



EIOPA REGULAR USE

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Opinion on Sustainability within Solvency II

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1. Introduction

- 1.1 In August 2018, EIOPA received a request from the European Commission (Commission) for an opinion on sustainability within Solvency II, with a particular focus on aspects relating to climate change mitigation.¹ The Commission will take the opinion into account in the preparation of its report on Directive 2009/138/EC (Solvency II Directive), due by 1 January 2021. The Commission invited EIOPA to provide its opinion by 30 September 2019.
- 1.2 In providing this opinion, EIOPA has followed the questions posed by the Commission in its request and analysed evidence collected via a public call for evidence, a confidential request for information and a public consultation on a draft opinion on sustainability within Solvency II (see Chapter 5).
- 1.3 The Commission's call for an opinion requests EIOPA's views on the integration of sustainability, in particular climate-related developments, into the Solvency II framework for the valuation of assets and liabilities, investment and underwriting practices, the calibration of market and natural catastrophe risks and the use of internal models.

Extract from the Commission's call for an opinion:

EIOPA is invited to elaborate in its opinion on the extent to which rules relating to cash flow projections for the calculation of the best estimate, in particular regarding loss estimates, and their application in practice, capture sustainability and climate related developments.

(...) the opinion should also point out where [...] the rules on valuation of assets do not sufficiently account for sustainability factors, with particular regard to the climate risk that insurers are exposed to via their investments and how this should be addressed.

Where EIOPA concludes that climate risk is not sufficiently taken into account [...] it is asked to provide estimates of the quantitative impact of climate risk were taken into account.

EIOPA is invited to (...) collect good practices of insurance undertakings concerning investments and asset liability management with a view to gaining insight into how insurers incorporate sustainability into their investment practices

EIOPA is asked to provide an opinion on the extent to which current practices in product design and in product pricing by insurance and reinsurance undertakings account for sustainability factors with particular regard to the climate risk the insurance obligations are exposed to, and the extent to which these practices are incentivised by Solvency II.

Where relevant, the opinion should also point out where the calibration of the standard parameters in the market risk module of the standard formula (...) do not sufficiently account for sustainability factors, with particular regard to the climate risk that insurers are exposed to via their investments and how this should be addressed.

¹ https://eiopa.europa.eu/Publications/Requests%20for%20advice/signed_letter_28_08_18.pdf

EIOPA is invited to elaborate in its opinion on the extent to which the calibration of the standard parameters for the natural catastrophe risk module of the standard formula captures climate related developments.

EIOPA is invited to elaborate in its opinion on the extent to which rules relating to internal model design and calibrations, and their application in practice, account for sustainability factors, with particular regard to the climate risk that existing insurance and reinsurance obligations are exposed to. EIOPA is invited to collect good practices of insurance and reinsurance undertakings concerning underwriting and provisioning with a view to gain insight in how (re)insurers incorporate sustainability.

- 1.4 EIOPA has applied the following approach in addressing the Commission's call for opinion:
- 1.5 **"Climate risks and climate change-related risks"**. The focus on climate change in the opinion was given by the scope of the Commission's call for an opinion. From the evidence received, EIOPA noted that stakeholders on various occasions interpreted "climate risks" narrowly as "natural catastrophe risks". EIOPA took this bias into account when assessing the evidence received, while clarifying that the term "climate risks" aims to include all risks stemming from trends or events caused by climate change, i.e. climate change-related risks. This encompasses climate change-related extreme weather events, including natural catastrophes, but also more general climate trends such as a general rise in temperature, sea level rise or climate-related forced migration that could affect (re)insurance activity. For clarity, EIOPA uses the term "climate-change related risks".
- 1.6 **Impact of climate change-related risks on non-life, health and life insurance.** In its first collection of evidence, EIOPA deliberately sought information from non-life (re)insurance business. This initial focus was made on the available information that non-life lines of business may be affected by climate change effects over a shorter time frame than the life and health business. The experience of the (re)insurance industry with climate change in non-life (catastrophe) insurance was expected to be the most advanced in practice, and hence a good foundation to take stock of current practices. However, it needs to be noted that while 41% of the undertakings considered in the sample of evidence collected between January and March 2019 are non-life insurers, in terms of assets under management, non-life undertakings represent only 8% of the sample (see figures 2 and 3 in Chapter 5). EIOPA therefore sought to collect additional evidence on the impact of climate change-related risks on the morbidity and mortality risks through its public consultation.
- 1.7 **Choice of market risk sub-modules.** The analysis focuses on equity, property and spread risks given the uncertainty around the way sustainability factors are

expected to impact interest rate², concentration³ and currency⁴ risks. Further analysis on these excluded sub-modules of the standard formula market risk would have exceeded the scope of the call for opinion in the given time frame.

1.8 **Definition of climate change-related risks: transition, physical and liability risk.** EIOPA used the categorisation of financial climate change risks introduced by the Bank of England: transition, physical and liability risks.⁵ These manifest, for example, as increasing underwriting, counterparty default or market risk for (re)insurers, affecting the value of the assets and liabilities. The physical risk related to the severity and frequency of natural catastrophes is of particular relevance for natural catastrophe underwriting risk.⁶ The risk of climate change-related liabilities can be of particular importance to insurance undertakings providing liability protection (e.g. directors' and officers' and professional indemnity insurance). EIOPA has not elaborated on the liability risks in its opinion. While it acknowledges the potential important impact of climate change risks on the liability protection business, further analysis would have exceeded the scope of the call for an opinion in the given time frame.

Table 1– Physical, transition and liability risks

Physical risks from climate change arise from a number of factors, and relate to specific weather events (such as heatwaves, floods, wildfires and storms) and longer-term shifts in the climate (such as changes in precipitation, extreme weather variability, sea level rise, and rising mean temperatures). Some examples of physical risks crystallising include: increased frequency, severity or volatility of extreme weather events impacting property and casualty insurance; and increased frequency and severity of flooding leading to physical damage to the value of financial assets or collateral held by banks, such as household and commercial property.

Transition risks can arise from the process of adjustment towards a low carbon economy. A range of factors influence this adjustment, including: climate change-related developments in policy and regulation, the emergence of disruptive technology or business models, shifting sentiment and societal preferences, or evolving evidence, frameworks and legal interpretations.

Liability risks come from people or businesses seeking compensation for losses they may have suffered from the physical or transition risks from climate change outlined above. Liability risks are of particular relevance to insurance undertakings given these risks can be transferred by means of liability protection, such as Directors & Officers

² Depending on the country and its state-based compensation mechanism some Member States might face pressure to finance due to increased natural catastrophes. However such phenomenon, if it ever realises and becomes permanent, is expected to be reflected through a downgrade, i.e. in the spread risk sub-module already covered in this opinion.

³ A concentration risk of "green" assets (in particular the so-called "greenwashing" risk) would first need to realise that specific behaviour patterns are detected for these assets.

⁴ Exchange rates might change depending on the overall health of an economy which includes its sustainability (e.g. a green economy is expected to be more successful going forward and as a consequence the currency gets stronger) but it is not straightforward to assess how much would be due to climate change.

⁵ <https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability>

⁶ <https://www.bankofengland.co.uk/prudential-regulation/publication/2019/enhancing-banks-and-insurers-approaches-to-managing-the-financial-risks-from-climate-change-ss>

and Professional Indemnity insurance. These are likely to fall under three different categories: failure to mitigate; failure to adapt; failure to disclose.

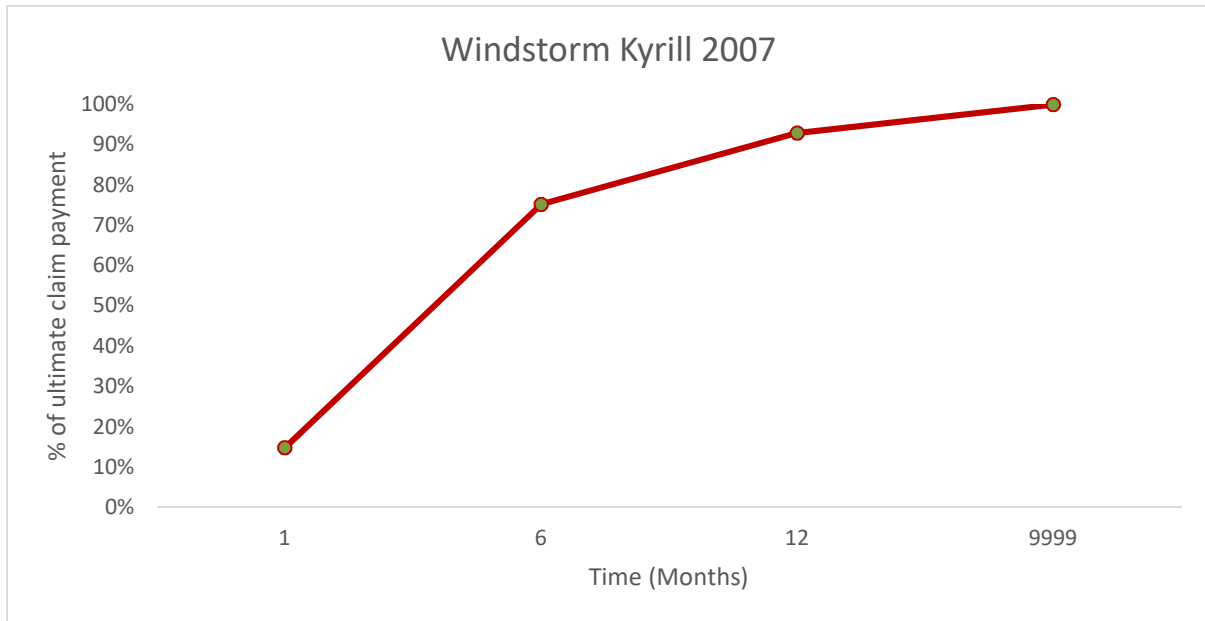
- 1.9 **Integration of sustainability risks in Pillar 1.** The Commission has asked EIOPA to consider the integration of sustainability risks, with a focus on climate risks, into the Pillar 1 aspects of the Solvency II framework. Previous advice⁷ by EIOPA addressed the Pillar 2 requirements.
- 1.10 Pillar 1 prudential capital requirements within the overall Solvency II framework aim to ensure that undertakings can survive severe unexpected shocks (losses) and still meet their obligations to policyholders over a one-year period (Article 101(3) of the Solvency II Directive). The Solvency II Directive expresses this as the ability to withstand shocks with a 1 in 200 probability within this one-year time horizon.
- 1.11 As outlined in the analysis in the following chapters, sustainability issues and more precisely climate change-related risks, bring considerable challenges to the valuation of assets and liabilities, underwriting and investment decisions and risk measurement. The following challenges need to be considered when integrating sustainability risks within Pillar 1 requirements:
- First, capital requirements in Solvency II are calibrated based on a one-year time horizon, while sustainability risks are generally considered to be long-term risks. In particular, climate change-related risks are expected to emerge over a longer time horizon which presents practical challenges for integrating them in the current Pillar 1 capital requirements.
 - Second, specifically for traditional non-life business, the insurance cover period (during which undertakings are liable for claims that occur) only spans the next 12 months, at the end of which undertakings can theoretically adjust the pricing for the future based on claims experience. This repricing is in particular enabled by the fact that the uncertainty on the final amount of natural catastrophe (NAT CAT) claims is limited as they are usually settled within one year after their occurrence (see Figure 1).
 - Third, market participants tend to believe that they have time to adapt their investment strategy within the next 10 to 20 years, and thus firms have limited incentives to consider climate change risks, in particular transitions risks, in their asset portfolio today. This behaviour refers to the so-called “tragedy of the horizon” coined by Mark Carney.⁸

⁷ https://eiopa.europa.eu/Publications/EIOPA-BoS-19-172_Final_Report_Technical_advice_for_the_integration_of_sustainability_risks_and_factors.pdf

⁸ <https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability>

1.12 Nevertheless, these challenges should not lead to complacency in assessing the impact of these risks in Pillar 1 requirements. For example, transition risks, in particular, can happen at any time and suddenly, and thus require undertakings to think about their investment strategy now.

Figure 1: Average amount of paid claim (as % of ultimate claim) with time. Observation from data request: For Windstorm Kyrill, in average 93% of the ultimate claim was paid after 12 months⁹.



1.13 Building on its advice on sustainability in Solvency II in the areas of risk management, investment and underwriting strategy, and investment stewardship, EIOPA thinks it is essential for (re)insurance undertakings to plan for the implementation of measures related to sustainability risks, especially where they will materially impact their business strategy.¹⁰

1.14 Therefore, EIOPA also emphasises the importance of scenario analysis under Pillar 2, alongside its analysis of Pillar 1 elements.

1.15 Finally, regarding Pillar 3, consideration will be given in the opinion to the relevance of public disclosure on climate change-related risks by (re)insurance undertakings in the frame of Solvency II.

1.16 EIOPA's opinion is given in Chapter 4 and the analysis conducted on the evidence collected at various stages of the process is included in Chapter 5.

The opinion covers the following areas:

⁹ On the x-axis, as an exception and by convention, '9999' doesn't refer to 9999 months after the occurrence date but refers to the latest date for which information on the claims' settlement is available (i.e. either the date at which the claim was definitively settled or a date before).

¹⁰ https://eiopa.europa.eu/Publications/EIOPA-BoS-19-172_Final_Report_Technical_advice_for_the_integration_of_sustainability_risks_and_factors.pdf

- The extent to which the valuation of assets and liabilities under Solvency II (can) capture sustainability factors;
- How (re)insurance undertakings, through their investment and underwriting practices, can account for sustainability considerations;
- How/if sustainability risks are reflected in capital charges for market and natural catastrophe risks under Solvency II;
- The extent to which internal models currently capture sustainability risks and factors.
- How sustainability could today best be taken into account across the three pillars in Solvency II (Pillar I - capital requirement, Pillar II - governance and supervision and Pillar III - disclosure and reporting).

2. Legal basis

- 2.1 EIOPA provides this Opinion on the basis of Article 34(1) of Regulation (EU) No 1094/2010.
- 2.2 EIOPA delivers this Opinion on the basis of the Solvency II Directive and Commission Delegated Regulation (EU) 2015/35 (Delegated Regulation).
- 2.3 This Opinion is addressed to the Commission, the European Parliament and the Council.
- 2.4 The Board of Supervisors has adopted this Opinion in accordance with Article 2(7) of its Rules of Procedure.

3. Context and objective

- 3.1 EIOPA is committed to the international and European agenda on sustainability. Since June 2018, EIOPA has undertaken a number of projects to pursue the integration of sustainability considerations in the prudential and conduct regulations for (re)insurance undertakings and institutions for occupational retirement provisions (IORPs). This includes EIOPA's technical advice on potential amendments to, or introduction of, delegated acts under the Solvency II Directive and the Insurance Distribution Directive with regard to the integration of sustainability risks and factors.¹¹ EIOPA has issued supervisory opinions on environmental, social and governance (ESG) risks and governance documents for IORPs. The Joint Committee of the European Supervisory Authorities (Joint Committee) is currently drafting implementing and regulatory technical standards on disclosure following the empowerments laid down in the Regulation on sustainability-related disclosures in the financial sector.
- 3.2 In the area of financial stability, EIOPA is engaged in the preparation of a sensitivity analysis exercise for climate-related risks to take place in 2020. Building on the investigation run in cooperation with the 2 Degree Investing

¹¹ https://eiopa.europa.eu/Publications/EIOPA-BoS-19-172_Final_Report_Technical_advice_for_the_integration_of_sustainability_risks_and_factors.pdf

Initiative on investments as well as new elements, the 2020 sensitivity analysis will assess the risks embedded in undertakings' portfolios in relation to different scenarios for the transition to a low-carbon economy. Further methodological details will be discussed in the workshop that EIOPA envisages for the Q4-2019 (date and targeted audience to be announced soon). EIOPA is also dedicating analysis on climate-related risks in its financial stability reports. Following a call for advice from the Commission, EIOPA, EBA and ESMA are analysing potential evidence on short term pressure from financial markets on corporates which could eventually impair financing sustainable projects. EIOPA focuses on potential pressures stemming from (re)insurance undertakings and IORPs.¹² EIOPA is also committed to enhance its supervisory stress testing methodology to incorporate climate-related risks. To this end, until 18 October 2019, EIOPA is seeking input from stakeholders on the possible approaches to climate stress testing on the Discussion Paper on Methodological principles of insurance stress testing.¹³

3.3 EIOPA is also coordinating a catastrophe risk expert network which provides in-depth expertise in modelling and/or underwriting of natural catastrophe and climate change risks from academia, brokers, reinsurance undertakings and model vendors. This expert group discusses and provides evidence, among others, on the following topics:

- The calibration of the standard parameters for the natural catastrophe risk module of the standard formula
- Risk management practices of the insurance and reinsurance industry in relation to catastrophe risks
- Private sector initiatives in addressing gaps in coverage of natural catastrophe risks

3.4 EIOPA is involved in the Commission's work on developing a unified classification system for sustainable economic activities ('taxonomy'), as a member of the Commission's technical expert group on sustainable finance (TEG). On 18 June 2019, the TEG published a report on EU Taxonomy¹⁴.

3.5 EIOPA is a member of the Network for Greening the Financial System (NGFS), and reference is made to the NGFS' recently published report "A call for action. Climate Change as a source of financial risk".¹⁵ EIOPA is an active member of the work stream 1 "Microprudential supervisory workstream".

¹² Call for advice to the European Supervisory Authorities to collect evidence of undue short-term pressure from the financial sector on corporations: https://ec.europa.eu/info/publications/190201-call-for-advice-to-esas-short-term-pressure_en.

¹³ Discussion Paper on Methodological Principles of Insurance Stress Testing: <https://eiopa.europa.eu/Pages/News/Discussion-on-Methodological-Principles-of-Insurance-Stress-Testing.aspx>

¹⁴ See https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en.

¹⁵ https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs_first_comprehensive_report_-_17042019_0.pdf

- 3.6 The International Association of Insurance Supervisors and the Sustainable Insurance Forum (SIF), of which EIOPA is a member, published a joint issues paper “Issues Paper on Climate Change Risks to the Insurance Sector”.
- 3.7 When drafting this opinion, EIOPA considered past and on-going policy and regulatory developments at European level, as part of the Commission’s Action Plan: Financing Sustainable Growth¹⁶. The aim of the Commission’s action plan is to reorient capital flows towards sustainable investment in order to achieve sustainable and inclusive growth; assess and manage relevant financial risks stemming from climate change, resource depletion, environmental degradation and social issues; and foster transparency and “long-termism” in financial and economic activity.
- 3.8 Where possible, the integration of sustainability should follow a consistent approach across sectors. Undertakings, in their asset allocation strategy, face challenges related to climate change risk which are very similar to those faced by banks and asset managers, and this risk can be analysed through very similar methods. However, the timing of the debates for including sustainability risk into the sectoral regulations is not perfectly aligned. EIOPA refers to ESMA’s Technical Advice to the European Commission on Sustainability Considerations in the credit rating market¹⁷ and Guidelines on Disclosure Requirements Applicable to Credit Ratings¹⁸. Reference is also being made to the mandate given to EBA in Article 98 of Directive 2013/36/EU (Capital Requirements Directive) to assess the potential inclusions in the review and evaluation performed by competent authorities of ESG risks, and to submit a report to the Commission, the European Parliament and to the Council by 28 June 2021.

¹⁶ https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en#commission-action-plan-on-sustainable-finance.

¹⁷ https://www.esma.europa.eu/sites/default/files/library/esma33-9-321_technical_advice_on_sustainability_considerations_in_the_credit_rating_market.pdf

¹⁸ https://www.esma.europa.eu/sites/default/files/library/esma33-9-320_final_report_guidelines_on_disclosure_requirements_applicable_to_credit_rating_agencies.pdf

4. Opinion

Valuation of assets

- 4.1 The general valuation principles of Solvency II are neutral to different types of risks, including sustainability risks which materialise through existing risk categories.
- 4.2 Solvency II assumes that market prices reflect all relevant risks. In order for market prices to better reflect the sustainability risks and factors, further improvements in the availability and quality of information relevant to their valuation is needed.
- 4.3 Where undertakings rely on external ESG ratings, they should ensure that the rating methodology is sufficiently transparent to allow them to understand the ratings provided for their investments.
- 4.4 In the public disclosure of relevant information regarding the use of alternative valuation methods (as required by Articles 263 and 296(4) of the Delegated Regulation), where relevant, undertakings should disclose where, and which, sustainability considerations have been taken into account.
- 4.5 Scenario analysis should be applied to assess the uncertainties around climate change impact on the valuation of assets over time, and mitigation strategies should be in place to address the risks posed by these uncertainties. This in turn will help to ensure that their valuations continue to be appropriate.

Valuation of liabilities

- 4.6 While there appears to be no gaps in the regulatory framework impeding the integration of sustainability in the valuation of liabilities, it is not straightforward for undertakings to account for sustainability/climate change-related developments in the valuation of liabilities in practice.
- 4.7 Undertakings should use best available science to perform sensitivity or scenario analysis to ensure adequacy of the best estimate, taking into account climate change-related risks in line with Article 29 of the Delegated Regulation.
- 4.8 Undertakings should, as a minimum, use historical loss data (corrected for possible events not in data) combined with scientific literature and, where appropriate, the output of forward-looking models when calculating their best estimate.

4.9 When using a forward-looking modelling approach in the calculation of the best estimate, practices should be applied in a manner proportionate to the nature, scale and type of risks faced by an undertaking:

- (Re)insurance business whose claims' occurrence or settlement periods are short-term might be less affected. These business models allow, in theory, for annual repricing and recalibration. Therefore, the annual validation of assumptions seems fit for purpose for short-term obligations.
- On the other hand, undertakings with larger or more medium/long-term obligations exposed to climate change-related risks should use more elaborate catastrophe/climate modelling, or stress-testing methods. Where relevant, undertakings are encouraged to develop forward-looking modelling approaches (see Table 3 for an overview of initiatives that include climate change).

4.10 For (longer-term) life business, the long horizon for cash-flows also means that there may be room to consider the impact of climate change in the calculation of the best estimate. Climate change-related risks may affect life exposures not just directly but also indirectly via asset management fees, expenses or economic scenarios generated to value contract options. Regarding the latter, EIOPA acknowledges that economic scenario generators should be calibrated to market prices. It should be noted, however, that the potential climate change impacts on assets might not have been properly captured by the market.

4.11 In conclusion, undertakings should apply, where appropriate, the following good practices:

- Ensure historical loss data is up-to-date;
- Consider possible events not captured by undertaking's historical loss dataset;
- Develop and use forward-looking catastrophe modelling;
- Apply stress-testing or scenario-analysis.

Investment practices

4.12 EIOPA considers it is prudentially relevant to require undertakings to take into account the impact of their investment activity on sustainability factors. This builds on EIOPA's previous advice to the Commission that (re)insurance undertakings should take into account the potential long-term impact of their investment strategy and decisions on sustainability factors.

4.13 The current development of initiatives such as the EU taxonomy and the disclosure of sustainability risks will improve the industry's efforts to consider transition as well as physical risks in setting their investment and risk management strategies. However, EIOPA is aware that further work is needed.

4.14 Moreover, EIOPA supports further transparency on sustainability ratings as well as on how ESG factors are currently considered in credit rating issuance. The promotion of consistent good practices from rating providers should

contribute to the understanding of ESG ratings as well as the quality and consistency of the scoring and their use by undertakings in their investment strategy and decisions.

- 4.15 Where undertakings have long-term assets to match long-term liabilities they should consider whether climate change would impact either their ability to hold these assets over that time frame or their expected cash-flows.

Underwriting practices

- 4.16 EIOPA considers it is prudentially relevant to require undertakings to take into account the impact of their underwriting activity on sustainability factors. This builds on EIOPA's previous advice to the Commission that (re)insurance undertakings should take into account the potential long-term impact of their investment strategy and decisions on sustainability factors.

- 4.17 Consistently with actuarial risk-based principles, (re)insurance should contribute to adaptation to and mitigation of climate change. A relevant example is "impact underwriting", which includes the development of new insurance products, adjustments in the design and pricing of the products and the engagement with public authorities without disregard for actuarial risk-based principles of risk selection and pricing.

- 4.18 The practice of developing products and services which reduce sustainability risks and have a positive impact on ESG issues, encourages better risk management.

- 4.19 Such impact underwriting can be done via measures involving the public sector as well as business and retail clients, building on the underwriting and risk expertise of (re)insurance undertakings, via:

- the integration of ESG considerations in the underwriting strategy and decisions;
- the development of new products addressing risks stemming from climate change and promoting risk mitigating behaviour;
- adjustments in the design and pricing of the products using forward-looking pricing assumptions;
- risk consulting services to clients for prevention purposes, especially for business clients; and,
- engagement with public authorities to promote risk awareness, risk assessment, disaster resilience and climate mitigation/adaptation strategies.

- 4.20 EIOPA recognises that higher prices reflecting climate change-related increasing risks may render certain risks un-insurable (or unaffordable) in the medium-to-long term.

- 4.21 EIOPA considers that there is scope for establishing public-private cooperation frameworks to enhance data gathering and risk assessments at a national, regional or European level. This may reduce the economic mismatch in high risk areas, highlight the importance of taking a systemic approach to a complex systemic problem, while addressing the current protection gap.
- 4.22 EIOPA encourages undertakings to consider information sharing within their organisation as sustainability factors relevant in one area may also be relevant for other areas. For example, underwriting considerations may also be relevant in investment decisions.

Capital requirements

- 4.23 EIOPA is of the opinion that within a risk-based framework like Solvency II any change to capital requirements must be based on a proven risk differential compared to the status quo. Assessment of the underlying risk is therefore also the starting point and guiding principle for the analysis and opinion on capital requirements related to sustainability.

Market risk

- 4.24 EIOPA did not receive any evidence that the current design and calibration of the Solvency II framework provides either an incentive to invest in sustainable assets or a disincentive that hinders investments in sustainable assets.
- 4.25 Based on the evidence received and its analysis, EIOPA is of the opinion that property, equity and spread risks are the standard formula market risk sub-modules most likely affected by sustainability, in particular climate change considerations.¹⁹
- 4.26 With regards to property risk, more granular data is necessary to calculate the risk profile of different kinds of property. For example, it would be useful to have an index that is comparable to the IPD total return index, and one using a comparable methodology, but limited to sustainable investments.
- 4.27 With regards to listed equity risk, EIOPA concludes from the analysis that there is no meaningful difference in the risk profile of sustainable equities compared to other equities. However, in order to draw a meaningful conclusion on the difference in risk profiles, it is important to have data covering more than one economic cycle.

¹⁹ The European Commission outlined in its request for opinion which areas EIOPA should focus on. Stakeholders mentioned a potential reputational risk due to sustainability considerations. Those however are outside of the scope of the current standard formula capital requirements.

- 4.28 With regards to spread risk, more granular data is necessary to calculate the risk profile of different classes of bonds.
- 4.29 Depending on the data that becomes available at a later date, it might be possible to better differentiate between the risk profiles of assets, including brown assets, based on their sustainability characteristics.
- 4.30 EIOPA did not receive any evidence from stakeholders on unlisted equity or unrated debt. Further, EIOPA did not find information that would allow to carry out an assessment on whether sustainable unlisted equity/unrated debt display different risk characteristics compared to their general/traditional counterparts.

Natural catastrophe risk

- 4.31 EIOPA considers the current Solvency II framework does not hinder the integration of current climate change-related developments in the calibration of the standard parameters for the natural catastrophe risk module of the standard formula.
- 4.32 A regular recalibration of the standard parameters for the natural catastrophe risk module of the standard formula (each 3 to 5 years) should take into account future developments, as well as the potential effect of climate change using the latest data and science available.
- 4.33 However, as will be detailed below, EIOPA notes that current capital requirements have been calibrated based on the available historical data for past events. Sustainability developments and, in particular climate change risks, are expected to materialise over the next 10 to 20 years. Climate change is likely to increase the frequency/severity of natural catastrophes. Such expected fluctuations need to be captured in the risk management strategies in a forward-looking manner in the ORSA. Past data on its own is unlikely to be a good predictor of future risks.
- 4.34 The catastrophe risk modelling community should expand their analyses on the potential effect of climate change and, where material, reflect the results of those analyses into their natural catastrophe models. Where undertakings rely on external catastrophe risk models, they should ensure the model is sufficiently transparent regarding the method and the data used and the assumptions taken in the design of the natural catastrophe models.
- 4.35 EIOPA considers that further work is needed to investigate whether additional climate change-related perils such as droughts and wildfire could be better captured in the Solvency II framework under the natural catastrophe risk sub-module.

Internal models

- 4.36 EIOPA considers the framework and rules relating to internal model design and calibrations do not prevent internal model undertakings from accounting for sustainability factors or the climate change-related risks that they are exposed to.
- 4.37 EIOPA did not receive sufficient information to elaborate on the extent to which the application in practice of the rules relating to internal models account for sustainability factors, with particular regard to the climate change risk.
- 4.38 EIOPA suggests that internal model undertakings relying on external providers for their catastrophe model discuss with them whether and how climate change is integrated in their model. This would increase the understanding on how the external models work in practice and enable a better understanding of the model limitations.
- 4.39 Internal model users should not only rely on historical data to integrate sustainability risks and, in particular, climate change as the occurrence of future trends may not be captured in historical data. The development of a more forward-looking approach should be pursued, applying specific and consistent scenarios.

Challenges in integrating sustainable finance considerations in Pillar 1 requirements and suggested way forward

- 4.40 EIOPA is of the opinion that undertakings should assess their exposure to sustainability risks which will increasingly impact the insurance sector over the coming years and decades. For example, the transition risk of revaluation of assets could arise suddenly, with important consequences, affecting potentially long-term illiquid investments. The increasing costs of natural catastrophe risks are already impacting the (re)insurance industry today.
- 4.41 EIOPA acknowledges that the medium to long-term impacts of climate change cannot fully be captured in the Solvency II capital requirements which are designed to reflect the risks that undertakings are exposed to over a one-year time horizon.
- 4.42 However, EIOPA does not consider that this time horizon should be changed, but rather complementary tools such as scenario analysis and stress testing would be more appropriate to capture impacts of climate change.
- Scenarios analysis will allow undertakings to consider the impact of sustainability risks beyond the one-year time horizon or where timing is unpredictable. Such analysis should be embedded in the undertakings' risk management, governance and ORSA. This should enable undertakings to

identify and assess the climate change-related risks they would be exposed to in a forward-looking manner and inform business planning and strategy.

- Stress testing at national or European level could also contribute to identify risks over a longer term horizon.

4.43 Undertakings' assessment of the impact of climate change will depend both on the materiality of climate change-related risks and be subject to Solvency II's proportionality principle.

4.44 EIOPA acknowledges that undertakings may use qualitative scenarios as a first step to help management explore the potential range of climate change-related risks implications. Where appropriate, especially if the risk exposure is material, this qualitative approach should be complemented with quantitative scenarios.

4.45 EIOPA is of the opinion that the scenarios should be tailored to the undertakings' risk profile. When developing these scenarios, undertakings should take the following questions into account (see Table 8 for further elaboration on the below mentioned topics):

- Which (re)insurance activities (investment, underwriting, strategy planning, new product development etc.) could be impacted by climate change-related risks – physical, transition and liability risks (these risks could impact both asset and liability sides)?
- How material are these risks to the impacted activities?
- What are the time horizons that should be considered?
- Which scenarios should be considered?
- Which data and tools are available to perform the scenario analysis?

4.46 EIOPA is of the opinion that further work is needed to define a consistent set of quantitative parameters that could be used in climate change-related scenarios that undertakings can then adopt as appropriate in their ORSA, risk management and governance practices. However, EIOPA also recognises that other parameters will depend on the specificities of each undertaking.

4.47 Regarding Pillar III aspects and taking into account current European initiatives, EIOPA is of the view that in the near future further consideration should be given to mandatory requirements for public disclosure on sustainability risks on both sides of the balance sheet. The experience gathered in the application of the Commission's Guidelines on reporting climate-related information, issued under the Directive on disclosure of Non-Financial Information²⁰ should prove helpful in this respect.

²⁰ https://ec.europa.eu/finance/docs/policy/190618-climate-related-information-reporting-guidelines_en.pdf

5. Summary feedback to the consultation and analysis of evidence

- 5.1 Between January and March 2019, EIOPA conducted a **public call for evidence**²¹ and a **confidential request for information**. National competent authorities (NCAs) liaised with their groups and undertakings for information (including quantitative data on natural catastrophe claims settlements) from their markets on practices relating to the integration of sustainability in asset and liability valuation, underwriting practices and incentives or disincentives for considering sustainability in Solvency II, in particular in the market risk and natural catastrophe modules for the standard formula and internal models.
- 5.2 153 solo undertakings and 31 groups responded to the request for information. 213 undertakings provided data on claims for NAT CAT events. Undertakings and groups which responded to these two different information requests were selected by participating NCAs according to materiality considerations at a national level. In terms of representativeness of the sample at a European level, solo and group participants represent approximately 20% and 38% of total assets, respectively.

Figure 2 Total sample in number of undertakings (only solo)

■ Life ■ Non-Life ■ Composite ■ Re-insurance ■ NA

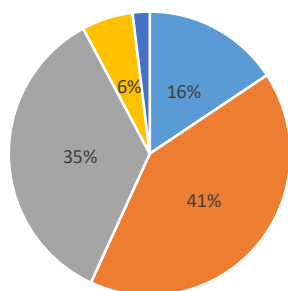
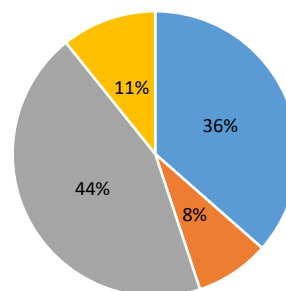


Figure 3 Total sample in assets of undertakings (only solo)

■ Life ■ Non-Life ■ Composite ■ Re-insurance



- 5.3 The questions specifically aimed to collect evidence on practices from non-life (re)insurers with regard to climate change. The focus on climate change was given by the call for an opinion by the Commission.
- 5.4 The public call for evidence was answered by 33 stakeholders. The answers to the public call for evidence are available on EIOPA's website.²²

²¹ See: <https://eiopa.europa.eu/Pages/About-EIOPA/Organisation/Sustainable-Finance-.aspx>

²² <https://eiopa.europa.eu/Pages/About-EIOPA/Organisation/Sustainable-Finance-.aspx>

- 5.5 From 3 June to 26 July 2019, EIOPA conducted a **public consultation on a draft opinion on sustainability within Solvency II**. 26 stakeholders responded to the consultation, of which 10 (re)insurance undertakings or groups, 8 industry associations, 1 consumer association, and 7 other stakeholders, including non-governmental organisations. EIOPA also received comments from the Insurance and Reinsurance Stakeholder Group (IRSG). All of the comments made were given careful consideration by EIOPA. (Non-confidential) responses to the consultation are available on EIOPA's website.²³
- 5.6 EIOPA would like to thank the Insurance and Reinsurance Stakeholder Group (IRSG) and all the participants to the public call for evidence, the confidential request for information and the public consultation for their comments which have provided important guidance to EIOPA in preparing the opinion for submission to the European Commission.
- 5.7 The main comments received to the public call for evidence, the confidential request for information and the public consultation on the draft opinion (hereafter commonly referred to as "the consultation"), as well as EIOPA's analysis based on these comments and additional evidence, can be found hereafter.

Climate change related risks

a. Physical risk

- 5.8 Groups and undertakings responding to EIOPA's consultation indicated that physical risks arising from longer-term shifts in climate (such as increases in sea level, changes in the intensity and/or frequency of storms and flooding), besides natural disasters (heatwaves, floods and wildfires) would most directly impact real estate portfolios. Indirect impacts of these events are expected on sovereign bond exposures (e.g. where tourism is affected) or on global supply chains (risk of supply chain disruption) and availability of resources (risk of resources scarcity). From the evidence available, some participants noted their exposures are currently mostly located in the Eurozone/Europe.
- 5.9 It has been observed that physical risk stemming from climate change is not systemically taken into account by insurers, especially on the assets side. For example in France, according to a survey by the ACPR in Autumn 2018²⁴, only 30% of 138 surveyed French insurers analyse their exposure to physical risks on the assets side, whereas 93% of those having a NAT CAT business take it into account.

²³ <https://eiopa.europa.eu/Pages/Consultation-on-an-opinion-on-sustainability-within-Solvency-II.aspx>

²⁴ https://acpr.banque-france.fr/sites/default/files/medias/documents/as_102_climate_change_insurers_en.pdf

b. Transition risk

- 5.10 Based on the summary evidence received, many groups and undertakings indicate that transition risk would not apply, or they cannot specify to what extent this would affect their portfolio.
- 5.11 This may be due to the more uncertain and complex nature of transition risk, as most participants consider the drivers to be related to political developments (establishment of sectoral climate change-related policies), development of customer expectations (with reputational impacts) and technology. Where groups and undertakings analyse their exposure to transition risks, this is mainly related to listed equity and bond investments, partly due to the availability and quality of data, and partly due to the significance of the exposure. The assets that are most significantly affected by transition risks depend on the sector of the investment. Sectors identified as most impacted are those most involved with or exposed to carbon intensive activities (and perceptions of high carbon footprints) going forward. Assets impacted by downward re-evaluations or converted to liabilities due to the transition to a low carbon economy, are commonly referred to as stranded assets.
- 5.12 Asset stranding could affect a variety of assets. However, the impacts vary across geographies, sectors, time horizons and in line with commitments to limit global temperature rises. While the low carbon transition presents material financial risks for e.g. some infrastructure asset types, for others (such as renewables and low carbon transport), it also presents material opportunities.²⁵
- 5.13 EIOPA is currently investigating to identify and quantify potential climate transition vulnerabilities in the asset portfolios of European insurers. The analysis is carried out in cooperation with the 2 Degree Investing Initiative and it is designed to track the extent to which insurers are accumulating or reducing transition risk in their corporate bonds and equity portfolios. This investigation should provide a first in-depth quantitative analysis of the exposure to transition risks and potential losses in case of abrupt fall in prices in assets that are climate-relevant. Previous analysis conducted in 2018 was limited to assets exposures to climate-related risk by mapping them to climate-relevant sectors.²⁶

c. Liability risk

- 5.14 During the consultation, several stakeholders pointed out that an assessment of liability risk should also be carried out. On the assets side of the balance sheet, liability risk can affect the value of assets of investees made responsible for pollution. On the liability side of the insurers' balance sheet, insurers can offer environmental liability coverage for companies considered to cause

²⁵ <https://www.cisl.cam.ac.uk/resources/publication-pdfs/cisl-climate-wise-transition-risk-framework-report.pdf>

²⁶ EIOPA Financial Stability Report December 2018, pp. 51-57:
<https://eiopa.europa.eu/Publications/Reports/EIOPA%20FSR%20December%202018.pdf>

environmental risks, potentially high claims can result from court decisions and need to be integrated in the valuation of insurers' liabilities.

Valuation of assets and liabilities

a. General valuation principles

- 5.15 A fundamental principle underpinning Solvency II is that the solvency position of an undertaking should be based on a market consistent valuation of the whole balance sheet, where assets and liabilities are valued consistently. Changes in the value of the assets and liabilities will affect the availability of own funds and the calculation of capital requirements.
- 5.16 The default valuation method for asset and liabilities under the Solvency II Directive is to use quoted market prices in active markets. The market-consistent valuation for assets and liabilities should determine the amount for which they could be exchanged (assets), transferred or settled (liabilities) between knowledgeable willing parties in an arm's length transaction. Where no quoted market prices in active markets are available, alternative valuation methods using to the maximum extent possible relevant market inputs can be applied, including assumptions about risk and expert judgment. (Article 10 of the Delegated Regulation). The valuation approach is therefore neutral to sustainability factors, as it is to other factors or information that may determine valuation.

b. Valuation of assets

- 5.17 Most of the evidence received during the consultation shows that undertakings do not value sustainable investments differently than other investments. According to stakeholders, the principles of valuation of assets of Solvency II allow for the integration of all material risks, including sustainability. This means that market consistent valuation techniques are applied, and where applicable, informed by undertaking-specific, and mostly historical data.
- 5.18 Various stakeholders believe that the improvement of data quality and collection of reliable information on sustainability parameters relating to investments would be one of the main steps in helping the market to correctly price sustainability risks.
- 5.19 Undertakings also mention using external ESG ratings to inform their investment strategy. Credit ratings are also referred to, which may take into account sustainability factors in counterparty default assessments, which are reflected in the valuation of assets.
- 5.20 An efficient market, in theory, allows for prices to reflect all known (and quantifiable) factors, including sustainability considerations. Currently, the

potentially limited availability of information on the sustainability profile of investees may lead to inefficiencies in setting prices in financial markets, and strong readjustments which may require more time to re-balance. Also, liability risks can be a cause of a sudden decrease of asset prices in one sector or specific company following a court decision for damages resulting from environmental risks.

- 5.21 Following the public consultation, some stakeholders state that for illiquid assets (e.g. real estate, private equity/debt), mark-to-model approaches, based on discounted cash flows models, are normally used. Such valuations should reflect the uncertainty of the amount and timing of the cash flows, requiring higher expected yields (i.e. lower valuations) with increasing uncertainty. Sustainability risks contribute to this uncertainty, and should be reflected adequately.
- 5.22 The amount and quality of information on the sustainability profile of the investees, on which market participants' expectations are formed, should increase in a near future and thus be included in the relevant market prices as well as in the expectations of undertakings. Changes in policy, technology and physical risks could prompt a reassessment of the value of a large range of assets as costs and opportunities become apparent (transition risks). A deeper knowledge of these factors together with a greater maturity of the market participants on this topic could then affect market prices more significantly than today.
- 5.23 Furthermore, where alternative methods/modelling are used, the insurer will need to adjust market prices to arrive at a fair valuation of assets. Such adaptations cover a number of characteristics of assets, among which are sustainability factors. However, it may not be straightforward to single out sustainability considerations in asset valuation.
- 5.24 The Solvency II framework provides – in a principle-based way – for the requirement to assess all relevant characteristics, features and risks of the assets in case quoted market price for that specific asset are unavailable and alternative valuation methods need to be used. Further, undertakings are required to disclose assumptions underlying alternative valuation methods.²⁷
- 5.25 As to valuation uncertainty, the Delegated Regulation states that when assessing the assumptions about risk, undertakings shall take into account the risk inherent in the specific valuation technique used to measure fair value and the risk inherent in the inputs of that valuation technique (Article 10 of the Delegated Regulation).
- 5.26 The example is being made of the valuation of transition risks for real estate investments. Real estate investments by insurers, especially at the level of

²⁷ Paragraph 4 of article 296 of the Solvency II Delegated Regulation.

individual properties, normally consist of investments in unlisted assets that are rarely traded. As a result, up-to-date arm's-length (market) prices that reflect all factors and developments that impact the value of such assets may not be available. Climate change, and policy responses to it, will become more and more relevant for the valuation of real estate investments. In a number of Member States, transition measures have been adopted that lay down new energy efficiency requirements for various types of properties which, if not implemented in time, could yield stranded assets risks for parties that have invested in such property classes. Both these risks and the costs associated with avoiding them should also be reflected in the valuation of real estate investments.

- 5.27 Considering the important exposure of (re)insurers, and the fact that the real estate sector is one of the largest greenhouse gas (GHG) emitters in the EU, it would be important, among other steps, that (re)insurers assess how their real estate portfolio reflects sustainability considerations.

c. Valuation of liabilities

- 5.28 Article 29 of the Delegated Regulation states that undertakings must take account of expected future developments, including future environmental developments. Further, Article 19 of the Delegated Regulation states that data should accurately reflect the risks to which an undertaking is exposed.

- 5.29 A substantial majority (over 75%) of the groups and undertakings who provided evidence to EIOPA during the consultation currently do not take explicit account of climate or sustainability risks in their best estimate calculations. Here it needs to be noted that the evidence collected is skewed towards non-life: non-life (CAT) insurers mostly responded they "implicitly" consider climate risks – but based on historical data, i.e. only in a retrospective manner. Life business in particular does not seem to integrate sustainability in best estimate calculations (83% of life insurers who participated responded that climate risks were not applicable to them).

- 5.30 A substantial number of respondents indicated that they consider that any climate change-related trends are implicitly captured by historical loss data. As these respondents base their best estimates on historical loss data, climate change would be included in their best estimate projections.

- 5.31 Undertakings and groups that reported not to include climate change-related risks in their best estimate, provided a number of explanations for not doing so, including:

a) Nature of non-life insurance business

- Short term duration of non-life contracts (typically 12-month contracts);
- Ability to re-price contracts annually, which means that pricing is usually done for a short time horizon;

- Quick (typically within one year after the event’s occurrence) settlement of non-life NAT CAT claims, enabling annual repricing;

b) Climate change “uncertainties”

- Lack of understanding of climate change impact (difficulty to split the variability of climate-related perils into a part solely stemming from climate change and another stemming from the natural variability of these events, i.e. to split between “noise” and “signal”);
- No validated “climate change model” available in the market;
- Lack of transparency to which extent current third-party cat models include climate change.

5.32 Circa one quarter of undertakings and groups who responded to the confidential request for information explicitly consider climate change-related risks as part of their cash-flow projections for the best estimate (See Table 2 on current practices). Furthermore, some evidence has been collected on initiatives for including climate change in catastrophe models (See Table 3).

Table 2 – Current practices for incorporating climate change-related risks in the calculation of the best estimate

- Use of stress-testing or scenario-based analysis to prospectively assess the impact of climate change on the best estimate;
- Use of well-known third-party model vendors to model catastrophe events and losses. However, most of third-party cat models are designed to support risk assessments for the next 12 months. A forward-looking approach would therefore not necessarily be supported by these models. Some new models are investigating how climate change can explicitly be modelled (See Table 3).
- Consider the appropriateness of the ‘Event Not in Data’ (ENID) provision informed by stress-scenario analysis.

Table 3 - Initiatives for including climate change in catastrophe models

- The impact of climate change is mostly not explicitly reflected in the current natural catastrophe models. Any climate change to date will be implicitly included in the recent data (historical data) used to create the NAT CAT models. However, a number of NAT CAT model vendors have done additional work with regard to climate change, of which the following examples are being noted:
- In addition to their near-term model, RMS has been providing since 2006 another view for the hurricane model which covers a projection into the next 5 years, incorporating various aspects of natural climate variability and the expected small changes due to anthropogenic climate change. The main conclusion reached by the experts at RMS is that over the next 5 years, Atlantic hurricane activity is expected to be consistent with the average of the past 11 years²⁸.

²⁸ <https://www.rms.com/blog/2018/02/08/impact-of-the-2017-north-atlantic-hurricane-season-on-the-rms-medium-term-rate/#more-4332>

- Corelogic works as well very closely with academic partners to study the impact of climate change on European windstorms for example. They used their European windstorm catastrophe model in combination with a Global Climate Model (GCM) which allowed them to simulate future climates in line with IPCC emission scenarios²⁹.
- JBA's UK Climate Change Flood Model is a catastrophe model specifically designed to provide an indication of possible future changes to flood risk across the UK. They have taken highly-detailed and complex scientific data and created a functional, forward-looking tool that insurers can use in conjunction with their UK Flood Model³⁰.
- AIR completed a study, funded by the Association of British Insurers (ABI), to evaluate the impact of climate change on losses from inland floods in the United Kingdom, extratropical cyclones (wind) in the United Kingdom, and typhoons (wind and inland flood) in China. The strategy for each of these three models was to use climate change information provided by the UK Met Office Hadley Centre for Climate and Services on how precipitation and wind would change by the end of the century. This information was then used to construct climate change conditioned catalogs.³¹

5.33 Responses to the consultation indicate that climate change can have an impact on the best estimate calculation of life insurers through its effect on health and mortality. For example, more extreme weather events (heatwaves, flooding) could lead to higher mortality which translates to higher surpluses for annuity writers. However, the effect will depend on factors such as the line of business.

5.34 Additionally, respondents consider that the main areas where climate change will impact the best estimate calculation of life insurers are economic scenario generators, mortality and morbidity rates.

Investment practices

5.35 Evidence collected shows that around 70% of insurance and reinsurance groups and solo undertakings (groups and undertakings) who responded to the consultation, have currently implemented practices to include sustainability risks in their investment management or indicated they are planning to do so in the next three years.

5.36 Many insurance groups and undertakings that have implemented an investment policy including the consideration of sustainability risks set up a dedicated governance process. Mostly have a dedicated ESG-committee, which sets the

²⁹ <https://www.corelogic.com/downloadable-docs/1-eurwnd-0217-02-european-windstorm-model-euowind-screen-022417.pdf>

³⁰ <https://www.jbarisk.com/news-blogs/new-uk-climate-change-flood-model/>

³¹ <http://w3.air-worldwide.com/Climate-Change-Impacts-on-Extreme-Weather>

policy regarding different ESG-related aspects (ratings, targets tools to manage and monitor sustainability risks, etc.), more rarely a separate carbon footprint committee. ESG-factors are then either incorporated into investment policy, or separated into specific ESG-policies under various different names.

- 5.37 Stakeholders argue that classical financial analysis can make accurate statements about sustainability risks, as the business model of potential investees and its effects on the development of earnings in the future have to be assessed. The investments policies generally set similar targets and measures for expected risk and return for sustainable investments as other investments. Thus, targets and measures for the return on sustainable assets are analysed jointly with traditional financial variables, regardless of their classification.
- 5.38 Some insurers mention that sustainable investments make economic sense, in particular, where the investments show a lower volatility and provide for more stable returns over the long term. Nevertheless, undertakings note that sustainable investments are not less risky per se.
- 5.39 When making investment decisions, insurers reported that they consider the following in relation to sustainability risks:
- Different risks for different types of assets. For example, physical risks will be assessed before directly purchasing buildings and the real estate portfolio will be assessed for different climate change scenarios and across key perils, including properties' locations and their elevation above sea level. These risks include direct damage to properties, and indirect effects, through for example disruptions to supply chains;
 - ESG ratings of the assets: insurers often rely on sustainability ratings provided by external agencies. EIOPA refers to the ongoing study by the European Commission on sustainability ratings, which would include the analysis of methodologies, market structure and depth and breadth of sustainability research assessments and scoring, as well as the independence of those research/scoring providers³²;
 - Other inputs from external sources such as the World Economic Forum³³, audit firms and risk assessments provided by specialized investment managers.
- 5.40 Insurers' commitment in sustainable investments can rely on commonly agreed standards. Some reported to have signed the UNPRI -principles (UN Principles for Responsible Investment)³⁴ to incorporate ESG-factors to their investment

³² See COM Action plan, action 6.

³³ <https://www.weforum.org/whitepapers/seeking-return-on-esg-advancing-the-reporting-ecosystem-to-unlock-impact-for-business-and-society>

³⁴ UNPRI signatory commits to:

Principle 1: We will incorporate ESG issues into investment analysis and decision-making processes.

Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.

Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.

Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.

and ownership decisions or the Montreal Pledge³⁵ to measure and publicly disclose the carbon footprint of their investment portfolios on an annual basis. Other references include: UN guiding principles on business and human rights, OECD MNE guidelines and national business recommendations, Equator principles.

- 5.41 Strategies aiming at integrating ESG factors within investments policy will depend on whether assets are held directly by the insurers or through assets managers. In the former case, insurers report to rely on services provided by assets managers who have also signed the above-mentioned principles, on ESG indexes. However, criteria applied in the investment decision will be less tailor-made to align with the insurer's investment policy.
- 5.42 Finally, some groups and undertakings reported having decided to bring their investment portfolio (at least for equities and/or corporate bonds) closer to a 2°C scenario and to measure the progress towards this goal through their investments. Insurers assess the risk triggered by the holdings of stranded assets by analysing and recognizing the sectors most vulnerable to transition risk. Transition risk can be impacted by different factors such as carbon pricing, regulatory or legal changes, changes in consumer habits, technological change.
- 5.43 Main obstacles cited by groups and undertakings in investing in sustainable investments related to climate change are the followings:
- the lack of data and information on performance even if implementation by investees of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) can help (re)insurers to inform their investment behaviour;
 - the lack of a commonly agreed taxonomy or definition of sustainable investments;
 - the poor offer in identified sustainable investments: for example, the green bond investment pool is still relatively small, in particular for EUR-denominated bonds and investing in a green bond raises several challenges in terms of concentration risk (e.g. issuers from the utilities sector are dominant in this area) and because the "green purpose" of the proceeds can be questionable in absence of a standard for green bonds;
 - the impossibility to monitor climate change risks: climate change-related risks impacting on investments would mostly arise from modification of migration flows from the most impacted area of the planet in terms of flooding or droughts, impacts on human health or on biodiversity.
- 5.44 As to investment opportunities arising from climate change, groups and undertakings mostly identify the following drivers:

Principle 5: We will work together to enhance our effectiveness in implementing the Principles.

Principle 6: We will each report on our activities and progress towards implementing the Principles.

³⁵ <https://montrealpledge.org/>

- Changes in regulation to enable the transition towards a low carbon economy: this could impact in particular investments in the energy and transport sector.
- Changes in expectations from consumers, expecting that financial institutions invest in a greener economy. However, only few groups and undertakings mention having implemented TCFD-reporting for an increased transparency on their investments;
- Technological advancements, with potential high creating value.

Table 4 – Current practices for incorporating of sustainability risks into investment policy

- Limiting investment in non-sustainable activities/companies:

(i) *the exclusion of any company belonging to a sector detrimental to environmental or social considerations* is the most radical approach. These include usually companies producing controversial weapons, tobacco, or with revenues from coal exceeding a certain percentage of total investment. Usually the threshold for investment in these sectors is set to decline over time.

(ii) *the Best-in-Class strategy* consists in selecting companies engaged in the reduction of their carbon footprint, regardless of the sector which they belong to. Such an approach allows companies from to finance their transition to a more environmentally sustainable economy. Also norms-based screening can lead an undertaking to consider divesting from certain sectors.

- Stewardship and impact investing

(i) *the inclusion investment strategy*, i.e. investments directed at economic activities aiming to achieve social and/or environmental goals (e.g. through sustainability-themed investments, best-in-class investment selection, norm-based screening, impact investing), is expressed either in terms of amount of investments by a given timeframe or as a percentage of the total investments. It often refers to highly certified real estate (rated as excellent or very good in the following standards: BREEAM³⁶, LEED³⁷, HQE³⁸), to lower carbon infrastructures or to green bonds.

(ii) *Engagement and voting on sustainability matters* can be a way to influence undertakings of which (re)insurers are shareholders towards a more sustainable strategy. Such a strategy can evolve over time, where disinvestment is a measure of last resort upon lack of the investee's commitment.

- Introduction of ESG criteria in the investment decision:

An ESG rating can be considered together with the financial criteria usually taken into account in an investment decision. Such a rating can be developed internally (based on

³⁶ <https://www.breeam.com/>

³⁷ <https://new.usgbc.org/leed>

³⁸ <https://www.behqe.com/>

information publically available but also possibly through questionnaires sent to the investees) or externally (by ESG ratings agencies, standards or assets managers).

Underwriting practices

- 5.45 From the evidence received, EIOPA concluded that a majority (~ 60%) of groups and undertakings currently do not take explicit account of climate or sustainability risks in their underwriting policies and pricing decisions. More than 80% of the Life Business responded that climate risk is not applicable to them.
- 5.46 Climate risk is in general part of the traditional non-life insurance business. However, assessing the impact of climate change, i.e. causing an increase of frequency and severity of climate events, is more challenging.
- 5.47 According to the evidence collected, circa 40 % of undertaking and groups, explicitly consider sustainability in their underwriting policies either for the impact sustainability risks may have on their business or for the impact their activity may have on the environment.
- 5.48 Some (re)insurance undertakings pointed out that as underwriting is the risk-based assessment and risk-based pricing of a risk, which the insurer is asked to cover, no other considerations than these risk-based factors should play a role in insurance underwriting. All questions that do not concern the immediate core of the risk transfer, such as sustainability, the undertaking's reputation or the business policy, would need to be clarified in a process that takes place immediately before or after the actual underwriting.
- 5.49 Stakeholders argued that "impact underwriting" could have a different objective than the risk-based assessment of a risk: to achieve social and/or environmental goals. This may potentially undermine the idea of risk identification, mitigation and pricing.
- 5.50 Industry participants also argued that "impact underwriting" could be particularly relevant where risk mitigation and loss prevention could make a significant difference. For retail clients, the prevention would essentially be at individual level. For companies or local authorities, more impact could be expected, according to some stakeholders. At this level, a collaboration between insurers, companies and local authorities could raise awareness of risks and standardise risk categories. Focusing on natural catastrophes, a stakeholder mentioned that prevention should be collective and be implemented by local authorities as well as companies. This may improve data quality and create new databases on the vulnerability to climate change.
- 5.51 It was stated by stakeholders that underwriting by itself cannot mitigate a risk, it can only price a risk. They acknowledge that to some extent a higher price for "climate-risky" business – at least in the short term - can set an incentive for

businesses to shift to sustainable business models. Some undertakings expect an increase of the insurance premiums of certain risks due to more frequent and severe climate change-related events. Some undertakings stressed the fact that they had already made changes in premiums following a concrete climate change-related event. Undertakings also highlighted the fact that these climatic events could eventually impact the reinsurance premiums, which will inevitably lead to higher risk premiums.

- 5.52 However there are obvious commercial, but also societal limits to repricing. Continuous increasing in pricing may, over the medium to long term lead to the risk of the industry crowding itself out of certain risks as well as the risk of an increasing protection gap for risks for which any type of protection may become unaffordable.
- 5.53 Undertakings who indicated that they are implicitly taking climate change-related risks into account in their pricing, mention integrating risks arising from climate change-related events in occurred and predicted losses. In order to predict losses, some insurers make use of specific models, like in-house models to better assess climate risk, establish a mapping of natural risks and use climate-based models. Scenarios developed based on IPCC projections are sometimes used to measure climate change impact on business and claim rates.
- 5.54 However, current modelling techniques rely on historical data of past events to assess the future amount of premiums. Yet, given climate variability and climate change, an over-reliance on historical climate observations to guide the design of such products can result in premiums which mislead policyholders and insurers alike, about the magnitude of underlying risks.³⁹ Research suggests that current climate model output is limited and that alternative approaches to include multiple sources of climate information can be developed.
- 5.55 In countries such as France, the UK and Norway, public reinsurance systems contribute to the insurability of certain risks (e.g. natural catastrophe). In Spain, a public system directly covers such natural catastrophe risks. Such systems do impact on the underwriting policies of the insurers even though the impact is deemed marginal by several groups and undertakings. Some respondents claim that the absence of such schemes could cause higher premiums for customers and that an important number of properties could be uninsurable in a scenario above 2 degrees without such public system of reinsurance. Some argue that the existence of public schemes may distort risk perception or even artificially lower commercial prices. The availability of insurance without the “real” price might lead, for example, to continued building in areas with high risks for flooding or investments in more resilient/energy efficient housing might be postponed.

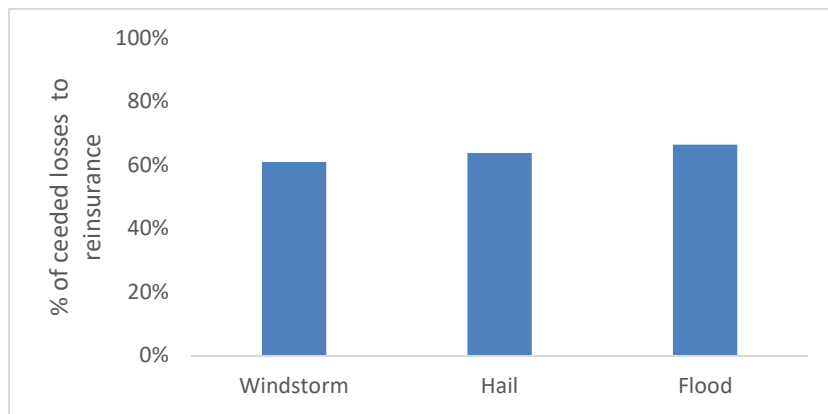
Table 5: Protection gap

³⁹ <https://www.sciencedirect.com/science/article/pii/S2212096314000023>

- Stakeholders provided no evidence of Solvency II impacting on an insurance protection gap.
- (Re)insurers expect to be able to adapt to an increased frequency and severity of risks arising from climate change, thanks to “advanced analytical methods”.
- (Re)insurers point out that they “cannot correct mistakes, e.g. in land-use planning”. Affordability remains an issue where there would be an economic mismatch in high risk areas (e.g. national subsidies for high risk areas leading to incorrect economic prices). The risk of relocation remains high.
- The idea was raised that better information on current and projected losses arising from climate change (in particular NAT CAT) could be collected in a European NAT CAT database.

5.56 Stakeholders referred to reinsurance as a risk mitigant. Data collected for the purpose of the opinion, confirms the reliance on reinsurance (see Figure 4).

Figure 4: Average ceded losses to reinsurers per peril Windstorm, Hail and Flood (for events ranging from year 1998 to 2019). Observation from data request: Around 60% of the insured losses were ceded to the reinsurers for all three perils.



5.57 While the 2018 EIOPA insurance stress test confirmed high resilience of the biggest European insurance groups to a series of natural catastrophes⁴⁰, it also showed that the current high resilience relies on reinsurance, even to a larger extent than for market risks losses. Participating firms in the stress test were among the 42 biggest European insurance. Out of these 42 European (re)insurance, only 25 were exposed to the prescribed set of Europe-located natural catastrophes. These 25 (re)insurers transferred 55% of the losses caused by the so-called Nat Cat scenario to reinsurers through the actual treaties in place. Accordingly, the most affected participants by this scenario were reinsurers and direct insurers largely involved in reinsurance activities. Furthermore, EIOPA noted that the losses were ceded to a limited number of counterparties, highlighting a potential concentration of risk. From a geo-

⁴⁰ The stress test showed a limited impact of a set of catastrophic losses over Europe from various perils supposed to materialise over a short period of time, like windstorms, floods and earthquakes. It needs to be pointed out that the events tested were not designed taking into account climate change, yet. In addition, the short time horizon does not take into account longer term developments due to climate change. Nevertheless, the results are useful to illustrate the effect of an increased severity and intensity of natural catastrophes hitting different geographical areas in Europe.

political perspective, 45% of the ceded losses went to reinsurance carriers based in non-EU jurisdictions.

- 5.58 However, as the consequences of a climate change below or above 2 degrees are too uncertain, almost all the undertakings answered that they were currently unable to indicate whether they expected to stop offering a material share of their contracts or not in such a situation. Few insurers brought to the attention that they could become more selective at the time of underwriting but that eventually the business will depend on the actual appetite of the market to pay the price of such a risk in certain areas and/or on the existence of a public system of reinsurance that will allow the insurance of goods that became uninsurable.

Table 6 – Current practices for incorporating sustainability risks into underwriting practices:⁴¹

- **Re-pricing of risks**

This occurs traditionally for non-life short term business, annual repricing takes place based on claims experience over the past 12 months.

- **Integrating ESG into the underwriting standards and guidelines of the undertaking**

This includes establishing guidelines, supported in some cases by ESG experts, to help underwriters take appropriately into account ESG risks. In this regard, reference to the development of the UN Principles for sustainable insurance on “Underwriting environmental, social and governance risks in non-life insurance business” can be made. Such guidelines can provide screening criteria for underwriting “sensitive business” (e.g. agriculture, hydroelectric power, infrastructure, oil & gas, mining...) or specify risk assessment tools for major infrastructure projects. These guidelines may furthermore integrate ESG factors in client/project assessment and approval as part of insurance underwriting processes and decisions. The guidelines may also require disclosure of certain parameters by corporate clients (e.g. GHG emissions). The conclusion of the screening may lead to the exclusion of cover for certain sectors (e.g. oil & gas exploration and production activities, tar sands and associated pipelines as well as underground mining activities) or activities (e.g. geographical exclusions aiming at reducing company exposure in certain countries with high risk exposures or because of international sanctions), or the inclusion of certain “green” activities.

- **Product development taking into account the impact on climate change**

For example, insurance products and services that encourage renewable energy infrastructure, by covering the risks linked with such new industries (e.g. covering equipment for the generation of renewable energy, or to cover profits lost due to interrupted or reduced electricity generation); new concepts for cover for the

⁴¹ See also Simons, M. and J. de Wilde (2017, February), The involvement of European insurance groups in the fossil fuels sector. A report for The Sunrise Project, Amsterdam, The Netherlands: Profundo.

agriculture sector or homeowners insurance to automatically include claims related to green infrastructure used for private purposes.

For example, insurance products and operations that encourage 'green' consumption behavior, such as products that use pricing mechanisms that favour low-carbon emissions (e.g. motor insurance products encouraging vehicles with low environmental impact, using pricing models based on mileage or car type; home insurance with environmental home appliances upgrades in case of damage or loss; SME insurance packages favouring "green" buildings or car fleets.; discount rates to companies that fulfil certain standards; discount for agricultural liability insurance to organic farmers and mountain farmers; units of account offered by life insurers with an ESG label on saving contracts).

For example, insurance products that cover "sensitive" sectors (e.g. fossil fuel) for costs for the recovery of environmental damage or ESG related improvements. (e.g. policies for financial losses resulting from damage caused by pollution; third-party liability policies for pollution, covering the reimbursement of costs for emergency or temporary measures to prevent or limit indemnifiable damage; insurance products that support fossil fuel companies with insurance cover for unconventional extraction methods and costs for the recovery of environmental damage; agriculture insurance to address the increased frequency of heatwaves and ensuing risk of droughts).

- **Other: risk services, research and development**

Provision of risk services for utilities or large corporate clients (e.g. risk engineering for projects, weather risk coverage)

Advice for clients to help them identify opportunities to optimise energy usage in their homes

Invest in research and development e.g. for flood or storm prediction or prevention of ESG risks.

Capital requirements

a. Market risk - general

- 5.59 Solvency II, as a risk-based framework is designed to take all quantifiable risks into account and requires insurers to hold sufficient capital against those risks. Solvency II capital requirements are calibrated to "correspond to the Value-at-Risk of the basic own funds of an insurance or reinsurance undertaking subject to a confidence level of 99.5 % over a one-year period" (Article 101 (3) of the Solvency II Directive).
- 5.60 Almost all respondents to the consultation agreed that the current design of Solvency II capital requirements does not provide any positive or negative incentives with regard to sustainable investments.
- 5.61 None of the respondents was in a position to provide EIOPA with evidence on whether there is a (significant) difference in risk profile between assets with an underlying activity the investor considers sustainable (following internal

methodology and reliance on international guidance) and other assets. The view was expressed that a closer look would be needed at specific assets, for example a bond issuance to finance a “sustainable” project, which can be more easily identified as green/sustainable compared to equity of a firm that offers multiple products and services.

- 5.62 Views are split among market participants, as to whether “green” (i.e. assets whose underlying activity is considered to be sustainable) assets need to be distinguished from other assets in order to implement an efficient asset allocation regarding climate change impacts. There is a clear opinion among undertakings that such a differentiation is not simple since the valuation and the risk profile of an asset has many facets and that it is not necessarily straightforward to break it down into “black and white”. Also, the lack of a standardised global or European definition makes it difficult at this stage to capture consistently the topic of sustainability in assets.
- 5.63 One major limitation identified next to the lack of a common definition was the lack of a database that would allow for the analysis of a long-term trend in associated risks. The assessment of the risk profile needs to be based on reliable data to allow for a statistical robust calculation of any potential difference in risk. Such data is currently not available.
- 5.64 While therefore most respondents were unable to provide evidence or did not express a view on the potential differences in risk profiles for green and other assets, some ventured, based on their judgment without providing a statistical sound foundation, views on the yield of sustainable investments. The feedback broadly covered the following themes:
- Some mentioned that sustainable investments should have higher yields due to higher risks, without specifying the time horizon however;
 - A view was expressed that green real estate would be similarly affected by environmental risks than other real estate, moreover, some sustainable investments like off-shore wind parks could even be more affected by climate developments than other investments;
 - Another view indicated a lower risk profile, especially in the long run;
 - Political dependency (subsidies) was highlighted as important factor that could impact profitability;
 - Some argued that project financing has a stronger link to sustainability than equities, given the latter reflects a diverse mix of activities;
 - One respondent also referred to credit ratings and the implicitly incorporated difference in default risk already at this stage; and
 - Lower liquidity of the markets where such green instruments are traded on could potentially influence the assessment of the risk profile.

- 5.65 Additional literature analysis confirms that no clear conclusions can be drawn as to the difference in risk profile of sustainable and non-sustainable investments.⁴²
- 5.66 Generally, stakeholders point out the need for Solvency II, as a prudential framework, to remain risk-based and avoid imposing investment incentives. Only if there is evidence that E, S, G factors impact the risk profile of an investment, could these elements be reflected in the regulatory framework. In the same vein, stakeholders expressed general opposition against the introduction of a separate risk module for sustainability risks within Solvency II since those risks materialise through existing risk categories.
- 5.67 Respondents noted that the main benefit of identifying green or brown assets, if based on a European definition (taxonomy) of sustainable activities, would be that investors will be better positioned to assess their asset allocations against climate change objectives. According to respondents' views, such classification would only be fit for purpose for application in the green bond universe or in project finance where a given economic activity is financed, e.g. a wind park, a solar park or public transport. In other words, such classification may support so-called thematic investments, or impact investing, but not general investment purposes. Respondents note that due to shifts in activities and strategy in the regular course of business or as a result of mergers and acquisitions, the footprint of a company could materially change.
- 5.68 Furthermore, it was noted that ESG factors need to be considered together and on a case-by-case approach, avoiding hereby that instances where, on the one hand, a "green" asset has negative social impacts and, on the other hand, a "brown" asset has positive social impacts.
- 5.69 While developments on a green taxonomy are on-going, no brown taxonomy has yet been developed at the European level. Private brown taxonomies, for instance based on carbon footprints, are already being used by firms providing ESG-related ratings. In order for EIOPA to go further in its work on assessing the need for potential differentiated capital requirements for green and/or brown assets, a brown taxonomy at the European level would be beneficial (cf. NGFS work⁴³). Such a taxonomy could enable further work on the yearly returns of brown assets and the risks associated to these assets compared to other assets.

⁴² See Amundi Asset Management Discussion Paper DP-36-2018 "How ESG Investing Has Impacted the Asset Pricing in the Equity Market. The analysis shows no clear result because the impact of ESG screening on return, volatility and drawdown highly depends on the time period, the investment universe and the investment strategy considered. See also Black Rock Research paper: Sustainable investing: a 'why not' moment. The conclusions of the paper are based on data series for relatively short periods. For developed market equities both risk and return are surprisingly similar for ESG and non ESG-investments. For emerging market equities, the return has been higher for ESG investments while the risk measured as volatility has been the same. Also for Fixed Income investments both the return and volatility is more or less the same for ESG and broader investments. In a separate discussion and referring to other research, for green bond investments the paper mentions lower liquidity as major "give up" for green bond investments.

⁴³ <https://www.banque-france.fr/en/financial-stability/international-role/network-greening-financial-system/about-us>

- 5.70 If such brown taxonomy were to enable the reflection of transition risks, it could also include impact on health, since important legal evolution can be expected on these matters, too (on pesticides for instance, see the debate on glyphosate).
- 5.71 As to which asset class would be most impacted, and whether a distinction is expected/could be observed, respondents state that any asset class could be impacted. Differences in the observed impact of climate change between unrated or rated exposures would not depend on the form/listing of the asset, but rather on the availability and soundness of the data as to the exposure and the significance of the exposure. In a few cases, the potential higher risk attached to equities was noted for equities being per se a higher risk investment type. It was frequently observed that the risk depends more on the underlying assets (e.g. coastal real estate vs. inland real estate / loan to a rated petrochemical industry vs. loan to a SME working on home insulation, exposures to traditional energy sector) than on the type of asset. The values of assets that are most significantly affected by transition risks, would depend on the sector of the investment. Sectors identified as being most impacted are those being most involved with or exposed to carbon intensive activities (and perceptions of high carbon footprints) going forward (risk of stranded assets). Direct investments in real estate would be most impacted by physical risks.
- 5.72 At this point, EIOPA refers to the specific treatment of other asset categories. The regulatory treatment for qualifying infrastructure investments was introduced in the Delegated Regulation in 2015⁴⁴. Commission Delegated Regulation of 8.3.2019 amending the Delegated Regulation, introduces modified capital requirements for (un)listed equity, long term listed equity and unrated bonds/loans⁴⁵. The impact of these regulatory provisions on the investment behavior should be assessed in the coming years. The long-term perspective of climate change, but also the long-term implications of “social” developments which materialise over a longer horizon, expose long-term investments particularly to sustainability risks. On the other hand, investing in a sustainable manner often requires a long term engagement, for example in the area of sustainable transportation infrastructure.
- 5.73 Also here, as stated before, in accordance with a risk-based approach the underlying activity should determine the risk of the investment. Any differential treatment should only be based on a proven difference in the underlying risks. For example, some sustainable investments are typically infrastructure investments, which are being identified by certain external parties to be carbon-intensive⁴⁶. The infrastructure investment will need to be assessed as to its

⁴⁴ Commission Delegated Regulation (EU) 2016/467 of 30 September 2015 amending Commission Delegated Regulation (EU) 2015/35 concerning the calculation of regulatory capital requirements for several categories of assets held by insurance and reinsurance undertakings.

⁴⁵ Commission Delegated Regulation (EU) .../... of 8.3.2019 amending Delegated Regulation (EU) 2015/35, currently subject to three months of scrutiny by the European Parliament and the Council.

⁴⁶ See for instance *Carbon Impact Analytics, How to measure the contribution of a portfolio to the energy climate transition*, p39, <http://www.carbone4.com/wp-content/uploads/2016/08/CarbonImpactAnalytics.pdf>

exposure to sustainability risks, potentially using extra-financial ratings. Where possible, the exercise of a stewardship approach by the investor, promoting risk mitigation and adaptation to climate change, may impact on the risk profile of the investment (inclusion strategy).

- 5.74 Cross-sectoral cooperation on risk differentials for general and sustainable investments, as well as green or brown investments, should be pursued. EIOPA makes reference to the work that is being undertaken in the NGFS as well as to the mandate for EBA to further work to investigate a prudential treatment of sustainable assets.
- 5.75 None of the respondents to the public consultation of the draft opinion disagreed that property risk, equity risk and spread risk are the market risk modules most likely affected by sustainability.

b. Property Risk

- 5.76 The property risk module is potentially subject to sustainability risks, especially to environmental risks, because the value of real estate may depend on climate events and real estate is particularly prone to physical risk.
- 5.77 If storms or floods become more intense in a region it is likely that this will also impact the price of real estate in that region compared to another region.
- 5.78 With regard to property risk, measures to reduce sustainability risks can be taken into account in the valuation of the asset. For examples energy efficient housing or more resilient building structures. Taking the first example, it is plausible that the value of a very energy efficient real estate, e.g. a zero emission house, is less sensitive to energy price movements compared to other real estate. Similarly, the introduction of strict regulation on housing markets may also influence different sets of real estate in a different way, representing a lower or higher risk respectively. Also, an energy-efficient house may be less exposed to downward market movements if demand remains stable.
- 5.79 EIOPA used the UK based IPD total return indices for the calibration of the real estate risk.⁴⁷ The calibration of the property risk does not differentiate according to the localisation of the property, nor does it differentiate between commercial or housing real estate. To be able to compare this baseline calibration with a subset of sustainable/green real estate, EIOPA would need a reliable source of data for such assets that would allow a comparison of the volatility over a longer period that also covers several economic cycles if possible. EIOPA was not able to identify such a data source. Going forward, based on a clear definition of sustainable/green real estate, such data could be identified and collected to

⁴⁷ CEIOPS, Solvency II Calibration Paper, 15 April 2010, p 64 ff.

allow for a robust assessment of whether or not there is a different risk associated with sustainable/green housing. It needs however to be acknowledged, that such a database ideally would be able to control also for other influencing factors to be able to analyse the isolated effect sustainability causes.

c. Equity risk

Listed Equity

- 5.80 Equity prices are influenced by a broad variety of factors. The effect sustainability risks and factors would have on the performance of a certain asset (class) is generally difficult to isolate:
- Companies often offer a variety of products and services and therefore the isolation of a single effect is difficult or blurred. A clearer link could be identified for project bonds.
 - A number of activities with a positive impact on the climate have emerged recently or firms are just starting to shift. Therefore a broad long-term time series might not exist.
 - The lack of a common definition makes it currently difficult to compare results of studies and indices.
- 5.81 CEIOPS (Committee of European Insurance and Occupational Pensions Supervisors) based its initial Solvency II calibration for listed equities on broad based indices⁴⁸– MSCI World Developed and others – and assessed the volatility of the index performance over a period of more than 30 years, including the most recent financial crisis. Based on the yearly volatilities, CEIOPS derived the stress of 39% for Type 1 equities.⁴⁹
- 5.82 In 2013, EIOPA published a Technical Report on Standard Formula Design and Calibration for Certain Long-Term Investments in which it described similar considerations in the context of Socially Responsible Investments⁵⁰. Overall, EIOPA was not able to draw any quantitative conclusion, relevant for equity risk as well as spread risk, amongst other things due to the lack of a common definition and lack of granular time series data.
- 5.83 For the purpose of this opinion, in a first attempt, EIOPA assessed several available indices that try to track sustainable equities. EIOPA is not in a position to analyse the different equities that are considered in the indices and can therefore not judge whether the underlying activities are sustainable. Also, EIOPA found that many of the indices identified as sustainable show a significant overlap with other more general indices which results to some degree to a bias.

⁴⁸ CEIOPS, Solvency II Calibration Paper, 15 April 2010, p. 36 ff.

⁴⁹ See Article 169 (1)(b) of the Delegated Regulation.

⁵⁰ See chapter 4. EIOPA, Technical Report on Standard Formula Design and Calibration for Certain Long-Term Investments, 19 December 2013.

Given that caveats and the short time of available data, EIOPA compared the returns on different basis.

5.84 Using the same data source as the one chosen for the initial calibration by CEIOPS for listed equities, an analysis was performed based on the following indices⁵¹:

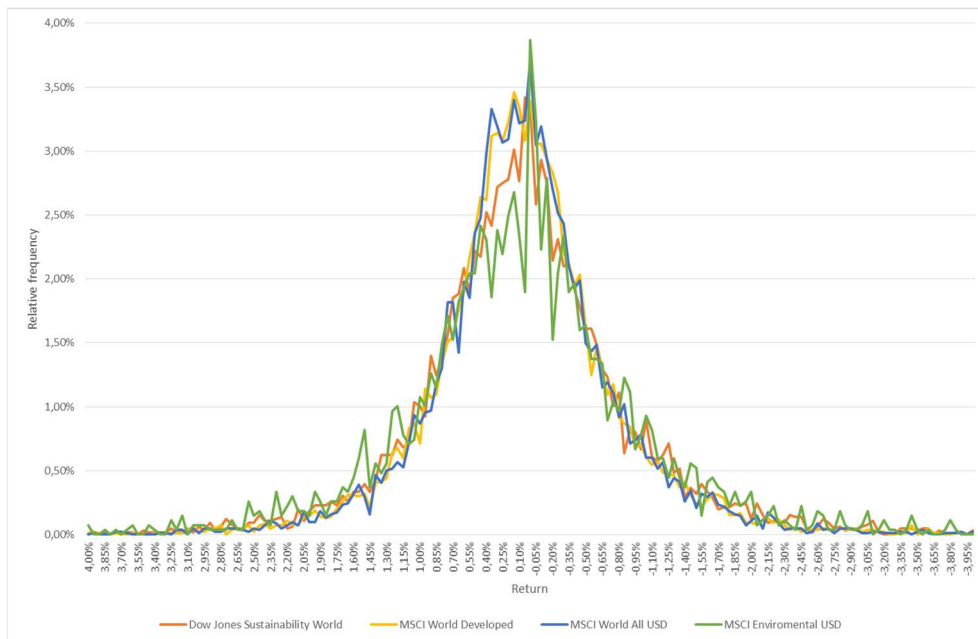
- MSCI World Developed (reference index)
- MSCI World All USD
- MSCI Environmental USD
- Dow Jones Sustainability World

5.85 The indices used in the calculation contain assets that are chosen using different methodologies (in line with investment practices) and that are considered to neither contribute further to climate change nor actively contribute to the mitigation of climate change. The methodologies used to identify sustainable assets are not harmonised and follow similar but not identical criteria. Absent a uniform methodology or taxonomy, the inter-index comparability may be limited. Also, the indices show some overlaps, meaning that an asset that is listed in the MSCI World Developed index can also show up in an index labelled as sustainable. Due to overlap, some of the return patterns may be similar and create some noise in the analysis.

➤ Daily returns:

5.86 The following graph compares for daily returns – without controlling for length of time series – the MSCI World Developed index with the Dow Jones Sustainability index, the MSCI Environmental USD index and the MSCI World All USD index. The distribution shows for the different indices a very similar pattern. Especially on the negative tail of the distribution there is no significant difference. Based on that result, EIOPA concludes for the first step, that there is no different volatility for sustainable assets compared to other assets (not controlling for sample overlap).

⁵¹ Other largely traded indices and some of their sustainable-labelled indices were analysed to exhibit a potential specific pattern of the latter but the conclusions reached did not differ from the ones drawn from the MSCI.



Source: Bloomberg

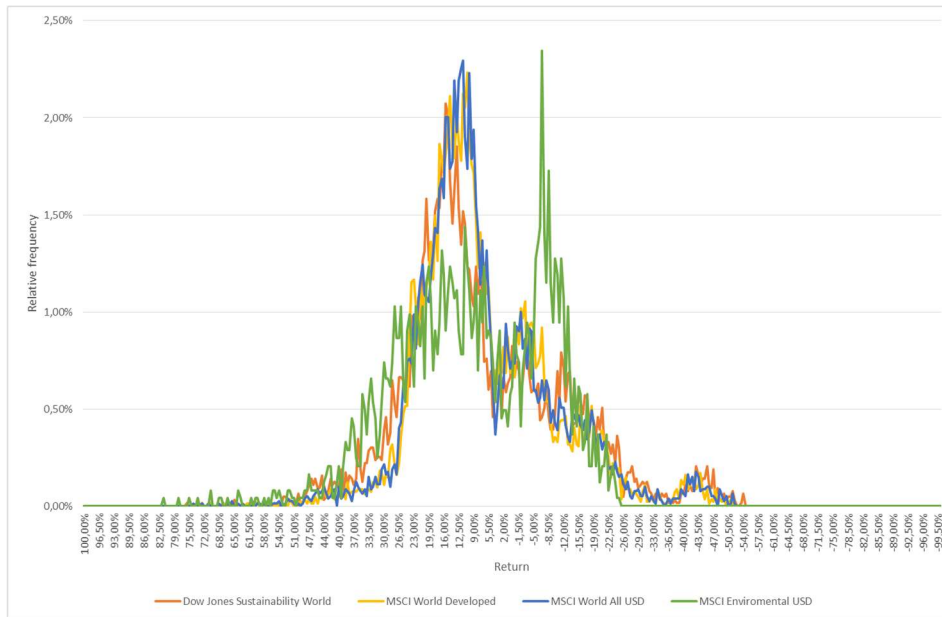
➤ Yearly Returns:

5.87 EIOPA performed in a second step a comparable analysis to the original calibration exercise using annual returns. The sample of indices as above is used to make that assessment. However, the analysis has been performed in two different set-ups to show the importance of the length of the time series.⁵²

➤ Without controlling for length of time series:

5.88 Data for each of the indices is available for a different number of trading days, the longest series is available for the MSCI World All USD with more than 8000 and the shortest series is available for the MSCI Environmental USD with around 2500.

⁵² An important reference point for the analysis is the CEIOPS Solvency II Calibration Paper, 15 April 2010, p. 37 ff.



Source: Bloomberg

5.89 Only the distribution for the MSCI Environmental USD shows a different distribution, especially on the negative end of the distribution. It is visible that there are no significant losses lower than 25% in the observed period. Looking at the summary statistics of the different indices below, this result is also translated into different characteristics of the returns, ultimately also showing a different 99.5% VaR, both empirically and under the assumption of a standard normal distribution. The latter assumption is, given the distribution visible above anyways not realistic.

Percentiles	Dow Jones Sustainability World	MSCI World Developed	MSCI World All USD	MSCI Environmental USD
100%	75,53%	70,50%	74,04%	81,04%
99,95%	69,70%	62,67%	66,55%	77,10%
99,50%	49,45%	44,00%	46,47%	60,53%
99%	46,11%	39,98%	43,03%	53,14%
97,50%	38,92%	30,88%	32,61%	42,79%
50%	10,88%	9,84%	9,88%	8,83%
2,50%	-39,93%	-30,89%	-31,24%	-19,01%
1%	-45,96%	-42,57%	-43,70%	-21,98%
0,50%	-48,18%	-44,62%	-46,13%	-23,25%
0,05%	-54,00%	-50,89%	-51,85%	-24,72%
Mean	6,73%	6,38%	6,47%	8,87%
St. Deviation	18,46%	15,47%	15,86%	17,19%
Kurtosis	58,37%	130,14%	143,36%	-9,88%
Skewness	-57,52%	-76,95%	-72,43%	40,05%
Normal VaR (99,5)	-40,33%	-33,08%	-33,96%	-34,97%
Empirical VaR (99,5)	-48,18%	-44,62%	-46,13%	-23,25%

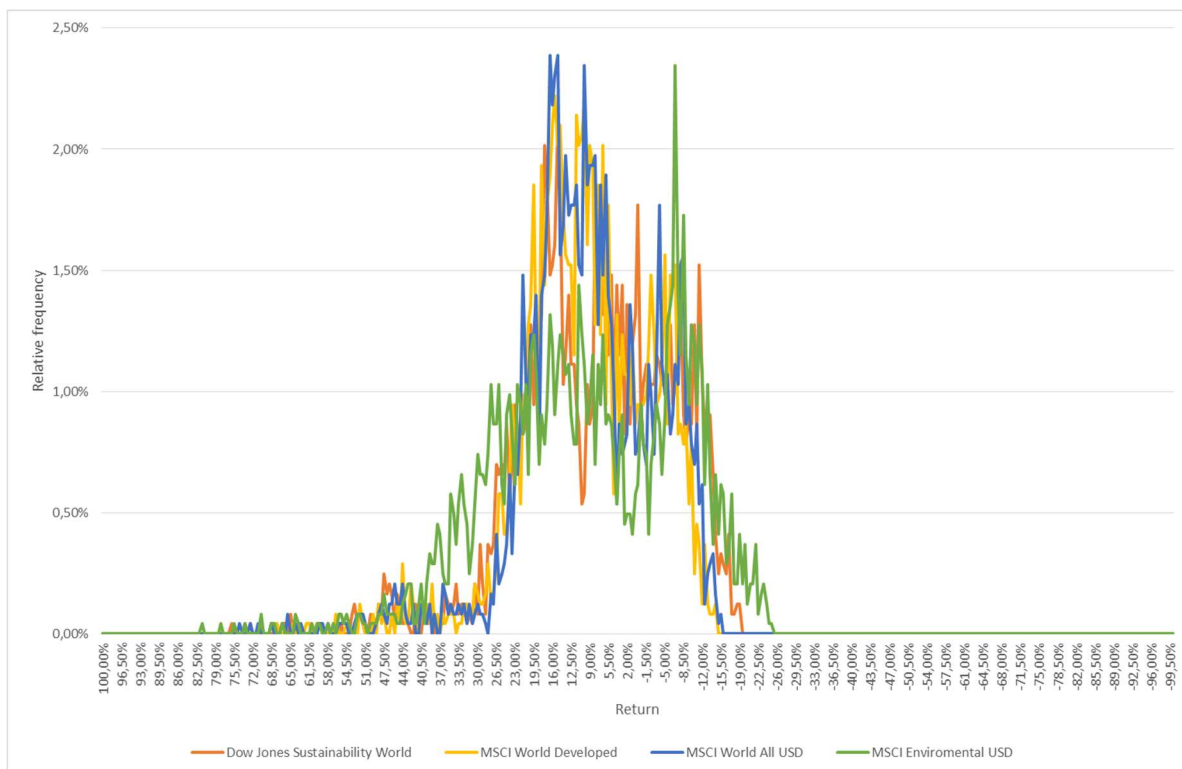
Source: EIOPA own calculations based on data from Bloomberg

5.90 The data presented shows that the empirical VaR 99.5% is very similar for the first three indices which would as a consequence indicate that there is no reason to treat sustainable assets differently.

➤ With controlling for length of time series:

5.91 As described above, only three indices show a very similar pattern in terms of annual returns. The third index shows a lower risk profile, but it is very important to caveat that result in the data since yearly data is only available since end 2009, i.e. the 2008 financial crisis is not included. This also explains the distribution in the graph and the lack of higher losses. EIOPA therefore calculated the same statistics as above and produced the same graph as well only using data from end 2009 to beginning 2019 for each of the indices.

5.92 Looking at that information, the underlying economic period was dominated by good economic development across most of the globe, the patterns become more similar again. Especially the distribution of the MSCI Environmental USD has shifted more weight on the negative tail.



Source: Bloomberg

5.93 The result of the optical analysis can also be found in the statistics. Compared to both the MSCI World All USD and MSCI World Developed, the empirical VaR is significantly more negative for the MSCI Environmental USD indicating that the risk is at least not lower for sustainable assets.

Percentiles	Dow Jones Sustainability World	MSCI World Developed	MSCI World All USD	MSCI Environmental USD
100%	75,53%	70,50%	74,04%	81,04%

99,95%	73,20%	68,13%	71,71%	77,10%
99,50%	57,47%	51,87%	55,69%	60,53%
99%	49,64%	45,66%	48,63%	53,14%
97,50%	41,57%	37,93%	41,53%	42,79%
50%	6,88%	9,76%	9,38%	8,83%
2,50%	-14,41%	-10,20%	-11,44%	-19,01%
1%	-16,77%	-11,84%	-13,22%	-21,98%
0,50%	-17,29%	-12,81%	-14,16%	-23,25%
0,05%	-19,23%	-14,61%	-15,77%	-24,72%
Mean	7,55%	9,31%	8,88%	8,87%
St. Deviation	14,18%	11,90%	12,61%	17,19%
Kurtosis	121,41%	178,71%	223,42%	-9,88%
Skewness	70,61%	70,82%	82,93%	40,05%
Normal VAR (99,5)	-28,61%	-21,03%	-23,29%	-34,97%
Empirical VAR (99,5)	-17,29%	-12,81%	-14,16%	-23,25%

Source: EIOPA own calculations based on data from Bloomberg

➤ Data requirement:

- 5.94 Ideally, EIOPA would have data on equity indices dating back at least 15 years or more to cover as a minimum the financial crisis and a period of generally increasing equity prices.
- 5.95 Next to that, the analysis would require indices without any overlap of assets among the indices, i.e. green assets compared to the residual and then optionally also brown assets to be able to differentiate further.
- 5.96 The identification of the assets for each of the segments should be based on a clear and harmonised methodology. Looking backwards, it can however not always be assumed that an asset that is currently considered to be green has always been green in the past. Examples of such a transformation can be found in the energy sectors, where firms constitute under the same name but the business has shifted. Any data used needs to be adjusted for any such developments in the past to allow a continuously consistent composition of the indices. Generally, EIOPA limited its consideration to Type 1 equities (as defined in Article 168 of the Solvency II Directive), therefore any equity included in data used for further analysis should possibly also fulfil the requirements set out in Art. 168 (1) and (6) Delegated Regulation.

d. Spread Risk

- 5.97 The spread risk module covers the risk that spreads of a rated asset change. This module is mostly relevant for bonds and therefore has also a relevance for sustainable assets, especially in the area of project bonds. Project bonds aiming

at sustainable projects can be differentiated from other bonds in a relatively straightforward manner if they have a narrow project focus. Consequently, data would be needed for bonds with different maturities and ratings to be able to assess the different characteristics.

- 5.98 In the absence of an index that would allow for a differentiated analysis of “sustainable” assets and “normal” assets⁵³, EIOPA looked at a specific segment of the bond market that has attracted more funds in recent years: green bonds. While it needs to be acknowledged that green bonds are subject to a potential “green washing” and may not have a very long history, the asset class can be a proxy for one form of sustainable assets. Literature suggests for example that green bonds may be “slightly less volatile”⁵⁴ or also that “unhedged green bond indices, however, have exhibited higher volatility”⁵⁵.
- 5.99 Without pre-empting on the analysis that will be conducted by EBA and Commission in the near future and acknowledging the work of the Technical Expert Group on an EU green bond standard, EIOPA sets out some elements to be considered for a potential calibration exercise for “green bonds” (Table 7).

Table 7: Elements for a green bond index for calibration purposes

Due to the current lack of readily available data to analyse spread volatility in different rating classes, EIOPA proposes elements for a calibration of green bonds, following a similar approach as described in EIOPA’s “Final Report on Consultation Paper No. 16/004 on the request to EIOPA for further technical advice on the identification and calibration of other infrastructure investment risk categories, i.e. infrastructure corporates” (EIOPA-16-490) published in 2016.

As a first step, suitable green bonds that should form part of the sample should be identified, based on commonly agreed criteria for identifying green bonds.

Ideally, the selected green bonds would cover a broad range of different economic activities (and geographic areas) to allow for some diversification similar to a general bond portfolio. Also, the green bonds should be of different ratings to allow a differentiated view in terms of rating classes, e.g. 3 to 4 different rating classes could be desirable. Since the analysis should be statistically sound, a sufficient large sample of bonds should be identified to smoothen some potential outliers in the data, e.g. around 10 bonds per rating and maturity bucket at any time if possible.

In a second step, a representative sample of “other” bonds that serve as reference against which the green bonds spread volatility is compared,

⁵³ As was already highlighted in EIOPA’s Technical Report on Standard Formula Design and Calibration for Certain Long-Term Investments, section 4 (on socially responsible investments), referred to above.

⁵⁴ See Bachelet, Becchetti and Manfredonia (2019): The Green Bond Premium Puzzle: The Role of Issuer Characteristics and Third-Party Verification; p. 12.

⁵⁵ See Ehlers and Packer (2017): Green bond finance and certification; p. 99.

should be identified. Additionally, a cap on bonds issued by financial institutions would need to be reflected in this analysis as well.

In a third step, spread and maturity data for all identified bonds would need to be downloaded from a data provider. If possible, data for the available bonds would cover a long time series to include experiences of a crisis as well as of economic growth.

In a fourth step, to derive meaningful conclusion, for each bond category, green and other, buckets of different maturities and rating need to be formed. For simplicity, the analysis could be restricted to the maturity bucket 0 to 5 years and 5 to 10 years, assuming that most bonds would fall within those categories. A bond with an initial maturity of 10 years would first fall within the bucket 5 to 10 and as soon as the outstanding maturity drops below 5 years the bond would fall within the 0 to 5 years bucket.

In a fifth step, for each bucket, an average spread would be calculated (simple mean). Based on all eligible inputs, for each rating and maturity bucket, an annual spread change would be calculated (rolling measure) to derive for each trading day for all buckets a time series of annual spread changes.

Since it is likely that bonds change buckets over time and new bond issuance would be included while some bonds mature, a yet to be determined process needs to be found to reduce the noise in resulting data. Jumps in data due to a change in sample composition should be limited where possible.

Based on this index, the annual spread volatility can then be tracked over time and can be grouped to calculate for each bucket the empirical 99.5 VaR. In a last step, the results could be compared, first within one bond category to see whether a higher volatility is associated with a longer maturity and then second across ratings within one bond category to see whether a lower rating is associated with a higher category and then last compare green bond results with other bond results.

The described analysis requires sufficient and good quality data input. Also, a known problem may arise from "green washing", which describes a potential risk of declaring bonds as green while the activity underlying the asset is not green. Such an inconsistency would weaken the validity of any conclusion drawn from the data. Since the selection of the sample is a major step of the entire exercise, it is important to stress that only results derived from a large enough sample can be considered reliable. Green bond issuance may for example only be available in greater volume after 2007 which would significantly reduce the usefulness of the exercise since the behavior of green bonds during a crisis situation would not be assessable due to the lack of information.

Solvency II however assumes within market risk a negative development and would therefore need to be based on such experience and data. Another factor that the analysis described above is not able to eliminate are potential other factors that influence spread. The analysis only focusses on the label green bond as proxy for sustainable investments without looking in more detail on potential other underlying differences of the assets included in the analysis.

e. Unrated debt

➤ Data requirement:

5.100 Solvency II assigns rated bonds in Art. 176 (3) Delegated Regulation stress factors along the two dimensions rating and duration. The duration is split in one band that covers 5 years and one band that covers everything beyond 20 years. Ratings are reflected in the credit quality steps and range from 0 to the category 5 to 6.

5.101 In order to assess the risk profile of bonds in a comparable way to what has been done in the past, information needs to be available on a similarly granular basis to differentiate between the two dimensions. Similar to equity, data needs to be available for rated bonds that are considered sustainable as well as for rated bonds that are not considered sustainable. For data requirements, reference is being made to Table 7 above.

f. Natural catastrophe risk

5.102 EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation (EIOPA-BoS-18/075)⁵⁶ covering the recalibration of the catastrophe module explained that EIOPA used the expertise of various stakeholders with professional background in Catastrophe risk modelling or management for performing the recalibration of the standard parameters of the natural catastrophe risk module of the standard formula.

5.103 For each scenario, experts discussed the proposed calibration values against the background of additional information on the models that were used to calculate the proposed parameter value, such as a country risk factor for a given scenario. At this stage, expert judgement is key to take into consideration issues such as recent changes in local policy conditions, improvement of infrastructure reducing the risk (e.g. flood defence) and comparison with internal model results were considered.

5.104 However, the current calibration of the standard parameters for the natural catastrophe risk module of the standard formula does not explicitly include climate change risks. It has not been analysed yet, whether and to what scale potentially large-scale effects on the hazard side, such as for windstorm, flood and hail scenarios, need to be covered by SCR charges in addition to the recurring recalibrations.

5.105 Most surveyed groups and undertakings consider that the calibration of the standard parameters for the natural catastrophe risk module of the standard

⁵⁶ https://eiopa.europa.eu/Publications/Consultations/EIOPA-18-075-EIOPA_Second_set_of_Advice_on_SII_DR_Review.pdf

formula sufficiently capture climate-related developments. The main rationale given is that climate trend is not relevant for a one-year time horizon. Given the gradual effects of climate change over the next years, the actual impact of climate change on the parameterization over a one-year time horizon is expected to be limited.

- 5.106 On the other hand, some undertakings consider that the calibration of the standard parameters for the natural catastrophe risk module of the standard formula does not sufficiently capture climate-related developments.
- 5.107 SCR calibration is based on cat models which are designed to support risk assessment for the next 12 months contracts (typically calibrated using historical data). The impact of climate change is mostly not explicitly reflected in the cat models, but any climate change to date will be implicitly included in the recent data they use to create their models.
- 5.108 There is a general view from surveyed undertakings suggesting that regular updates on natural catastrophe parameters would allow to capture climate-related developments for the next 12 months. Regular recalibration of the standard parameters for the natural catastrophe risk module of the standard formula would enable to include latest natural catastrophe events and thus capture the actual impact of climate change in frequency and intensity of those risks. Members of the catastrophe risk expert network⁵⁷ agreed with this view but also mentioned the high uncertainty around climate extreme events. Indeed establishing current impact of climate change on risk level is extremely challenging as for most of the perils, the natural variability to date is larger than the underlying climate change tendency. They also suggested to be careful with updating to frequently the parameters to avoid capturing the natural high volatility that is intrinsic to low frequency, high severity events.
- 5.109 During the consultation of this opinion stakeholders agreed with EIOPA that regular recalibration of the parameters for the natural catastrophe risk module of the standard formula will allow to capture climate-related developments, including the impact of climate change.
- 5.110 Most consulted stakeholders do not see the need for changing the design of the natural catastrophe risk module of the standard formula to capture climate-related developments, including the impact of climate change.
- 5.111 However, some stakeholder questioned whether all climate-related risks are really captured by the perils which are explicitly identified in the Solvency II framework. As an example, wildfires or droughts are not individually captured as a natural catastrophe event. These perils which are typically weather-related can generate substantial losses. For example, in 2018, the most expensive natural catastrophe was a wildfire in northern California with overall losses of

⁵⁷ For further information on this network see chapter "3.Context and objectives"

US\$ 16.5bn. In Europe, the sustained drought, which caused substantial agricultural losses and many wildfires, was Europe's costliest natural disaster of the year 2018⁵⁸. Climate change has then a strong influence on these types of perils.

- 5.112 From the consultation, there was general support that climate change needs to be captured in a forward-looking manner, with some stakeholders agreeing with EIOPA it should be in the ORSA. They were mixed view on whether it should include a quantitative or only a qualitative analysis.
- 5.113 Members of the EIOPA catastrophe risk expert network⁵⁹ underlined the usefulness and relevance of insurance stress-tests scenario focused on natural catastrophes (since 2018) as a way of raising awareness on the topic of climate change. Supporting that, the feedback received from the consultation of this advice was that conducting stress testing and scenario analysis are effective tools to capture climate change in a forward-looking manner.

Internal models

- 5.114 Internal models are designed to allow undertakings to better reflect their specific business model and risk profile in the calculation of the solvency capital requirement. This allows to incorporate risks either not taken into account in the standard formula or taken into account in the standard formula but in a more realistic way. Internal models evolve through time and can be adapted more quickly than the standard formula, to take account of new identified risks such as sustainability factors, and in particular climate change-related risks. In addition, according to Article 122 of the Directive, undertakings may use for internal modelling purposes a different time period or risk measure than the 99,5 % Value-at-Risk over a one-year period as long as the outputs of the internal model can provide policyholders and beneficiaries with an equivalent level of protection. This might permit measurement over the longer time frames over which sustainability considerations are likely to apply and thereby better incorporate sustainability risks in their models. However, a key difficulty would be obtaining suitable data for calibration, and expert judgement would need to be applied.
- 5.115 During the consultation of this opinion, stakeholders agreed with EIOPA that the rules relating to internal model design and calibrations do not prevent internal model undertakings from accounting for sustainability factors, with particular regard to the climate change-related risks that existing insurance and reinsurance obligations are exposed to.

⁵⁸ <https://www.munichre.com/en/media-relations/publications/press-releases/2019/2019-01-08-press-release/index.html>

⁵⁹ For further information on this network see chapter "3.Context and objectives"

- 5.116 Most surveyed undertakings do not plan to integrate sustainability factors in the market risk module of their internal model as they are not regarded as material over a one-year time-frame and they assume climate change-related risks will be reflected in the model through increase in volatility of existing risk factors. At the same time, some undertakings modelled sustainability factors in their credit risk module through internal ratings taking into account sustainability risks or used ESG-ratings in their investment decisions.
- 5.117 For the underwriting risk modules, almost all undertakings with an internal model stated that climate change-related risks were reflected. Although climate change is not explicitly covered in their internal model, the risks that are impacted by climate change, and therefore also the associated climate change-related risks would therefore be covered. In addition, many internal model undertakings rely on external providers for their catastrophe model and assume climate change-related risks are taken into account because those models are parameterized from the latest data available and use the most recent available climate models.
- 5.118 Solvency II provides dedicated rules regarding the reliance on external models and external data. Article 126 of the Solvency II Directive specifies that the use of a model or data obtained from a third party shall not be considered to be a justification for exemption from the rules relating to internal model design and calibrations. Article 237 of the Delegated Regulation mentions that the undertaking should be able to demonstrate a detailed understanding of the parts and data of the internal model obtained from a third party, including their limitations.
- 5.119 During the consultation of this opinion, EIOPA received an example of an undertaking accounting for pandemics evolution considering climate change in its internal model. This example suggests that the application in practice of the rules relating to internal model design and calibrations do not prevent internal model undertakings from accounting for the climate risk that they are exposed to. But this single example is regarded as not sufficient to elaborate further on the application in practice of the rules relating to internal model design and calibrations.
- 5.120 A good practice was identified from an undertaking stating that climate change-related risks were not explicitly reflected in its model and mentioned it was developing a Climate VaR measure, which enables the potential business impacts of future climate change-related risks and opportunities to be assessed in each of the IPCC scenarios and in aggregate. Over time they will consider how the output of this analysis could be taken into account in their ORSA and economic capital model.

Challenges in integrating sustainability in Pillar I and suggested way forward

- 5.121 While acknowledging the challenges related to incorporating sustainability risks within Pillar 1, respondents to the Consultation Paper were generally supportive of the inclusion of sustainability risks in a forward-looking manner, including in the ORSA.
- 5.122 There seems to be a limited number of approaches today that allow insurers to analyse their climate change-related risks through climate change scenarios, and (re)insurance undertakings may currently be underestimating their exposure to climate change risk. Several obstacles exist in this respect among those (i) the access and availability to data, (ii) the need to adapt existing models in the absence of known market prices and historical data taking into account trends implied by climate change.
- 5.123 Stakeholders acknowledged the lack of a consistent approach across the industry in considering sustainability risks within the ORSA at present. Most stakeholders stated however the need for the ORSA to remain a bespoke, undertaking-specific assessment. Some stakeholders supported the provision of a standardised set of quantitative climate change scenarios by EIOPA which would only serve as guidance and not be mandatory.
- 5.124 Stakeholders commented that the ORSA time horizons, usually defined for business strategy purposes (typically 3 to 5 years), are still not long enough to accurately reflect risks which will emerge over longer time periods.
- 5.125 Moreover, as historic data may need to be adjusted to reflect expected future changes which are not adequately reflected in the data, subjectivity and expert judgement will be needed.
- 5.126 In order to address the challenges mentioned above, almost all stakeholders supported EIOPA's suggestion to use long-term scenario analysis in their risk management, governance and ORSA to develop a forward-looking approach with regard to sustainability risks, in particular climate change-related risks.
- 5.127 The purpose of scenario analysis is to consider and better understand how an undertaking might perform under different future states. Climate change-related scenarios⁶⁰ allow an undertaking to explore and develop an understanding of how the climate change-related risks might affect their business over time.

Table 8 – Relevant topics for climate change scenarios:

- **Time horizon:** The time horizon to consider for the climate change scenario will depend on the nature of the activities which could be impacted by climate change-related risks. For example, considering the impact of climate change to underwriting and pricing would correspond to a short term time horizon and

⁶⁰ <https://www.fsb-tcfd.org/publications/final-technical-supplement/>

considering the impact of climate change for strategy planning might correspond to a medium to long term time horizons⁶¹.

- **Scenarios:** The choice of the scenario will vary depending on the type of risks considered. An undertaking may want to familiarize itself with relevant scenarios developed by the IEA⁶² and the IPCC⁶³. These scenarios can be broadly assigned into two categories: (1) scenarios that articulate different pathways in the energy and economic system that would result in a certain level or trajectory of GHG emissions and resulting GHG concentrations in the atmosphere (transition scenarios) and (2) scenarios that articulate different pathways that account for physical changes arising from different levels of GHG concentrations (physical risk scenarios)⁶⁴. EIOPA, in line with the TCFD, is recommending that undertakings use, at a minimum, a 2°Celsius (2°C) scenario and consider using other scenarios most relevant to the undertaking's circumstances.
- **Tools:** A number of tools and reports are available to translate the selected scenarios into transition or physical impacts. For example, the 2°Investing Initiative PACTA tool⁶⁵ looks at transition risks on the asset side, Carbon Delta⁶⁶ looks at physical and transition risks on the asset sides or CAT models look at physical risks on the liability side. CAT models could also be applied to asset side risks (e.g. real estate portfolios). In some countries, such as the Netherlands, Switzerland and the United Kingdom, reports on climate change scenarios (KNMI'14⁶⁷, CH2018⁶⁸, UKCP18⁶⁹, respectively) have been published. These could be used to assess the physical impact of climate change under different emission scenarios. The undertakings will have to evaluate which available tools and reports might be best suited for them depending on the type of analysis they want to perform.
- **Data:** Historical data on its own is unlikely to be a good predictor of future risk. Undertakings should follow a forward-looking approach by combining their most up-to-date data with expert judgement or the most recent scientific developments.

5.128 In order to provide further guidance on climate scenarios, NGFS is currently working on a *Handbook for Supervisors on Climate and Environmental Risk Assessment*. The content of this Handbook will be based on the experiences and information of the NGFS members. EIOPA will cooperate in these types of initiative.

⁶¹ <https://www.bankofengland.co.uk/prudential-regulation/publication/2019/a-framework-for-assessing-financial-impacts-of-physical-climate-change>

⁶² <https://www.iea.org/topics/climatechange/scenarios/>

⁶³ Intergovernmental Panel on Climate Change (IPCC). "Annex II: Glossary." *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. IPCC, Geneva, Switzerland, pp. 117-130. 2014.

⁶⁴ <https://www.fsb-tcfd.org/publications/final-technical-supplement/>

⁶⁵ <https://www.transitionmonitor.com/>

⁶⁶ <https://www.carbon-delta.com/>

⁶⁷ <http://www.climatescenarios.nl/>

⁶⁸ <https://www.nccs.admin.ch/nccs/de/home/klimawandel-und-auswirkungen/schweizer-klimaszenarien.html>

⁶⁹ <https://www.metoffice.gov.uk/research/collaboration/ukcp>

- 5.129 As to the public disclosure of sustainability risks, stakeholders generally acknowledged that disclosure by investees is a good tool for informing market prices.
- 5.130 As regards public disclosure on sustainability (environmental) risks by (re)insurance undertakings, stakeholders objected or cautioned however against additional prudential requirements, based on the following:
- The potential overlap with other (regulatory) initiatives aimed at promoting public disclosure;
 - The limited usefulness of Solvency II's Solvency and Financial Condition Report (SFCR) in general;
 - If any disclosure were to be required, this should be qualitative in a first instance, and only for material risks;
 - Articles 263 and 269 of the Delegated Regulation already implicitly require the disclosure of sustainability risks with regard to the valuation assumptions.
- 5.131 The most relevant European regulatory initiatives on the disclosure of sustainability risks are:
- The Guidelines on reporting climate-related information, issued under the Directive on disclosure of Non-Financial Information (NFI Directive)⁷⁰
 - The Proposal for Regulation on sustainability-related disclosures in the financial services sector⁷¹
- 5.132 Furthermore, EIOPA is currently in public consultation on the Solvency II reporting and public disclosure requirements, as part of the Solvency II 2020 review.
- 5.133 The aforementioned Guidelines apply to the (re)insurance industry, and provide useful guidance on the disclosure of relevant sustainability related elements on the assets and liabilities of (re)insurers.⁷² It has to be noted that the guidelines are of a non-binding nature and cover undertakings of a certain size (large companies with more than 500 employees).
- 5.134 The Proposal for Regulation on sustainability-related disclosures in the financial services sector, once adopted, will require the disclosure of sustainability risks at entity and product level from life insurance companies (irrespective of size), which offer insurance-based investment products.
- 5.135 Based on this, EIOPA notes that there is gap in the European regulatory framework for the mandatory disclosure of sustainability risks related to liabilities of life and non-life insurance companies.

⁷⁰ https://ec.europa.eu/finance/docs/policy/190618-climate-related-information-reporting-guidelines_en.pdf

⁷¹ <https://data.consilium.europa.eu/doc/document/ST-7571-2019-ADD-1/en/pdf>

⁷² See Annex I of the Guidelines.

5.136 Furthermore, consideration should be given to cross-sectoral consistency, in particular where it is expected that the Capital Requirements Regulation will be amended to require large institutions that have issued securities that are admitted to trading on a regulated market, to disclose information on ESG risks, including physical and transition risks.⁷³

⁷³ See proposal for a regulation of the European Parliament and of the Council amending Regulation (EU) No 575/2013 as regards [...] reporting and disclosure requirements and amending Regulation (EU) No 648/2012 (OJ publication pending).

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Annex 2 - List of abbreviations

CEIOPS – Committee of European Insurance and Occupational Pensions Supervisors

EIOPA – European Insurance and Occupational Pensions Authority

EBA – European Banking Authority

ENID – event not in data

ESG – Environmental, Social and Governance

ESMA – European Securities and Markets Authority

GHG – greenhouse gas

IDD – Insurance Distribution Directive

IORP – Institution for Occupational Retirement Provision

IPCC - Intergovernmental Panel on Climate Change

MiFID – Markets in Financial Instruments Directive

NAT CAT – natural catastrophe

NCA – National Competent Authority

NGFS – Network for Greening the Financial System

ORSA – Own Risk and Solvency Assessment

SME – small and medium sized enterprise

TCFD - Task Force on Climate-related Financial Disclosures

TEG – (European Commission's) Technical Expert Group

UNPRI – United Nations Principles for Responsible Investment

Annex 3 - Main relevant provisions from the Solvency II Directive and Delegated Regulation

	Solvency II Directive	Delegated Regulation	EIOPA Guidelines
Valuation of assets and liabilities	<p>Article 44 - Risk management</p> <p>Article 75 - Valuation of assets and liabilities</p> <p>Article 132 - Prudent Person Principle</p>	<p>Article 2 - Expert judgment</p> <p>Article 7 - Valuation assumptions</p> <p>Article 9 - Valuation methodology - general principles</p> <p>Article 10 - Valuation methodology - Valuation hierarchy</p> <p>Article 259 - Risk management system</p> <p>Article 260 - Risk management areas</p> <p>Article 262 - Overall solvency needs</p> <p>Article 263 - Alternative methods for valuation</p>	
Valuation of liabilities	<p>Article 77(2): Calculation of the Technical Provisions</p>	<p>Article 29: Expected future developments in the external environment</p>	<p>Guidelines on Valuation of Technical Provisions: Guideline 1: Completeness of data</p>

	Solvency II Directive	Delegated Regulation	EIOPA Guidelines
Market risk	Article 101(3) and (4) – calculation of the Solvency Capital Requirement	Article 164 – (Market Risk) Correlation coefficients Articles 168 – 173 – Equity risk sub-module Article 174 – Property risk sub-module Articles 175 – 181 – Spread risk sub-module	
Natural catastrophe underwriting risk	Articles 101, 104§6, 105		Articles 120 to 126

	Solvency II Directive	Delegated Regulation	EIOPA Guidelines
	<p>Article 112 - General provisions for the approval of full and partial internal models</p> <p>Article 120-125 - Use test and standards (statistical quality, calibration, validation, documentation)</p> <p>Article 126 - External models and data</p>	<p>Articles 222 to 247 - Full and Partial Internal Models</p> <p>Including:</p> <p>Article 233 - Coverage of all material risks</p> <p>Article 237 - Understanding of external models and data</p>	<p>Guidelines on the use of internal models: Chapter 11: External models and data</p> <p>(Guidelines 50 to 57)</p>