sup> [Global HIV/AIDS and the Developing World \(cgdev.org\)](https://www.cambridge.org/section 13.1.1)

<sup>20</sup> [Poor Countries Face Four Times More Climate Change Risk, S&P Warns - Bloomberg](https://www.cambridge.org/section 13.1.1)

<sup>21</sup> [aids-and-the-actuary.pdf \(cambridge.org\)](https://www.cambridge.org/section 13.1.1)

<sup>22</sup> [Unknown \(cambridge.org\) section 3.9](https://www.cambridge.org/section 13.1.1)

<sup>23</sup> [How natural catastrophes are impacting 10 countries and the world | Swiss Re](https://www.cambridge.org/section 13.1.1)

<sup>24</sup> [How Flood Re works - Flood Re](https://www.cambridge.org/section 13.1.1)

# 5. The role of management actions within ORSA scenarios

This section discusses the action toolkit Management typically considers in their ORSA. We start by outlining a number of key concepts on how actions could be considered for the ORSA purpose. We then review the typical actions companies have in their toolkit, drawing on the key dimensions to illustrate benefits and costs. We finally look at how management generally considers the action toolkit in scenario modelling, creating the link with their risk appetite framework.

## 5.1 Action toolkit – definitions

The starting point is that ORSAs typically focus on analysing the solvency impacts of adverse stress tests or scenarios. In addition, (re)insurers might consider liquidity risk aspects in both scenarios and management actions (or additional dimensions as they see fit). The action toolkit will therefore target the levers that allow for the management of the underlying solvency or liquidity indicators and triggers. The toolkit may be complemented by actions impacting operational, commercial or reputation indicators and triggers, which is often done in parallel exercises to the ORSA, e.g. through business continuity testing.

Actions are also often designated as either pre-emptive or reactive. Pre-emptive actions can be embedded in insurance products where they take the form of contractually-agreed triggers to reduce benefits upon a pre-determined trigger. They can also be part of existing capital management programs, in the form of credit lines or other forms of liquidity or capital increase that management can call under pre-agreed conditions with a third-party provider or with their own shareholders.

Reactive actions are part of management's toolkit upon which could be drawn upon when an adverse scenario materialises, e.g. lead to a breach of deterioration in risk indicators or a breach of risk appetite. In the context of the ORSA, reactive actions can/should be considered as options that management will have in their toolkit to address a real case stress situation, should it happen.

In the 2021 stress test exercise, EIOPA drew the distinction between pre-emptive and reactive actions by referring to the fixed balance sheet and the constrained balance sheet views. The first allowed for the recognition of contractually-agreed mechanisms to provide capital and liquidity relief in the stress scenario (designed as an immediate shock), e.g. the review of future discretionary benefits, expected dividend adjustments or cancellation of coupon payments on subordinated debts. The latter allowed for companies to consider additional actions that would provide relief in the stress scenario, e.g. additional profit-sharing adjustments, investment actions or new capital issuance.

To build a robust action toolkit, it is critical for management to develop an understanding of the range and availability of actions that could be taken in response to adverse stresses. Management may look to consider the following dimensions:

- **Feasibility:** each action has to be analysed considering external and internal circumstances: do possibly rapidly developing market circumstances allow the action to be taken, what are the operational and governance steps to activate them, as well as how fast do they bring the expected relief and be effective to restore solvency (or liquidity) levels (benchmarked against the maximum period of 6 months required by the SII regulation). Some actions may be put in place within weeks, other may take months to go through the entire group decision process. Actions may require very specific information that may not be timely available.
- **Short-term and longer-term side effects:** in a given stress scenario, not all actions will be equally desirable in terms of their (opportunity) costs: Actions considered following a market-wide stress may be very different than actions necessary to address an idiosyncratic stress. In the middle of an equity market crisis, de-risking the investment portfolio by selling equity positions may require a costly realisation of

losses. Or when one company’s solvency is under pressure, the costs to get fresh capital will increase materially (if that remains a viable action at all). Furthermore, actions may also have longer-term profitability, commercial, regulatory or reputation impacts that management may prefer to avoid, or may have to mitigate. These considerations should inform management’s decision.

- **Diversity:** considering the above feasibility and desirability dimensions, management ought to gauge the robustness of their action toolkit through the lens of diversity. They should address capital or liquidity shortfalls, of both, in various

forms of capital increase to replenish the own funds. They should allow for de-risking on both sides of the balance sheet to adjust the solvency capital and liquidity requirements. As per the ORSA’s scope described above in section 2.4, they should also consider business continuity and operational dimensions, as well as stakeholders’ impact (e.g., reputation).

### 5.2 Typical actions companies have in their toolkit

From the survey run with CRO Forum Members, we know that typical actions include:

	Main impacts	Feasibility
<b>Actions to reduce capital resources outflow</b>		
<b>1. Expected dividend adjustment, change to share-buy-back programs</b>	Both own funds and liquidity increase.	Fast and relatively easy if clear triggers to adjust dividends are anchored in Board policy.
<b>2. Non-redemption of certain debts</b>	Both own funds and liquidity increase.	Complex to put in place considering longer-term implications this could have on access to capital in the future.
<b>3. Cost reductions, e.g. cutting project spend</b>	Increases both liquidity and solvency, but impacts may be relatively limited.	Fast and relatively easy if contractual agreements are in place. Comes with trade-off on loss of expected benefits delivered by projects.
<b>Actions to source new capital</b>		
<b>4. External credit lines/ loans</b>	Liquidity increase. Own funds increase if the credit lines/loans are subordinate to policyholder liabilities.	Fast and relatively easy if contractual agreements are in place. Accessibility may be expected to dramatically decrease after the scenario has realised.  Pricing may be a function of the rating or solvency level.
<b>5. Hybrid capital issuance</b>	Both own funds and liquidity increase.	Will primarily depend on the current or remaining leverage capacity (function of own funds and solvency capital requirements).
<b>6. Share issuance</b>	Both own funds and liquidity increase.	Relatively long and complex to put in place as generally subject to a number of approvals including the Board and Shareholders.

	Main impacts	Feasibility
<b>Actions to de-risk the balance sheet</b>		
<b>7. Investment strategy adjustment</b>	Market risk capital requirements decrease.	Function of the scenario's key drivers.
<b>8. Additional/dynamic hedging</b>	Market risk capital requirements decrease.	Function of the scenario's key drivers. Buying the protection could become very costly.
<b>9. Reinsurance management</b>	Insurance risk capital requirements decrease (generally at the cost of a moderate increase in the credit risk requirements).	Function of the scenario's key drivers. Buying the protection could become very costly.
<b>10. Insurance product adjustments</b>	Insurance risk capital requirements decrease.	Delays in realizing material impacts (e.g. over full renewal cycle), trade-off for customers.
<b>Actions to adjust capital deployment</b>		
<b>11. Insurance portfolio management, e.g. new business targets/volumes adjustment</b>	Own funds could increase, or insurance risk requirements decrease, or both.	Delays in realizing material impacts (e.g. over full renewal cycle), trade-off for distributors and customers.
<b>12. Sale of book of business</b>	Mainly market and underwriting risk requirements decrease.	Relatively complex to put in place (function of availability of counterparty willing to acquire the business at an acceptable price).
<b>13. Renewal premiums increase</b>	Own funds increase, possibly partially offset by capital requirements increase.	Delays in realizing material impacts (e.g. over full renewal cycle), trade-off for customers.

Companies will often focus on developing a set of actions that primarily gives management flexibility in the options available to mitigate solvency and liquidity stresses of varying severity and nature. Identifying the secondary impacts of these actions on future earnings and the long-term profitability, considering the operational complexities in activating each action, and finally addressing commercial and reputation consequences is also common.

Management will typically consider the deployment of actions in scenarios causing a breach of the company's risk appetite (pre-set indicators and triggers anchored in the company's capital and risk management framework). The extent to which actions are tested in scenarios varies across CRO Forum Members. As mentioned above, some companies focus on assessing the feasibility and desirability of actions in recovery planning or other risk analyses rather than the ORSA; these firms however signpost that a toolkit of actions are available which could be deployed to facilitate a return of the company to within its risk appetite. Other companies will test the practicality of deploying actions as part of the ORSA.

### Example 1 - Defining actions in scenarios breaching risk appetite

Some of the scenarios explored in the ORSA may lead to a breach of the firm's risk appetite, e.g. the solvency risk appetite. Management could use some, or all such scenarios, to test the availability of actions (in their toolkit) to restore the firm to within its risk appetite. One approach would be to identify, quantify and document a list of management actions that could be taken in response to the scenario. These actions could then be identified in the ORSA summary to confirm whether sufficient mitigating actions are available, and to facilitate board discussion to:

1. Increase familiarity of actions that may be taken in response to fast acting scenarios and develop management cohesion. For example, the board could identify preferred actions, pre-approve some actions, and agree to adjust/simplify governance required for implementation, facilitating more timely deployment of responsive actions (particularly time sensitive actions).
2. Enable management to assess whether further work is required to identify and develop alternative actions. For example, the existing design of available actions may be too constraining on strategy or only a limited pool of costly actions may be available.

### Example 2 - Defining actions in the context of very long-term scenarios, shifting focus from reactive to proactive actions or recommendations

An insurer could analyse climate change scenarios with a view to better understand and manage the short, medium and long-term risks from climate change, and how they will affect its business model. Similar to the Bank of England's Climate Biennial Exploratory Scenario, the company could consider hypothetical scenarios with different paths to a net-zero emissions economy. Those scenarios span over a 30-year time horizon or longer.

Considering the relative complexity and the high level of uncertainty of such scenarios, a good starting point would be to break down the analysis by areas: i) asset impact and its mitigation actions, ii) liability impact and its mitigation actions, and iii) a deeper-dive on

natural catastrophe risk. While most actions that are part of the traditional action management toolkit are generally designed and tested to provide the necessary release to a one-off shock, more strategic considerations can be useful to address the specific challenges of climate-change scenarios, with their high level of uncertainty.

In the example of the climate change scenarios, the company could therefore broaden its toolkit to consider management actions that will influence both strategy and governance. Such additional actions could include investments into ESG-related data analysis capabilities, positive impact investment targets, ESG-driven consideration in investment decisions, insurance product innovation to help make low energy home improvements affordable, or setting targets on the volume of insurance premiums from products that stimulate the transition to more sustainable behaviour.

In conclusion, the management action toolkit may not fundamentally change year-after-year, but that it will evolve and be continuously refined thanks to new insights delivered by evolving scenario and stress test analyses, capturing the changes in the company's risk profile.



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