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EIOPA-BoS-19/241
3 June 2019

Consultation Paper on an opinion on sustainability within Solvency II

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1. Responding to this paper

EIOPA welcomes comments on its draft opinion on integrating sustainability in Solvency II.

Comments are most helpful if they:

- respond to the question stated, where applicable;
- contain a clear rationale; and
- describe any alternatives EIOPA should consider.

Please send your comments to EIOPA using the EU Survey tool, by 26 July 2019 23:59 hrs CET.

Contributions not provided via the tool, sent to a different email address or submitted after the deadline, will not be processed.

Publication of responses

Contributions received will be published on EIOPA's public website unless you request otherwise in the respective field in the template for comments. A standard confidentiality statement in an email message will not be treated as a request for non-disclosure.

Please note that EIOPA is subject to Regulation (EC) No 1049/2001 regarding public access to documents and EIOPA's rules on public access to documents[1].

Contributions will be made available at the end of the public consultation period.

Data protection

Please note that personal contact details (such as name of individuals, email addresses and phone numbers) will not be published. They will only be used to request clarifications if necessary on the information supplied.

EIOPA, as a European Authority, will process any personal data in line with Regulation 2018/1725. More information on data protection can be found at https://eiopa.europa.eu/ under the heading 'Legal notice'.

2. Legal basis

2.1 The European Insurance and Occupational Pensions Authority (EIOPA) provides this Opinion on the basis of Article 34(1) of Regulation (EU) No 1094/2010.

[1] Public Access to Documents

2.2 EIOPA delivers this Opinion on the basis of Directive 2009/138/EC (Solvency II Directive)[2] and Commission Delegated Regulation (EU) 2015/35 (Delegated Regulation).[3]

2.3 This Opinion is addressed to the European 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[5].

3. Next steps

3.1 EIOPA will consider the responses it receives to this Consultation Paper, and will finalise the draft opinion for submission to the European Union institutions, by 30 September 2019.

3.2 EIOPA stands ready for further work and follow-up action.

4. Context and objective

4.1 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)insurers and IORPs. This includes EIOPA's recent 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.[2] EIOPA will also issue 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.[2]

4.2 In the area of financial stability, EIOPA is engaging with the 2 Degree Investing Initiative on a scenario analysis for climate-related risks on

[2] EIOPA's Technical Advice on the integration of sustainability risks and factors in the delegated acts under Solvency II and IDD, https://eiopa.europa.eu/publications/submissions-to-the-ec.

investments, and EIOPA is dedicating analysis on climate-related risks in its financial stability reports. Following a call for Advice from the European Commission (the Commission), EIOPA is analysing evidence on short term pressure of financial markets on (re)insurers and IORPs.[3]

4.3 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).[4]

4.4 EIOPA is a member of the work 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".[5]

4.5 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".

4.6 In August 2018, EIOPA received a request from the Commission for an opinion on sustainability within Solvency II, in particular relating to aspects that relate to climate change mitigation.[6] The opinion will be taken into account by the Commission in the preparation of the Commission's report on the Solvency II Directive, due by 1 January 2021. The Commission invites EIOPA to provide the opinion by 30 September 2019. The present consultation paper contains EIOPA's analysis to prepare the opinion.

4.7 When drafting this opinion, EIOPA considered past and on-going policy and regulatory developments at European level. This includes:

[3] 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.

[4] See https://ec.europa.eu/info/publications/sustainable-finance-technical-expert-group_en. The TEG recently has consulted on selected economic activities and proposed criteria for the first sub-set of economic activities expected to make a substantial contribution to climate mitigation (1st round climate mitigation activities).

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

[6] Letter from DG FISMA on sustainability within Solvency II: https://ec.europa.eu/info/files/180828-letter-eiopa-solvency-2_en.

- The Commission's Action Plan: Financing Sustainable Growth[7], which aims 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.
- The Commission's ongoing legislative process for regulation on sustainable finance.[8] This includes regulation on taxonomy, disclosure requirements[9] and benchmarks[10], as well as draft Delegated Acts amending provisions on suitability assessments under IDD and MIFID II[11]. Reference is also made to the development of non-binding guidance on non-financial reporting.[12]
- The Commission's work on better integrating sustainability in ratings and market research (Action 6 of the Commission's Action Plan), as well as ESMA's consultation paper on guidelines on disclosure requirements applicable to credit ratings, in particular where the guidelines aim at improving the transparency of credit rating press releases concerning the extent to which sustainability factors have been considered as part of a credit rating.[13]

4.8 Where possible, the integration of sustainability should follow a consistent approach across sectors. Insurers, 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. As regards the banking sector, to date no European-wide prudential treatment for green bonds exists. EBA will investigate on a dedicated prudential treatment of sustainable assets in the near future under Article 501(c) of the Capital Requirements Regulation 575/2013.

[7] See https://ec.europa.eu/info/business-economy-euro/banking-and-finance/sustainable-finance_en#commission-action-plan-on-sustainable-finance, COM(2018)97 final.

[8] Proposal for a Regulation on the establishment of a framework to facilitate sustainable investment, 24.5.2018 COM (2018) 353 final.

[9] Proposal for a Regulation on disclosures relating to sustainable investments and sustainability risks and amending Directive (EU) 2016/2341.

[10] Proposal for a Regulation amending Regulation (EU) 2016/1011 on low carbon benchmarks and positive carbon impact benchmarks.

[11] See https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5524115#isc-2018-03038

[12] https://ec.europa.eu/info/business-economy-euro/company-reporting-and-auditing/company-reporting/non-financial-reporting_en

[13] ESMA, Consultation Paper, Guidelines on Disclosure Requirements Applicable to Credit ratings, 19 December 2018, ESMA 33-9-290.

Reference is also being made to the TEG interim report on an EU Green Bond Standard[14].

5. Evidence collected

5.1 Between January and March 2019, EIOPA has conducted a public call for evidence[15] and a confidential request for information. National competent authorities 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 module 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 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.

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 is given by the call for opinion by the Commission. The deliberate selection for non-life business was made partly on the available evidence that non-life lines of business may currently be mostly affected by climate change effects and, partly, considering the use of resources from industry. However, while 41% of the undertakings considered in the sample are non-life insurers, in terms of assets under management, non-life undertakings represent only 8% of the sample (Figure 1 and 2 below). 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.

[14] https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/190306-sustainable-finance-teg-interim-report-green-bond-standard_en_0.pdf

[15] See: https://eiopa.europa.eu/Pages/About-EIOPA/Organisation/Sustainable-Finance-.aspx

Figure 1 Total sample in number of undertakings (only solo)

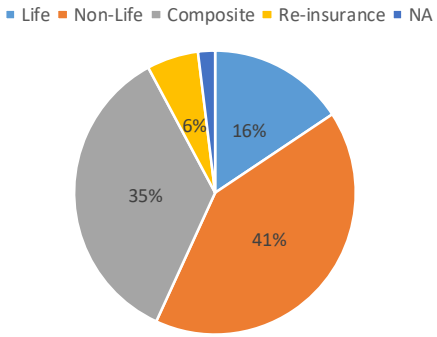
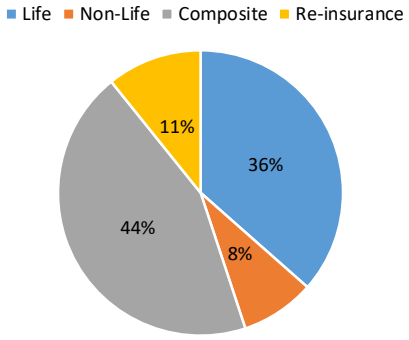


Figure 2 Total sample in assets of undertakings (only solo)



5.4 The responses show that on many occasions, respondents interpret climate risk narrowly as natural catastrophe risk. EIOPA took this bias into account in assessing the responses, 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 general rise in temperature, sea level rise or climate-related forced migration that could affect (re)insurance activity.

5.5 Evidence provided by life insurers confirms that health/life insurers are not considering climate change in their valuation of liabilities and underwriting practices. EIOPA would welcome further insights, during the consultation, from the life and health (re)insurance industry on how sustainability could be considered in their business models, valuation and solvency assessments.

5.6 The public call for evidence was answered by 33 stakeholders. The questions of the call for evidence can be found in Annex 3. The answers to the public call for evidence are available on EIOPA's website.[16]

5.7 EIOPA's analysis of the evidence is contained in the following opinion. Main policy conclusions are contained in blue shaded text.

[16] https://eiopa.europa.eu/Pages/About-EIOPA/Organisation/Sustainable-Finance-.aspx

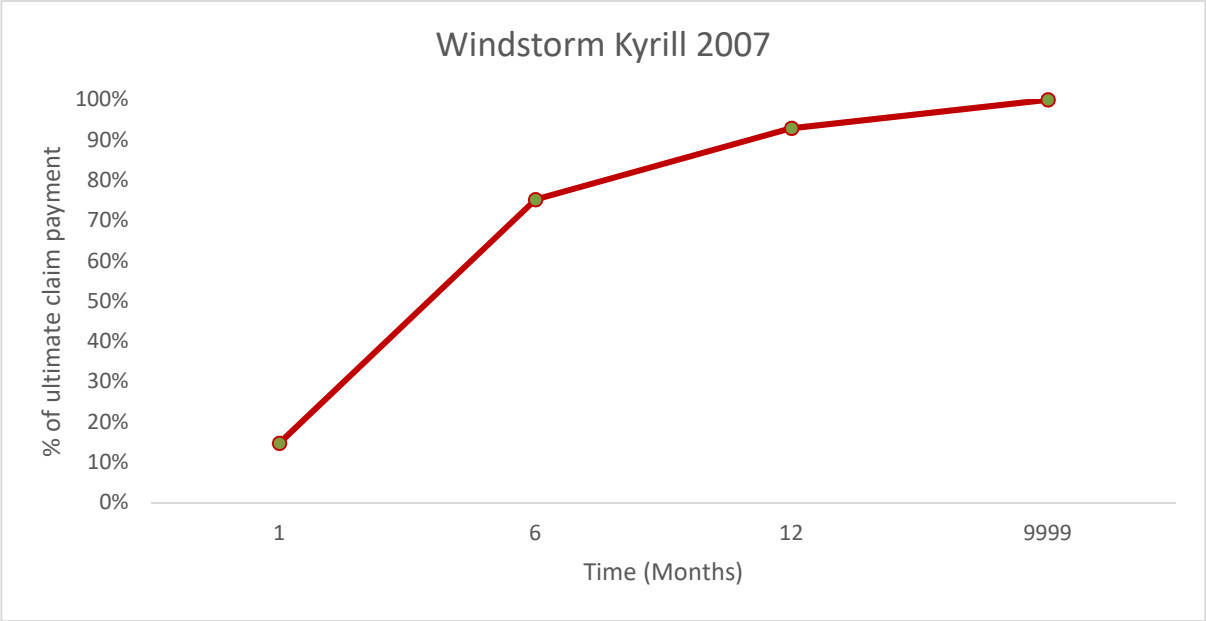
6. Challenges on integrating sustainability risks in prudential Pillar 1 requirements ("time horizon")

6.1 The tragedy of the horizon of climate change has been coined in the speech of the Governor of the Bank of England, Breaking the tragedy of the horizon – climate change and financial stability: "*We don't need an army of actuaries to tell us that the catastrophic impacts of climate change will be felt beyond the traditional horizons of most actors – imposing a cost on future generations that the current generation has no direct incentive to fix*."[17]

6.2 This challenge has been repeatedly illustrated in the evidence collected for this opinion. Generally, stakeholders argue that sustainability considerations, in particular climate change, could not usefully be reflected in Pillar 1 requirements. First, a prudential framework for capital requirements, based on a one-year time horizon would be too short for solvency capital requirements to reflect climate change risks. Secondly, specifically for traditional non-life business, the insurance cover period (during which claims can occur) only spans the next 12 months at the end of which insurers can theoretically adjust the pricing for the future, based on claims experience. This repricing is enabled by the fact that the uncertainty on the final amount of NAT CAT claims is limited as they are usually settled within 1 year after their occurrence (see Figure 3). Therefore undertakings argue that the integration of sustainability risks does not require further regulatory intervention. Thirdly, some insurers seem to expect that they would have time to adapt their investment strategy within the next 10 to 20 years, reflecting a limited consideration to transitions risks in their asset portfolio today.

[17] https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability

Figure 3: 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 months.



6.3 At this point, EIOPA reiterates the function of Pillar 1 prudential capital requirements within the overall Solvency II framework, which is based on three pillars. The Pillar 1 capital requirements aim to ensure that undertakings can survive severe unexpected shocks (losses) and still meet their obligations to policyholders over a 1-year period (Article 101 (3) of the Solvency II Directive). The Solvency II Directive expresses this as the ability to withstand shocks to happen with a 1 in 200 probability, within this 1-year time horizon.

6.4 As climate change is expected to manifest over the coming years and decades, this significantly longer time horizon presents practical challenges in the context of Pillar 1 capital requirements. While climate change may be expected to have significant long-term impacts on the insurance sector, this consultation paper focuses on those impacts which are relevant in the context of Solvency II Pillar 1 capital requirements and valuation of assets and liabilities. While sustainability risks are long term risks, and data may not yet be widely available to assess these risk, this should not lead to complacency in assessing the impact of these risks. In this Opinion, EIOPA builds upon elements included in EIOPA's advice on sustainability in Solvency II in the areas of risk management, investment and underwriting strategy and investment stewardship.[18]

[18] See https://eiopa.europa.eu/Publications/EIOPA-BoS-19-172_Final_Report_Technical_advice_for_the_integration_of_sustainability_risks_and_factors.pdf

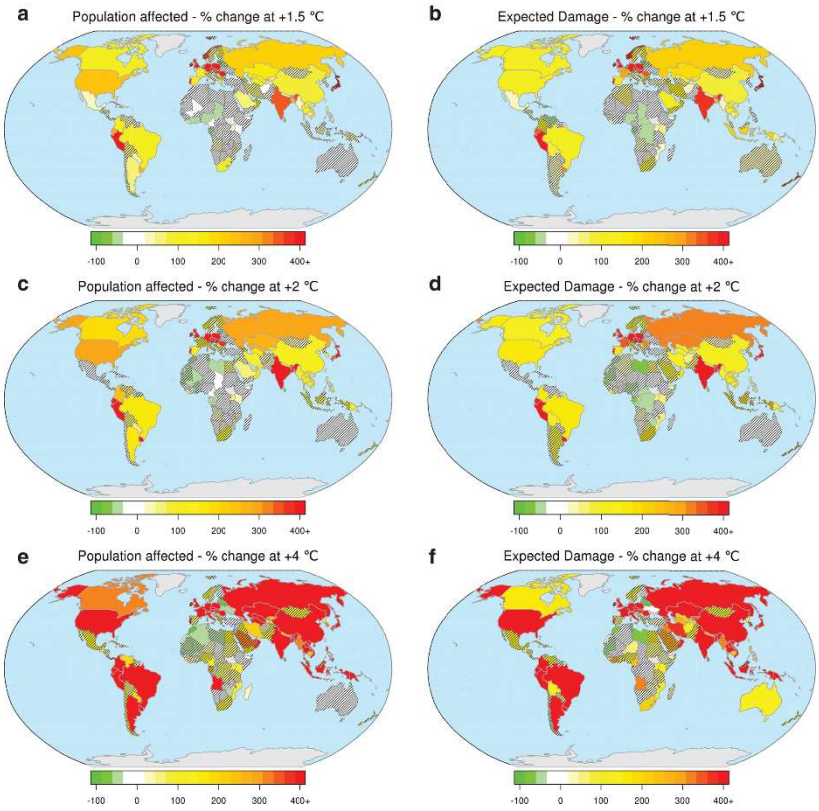
6.5 EIOPA is of the opinion that the most pressing need is for insurers to develop and embed long term scenario analysis in their risk management, governance and ORSA. This should enable undertakings to identify and assess the climate-change related risks they would be exposed to, in a forward-looking manner and inform business planning and strategy. EIOPA is of the opinion that it is important to apply consistent scenarios for the identification and measurement of sustainability risks, including climate-change related risks. Specific economic and physical scenarios consistent with latest research could be used. For example, based on the IPCC representative concentration pathways (RCP) of future global greenhouse gas emissions, which can be related to changes in global warming, scenarios for physical risks could be derived.

6.6 Example of possible scenarios to be investigated in the ORSA include the impact of sea level rise (see Figure 4) or how flood risk damages might change under different global warming scenarios (see Figure 5).

Figure 4: Physical impact for different global warming scenarios by 2100. Source: CRO Forum (2019) 'The heat is on – Insurability and resilience in a Changing Climate'

Warming by 2100		<2 °C		3 °C	5 °C
Physical impacts		1.5 °C	2 °C		
Sea-Level Rise (cm)		0.3-0.6 m	0.4-0.8 m	0.4-0.9 m	0.5-1.7 m
Coastal assets to defend ($tn)		$10.2tn	$11.7tn	$14.6tn	$27.5tn
Chance of ice-free Arctic summer		1 in 30	1 in 6	4 in 6 (63%)	6 in 6 (100%)
Tropical cyclones:	Fewer (#cat 1-5)	-1%	-6%	-16%	Unknown
	Stronger (# cat 4-5)	+24%*	+16%	+28%	+55%
	Wetter (total rain)	+6%	+12%	+18%	+35%
Frequency of extreme rainfall		+17%	+36%	+70%	+150%
Increase in wildfire extent		x1.4	x1.6	x2.0	x2.6
People facing extreme heatwaves		x22	x27	x80	x300
Land area hospitable to malaria		+12%	+18%	+29%	+46%

Figure 5: Average change in population affected (a, c, e) and expected damage (b, d, f) per country at specific warming level. Source: Alfieri et al. 2016 Global projections of river flood risk in a warmer world, Earth's Future, Volume 5, Issue 2



6.7 EIOPA acknowledges that the long-term impacts of climate change cannot fully be captured in the current Solvency II prudential 1-year time horizon. However, EIOPA does not consider that the 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. Similarly, no changes are proposed to the valuation principles of the Solvency II Directive which are based on market consistency or modelling approaches.

6.8 EIOPA notes however 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 risk management strategies in a forward-looking manner. Past data on its own is unlikely to be a good predictor of future risks.

6.9 EIOPA is of the opinion that the most pressing need is for insurers to develop and embed long term scenario analysis in their 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.

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

6.11 EIOPA is of the opinion that transparency, through public disclosure, should contribute to the identification of the appropriate scenarios to use in a forward-looking approach.

6.12 EIOPA is of the opinion that it is important to apply consistent scenarios for the identification and measurement of sustainability risks, including climate-change related risks. Specific economic and physical scenarios consistent with latest research such as the IPCC greenhouse gas emission forecasts, could be used.

6.13 EIOPA also acknowledges that the duration of contracts does have an impact on how sustainability can be reflected in the valuation of the liabilities and pricing of the insurance contracts. Sustainability may also be impacted by the duration of the settlement period, although probably to a lesser extent. These two different aspects would be relevant to develop further. More specifically where the claims' occurrence period (which climate change is expected to mostly impact) and claims' settlement period of certain lines of business span a longer-term horizon (beyond 2 years) the valuation of liabilities would benefit from a forward-looking approach.

Questions to stakeholders

Q1: Do you agree that no change in the time horizon for capital requirements would be required to integrate climate change considerations? Please elaborate.

Q2: Do you agree that insurers should consider sustainability risks, and in particular climate change risks, in a forward-looking manner? If yes, how should this be incorporated into current or new requirements? If not, please elaborate.

Q3: Do you agree that long-term scenario analysis in risk management, governance and ORSA should enable insurers to develop a forward-looking approach with regard to sustainability risks, and in particular climate change risks? Please elaborate.

Q4: What are your views on incorporating a standardised set of quantitative scenarios in the ORSA, e.g. derived from the IPCC representative concentration pathways (RCP) - which are likely to evolve over time? Can you please elaborate on which scenarios you would use and which time span should be covered by such scenario analysis, specifying your approach for the valuation of assets, liabilities and your own solvency assessment (for standard formula and internal model users)?

7. Valuation of assets and liabilities

Extract from the European Commission's request for 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."

7.1 General principles

7.1 The main relevant provisions in the Solvency II Directive and Delegated Regulation are:

Solvency II Directive	**Delegated Regulation**
Article 44 - Risk management Article 75 – Valuation of assets and liabilities Article 132 – Prudent Person Principle	Article 2 – Expert judgment Article 7 - Valuation assumptions Article 9 – Valuation methodology – general principles Article 10 – Valuation methodology - Valuation hierarchy Article 259 – Risk management system Article 260 - Risk management areas Article 262 – Overall solvency needs Article 263 – Alternative methods for valuation

7.2 A fundamental principle underpinning Solvency II is that the solvency position of an undertaking should be based on an economic 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.

7.3 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.

7.4 Financial risks from climate change arise through two primary channels: physical and transition risks. These manifest, for example, as increasing underwriting, reserving, counterparty default or market risk for (re)insurers, affecting the value of the assets and liabilities. The risk of climate-related liabilities can be of particular importance to insurance undertakings providing liability protection (e.g. directors' and officers' and professional indemnity insurance). The physical risk related to the severity and frequency of natural catastrophes is of particular relevance for natural catastrophe underwriting risk.[19]

7.5 In its Financial Stability Report of December 2018[20], EIOPA undertook a first analysis of the investment exposure of European insurers to climate-related sectors (fossil fuel, utilities, energy-intensive sector, transport and housing). Overall between 10 and 13% of the assets held by insurers are climate-related, of which:

- Most are in housing (7%), followed by energy intensive sectors (1.5%), fossil fuels (0.8%), utilities (0.8%) and transport (0.4%).
- The highest share of climate-related exposures is in the form of property and mortgages, followed by corporate bonds and equity.

[19] See Prudential Regulatory Authority, Supervisory Statement SS3/19, Enhancing banks' and insurers' approaches to managing the financial risks from climate change, April 2019

[20] See https://eiopa.europa.eu/Pages/EIOPA--Financial-Stability-Report---December-2018.aspx.

7.6 Analysis conducted by EIOPA confirms the weight of housing in climate-related exposure of European (re)insurers.[21] It should be noted that the definition of "climate-related exposures" does not allow for differentiating whether these exposures amount to risks or opportunities. First, the introduction of stricter energy efficiency standards could significantly affect the value of real estate portfolios, in particular for 'brown' commercial and residential real estate. Second, housing accounts for a significant portion of energy consumption and carbon emissions. The introduction of a carbon price (or other climate policy intervention) could therefore significantly affect the energy costs of housing and, hence, affect the credit standing of users in the built environment. Finally, physical risks in high-risk areas could also affect the value of real estate portfolios. Further analysis may contribute to differentiate, within these sectors, between assets related to a "clean" or "green" energy production and those, more exposed to transition risks, related to "brown" energy production.

Physical risk

7.7 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).

7.8 Some examples of physical risks crystallising include: increasing frequency, severity or volatility of extreme weather events impacting property and casualty insurance; and increasing 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.

7.9 Groups and undertakings responding to EIOPA's call for evidence and request for information 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 on 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

[21] Source: EIOPA QRT data (S.06.02). Note: Sample consists of solo undertakings reporting for 2018Q1. Assets held for unit-linked business are included.

participants noted their exposures are currently mostly located in the Eurozone/Europe.

7.10 There seems to be a limited number of approaches today to allow for insurers to analyse their physical risks under climate change scenarios, and financial institutions currently may underestimate their exposure to climate change risk[22]. The access and availability to data, and the lack of a comprehensive approach integrating all necessary developments are among the obstacles cited in this respect.

Transition risk

7.11 Transition risk can arise from the process of adjustment towards a low carbon economy. A range of factors influence this adjustment, including: climate-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.[23]

7.12 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.

7.13 This may be due to the less "tangible" nature of transition risk, as most participants consider the drivers to be related to political developments (establishment of sectoral climate-related policies), development of customer behaviour and technology. Where analysis on the exposure to transition risks is being undertaken by groups and undertakings, 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 exposure. The assets that are most significantly affected by transition risks, would 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 (risk of stranded assets).

7.14 EIOPA is currently cooperating with the 2 Degree Investing Initiative to identify and quantify potential climate transition vulnerabilities in the asset portfolios of European insurers. The analysis will be designed to

[22] For example, according to a survey by the Institute for Climate Economics of December 2018 only 41% of 17 surveyed French insurers analyse their exposure to physical risks

[23] See Prudential Regulatory Authority, Supervisory Statement SS3/19, Enhancing banks' and insurers' approaches to managing the financial risks from climate change, April 2019

track the extent to which their portfolios are accumulating or reducing transition risk, and should provide a quantitative analysis of the total exposure to transition risks and potential losses in case of abrupt fall in prices in assets that are climate-relevant.

7.2 Valuation of assets

7.15 The evidence received shows that undertakings do not value sustainable investments differently than other investments. This means that market consistent valuation techniques are applied, and where applicable, informed by undertaking-specific, and mostly historical data.

7.16 Undertakings also mention using external ESG ratings to inform their investment strategy. EIOPA refers at this point to the work that is being undertaken by the Commission on the methodologies for sustainability ratings and ESMA on the transparency of credit ratings in their consideration of ESG factors (see reference in section 4 of the Opinion).

7.17 In a deep, liquid and transparent market, prices should reflect all known (and quantifiable) factors, including sustainability considerations. However, the availability and quality of information on sustainability risks and sustainable investments, may not be at a level of granularity and consistency today that allows for full reliance on the market valuation. For example, anticipations on financial markets could reverse very quickly following catastrophic losses in some sectors or geographical areas. Also, liability risks can be a cause of sudden decrease of asset prices in one sector or specific company following a court decision for damages resulting from environmental risks.

7.18 EIOPA is of the opinion that continued improvement in the quality and scope of public disclosure on sustainability risks and factors affecting assets and liabilities is of crucial importance to ensure that market prices can factor in sustainability risks.

7.19 The amount and quality of information on sustainability risks and sustainable investments, on which market participants' expectations are formed, should increase in a near future and thus to 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.

7.20 Furthermore, where alternative methods/modelling are used, the assumptions used may or may not include sustainability considerations, or may do so inadequately. It is not straightforward to single out sustainability considerations in asset valuation.

7.21 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 individual properties, normally consist of investments in unlisted assets that are at best periodically 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 are usually not available. For the purpose of Solvency II valuation of such assets, insurers cannot solely rely on quoted market prices. Climate change, and policy responses to it, are likely to introduce new factors 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.

7.22 Solvency II rules are silent regarding the inclusion of assumptions taking into account sustainability issues, but require undertakings to disclose assumptions underlying alternative valuation methods[24].

7.23 As to valuation uncertainty, the Delegated Regulation states that 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).

7.24 Considering the important exposure of (re)insurers, and the fact that the real estate sector is one of the largest CO2 emitters in the EU, EIOPA considers that, among other steps, (re)insurers should assess how their real estate portfolio reflect sustainability considerations.

[24] Paragraph 4 of article 296 of the Solvency II Delegated Regulation.

7.25 EIOPA considers that while the general valuation principles of Solvency II are neutral to different types of risks, including sustainability risks which materialise through existing risk categories, they do not hinder their integration.

7.26 EIOPA is of the opinion that continued improvement in the quality and scope of public disclosure on sustainability risks and factors affecting assets is of crucial importance to ensure that market prices can factor in sustainability.

7.27 Where undertakings rely on external ESG ratings, they should ensure that the rating is sufficiently transparent to allow them to understand and validate the ratings provided for their investments.

7.28 EIOPA is of the opinion that 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.

7.29 EIOPA is of the opinion that scenario analysis should be applied to assess the uncertainties around climate change impact on the valuation of assets over time and that mitigation strategies should be in place for the risks posed by these uncertainties. This in turn will help ensure that their valuations continue to be appropriate.

Questions to stakeholders

Q5: Do you agree that the principles of valuation of assets of Solvency II allow for the consideration of sustainability factors? Please elaborate.

Q6: How in practice could the valuation of assets adequately (better) reflect sustainability risks?

Q7: Should prudential disclosure requirements (e.g. Articles 263 and 296 of the Delegated Regulation) be amended to explicitly include sustainability considerations? Please elaborate.

Q8: Should other enhancements / changes to the current regulations be envisaged regarding the consideration of sustainability factors in the valuation of assets?

Q9: Do you have additional views and evidence to be considered with regard to the exposure to physical risks?

Q10: Do you have additional views and evidence to be considered with regard to the exposure to transition risks?

7.3 Valuation of liabilities

7.30 A substantial majority (over 75%) of the groups and undertakings who provided evidence to EIOPA 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 risk were not applicable to them).

7.31 A substantial numbers 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.

7.32 Undertakings and groups that reported not to include climate-change related risk 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 months-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

7.33 Circa one quarter of undertaking and groups who responded to the request for information explicitly consider climate risks as part of their cash-flow projections (See Table no. I).

Table no. I – Current practices for incorporating of 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 model are designed to support risk assessment 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 be explicitly modelled.

- Consider appropriateness of the 'Event Not in Data' (ENID) provision informed by stress-scenario analysis.

7.34 Besides general valuation rules, specific provisions apply to the valuation of technical provisions:

Solvency II Directive	**Delegated Regulation**	**EIOPA Guidelines on Valuation of Technical Provisions**
Article 77(2): Calculation of the Technical Provisions	Article 29: Expected future developments in the external environment	Guideline 1: Completeness of data

7.35 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.

7.36 EIOPA acknowledges that (re)insurance business whose claims' occurrence (for e.g. traditional non-life business) or claims' settlement periods are short-term (i.e. 1-2 years) (esp. for NAT CAT claims but

excluding liability lines of business) might be less affected: these business models allow, in theory, for annual repricing. This means, commercial considerations permitting, that prices can be adjusted for any new development on short notice (this is especially possible due to a quick settlement pattern of NAT CAT claims). Therefore the annual validation of assumptions, according to the Delegated Regulation, seems fit for purpose for short (1-2 years) duration business.

7.37 For longer-term business, on the other hand, estimating the foreseeable impacts of climate change over a longer term horizon, is needed. Firms are encouraged to use best available science to perform sensitivity or scenario tests to ensure adequacy of the best estimate. Moreover, where exposures warrant it, undertakings are encouraged to develop forward-looking modelling approaches (see Table no. II) and assess, in a consistent manner, the valuation uncertainty relating to climate change.

7.38 In taking account of climate risks in line with Article 29 of the Delegated Regulation, firms should use best available science to perform sensitivity or scenario tests to ensure adequacy of the best estimate.

7.39 EIOPA is of the opinion that in applying a forward-looking modelling approach in the calculation of the best estimate, practices should be applied in a manner proportionate to the scale and type of exposures faced by an undertaking. For example, more elaborate catastrophe/climate modelling, or stress-testing methods should be used by undertakings with larger or more medium/long-term obligations exposed to climate risks.

7.40 EIOPA is of the opinion that 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.

7.41 Undertakings should apply 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;

7.42 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 risks may affect life exposures not just directly -e.g. through impacts on mortality rates due to future climatic events, including droughts, heatwaves or periods of extreme cold – but also indirectly via asset management fees, expenses or economic scenarios generated to value contract options.

7.43 The extent to which undertakings are currently accounting for climate risks in their life best estimates, or the practicality of doing this, is unclear. Given these uncertainties, EIOPA wishes to further consider the extent to which and ways in which climate risks are currently included in life best estimates. From the preliminary analysis, EIOPA is of the view that while there appear 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.

Table no. II - Initiatives for including climate change in catastrophe models

7.44 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:

7.45 RMS has been providing already since 2006 in addition to their near-term model, another view for the hurricane model which cover a projection into the next 5 years that incorporates 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 years[25].

7.46 Corelogic works as well very closely with academics 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 scenarios[26].

7.47 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 Model[27].

7.48 AIR completed a study funded by the Association of British Insurers (ABI) to evaluate the impact of climate change on loss from inland flood 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 Science and Services on how precipitation and winds would change by the end of the century. This information was then used to construct climate change–conditioned catalogs[28].

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

Questions to stakeholders

Q11: Do you agree with the good practices EIOPA is suggesting for undertakings to apply for integrating sustainability in the valuation of liabilities? Would you have further suggestions?

Q12: What is your view on adopting a forward-looking modelling approach in the calculation of the best estimate should be applied to assess climate change-related risks? Please elaborate.

Q13: What would you consider to be proportionate good practices for such a forward-looking modelling approach in the calculation of the best estimate?

Q14: Do you agree that climate risks may affect the technical provision calculation for the life insurance? Please elaborate.

Q15: Do you agree that the two main assumptions/areas where climate may impact the calculation of life technical provisions are the Economic Scenario Generators and the mortality rates? What about morbidity rates? Please elaborate.

Q16: Is climate change relevant for Economic Scenario Generators? If yes, how could climate change be included in Economic Scenario Generators? Please elaborate.

Q17: Is the impact of climate change relevant on the mortality rates? If yes how could climate change be included in mortality rates? If no,please elaborate.

8. Investment and underwriting practices

Extract from the European Commission's request for advice

"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

[26] https://www.corelogic.com/downloadable-docs/1-eurwnd-0217-02-european-windstorm-model-eurowind-screen-022417.pdf

[27] https://www.jbarisk.com/news-blogs/new-uk-climate-change-flood-model/

28 Climate change impacts on extreme weather, 2017, AIR

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."

8.1 Investment practices

8.1 Evidence collected shows that around 70 % of insurance and reinsurance groups and solo undertakings (groups and undertakings) who responded to the requests from EIOPA, 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.

8.2 Close to one third of the groups and undertakings do not plan to implement practices to include sustainability risks in investment management.

8.3 Many insurance groups and undertakings that have implemented an investment policy including the consideration of sustainability risks have a dedicated ESG-committee, which sets the policy regarding different ESG-related aspects (ratings, targets tools to manage and monitor sustainability risks, etc.). One respondent mentioned having a separate carbon footprint committee. Where applicable, ESG-factors are either incorporated into investment policy, or they are separated into specific ESG-policies under various different names. Further risk management approaches include for example considering particular risks for specific assets, e.g. physical risks for direct real estate portfolios and this is assessed as part of the purchase process. They analyse the physical risks across the real estate portfolio 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.

8.4 Groups and undertakings point out they rely on sustainability ratings provided by specific providers. 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 providers.[29] EIOPA has also noted that sustainability considerations are becoming more prevalent in traditional credit rating activity, where relevant for the creditworthiness. EIOPA supports further transparency on sustainability ratings as well as on how ESG factors are currently considered in credit rating issuance. Good practices in this regard should further promote the understanding of ESG ratings and the quality and consistency of the scoring.[30]

8.5 Other input from external sources such as the World Economic Forum[31], audit firms and risk assessments provided by specialized investment managers was also reported to be used by undertakings.

8.6 Several groups and undertakings mention that they have signed the UNPRI -principles (UN Principles for Responsible Investment)[32]. By doing this, they have committed themselves to incorporate ESG-factors to their investment and ownership decisions. Some of them only use external asset managers which also are PRI-signatories, or otherwise use internal ESG-policies.

8.7 Some groups and undertakings refer to signing the Montreal Pledge[33] by which investors commit to measure and publicly disclose the carbon footprint of their investment portfolios on an annual basis. While carbon footprints are a useful metric to assess transition risks, it was noted that this needs to be complemented with additional forward-looking assessments and climate scenarios.

8.8 Some groups and undertakings have decided to bring their investment portfolio (equities) closer to a 2°C scenario and to measure the progress towards this goal through their investments. A climate scenario analysis helps the groups and undertakings to understand and analyse how the climate change drives the financial impact. The risk of stranded assets was captured by some groups and undertakings by analysing and

[29] See COM Action plan, action 6.

[30] See ESMA Consultation Paper on disclosure requirements applicable to credit ratings

[31] See World Economic Forum, "*Seeking Return on ESG Advancing the Reporting Ecosystem to Unlock Impact for Business and Society*", January 2019

[32] 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.
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.

[33] https://montrealpledge.org/

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.

8.9 Implementation by investees of the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) also helps certain (re)insurers to inform their investment behaviour. Only few groups and undertakings mention having implemented TCFD-reporting[34].

8.10 Main obstacles cited by groups and undertakings in investing in sustainable investments related to climate change are 'market obstacles', such as the lack of data and information on performance as well as the impossibility to monitor climate change risks. Participants consider that risks from climate change impacting on investments would mostly arise from climate migration, flooding more generally and the environmental impact on biodiversity, and human health, more specifically. Further obstacles cited are the lack of a theoretical framework and lack of clarity on what are sustainable investments (related to taxonomy and benchmarks).

8.11 From the evidence collected, EIOPA understands that the large majority of groups and undertakings argues that sustainable investments, as defined in the undertakings' investment policies, would be subject to similar targets and measures for expected risk and return as other investments. It seems that the risk analysis or performance for sustainable investments is not calculated separately or benchmarked against all/non-sustainable investments.

8.12 In particular, the groups and undertakings argue that targets and measures for the return on sustainable assets are analysed jointly with traditional financial variables, regardless of their classification. Classical financial analysis should make accurate statements about sustainability risks, as it must analyse the business model of companies and its effects on the development of earnings in the future. This also seems to apply so far to green bonds, where creditworthiness, yield, duration and liquidity of these instruments would matter in the same manner as for conventional bonds. It is argued that as the green bond investment pool is still relatively small, in particular for EUR-denominated bonds and when prioritising for liquid benchmark bonds, particular attention should be paid to concentration risk (e.g. issuers from the utilities sector are dominant in this area). Also, particular attention would need to be paid

[34] https://www.fsb-tcfd.org/

to the "green purpose" of the proceeds and the absence of a standard for green bonds (in particular, beginning with a taxonomy) is highlighted as a particular risk.

8.13 Some mention that sustainable investments would make economic sense. In particular, where the investments would show a lower volatility, providing for more stable returns over the long term, a better risk-adjusted return may be achieved. Nevertheless, undertakings note that sustainable investments are not less risky per se.

8.14 As to investment opportunities arising from climate change, groups and undertakings mostly identify investments in the energy and transport sector. Market participants identify these sectors to be subject to sector-specific regulation themselves, which may provide on balance incentives (opportunities) or disincentives (risks) for investment as they would enable the transition towards a low carbon economy. Another driver for investments in light of climate change, which is highlighted by market participants, is the change in expectations from consumers. Mostly technological advancements seem to be creating potential value, or opportunities for investments related to climate change.

Exclusion/restriction investment practices

8.15 The most common method of ESG-investing referred to by groups and undertakings is excluding certain types of sectors[35] from the investment portfolio. These include usually companies with revenues from coal (or related such as oil, gas and transport sectors) exceeding a certain percentage of total. Usually the threshold for investment in these sectors is set to decline over time. One respondent mentioned the Science Based Target initiative which provides companies with a defined pathway to future-proof growth by specifying how much and how quickly they need to reduce their greenhouse gas emissions. Exclusions further also refer

[35] For example, as regard ESG criteria, insurance entities consider with higher risk investments in assets issued by companies that:
• produce weapons that violate fundamental humanitarian principles through their normal use (cluster bombs, antipersonnel landmines, nuclear arms, etc.);
• are involved in coal sector; serious or systematic human rights violations; severe environmental damages or are implicated in cases of gross corruption.
As regard activities, some entities set up a specific process aiming at continuous monitoring of the investable universe; identifying and evaluating issuers with an higher exposure to ESG issues, to be considered complementing traditional techniques of analysing financial risk and return with analyses of ESG policies; excluding from the investable universe issuers with serious ESG issues.

to controversial weapons, tobacco, gambling, nuclear energy, tar sand etc.

8.16 Some groups and undertakings use exclusion criteria only for direct investments, but other apply it to externally managed assets as well. One selection criterion for mutual funds is whether the fund reports its carbon footprint or not. Some of the analysis is carried out by external ESG-service providers.

8.17 Some stakeholders point out that these exclusion strategies can be relevant at the individual's insurer or group's level in terms of managing financial risks but do not necessarily respond to the first objective of the Commission's action plan, that is reorient capital flows. Indeed, as long as there is sufficient financing for these sectors or undertakings and as long as there is no government measure reducing the provision of certain types of energy, individual exclusion measures do not have a global effect on capital flows: investors could just be replaced by other investors (potentially less concerned by sustainability and less involved in terms of stewardship for instance). Only widespread exclusion strategies would have an effect on capital flows.

Inclusion / impact investment practices

8.18 Inclusion investment strategies, i.e. investments directed at sustainable economic activities, according to the evidence collected by EIOPA, seems less common than exclusion, but several insurance groups and undertakings have committed to invest more into sustainable assets (green bonds, renewables, direct financing of energy transition such as infrastructure etc.). Some of these commitments are expressed in a certain amount by, for example year 2030; others were set as a percentage of total (direct) investments.

8.19 A common green investment strategy is to invest only, or mostly, in certified real estate (BREEAM[36], LEED[37], HQE[38]) and aiming for high certifications (very good, excellent). Some mentioned reduction targets in real estate energy consumption.

[36] https://www.breeam.com/

[37] https://new.usgbc.org/leed

[38] https://www.behqe.com/

8.20 As an example, inclusion strategies would favour exposure to counterparties adopting a progressive alignment with the 2° scenario and reducing exposure to counterparties late in the implementation of this objective. This approach could reduce transition risks. It is argued that since the alignment would be achievable within each and every sector, such a strategy would not substantially modify the sectoral exposure of the portfolio. Yet, some elements limit the capacity to fully implement such strategy: lack of prospective information available on companies and counterparties, need to adapt the information systems of financial institutions, lack of translation of climate scenarios into financial impact or the lack of training of staff on climate stakes[39].

8.21 Some practices to support inclusion investment strategy are mentioned in this respect: the disclosure of information by counterparties (incentivize counterparties to disclose prospective information on their own alignment with a 2° scenario ; adapt information systems in order to be able to collect, store and aggregate new indicators and information on climate stakes of counterparties) and the collection and analysis of climate indicators already available (Carbon impact indicators ; qualitative ESG criteria ; indicators of alignment on a 2° scenario - macro-indicators aggregating quantitative indicators based on historical data and prospective qualitative indicators ; green/brown-part indicators, that inform on the part of revenue of the undertaking that will evolve positively/negatively due to the transition to a low-carbon economy).

8.22 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.

8.23 EIOPA is of the opinion that the (re)insurance industry should consider transition as well as physical risks in setting their investment and risk management strategies. To facilitate this, it is essential that relevant institutions have a coordinated approach and support the development of initiatives such as a taxonomy and disclosure of sustainability risks.

[39] See I4CE, "Gérer les risques de transition de son portefeuille : de la théorie à la pratique", April 2017

Questions to stakeholders

Q18: Do you identify other relevant practices to include sustainability risks in (re)insurers' investment strategy and decisions?

Q19: Do you have any further views on the analysis of returns on sustainable assets?

Q20: To what extent do you align your investment strategy and decisions with your underwriting strategy and decisions in respect of sustainability risks?

Q21: Which good practices do you identify to deal with transition and physical risks in (re)insurers asset portfolios?

8.2 Underwriting practices

8.24 From the evidence received, EIOPA concludes 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.

8.25 Climate risk is in general part of the traditional non-life insurance business. However, assessing the impact of climate *change*, i.e. the causing an increase of frequency and severity of climate events, is more challenging.

8.26 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 (Table no. III).

Table no. III – Current practices for incorporating sustainability risks into underwriting policies are done by:

- **Integrating ESG into the underwriting standards and guidelines of the organization:** Some insurers developed group guidelines, supported in some cases by ESG experts, to help underwriters take appropriately into account ESG risks (e.g. such as mining, human rights, clinical trials, and the defense sector). 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.

- **Establishing roles and responsibilities for ESG issues:** Some undertakings have set up of a Group ESG experts to assess potentially critical ESG risks identified by underwriters ;

- **Escalating ESG risks to decision-makers:** Group Finance and Risk Committee serves as the final escalation body for decisions regarding the underwriting of specific ESG risks.

- **Excluding specific economic activities or geographical sectors:** For example, some undertakings have decided to exclude offering any insurance cover to oil & gas exploration and production activities, tar sands and associated pipelines as well as to underground mining activities. Geographical exclusions are for example implemented through guidelines aiming at reducing company exposure in certain countries with high risk exposures or because of international sanctions.

- **Aligning Terms and Conditions with risk-reducing behavior:** Discounts and incentives offered by some insurers for certain products favoring climate-change mitigation (e.g.CO2 bonus and climate bonus in motor insurance to customers driving environment-friendly vehicles; discount for agricultural liability insurance to organic farmers and mountain farmers; price reduction for non-fossil energy cars Units of account offered by life insurers with an ESG label on saving contracts.

- **Crafting innovative insurance products:** Partnerships with ESG-minded companies (provision of the necessary risk-coverage or insurances for these companies and their customers; e.g. partnership with 'Felyx', an e-scooter sharing platform). These partnerships could also include information and competence exchanges.

8.27 Undertakings who indicated that they are implicitly taking climate risks into account in their pricing, mention integrating risks arising from climate-related events in occurred and predicted losses. In order to predict losses, some insurers make use of specific models like in-house models in order to better assess climate risk, establish a mapping of natural risks and use climate-based models at time of underwriting to assess the right level of risk, in order to increase knowledge about the frequency and most exposed areas. Scenarios developed based on IPCC projections are sometimes used to measure climate change impact on business and claim rates.

8.28 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.[40] Research suggests that current climate model output are limited and that alternative approaches to include multiple sources of climate information can be developed.

8.29 As trends accelerate, in the more severe climate projections, pricing may need to rely on more forward-looking components alongside loss history and risk modelling. Not only intensity and frequency of events might change but also the regions where they occur. Other perils might become relevant and others might have less relevance. Actuaries will have to consider that their claims data may not necessarily contain all trends. Catastrophe modelers and actuaries will have to continue collaborations to determine the views of future NAT CAT events in order to build forward-looking pricing models. EIOPA underlines, in line with the advice, the importance for underwriters to consider the actuarial analysis of the risks related to climate change, when underwriting climate-related risks.

8.30 An increase of the premiums of insurance is expected due to the increase of the frequency and the severity of the climate related events, which a lot of insurers associate with climate change, and the consequent impact on the loss ratios, some undertakings expect an increase of the premiums of insurance of these risks. These premiums are expected to be impacted in a different way according to the geographical zones. Some undertakings stressed the fact that they had already made changes in premiums following a concrete climate change-related event.

8.31 Undertakings also highlighted the fact that these climatic events could eventually impact the reinsurance premiums, which will inevitably lead to higher risk premiums.

8.32 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. Such public -

[40] Daron, J. & Stainforth, D. (2014),' Assessing pricing assumptions for weather index insurance in a changing climate, Climate Risk Management, Vol.1 (2014), pp.76-91

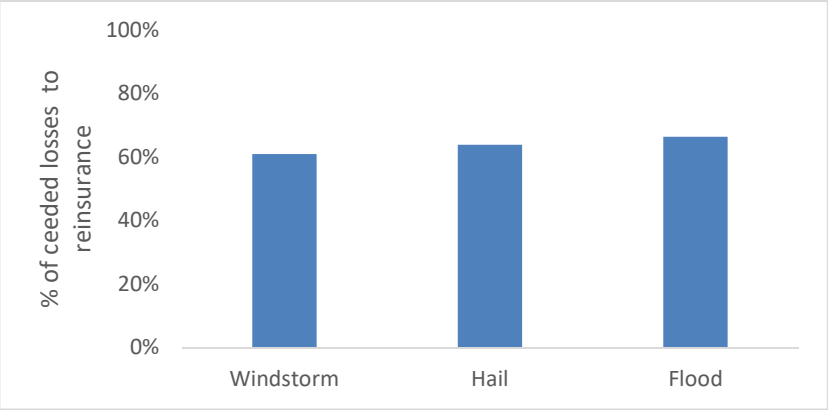
private schemes can palliate the widening of a protection gap, for example where risks would otherwise become uninsurable. Some argue that the existence of public schemes may distort risk perception or even artificially lower commercial prices. The availability of insurance without the "real" price might then lead, for example, to continued building in areas with high risks for flooding or investments in more resilient/energy efficient housing might be postponed.

8.33 Another risk mitigant mentioned by stakeholders is the use of reinsurance. While the 2018 EIOPA insurance stress test confirmed high resilience of the biggest European insurance groups to a series of natural catastrophes[41], 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 groups who 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-political perspective, 45% of the ceded loses went to reinsurance carriers based in non-EU jurisdictions.

8.34 Data collected for the purpose of the opinion, confirms the reliance on reinsurance (see Figure 6).

[41] 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.

Figure 6: 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.



8.35 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.

8.36 EIOPA points out that in the short term, insurers may benefit from underwriting business at higher prices, reflecting the increasing risk attached to the events occurring. However, increases in pricing in the medium-to-long term may render certain risks un-insurable (or unaffordable), eventually affecting (re)insurers' business. This could be addressed by explicitly considering risk mitigation and adaption strategies in the product design (e.g. terms and conditions for underwriting to support environmental goals), eventually lowering the costs for (re)insurance for climate-related risks.

8.37 Such "impact underwriting" may limit the risk of a further widening of a protection gap for natural catastrophe insurance. At the same time, it would limit the risk of (re)insurers from being crowded out as risk managers through increased state intervention (including mandatory covers, state backed (re)insurance or pooling mechanisms).

8.38 EIOPA is of the opinion that the (re)insurance industry should give further consideration as to how risk mitigation and adaptation strategies for climate change should be embedded in the underwriting policy of (re)insurers. The practice of developing products and services which reduce risk, have a positive impact on ESG issues and encourage better risk management should be considered as a good practice.[42]

8.39 EIOPA underlines the importance for underwriters to consider the actuarial analysis of the risks related to climate change, when underwriting climate-related risks.

8.40 EIOPA is of the opinion that in light of sustainability considerations, in particular climate change, public authorities and (re)insurers should consider the impact of underwriting practices on the existence, and potential widening of a protection gap for natural catastrophe insurance.

Questions to stakeholders

Q22: Do you consider "impact underwriting" described in the opinion to be a relevant way to take into account sustainability in underwriting policy?

Q23: Do you explicitly consider risk mitigation and adaption strategies addressing climate change in your products? Please elaborate.

(a) What would be the main benefits/obstacles of the generalisation of such a practice?

(b) Which measures would you recommend to assess the risk mitigating effect of such underwriting?

Q24: Do you identify other good practices than those described above?

Q25: What are your views on climate change potentially widening the protection gap for natural catastrophe (re)insurance?

Q26: Do you have evidence on Solvency II impacting the insurance protection gap (e.g. for natural catastrophe risks) in light of climate change? Please elaborate.

9. Capital requirements

[42] See PSI Working paper, pages 26, referring to the Principles for Sustainable Insurance.

Extract from the European Commission's request for advice:

"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.

EIOPA is invited to elaborate in its option 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."

9.1 Market risk - general

9.1 The main relevant provisions in the Solvency II Directive and in the Delegated Regulation are:

Solvency II Directive	**Delegated Regulation**
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

9.2 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).

9.3 Almost all respondents to EIOPA's call for evidence and request for information agreed that the current design of Solvency II capital requirements does not provide any positive or negative incentives with regard to sustainable investments.

9.4 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.

9.5 Views are split among market participants, as to whether "green" (i.e. assets whose underlying activity is consider 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.

9.6 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.

9.7 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.

9.8 Additional literature analysis confirms that no clear conclusions can be drawn as to the difference in risk profile of sustainable and non-sustainable investments.[43]

9.9 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 SII since those risks materialise through existing risk categories.

9.10 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.

9.11 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.

[43] 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.

9.12 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/brown assets, a brown taxonomy would need to be developed at the European level. 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.

9.13 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).

9.14 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 most impacted are those 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.

9.15 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 2015[44]. Commission Delegated Regulation of 8.3.2019 amending the Delegated

[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.

Regulation, introduces modified capital requirements for (un)listed equity, long term listed equity and unrated bonds/loans[45]. 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.

9.16 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-intensive[46]. The infrastructure investment will need to be assessed as to its 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).

9.17 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.

9.18 EIOPA did not receive any evidence that the current design and calibration of the framework provides either an incentive to invest in sustainable assets or a disincentive that hinders investments in sustainable assets.

9.19 EIOPA considers, based on the evidence received and analysis, that property risk, equity risk and spread risks are the market risk modules

[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

most likely affected by sustainability, in particular climate change considerations.[47]

9.2 Property Risk

9.20 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.

9.21 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.

9.22 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.

9.23 EIOPA used the UK based IPD total return indices for the calibration of the real estate risk.[48] 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 allow for a robust assessment of whether or not there is a different

[47] 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.

[48] [48] CEIOPS, Solvency II Calibration Paper, 15 April 2010, p 64 ff.

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.

Data requirement

9.24 EIOPA is of the opinion that, in the absence of available data to calculate different risk profiles for different kinds of property, more granular data would be needed. Two indices would be needed, one that is comparable to the IPD total return index and one that uses a comparable methodology, but is limited to sustainable investments.

9.3 Equity risk

Listed Equity

9.25 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.

9.26 CEIOPS (Committee of European Insurance and Occupational Pensions Supervisors) based its initial Solvency II calibration for listed equities on broad based indices[49]– 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.[50]

9.27 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

[49] CEIOPS, Solvency II Calibration Paper, 15 April 2010, p. 36 ff.

[50] See Article 169 (1)(b) of the Delegated Regulation.

Investments[51]. 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.

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

9.29 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 indices[52]:

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

9.30 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 patters may be similar and create some noise in the analysis.

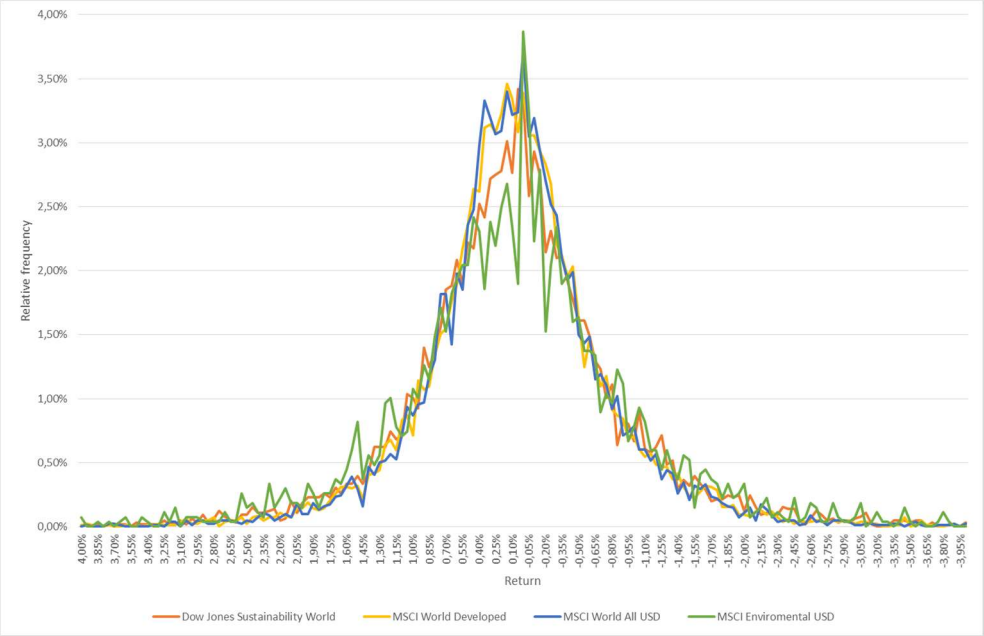
<u>Daily returns</u>

9.31 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

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

[52] 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.

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).



Source: Bloomberg

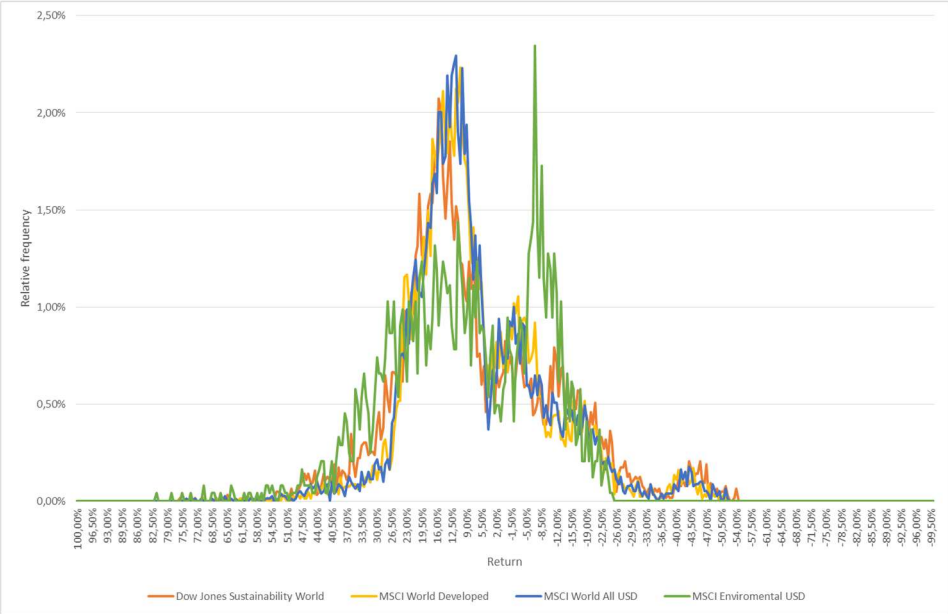
Yearly Returns

9.32 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.[53]

Without controlling for length of time series:

9.33 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.

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



Source: Bloomberg

9.34 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%

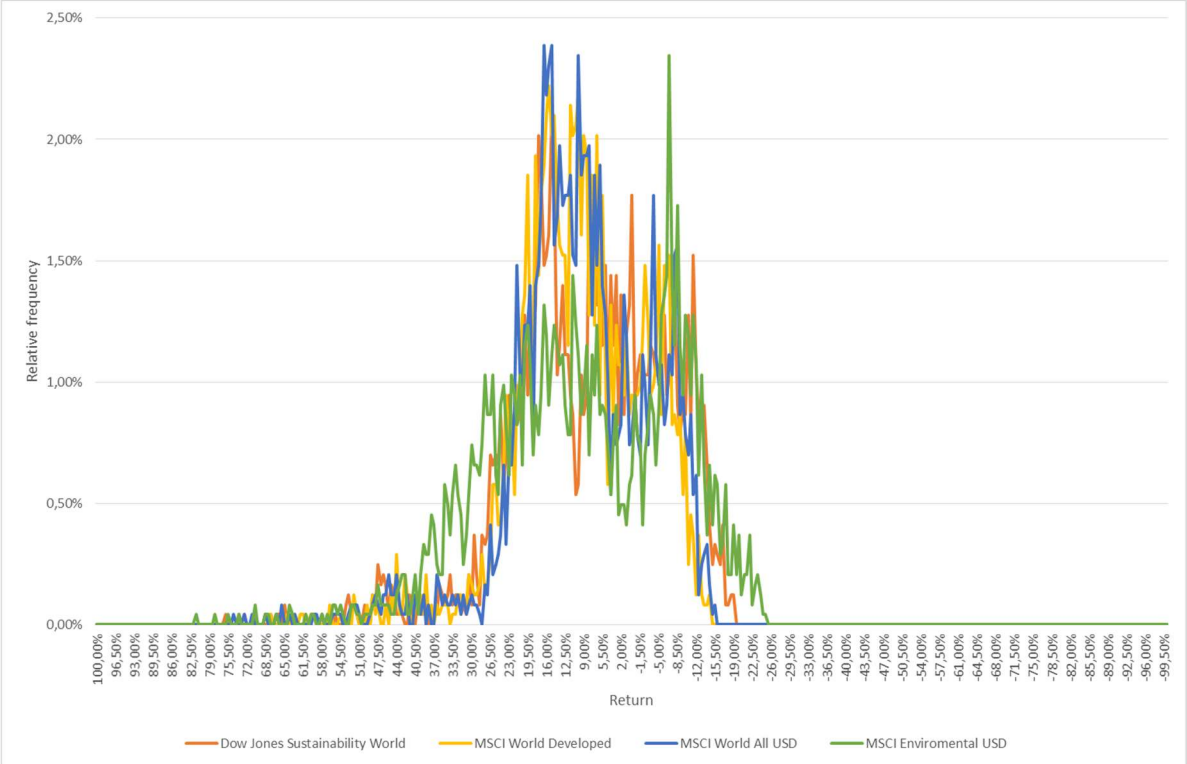
Source: EIOPA own calculations based on data from Bloomberg

9.35 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:

9.36 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.

9.37 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

9.38 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

9.39 EIOPA concludes from the analysis for listed equity that it is important to have data that covers more than only one economic cycle to draw a meaningful conclusion on the difference in risk profile for sustainable and non-sustainable listed equities.

9.40 Based on the evidence available, the analysis performed by EIOPA concludes that there is no meaningful difference in risk profile for sustainable equities compared to other equities. Depending on additional data which may become available, including on brown assets, it may be possible to better differentiate between the risk profiles of assets based on their sustainability characteristics, at a later date.

Unlisted equity

9.41 EIOPA did not receive any evidence from stakeholders with respect to unlisted equity. Also, EIOPA did not find information that would allow an assessment on whether sustainable unlisted equity demonstrates different risk characteristics compared to general unlisted equity.

Data requirement

9.42 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.

9.43 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.

9.44 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.

9.4 Spread Risk

9.45 The spread risk modules 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.

9.46 In the absence of an index that would allow for a differentiated analysis of "sustainable" assets and "normal" assets[54], 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

[54] 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.

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"[55] or also that "unhedged green bond indices, however, have exhibited higher volatility"[56].

9.47 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 no. IV).

Table no. IV: Elements for a green bond index for calibration purposes

9.48 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.

9.49 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.

9.50 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.

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

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

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

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

9.52 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.

9.53 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 0-5 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 5-10 and as soon as the outstanding maturity drops below 5 years the bond would fall within the 0-5 years bucket.

9.54 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.

9.55 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.

9.56 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.

9.57 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.

9.58 SII 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.

Unrated debt

9.59 EIOPA did not receive any evidence from stakeholders with respect to unrated debt. Also, EIOPA did not find information that would allow an assessment on whether sustainable unrated debt demonstrates different risk characteristics compared to general unrated debt.

Data requirement

9.60 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 5-6.

9.61 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 no. IV above.

Questions to stakeholders

Q27: Market risk:

a) **Do you support the views on the treatment of sustainability risks in the market risk module?**
b) **Do you have further evidence which should be considered?**

Q28: Property risk: Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in property risk capital charges?

Q29: Equity risk:

a) **Do you have comments on the analysis of risk differentials for listed equity? Please elaborate.**
b) **Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in listed equity risk capital charges? Please elaborate.**
c) **Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in unlisted equity risk capital charges? Please elaborate.**
d) **Which data sources or research conducted would be relevant to consider for unlisted equity risk capital charges?**

Q30: Spread risk:

a) **Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in spread risk capital charges?**
b) **Which data sources or research conducted would be relevant to consider for the integration of sustainability risks in spread risk capital charges?**
c) **What are your views on the methodology for a green bond index?**
d) **Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in unrated debt capital charges?**
e) **Which data sources or research conducted would be relevant to consider for the integration of sustainability risks in unrated debt capital charges?**

Q31: Do you agree that climate change should be captured in a forward-looking manner in the ORSA for market risk especially by incorporating a quantitative approach based on a standardised set of climate change scenarios? If no, please elaborate. If yes, which scenarios/tools could be used for quantitative assessments and which time span would you apply?

9.5 Natural catastrophe underwriting risk

9.62 The main relevant provisions in the Solvency II Directive and Delegated Regulation are:

Solvency Directive	Delegated Regulation
Articles 101, 104§6, 105	Articles 120 to 126

9.63 EIOPA's second set of advice to the European Commission on specific items in the Solvency II Delegated Regulation (EIOPA-BoS-18/075)[57] 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.

9.64 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.

9.65 However, the advice states 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.

9.66 Most surveyed groups and undertakings consider that the calibration of the standard parameters for the natural catastrophe risk module of the standard formula sufficiently capture climate-related developments. The main rationale given is that climate trend is not relevant for a 1-year time

[57] https://eiopa.europa.eu/Publications/Consultations/EIOPA-18-075-EIOPA_Second_set_of_Advice_on_SII_DR_Review.pdf

horizon. Given the gradual effects of climate change over the next years, the actual impact of climate change on the parameterization over a 1-year time horizon is expected to be limited.

9.67 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.

9.68 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.

9.69 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 to the frequency an in the intensity of those risks. Members of the catastrophe expert network 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.

9.70 Members of the EIOPA catastrophe expert network 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.

9.71 EIOPA considers the current Solvency II framework does not hinder the integration of current climate related developments in the calibration of the standard parameters for the natural catastrophe risk module of the standard formula.

9.72 Going forward, EIOPA is of the opinion that 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.

9.73 However, as referred to above (section 6) 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.

9.74 EIOPA is of the opinion that the catastrophe risk modelling community should expand their analysis on the potential effect of climate change and where material to reflect the results of those analysis 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.

Questions to stakeholders

Q32: Do you agree 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? Please elaborate.

Q33: Would you advise changing the design of the natural catastrophe risk module of the standard formula to capture climate related developments, including the impact of climate change? If no, please elaborate. If yes, please provide an alternative method.

Q34: Do you agree that climate change should be captured in a forward-looking manner in the ORSA for natural catastrophe underwriting risk especially by incorporating a quantitative approach based on a standardised set of climate change scenarios ? If yes, which scenarios/tools could be used for quantitative assessments and which time span would apply?

Q35: How do you take into account the long term view of climate-related developments, including the impact of climate change for the management of your natural catastrophe risks?

10. Internal models

Extract from the European Commission's request for advice

"EIOPA is invited to elaborate in its option 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."

10.1 Following relevant provisions to internal models apply:

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

10.2 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 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 provides policy holders 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.

10.3 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 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.

10.4 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-risk would therefore be covered. In addition, many internal model undertakings rely on external providers for their catastrophe model and assume climate related risks are taken into account because those models are parameterized from the latest data available and use the most recent available climate models.

10.5 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.

10.6 A good practice was identified from an undertaking stating that climate 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-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.

10.7 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 risk that they are exposed to.

10.8 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.

10.9 EIOPA would advise internal model undertakings relying on external providers for their catastrophe model to engage a discussion with them on whether and how climate change is integrated in their model. This would increase the understanding on how the external models works in practice and enable a better understanding of the model limitations.

10.10 EIOPA is of the opinion that 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 should be pursued, applying specific and consistent scenarios.

Questions to stakeholders

Q36: Do you agree 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 risk that existing insurance and reinsurance obligations are exposed to? Please elaborate.

Q37: Could you provide further explanation/examples on how sustainability factors, with particular regard to the climate-change risks are taken into account in your internal model?

Annex 1 - Bibliography

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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

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

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 - Summary of Questions to Stakeholders

Challenges on integrating sustainability risks in prudential Pillar 1 requirements

Q1: Do you agree that no change in the time horizon for capital requirements would be required to integrate climate change considerations? Please elaborate.

Q2: Do you agree that insurers should consider sustainability risks, and in particular climate change risks, in a forward-looking manner? If yes, how should this be incorporated into current or new requirements? If not, please elaborate.

Q3: Do you agree that long-term scenario analysis in risk management, governance and ORSA should enable insurers to develop a forward-looking approach with regard to sustainability risks, and in particular climate change risks? Please elaborate.

Q4: What are your views on incorporating a standardised set of quantitative climate change scenarios in the ORSA, e.g. derived from the IPCC representative concentration pathways (RCP) - which are likely to evolve over time? Can you please elaborate on which scenarios you would use and which time span should be covered by such scenario analysis, specifying your approach for the valuation of assets, liabilities and your own solvency assessment (for standard formula and internal model users)?

Valuation of assets and liabilities

<u>Valuation of assets</u>

Q5: Do you agree that the principles of valuation of assets of Solvency II allow for the consideration of sustainability factors? Please elaborate.

Q6: How in practice could the valuation of assets adequately (better) reflect sustainability risks?

Q7: Should prudential disclosure requirements (e.g. Articles 263 and 296 of the Delegated Regulation) be amended to explicitly include sustainability considerations? Please elaborate.

Q8: Should other enhancements / changes to the current regulations be envisaged regarding the consideration of sustainability factors in the valuation of assets? Please elaborate.

Q9: Do you have additional views and evidence to be considered with regard to the exposure to physical risks?

Q10: Do you have additional views and evidence to be considered with regard to the exposure to transition risks?

Valuation of liabilities

Q11: Do you agree with the good practices EIOPA is suggesting for undertakings to apply for integrating sustainability in the valuation of liabilities? Would you have further suggestions?

Q12: What is your view on adopting a forward-looking modelling approach in the calculation of the best estimate to assess climate change-related risks? Please elaborate.

Q13: What would you consider to be proportionate good practices for such a forward-looking modelling approach in the calculation of the best estimate?

Q14: Do you agree that climate risks may affect the technical provision calculation for the life insurance? Please elaborate.

Q15: Do you agree that the two main assumptions/areas where climate may impact the calculation of life technical provisions are the Economic Scenario Generators and the mortality rates? What about morbidity rates? Please elaborate.

Q16: Is climate change relevant for Economic Scenario Generators? If yes, how could climate change be included in Economic Scenario Generators? Please elaborate.

Q17: Is the impact of climate change relevant on the mortality rates? If yes, how could climate change be included in mortality rates? If no, please elaborate.

Investment and underwriting practices

Investment practices

Q18: Do you identify other relevant practices to include sustainability risks in (re)insurers' investment strategy and decisions?

Q19: Do you have any further views on the analysis of returns on sustainable assets?

Q20: To what extent do you align your investment strategy and decisions with your underwriting strategy and decisions in respect of sustainability risks?

Q21: Which good practices do you identify to deal with transition and physical risks in (re)insurers asset portfolios?

Underwriting practices

Q22: Do you consider "impact underwriting" as described in the opinion to be a relevant way to take into account sustainability in underwriting policy? Please elaborate.

Q23: Do you explicitly consider risk mitigation and adaption strategies addressing climate change in your products? Please elaborate.

(a) What would be the main benefits/obstacles of the generalisation of such a practice?
(b) Which measures would you recommend to assess the risk mitigating effect of such underwriting?

Q24: Do you identify other good practices than those described above?

Q25: What are your views on climate change potentially widening the protection gap for natural catastrophe (re)insurance?

Q26: Do you have evidence on Solvency II impacting the insurance protection gap (e.g. for natural catastrophe risks) in light of climate change? Please elaborate.

Capital requirements

Market risk

Q27: Market risk:
(a) Do you support the views on the treatment of sustainability risks in the market risk module? Please elaborate.
(b) (b) Do you have further evidence which should be considered? Please elaborate.

Q28: Property risk:
Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in property risk capital charges?

Q29: Equity risk:

(a) Do you have comments on the analysis of risk differentials for listed equity? Please elaborate.

(b) Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in listed equity risk capital charges? Please elaborate.
(c) Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in unlisted equity risk capital charges? Please elaborate.
(d) Which data sources or research conducted would be relevant to consider for unlisted equity risk capital charges?

Q30: Spread risk:

(a) Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in spread risk capital charges? Please elaborate.
(b) Which data sources or research conducted would be relevant to consider for the integration of sustainability risks in spread risk capital charges?
(c) What are your views on the methodology for a green bond index?
(d) Do you have additional views and evidence to be considered with regard to the integration of sustainability risks in unrated debt capital charges?
(e) Which data sources or research conducted would be relevant to consider for the integration of sustainability risks in unrated debt capital charges?

Q31: Do you agree that climate change should be captured in a forward-looking manner in the ORSA for market risk especially by incorporating a quantitative approach based on a standardised set of climate change scenarios? If no, please elaborate. If yes, which scenarios/tools could be used for quantitative assessments and which time span would you apply?

Natural catastrophe underwriting risk

Q32: Do you agree 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? Please elaborate.

Q33: Would you advise changing the design of the natural catastrophe risk module of the standard formula to capture climate related developments, including the impact of climate change? If no, please elaborate. If yes, please provide an alternative method.

Q34: Do you agree that climate change should be captured in a forward-looking manner in the ORSA for natural catastrophe underwriting risk especially by

incorporating a quantitative approach based on a standardised set of climate change scenarios? If no, please elaborate. If yes, which scenarios/tools could be used for quantitative assessments and which time span would apply?

Q35: How do you take into account the long term view of climate-related developments, including the impact of climate change for the management of your natural catastrophe risks?

Internal models

Q36: Do you agree 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 risk that existing insurance and reinsurance obligations are exposed to? Please elaborate.

Q37: Could you provide further explanation/examples on how sustainability factors, with particular regard to the climate-change risks are taken into account in your internal model?