



International Actuarial Association  
Association Actuarielle Internationale

# International Actuarial Note 200

## Application of IFRS S2 Climate Related Disclosures

Exposure Draft

17 October 2025

*This International Actuarial Note is an educational document. It serves to familiarize actuaries with approaches that might be taken to work relating to IFRS S2 Climate Related Disclosures and to demonstrate how the actuarial profession might approach the topic. It does not impose any obligation on any IAA Member Association or any individual actuary to promote or apply the practices described. It is not a definitive statement as to what constitutes generally accepted practice in the area under discussion and the language used is not directive.*

**IAN 200**  
**International Actuarial Note 200**  
**Application of IFRS S2 Climate Related Disclosures**

An International Actuarial Note (IAN) is an educational document that provides information on current or emerging practices in relation to an international actuarial topic. It serves to familiarize actuaries with approaches that might be taken and to demonstrate how the actuarial profession might approach the topic. The major difference between an IAN and other IAA educational documents is that all IAA Member Associations must be invited to provide input to the IAN through a formal consultation process, which maximizes the capacity to identify any material differences of opinion on the content of the IAN.

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Exposure Draft

## 1 INTRODUCTION

2 This International Actuarial Note (IAN), which is an educational document, has been  
3 developed by the International Actuarial Association (IAA) to assist actuaries in  
4 complying with the requirements in:

- 5 a. The International Financial Reporting Standard S1 (IFRS S1);
- 6 b. The International Financial Reporting Standard S2 (IFRS S2); and
- 7 c. The International Standard of Actuarial Practice 8 (ISAP 8)<sup>1</sup>,

8 by offering practical examples of ways in which actuaries might perform actuarial  
9 services in connection with the IFRS S1 and IFRS S2 Standards in the course of their  
10 work. This IAN is organized into 4 sections, primarily focusing on the main topics of  
11 IFRS S2. Each section has a brief introduction to the topics covered and is written as  
12 a series of questions and answers. This IAN is based on the IFRS S1 and IFRS S2  
13 Standards issued in June 2023, by the International Sustainability Standards Board  
14 (ISSB).<sup>2</sup> This document will be revised in the future to reflect any changes to the  
15 Standards by the ISSB, and as practice around climate related disclosures evolves.

### 16 **What are IFRS Ss in the Context of International Financial Reporting** 17 **Standards?**

18 The IFRS<sup>3</sup> Foundation has two standard-setting boards, the International Accounting  
19 Standards Board (IASB) and International Sustainability Standards Board (ISSB).

20 IFRS Accounting Standards issued by the International Accounting Standards Board  
21 (IASB)<sup>4</sup>, are intended to serve as guidance for developing general purpose financial  
22 statements and other financial reporting on a globally accepted basis. IFRS  
23 Sustainability Disclosure Standards (IFRS S) are issued by the ISSB, and are  
24 complementary to the broader group of IFRSs, dealing with sustainability-related  
25 disclosures. The ISSB was formed as a result of a decision made at the 2021 United  
26 Nations Climate Change Conference in Glasgow. The IFRS S standards are designed  
27 to produce information in the right way to support investor decision-making and  
28 facilitate international comparability. They are also intended to fit in with existing  
29 IFRSs and hence prevent duplicative reporting. This IAN may also be helpful to entities  
30 that do not report under IFRS.

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<sup>1</sup> ISAP 8 is expected to be adopted in November 2025. A link will be provided here to the adopted version.

<sup>2</sup> The ISSB is an independent standard-setting body within the IFRS Foundation responsible for developing IFRS Sustainability Disclosure Standards.

<sup>3</sup> International Financial Reporting Standards

<sup>4</sup> The IASB is an independent standard-setting body within the IFRS Foundation, responsible for developing IFRS Accounting Standards.

### 33 **What is IFRS S1 - General Requirements for Disclosure of** 34 **Sustainability-related Financial Information?**

35 The objective of IFRS S1 is to require an entity to disclose information about its  
36 sustainability-related risks and opportunities that are useful to primary users of  
37 general-purpose financial reports in making decisions relating to providing resources  
38 (e.g., capital) to the entity. In achieving this objective, it effectively forms a foundation  
39 for other sustainability-related Standards (e.g., IFRS S2, Climate-related disclosures).

40 In concept, the Standards require relevant and accurate financial information to be  
41 presented by an entity in respect of sustainability-related disclosure. Fair presentation  
42 of the information and the materiality of the information in respect of the entity's  
43 prospects are covered.

44 Core contents of the disclosures relate to:

- 45 1. Governance;
- 46 2. Strategy;
- 47 3. Risk Management; and
- 48 4. Metrics and Targets.

49 The more practical requirements of the Standard cover sources of guidance, location  
50 of disclosures (i.e., primarily to supplement general purpose financial reporting), and  
51 timing of disclosure.

### 52 **What is IFRS S2 - Climate-related Disclosures?**

53 The objective of IFRS S2 is to require an entity to disclose information about its  
54 climate-related risks and opportunities that are useful to primary users of general-  
55 purpose financial reports in making decisions relating to providing resources to the  
56 entity. It can be regarded as a focused extension of IFRS S1. This Standard focuses  
57 on climate-related disclosures in the areas of governance, strategy, risk  
58 management, and metrics and targets.

### 59 **What is ISAP 8?**

60 International Standard of Practice 8 (ISAP 8)<sup>5</sup> is a model standard of practice  
61 adopted by the IAA. This ISAP provides guidance to actuaries when performing  
62 actuarial services to support the preparation by an entity of climate-related  
63 disclosures in accordance with IFRS S2. The goal is to:

- 64 • Promote consistent and appropriate actuarial practices in climate-related  
65 financial disclosures.
- 66 • Enhance public confidence in actuarial work related to sustainability.
- 67 • Support collaboration with other professionals and disciplines involved in  
68 climate risk reporting.

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<sup>5</sup> A link to ISAP 8 will be added when available.

69 ISAP 8 is not binding on an individual actuary unless adopted by a local actuarial  
70 standard-setting body.

71 As climate-related financial disclosures become mandatory in many jurisdictions,  
72 ISAP 8 helps actuaries to:

- 73 • Navigate the complexity of climate risk.
- 74 • Ensure their work meets regulatory and professional expectations.
- 75 • Contribute meaningfully to sustainability reporting and risk governance.

### 76 **Who are the potential users of these disclosures and how might they** 77 **benefit from them?**

78 Additional and standardized disclosure of climate-related risks and opportunities  
79 allow stakeholders to better evaluate them for an organization. However, each  
80 stakeholder will have its own perspective and be using the disclosures to address  
81 their respective perspectives. It will be useful to understand these perspectives when  
82 preparing disclosures, while recognizing that this is an evolving area. There needs to  
83 be a balance between meeting all the needs of stakeholders and the effort required  
84 to produce the disclosures. Examples of some stakeholder perspectives include:

- 85 a. Board of Directors – how to evaluate the performance of management in  
86 addressing the risks and opportunities and to ensure sustainability of the  
87 organization
- 88 b. Shareholders (or owners) – inform the Board of Directors of their collective  
89 view of the importance of addressing the risk and can indirectly influence the  
90 company sustainability strategy
- 91 c. Management – benchmark the management of the risk versus other  
92 organizations in particular competitors
- 93 d. Financial Analysts – evaluate the effect of risk on share price and issue  
94 opinions on buy/sell
- 95 e. Auditors – attest to the credibility of the financial results
- 96 f. Regulators – monitor the security of benefits provided by financial institutions
- 97 g. Public – be informed of the organization’s approach to climate change.

98 Furthermore, actuaries, in their regulated work (premium and liability setting), may  
99 use the information to develop their assumptions, including the effect of climate-  
100 related risks on the best estimate of future claims/benefits and return on assets, and  
101 on whether additional margins are appropriate to protect shareholders/customers.

### 102 **What is the Focus of this IAN?**

103 This IAN is intended to provide material in support of actuaries and other  
104 professionals responding to the needs of IFRS S2. As IFRS S1 forms an important  
105 foundation to IFRS S2, the IAN also references IFRS S1.

106 This initial version of the IAN serves as a foundation document and will be further  
107 developed as the practice evolves. At this stage, it focuses on areas in which  
108 actuaries are likely to add most value.

109 Note that this IAN is intended to provide educational guidance material only. Any use  
110 of words such as “should” and “must” are direct quotations from the Standards, and  
111 no prescription is intended.

112 Consistent with IFRS S1 and IFRS S2, which are structured around Governance,  
113 Strategy, Risk Management, and Metrics and Targets, this IAN follows a similar  
114 structure in presenting its educational material as follows:

### 115 **Section 1: Governance**

116 The Standards include reference to Governance requirements in a relatively high-  
117 level manner. At this early stage in the application of the Standards, this note takes a  
118 similar approach. Effectively the appropriate controls need to be in place, supported  
119 by appropriate expertise and experience that can be applied as necessary.

### 120 **Section 2: Strategy**

121 IFRS S2 is detailed in respect of requiring the development and disclosure of the  
122 strategy for management of climate-related risk. Essentially each entity will have its  
123 own strategy based on its business and the way it manages, and expects to manage,  
124 its business. This suggests that educational guidance will involve several  
125 dimensions. At this stage the IAN focuses on a limited number of those dimensions,  
126 but we expect other dimensions will be included as the use of the Standards  
127 develops.

### 128 **Section 3: Risk Management**

129 Techniques for managing risk form a substantial part of the aims of IFRS S2. The  
130 IAN is divided into two main areas:

- 131 a. basic risk management needs; and
- 132 b. scenario analysis.

133 The innate dynamic nature of climate-related risk and the means to manage it  
134 dictates that scenario analysis forms a substantial part of assessment and  
135 management of the risks.

### 136 **Section 4: Metrics and Targets**

137 The specific needs of climate-related risk measures and targets, and monitoring  
138 thereof, are covered in this section.

## 139 **1. Governance**

### 140 **1.1 What are the relevant paragraphs in the IFRS Standards?**

141 These are set out in IFRS S1 paragraphs 26-27 and IFRS S2 paragraphs 5-7.

### 142 **What is the objective of the disclosures for governance?**

143 The objective of climate-related financial disclosures on governance is to enable  
144 users of general-purpose financial reports to understand the governance processes,  
145 controls, and procedures an entity uses to monitor, manage, and oversee climate-  
146 related risks and opportunities.

147 Companies may wish to convey the following points through their governance  
148 disclosures:

- 149 a. Strong senior sponsorship and buy-in to the climate related objectives;
- 150 a. Clear ownership with accountability mechanisms such as a dedicated  
151 sustainability committee along with aligned governance across all related  
152 initiatives to ensure the Board of Directors and senior management have a  
153 clear line of sight and facilitate a coherent approach; and
- 154 b. Robust metrics, targets, and consequences (including a remuneration link) if  
155 commitments are not met

### 156 **1.2 What does the Standard require related to disclosures for governance?**

157 Disclosures may include items such as:

- 158 a. Description of the board's oversight of climate-related risks and opportunities;
- 159 a. Identification of appropriate committees and responsible individuals including  
160 a definition of respective responsibilities;
- 161 b. Description of management's role in assessing and managing climate-related  
162 risks and opportunities;
- 163 c. Outline of the policies, procedures, and charters which establish reporting and  
164 decision-making processes; and
- 165 d. Description of monitoring and ongoing oversight activities.

### 166 **1.3 What detailed disclosure does the Standard require?**

167 Specifically, the Standard requires that an entity shall identify the body(s) or  
168 individual(s) and disclose information about:

- 169 a. how responsibilities for climate-related risks and opportunities are reflected in  
170 the terms of reference, mandates, role descriptions and other related policies  
171 applicable to that body(s) or individual(s);
- 172 b. how the body determines whether appropriate skills and competencies are  
173 available or will be developed to oversee strategies designed to respond to  
174 climate-related risks and opportunities;
- 175 c. how and how often the body is informed about climate-related risks and  
176 opportunities;

- 177 d. how the body takes into account climate-related risks and opportunities when  
178 overseeing the entity's strategy, its decisions on major transactions and its risk  
179 management processes and related policies, including whether the body has  
180 considered trade-offs associated with those risks and opportunities; and
- 181 e. how the body oversees the setting of targets related to climate-related risks  
182 and opportunities, and monitors progress towards those targets, including  
183 whether and how related performance metrics are included in remuneration  
184 policies.

185 The Standard also requires information to be disclosed about management's role in  
186 the governance processes. This includes controls and procedures used to monitor,  
187 manage and oversee climate-related risks and opportunities, and information about:

- 188 a. whether the role is delegated to a specific management-level position or  
189 management-level committee and how oversight is exercised over that position  
190 or committee; and
- 191 b. whether management uses controls and procedures to support the oversight of  
192 climate-related risks and opportunities and, if so, how these controls and  
193 procedures are integrated with other internal functions.

194 **1.4 What issues can be considered from an actuarial perspective relating to**  
195 **governance?**

196 Actuaries may provide input into the governance process related to climate risks and  
197 opportunities in various ways, depending upon the role they play in the organization.  
198 For example, an actuary may be interested in understanding whether the governance  
199 framework is adequate and effective from various perspectives including risk  
200 management, reserving and marketing. Actuaries may be involved in developing the  
201 governance framework around climate-related risk and opportunities and integrating  
202 them into the existing governance framework. They will also likely be involved in  
203 reviewing the disclosures prepared around governance, to confirm their accuracy  
204 around key actuarial aspects of the framework and its function.

## 205 **2. Strategy**

### 206 **2.1 What does this chapter address?**

207 This chapter considers possible approaches to climate-related disclosures on the  
208 strategy or the approach an entity will use to manage climate-related risks and  
209 opportunities.

210 It focuses on ways to disclose climate related strategy to users of general-purpose  
211 financial reports and addresses how actuaries may be able to contribute.

### 212 **2.2 Which sections of IFRS S2 address this topic?**

213 Paragraphs 8-23. Application guidance provided in B1-B18.

### 214 **2.3 What are the objectives of climate related disclosures on strategy?**

215 Climate related disclosures are expected to enable users of general-purpose  
216 financial reports to understand an entity's strategy or strategies for managing  
217 climate-related risks and opportunities. Specifically, the disclosures are expected to  
218 aid in understanding climate related risks and opportunities in the following areas:

- 219 a. Climate-related risks and opportunities that could impact the entity's prospects;
- 220 b. Current and anticipated effects on business model and supply chain;
- 221 c. Impacts on strategy and decision making, including transition planning;
- 222 d. Effects on financial position, financial performance and free cash flow over the  
223 reporting period as well as in the short, medium, and long term horizons;
- 224 e. Impacts on financial planning;
- 225 f. Climate resilience of the strategy; and
- 226 g. Strategy for meeting any climate related goals that have been established

227 An entity's strategy to manage climate change is ideally embedded in the overall  
228 strategy of the organization. The following questions explore each of the objectives  
229 in turn.

### 230 **2.4 How might an entity assess climate-related impacts on its prospects?**

231 Climate-related topics can be considered in addition to what is already being  
232 considered for the current business strategy using a Strengths, Weaknesses,  
233 Opportunities, Threats (SWOT) analysis.

234 A SWOT analysis juxtaposes the following four angles to look at an entity's position:

- 235 • Strengths and Weaknesses  
236 These involve an inward analysis of the entity's unique situation
- 237 • Opportunities and Threats  
238 These focus on the outside situation in which an entity is acting

239 These four perspectives may be used as a framework to view how the entity may be  
240 impacted by climate change and how it may be uniquely positioned to respond to  
241 those risks and opportunities.

242 Opportunities and Threats correspond to the opportunities and risks mentioned in  
243 the Strategy section of IFRS S1. Strengths can be linked to resilience, which is the  
244 topic discussed in IFRS S2 paragraphs 41-42.  
245 Some specific examples around SWOT analysis items related to climate-related risks  
246 and opportunities are explored in the following questions.

247 **2.5 What are some of the climate-related effects on the entity's business model**  
248 **and value chain to be considered?**

249 **Business model and value chain (IFRS S2 paragraph 13)**

250 **a. What is meant by a business model?**

251 IFRS S2 paragraph 13 requires entities to report current and anticipated effects of  
252 climate-related risks and opportunities on the entity's business model.

253 A business model may involve:

- 254 i. client segments: which customers does an entity want to serve;
- 255 ii. product offering;
- 256 iii. a value proposition, or what service a company offers to these customers; and
- 257 iv. an operating model, or how the entity wants to differentiate itself.

258 Entities may find that climate-related developments provide a challenge to stay on  
259 top, or an opportunity to get on top, of their current value discipline.

260 **b. What is meant by a value chain?**

261 IFRS S2 paragraph 13 requires entities to report current and anticipated effects of  
262 climate-related risks and opportunities on the entity's value chain. IFRS S1 defines a  
263 value chain as:

264 *"The full range of interactions, resources and relationships related to a reporting*  
265 *entity's business model and the external environment in which it operates.*

266 *A value chain encompasses the interactions, resources and relationships an entity*  
267 *uses and depends on to create its products or services from conception to delivery,*  
268 *consumption and end-of-life, including interactions, resources and relationships in the*  
269 *entity's operations, such as human resources; those along its supply, marketing and*  
270 *distribution channels, such as materials and service sourcing, and product and service*  
271 *sale and delivery; and the financing, geographical, geopolitical and regulatory*  
272 *environments in which the entity operates."*

273 A "supply chain" is a subset of a value chain, referring more to upstream logistics  
274 and inputs to a firm's activities.

275 An example of how supply chain may impact insurance risk is replacement value for  
276 an insured risk. Many property insurance policies cover replacement value up to a  
277 coverage limit, and the inflation in recent years has increased the replacement costs  
278 for insured items, impacting overall loss ratios of those insured losses.

279 **c. How can an entity respond to climate-related risks and opportunities in its**  
280 **business model and value chain?**

281 IFRS S2 paragraph 13 requires entities to disclose information that enables users of  
282 general-purpose financial reports to understand the current and anticipated effects  
283 of climate-related risks and opportunities on the entity's business model and value  
284 chain.

285 Depending on the current and projected impact of climate-related risks and  
286 opportunities, an entity may already have taken concrete steps or plans to adapt its  
287 strategy.

288 Without limiting the possibilities and creativity of insurance entities, such steps  
289 could consist of:

- 290 i. Foregoing insurance underwriting in disaster-prone geographical areas;
- 291 ii. Considering new claim services apart from only financial indemnification;
- 292 iii. Improving the ability to handle the claims volume from a concentrated mass  
293 event;
- 294 iv. Diversifying to insurance risks that will have less impact from climate-related  
295 risks;
- 296 v. Identifying new ways to provide coverage, either for new exposures or existing  
297 ones placed under stress by climate risk;
- 298 vi. Reducing expenses to ease affordability pressure, such as changing to direct  
299 sales;
- 300 vii. Changing capital sources, such as an insurer deciding to rely more on  
301 reinsurance coverage; and
- 302 viii. Changing the investment mix backing insurance liabilities in order to manage  
303 transition risk on the asset portfolio.

304 For ongoing changes, the related change management and progress could be  
305 disclosed.

306 For anticipated effects under certain scenarios, an entity could disclose how these  
307 scenarios are being monitored, and which scenario-driven management actions have  
308 already been identified. Financial projections and sensitivity analysis could then  
309 show how these actions would improve the financial position of the entity under  
310 these specific scenarios.

311 If an entity has decided to look beyond its current core business as a reaction to  
312 climate-related risks and opportunities, it could opt to disclose this either in an early  
313 stage or as soon as this option is being activated.

314 For climate-related risks, it may make sense to consider climate change as an  
315 underlying driver of the common insurance, credit, and market risks. From this  
316 perspective, it may turn out that property and agricultural insurance risk is  
317 particularly exacerbated by a certain catastrophic weather event. A phenomenon like  
318 El Nino could influence hurricanes, droughts, and precipitation in different parts of  
319 the world, making consideration of seemingly separate risks in a holistic manner

320 necessary. A common climate-related risk driver may also affect other parties in the  
321 value chain at the same time, increasing the importance of value chain  
322 considerations.

323 When thinking of the opportunities related to climate change, coverage for climate  
324 related risks (heat stroke cover, flood insurance, or cover for respiratory issues  
325 related to wildfires) may be more in demand in the coming years.

326 On the asset/investment side of the balance sheet, risk may include carbon-intensive  
327 industries and fossil fuel assets that are highly exposed to transition risk.

328 Insurers should further consider the emissions transferred to their balance sheet  
329 through the underwriting of carbon intensive industries.

## 330 **2.6 How will climate change impact strategy implementation, including transition** 331 **planning?**

332 Climate-related risks and opportunities may call for immediate actions or for plans  
333 that are only activated in case a certain climate-related scenario emerges.

334 In both cases, specific triggers or key performance indicators (KPI's) may be set to  
335 measure progress. Such metrics and targets are covered in other sections of this  
336 IAN.

337 IFRS S2 paragraph 10 (b) requires entities to classify climate-related risks in either  
338 one of two categories:

- 339 i. Physical risk; or
- 340 ii. Transition risk.

341 Physical risk refers to potential physical impacts, which can be event-driven (acute)  
342 or longer-term shifts in climate patterns (chronic). For most entities this relates to  
343 their own physical assets, the location of their operations, and the physical risks  
344 elsewhere in the value chain. For financial institutions, including insurers, this can  
345 also relate to their investment portfolios and the type and location of insurance  
346 underwriting.

347 Specific to insurers, acute events are high severity incidents that may impact a  
348 significant number of insurance contracts, while chronic changes can relate to the  
349 frequency of such events, but also to the potential for increased frequency and/or  
350 level of low severity risks that could make insurance coverage less profitable for  
351 insurers and/or less affordable for policyholders.

352 Transition risk refers to the extensive policy, legal, technology, and market changes  
353 to address mitigation and adaptation requirements related to climate changes.

354 A climate-related transition plan is defined in IFRS S2 Appendix A as an aspect of an  
355 entity's overall strategy that lays out the entity's targets, actions, or resources for its  
356 transition towards a lower-carbon economy, including actions such as reducing its  
357 greenhouse gas emissions.

## 358 **What might a transition plan include?**

359 A transition plan refers to the climate-related risks and opportunities of the entity  
360 and reconsiders them on a regular basis to assess the continuing validity of the  
361 transition plan.

362 It describes clear objectives and the plan on how to achieve these in time, identifying  
363 human and other resources. The result of this may include an initial timeline and  
364 total expected costs and benefits.

365 For insurers, some specific actions may include discontinuing certain lines of  
366 business, initiating certain new lines of business, or entering into risk control  
367 activities, such as reinsurance or adjusting coverage limits on policies. An internal  
368 carbon pricing mechanism could be adopted as an incentive for reducing emissions.  
369 The plan may also indicate how progress is being monitored. This may include a  
370 baseline measurement at the initiation of the transition project. All of these and  
371 other actions would be described in the climate disclosures.

372 Education and training may be required to raise skills and capabilities in the  
373 organization to the required level.

374 Finally, the risks and opportunities related to the entire transition plan may be paired  
375 with explicit contingency plans and mitigating actions.

376 A review of the transition plans of insurers that have already made climate-related  
377 disclosures may be useful.

378 **2.7 How might actuaries think about the impacts on financial performance,**  
379 **position and cash flows over different time horizons related to climate**  
380 **changes?**

381 When discussing climate-related risks entities, according to IFRS S2 paragraph 10  
382 (c) (d), have to specify the time horizons – short, medium or long term – over which  
383 each risk is expected to occur and how these definitions are linked to the planning  
384 horizons used by the entity for strategic decision-making. As part of their strategy,  
385 entities will decide how short, medium, and long term are defined.

386 In the context of climate-related disclosures, two separate approaches can be  
387 discerned:

- 388 a. Time horizons defined by the nature of the entity's business; or
- 389 b. Time horizons defined by the speed of climate change which  
390 typically cover decades.

391 Although not required to be disclosed by IFRS S2, an entity could use these time  
392 horizons to reassess their overall business strategy.

393 For example, the horizons could be set as:

394 a. **Short term (e.g. up to 3 years)**

395 This timeframe focuses on current business and immediate risks and  
396 opportunities, often related to near-term climate targets and policy changes.  
397 For example, this could include the impact of extreme weather events or the  
398 transition to a low-carbon economy. This timeframe might align with part of the  
399 company's strategic plan.

400 b. **Medium term (e.g. 3 to 10 years)**

401 This timeframe may align with company medium term target timeframes and  
402 provides scope to allow various climate-related pathways to unfold, including  
403 the effects of climate policies and technological advancements. It can also

404 assess medium term risks and opportunities of the transition to a sustainable  
405 economy.

406 c. **Long term (e.g. 10 to 30 years)**

407 This timeframe may align with company long term target timeframes, e.g.  
408 2050. It would provide sufficient time to observe longer term climate impacts,  
409 such as sea level rise or changes in ecosystems. It can be used to assess the  
410 long term resilience of an entity and its ability to adapt to a changing climate,  
411 considering future innovation or practices that do not currently exist

412 With respect to IFRS S2, it then seems that entities are required to provide only  
413 disclosures about their strategy to manage and protect short term activities, but  
414 entities may wish to consider how these disclosures integrate with other business-  
415 related disclosures it makes to stakeholders, coupled with the climate-related risks  
416 and opportunities time horizon which could span multiple decades.

417 **2.8 How might entities include climate-related risks and opportunities in their**  
418 **financial planning?**

419 IFRS S2 paragraphs 15-21 discusses the disclosures about the anticipated financial  
420 effects of a climate-related risk or opportunity. These disclosures are allowed to be  
421 commensurate with the skills, capabilities, and resources that are available to the  
422 entity.

423 The financial effects of climate-related risks or opportunities can be measured by  
424 considering all expected cash flows under various situations:

425 a. Base estimate projections: considering the as-is situation based on the current  
426 situation and business expectations, and counting-in the effects of the  
427 evolution in key input variables:

- 428 • when no climate-related action is taken; and
- 429 • when the strategic climate-related actions are taken.

430 b. Scenario analysis: what-if projections evaluating the impact of selected  
431 scenarios; and

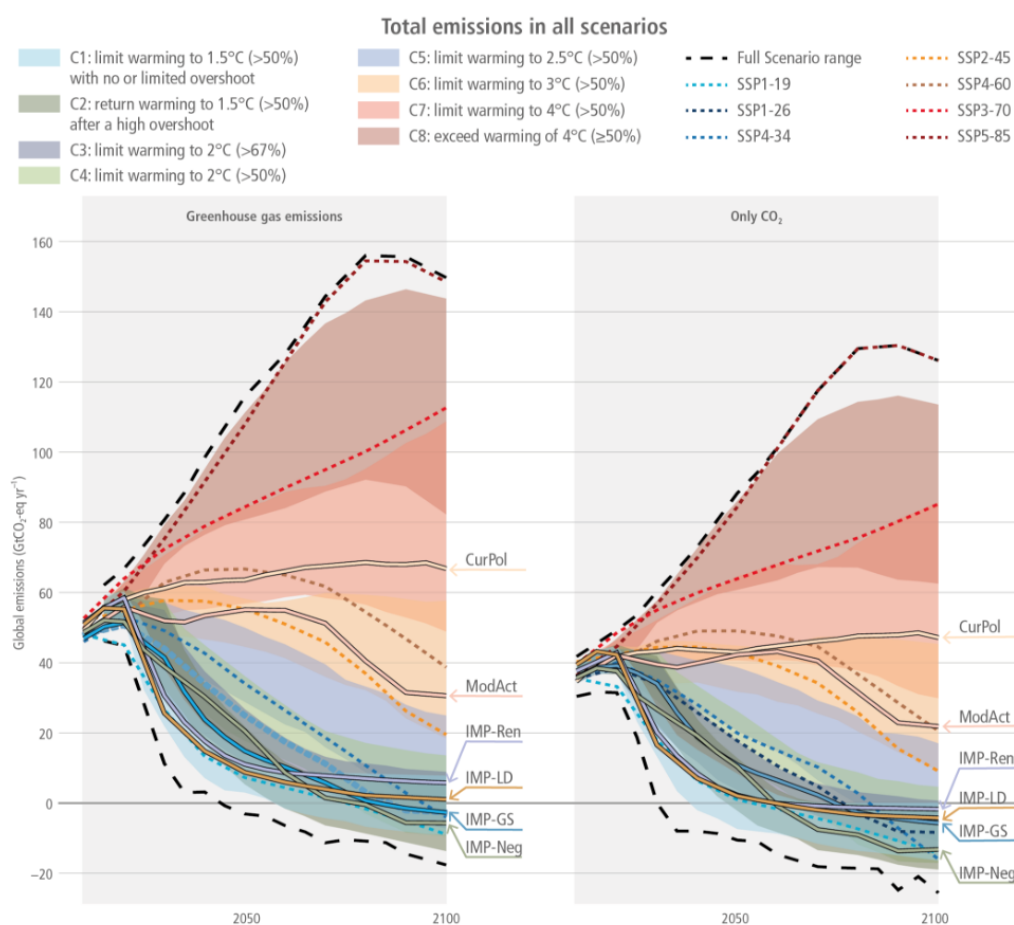
432 c. Stress testing: projections that include a severe shock in an input parameter,  
433 testing the impact and robustness of the financial position.

434 There are various sets of illustrative scenarios that can be considered for such  
435 testing and analysis. The graph below illustrates the total emissions in all scenarios  
436 as reported in the IPCC Sixth Assessment Report.<sup>6</sup>

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<sup>6</sup> <https://www.ipcc.ch/assessment-report/ar6/>

437

Figure 1: CO<sub>2</sub> Emission Scenarios

438

439 *Source: IPCC 6<sup>th</sup> Assessment Report*

440 Scenarios such as the Network for Greening the Financial System (NGFS) are  
 441 commonly used by central banks and financial institutions. These use models to  
 442 convert climate action and greenhouse gas emissions into economic impacts, which  
 443 organizations can then use in financial modelling of climate change impacts.<sup>7</sup>

444 These cash flows may involve both assets and liabilities on the entity's balance  
 445 sheet, as well as future new business volumes.

446 Following the creation of different sets of cash flows, entities can then assess their  
 447 current financial position by considering additionally the time value of money and  
 448 uncertainty surrounding the projected cash flows.

449 As mentioned in IFRS S2 paragraph 17, an entity may disclose single amounts or  
 450 ranges.

<sup>7</sup> Note the IFoA Risk Alert dated 6 June 2024 that there is a risk, when using current published scenarios that an Actuary will underestimate climate risk.  
<https://actuaries.org.uk/media/ue4hdq3l/risk-alert-climate-change-scenario-analysis.pdf>

## 451 **2.9 What is climate resilience?**

452 IFRS S2 paragraph 22 requires an entity to disclose information about its resilience  
453 to climate-related changes, developments, and uncertainties.

454 IFRS S2 Appendix A defines climate resilience as *“the capacity of an entity to adjust  
455 to climate-related changes, developments, or uncertainties”*.

456 Climate resilience involves the capacity to manage climate-related risks and benefits  
457 from climate-related opportunities, including the ability to respond and adapt to  
458 climate-related transition and physical risks. An entity’s climate resilience includes  
459 both its strategic and operational resilience to climate-related changes,  
460 developments, and uncertainties. Resilience, however, also encompasses the  
461 management of residual risks which will remain despite efforts to mitigate and  
462 adapt to climate change.

## 463 **2.10 How might climate-related scenarios to assess climate resilience be set?**

464 The application guidance in Appendix B of IFRS S2 documents a two-stage  
465 assessment:

466 First, an entity may consider its exposure and its skills, capabilities, and resources  
467 for the assessment. The Standard requires that this be redone each time that  
468 climate-related scenarios are renewed.

469 Assessment of the exposure is required to assess how quantitative, technical, and  
470 sophisticated the scenarios could be in order to be useful. Significant exposure to  
471 severe risks requires the necessary quantitative sophistication, but the reverse is  
472 true relative to less severe exposures that do not have to be overly assessed. IFRS  
473 S2 paragraph 25 requires entities to disclose information on how they prioritize and  
474 monitor climate-related risk exposure.

475 Skills and capabilities include both internal and external skills and capabilities.  
476 Internal skills and capabilities may be limited at the start of climate-related reporting.  
477 It is expected that entities will assess how internal capabilities will grow over time,  
478 how external capabilities can be used, and how resources are allocated to do both.  
479 In this respect, the severity of exposure remains the key driver to determine how  
480 sophisticated the scenarios need to be.

481 On the other hand, IFRS S2 paragraph B7 acknowledges that scenario setting is an  
482 iterative learning process and that the speed by which an industry is improving its  
483 capabilities is a limiting factor.

484 Second, an entity may determine the appropriate approach, within the boundaries of  
485 the previous considerations, for selecting inputs and making analytical choices  
486 about how to carry out the scenario analysis.

487 This will involve some judgment, and it is recommended to disclose which potential  
488 sources of information have been consulted to come to the chosen approach.

489 The selected scenarios may then be used to identify and assess risks to the entity,  
490 particularly those that are not well managed by its existing risk management  
491 framework, which may then threaten its business model resilience.

492 **2.11 How might actuaries document climate-related scenarios, and how will**  
 493 **disclosures describe strategies for meeting climate-related goals and targets?**

494 IFRS S2 paragraph 22 (b) requires disclosure on how and when the climate-related  
 495 scenario analysis was carried out, including input, key assumptions, and the  
 496 reporting period.

497 This could be complemented by illustrating the scenario analysis cycle, which  
 498 besides frequency also mentions the different steps in the scenario analysis, such as  
 499 review of climate-related risks and opportunities.

- 500 a. Scenario selection – A possible option is to vary different degrees of climate  
 501 changes (e.g. levels of global warming) against different intensities and pace  
 502 by the entity to take action
- 503 b. Scenario analysis – including a motivated choice between a quantitative or  
 504 qualitative analysis
- 505 c. Results validation – including explaining possible limitations of the selected  
 506 scenarios
- 507 d. Results reporting
- 508 e. Management feedback – identification of key priorities and action plans

509 Entities may have their own internally established goals with respect to climate  
 510 change and/or they may have regulatory requirements imposed upon them. The  
 511 disclosure requires that strategies for reaching these goals be described. The  
 512 specific transition plan will be described qualitatively in the disclosures, along with  
 513 the quantitative metrics and targets that are discussed elsewhere in this IAN. There  
 514 may be existing regulatory disclosure around climate change which can be leveraged  
 515 for purposes of complying with the IFRS S2 disclosure requirements. Regulatory  
 516 climate stress tests also form part of financial institutions' climate-related risk  
 517 management toolkit. A growing number of supervisory authorities have either  
 518 conducted, are in the process of conducting, or have announced plans to conduct  
 519 climate stress testing exercises. For example, insurers subject to European Union  
 520 (EU) regulation must perform an annual Own Risk & Solvency Assessment (ORSA).  
 521 As part of its 2021 review of the Directive, the EU recommended to companies that  
 522 they include climate scenarios in their solvency assessment.

523 **2.12 What is meant by cross-industry and industry-based metrics?**

524 IFRS S2 paragraph 23 requires an entity to consider the applicability of the cross-  
 525 industry metric categories in IFRS S2 paragraph 29, and industry-based metrics in  
 526 IFRS S2 paragraph 32 from Industry-based Guidance on Implementing IFRS S2.

527 See 4.3 in the section on Metrics and Targets

528 **2.13 How might actuaries contribute to preparing these types of disclosures?**

529 There are various areas where actuaries may be able to contribute to preparation of  
 530 strategy-related climate disclosures. These are listed below, but the list is not  
 531 considered to be exhaustive, since this is an evolving area of practice for actuaries.

- 532 a. **Risk identification** - The disclosures require a description of where in the  
 533 entity's business model and value chain climate-related risks and opportunities

- 534 are concentrated (for example, geographical areas, facilities, and types of  
535 assets). Actuaries, as experienced risk professionals, are well suited to assist  
536 in this type of risk identification and assessment.
- 537 b. **Transition planning** - In developing and describing the entity's transition plan,  
538 actuaries may be able to assist with developing and preparing information  
539 about key assumptions used in developing the transition plan, and  
540 dependencies on which the entity's transition plan relies.
- 541 c. **Financial impacts** – As contributors to the entity's financial statements through  
542 the development of reserves, provisions, and predictions about cash flows,  
543 actuaries may be able to contribute to the disclosures around financial impacts  
544 through assistance in developing assumptions and building financial models  
545 based on those assumptions.
- 546 d. **Uncertainty assessment** – In developing the entity's climate resilience  
547 assessment, actuaries may be able to contribute to analysis and determination  
548 of whether certain quantitative or qualitative disclosures are meaningful by  
549 leveraging experience around reserve setting, insurance product pricing, and  
550 asset-liability analysis. Actuaries may wish to provide caveats with their  
551 estimates to impress upon users of the disclosures the level of uncertainty  
552 inherent in the estimates.
- 553 e. **Monitor evolving actuarial practice** – There may be a case for the actuarial  
554 profession to offer knowledge and expertise to a wider range of industries than  
555 just insurance. Actuaries may wish to keep in mind the rapidly evolving  
556 situation around climate and that in their work around financial estimates and  
557 estimations of scenario impacts, caveats can be used to impress upon users  
558 the uncertainty embedded in such estimates. Additionally, actuaries may wish  
559 to continue to stay abreast of:
- 560 • Technological knowledge on how to include exogenous parameters in  
561 pricing and provisioning;
  - 562 • Regulatory knowledge regarding evolving environmental regulations,  
563 reporting requirements, and emerging climate-related policies that could  
564 affect businesses and industries;
  - 565 • Collaborative and interdisciplinary skills.

**2.14 What S2 industry-based guidance is applicable for actuaries?**

IFRS S2 paragraph 12 requires entities to consider the applicability of the industry-based disclosure topics defined in the Industry-based Guidance on Implementing IFRS S2.<sup>8</sup>

In the Industry-based Guidance, traditional areas of work for actuaries include:

- a. Vol. 15 – Asset Management
- b. Vol. 16 – Commercial Banks
- c. Vol. 17 – Insurance
- d. Vol. 18 – Investment Banking
- e. Vol. 19 – Mortgage Finance

A possible approach is to categorize the different areas of action into:

- a. INVEST– adoption of climate change factors in investment management by reducing the financing of carbon emissions and investing in the transition
- b. INFLUENCE– policies to incentivize responsible behaviour through product offering
- c. OPERATE– manage the physical and transitional risk exposure in the entity and the value chain

Within these three categories lie both risks and opportunities:

INVESTING provides an opportunity to support the economy to move away from carbon emissions but may also cause a risk if these investments are in industries that are significantly exposed to transition risk, are done in new technologies or in illiquid, physical infrastructure exposed to extreme weather events.

Useful disclosures on investments could be a baseline situation, a target situation with a transition time frame and an exclusion policy.

Insurers could account for the climate impact of the insurance-associated emissions from underwriting by considering the risks insured and how the insurance provided contributes to enabling of the business operation. Emissions removed or avoided could also be reported on.

INFLUENCING customers may be done by facilitating decarbonization or by providing them access to investments in decarbonization. This starts with informing customers in the first place. In both own investments and investments offered to customers there is a reputational risk if entities do not comply or keep pace with rapidly evolving good practice standards or government policy, regulatory and legal changes.

OPERATIONS may benefit from investing in sustainable and climate-resilient real assets, but risk higher delivery costs in acquiring and higher insurance costs and value depreciation in places that are vulnerable to extreme weather impacts.

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<sup>8</sup> The Industry-based Guidance accompanies IFRS S2 Climate related Disclosures (published June 2023); and is issued by the International Sustainability Standards Board (ISSB).

603 OPERATIONS may also include a degree of INFLUENCING by informing and setting  
604 targets for suppliers down the value/supply chain.

### 605 **3. Risk Management**

#### 606 **3.1 Introduction**

607 One of the key areas of climate reporting is the way that an entity embeds climate-  
608 related risks and opportunities into its overall risk management framework. The  
609 reporting Standard aims to allow users of financial reporting to understand how an  
610 entity identifies, assesses, prioritizes, and monitors the related risk and  
611 opportunities.

#### 612 **3.2 What are the required risk management disclosures under IFRS S2?**

- 613 a. Description of the processes and related policies used to identify, assess,  
614 prioritize, and monitor climate risks and opportunities, such as:
- 615 i. Inputs and parameters used in the framework, including scope of  
616 business covered and sources of information used in its risk management  
617 processes;
  - 618 ii. Whether and how scenario analysis is used for this purpose;
  - 619 iii. How the nature, likelihood, and severity of the climate risks are considered  
620 in related analysis, including descriptions of qualitative or quantitative  
621 analysis;
  - 622 iv. Prioritization of climate risks among other risks monitored and managed  
623 in the overall risk management framework;
  - 624 v. How climate risks are monitored;
  - 625 vi. Any changes in processes as compared to the prior reporting period; and  
626 vii. If the risks are managed differently to the opportunities, the disclosures  
627 might differentiate this fact.
- 628 b. The extent to which the aforementioned are embedded in the entities' overall  
629 risk management framework, as compared to a standalone framework.
- 630 c. The Standard warns against duplication in sustainability reporting, noting that if  
631 one description of all sustainability is generally included in the overall risk  
632 management framework, then this requirement can be satisfied in one section  
633 for all sustainability reporting.

#### 634 **3.3 What are some common items included in the risk management disclosures 635 around climate risk?**

636 Currently, during risk management process, climate related risks are commonly  
637 identified and assessed by geography, business division, or product segment  
638 (physical, transition, liability, and strategic). These risk management processes are  
639 generally holistic, applying a single consistent view of climate risk across the  
640 business (e.g. underwriting, claims, and investments), and involve clear and robust  
641 engagement strategies with stakeholders, designed to remove or reduce certain  
642 climate risks.

643 Disclosures may provide a description of planned improvements to climate risk  
644 management activities.

### 645 **3.4 Risk Management Scenarios**

#### 646 **a. Introduction**

647 Scenario analysis is a useful tool to help users imagine “what-if”. It can help describe  
648 possible futures that consider different variations of climate change and societal  
649 response to it. Scenario analysis needs to be linked to the entity’s risk management  
650 framework and risk appetite statement, so that the outcomes of the scenario  
651 analysis can be truly embedded into the entity’s risk management.

652 One clear example demonstrating the link between scenario analysis and risk  
653 management is in the determination of the entity’s resilience to climate-related risks  
654 and opportunities. After identifying the risks arising from climate scenarios, users  
655 should then compare that to a risk appetite statement, whether qualitatively or  
656 quantitatively, to understand if the risks would breach the entity’s risk appetite. The  
657 scenario analysis exercise will also allow the entity to identify gaps within its risk  
658 management framework and risk appetite statement.

#### 659 **b. What does this sub-section address?**

660 This sub-section considers possible approaches to climate-related scenario analysis  
661 processes and considerations on the methodology, assumptions, and  
662 communications on climate-related scenario analysis.

#### 663 **c. Which sections of IFRS S2 address this topic?**

664 Paragraphs 22-23. Application guidance provided in B1-B18. Anticipated financial  
665 effects addressed in 15 (b), 16 (c)-(d), 17-21.

#### 666 **d. What other IAA documents may be relevant to this topic?**

- 667 • Introduction to Climate-Related Scenarios<sup>9</sup>
- 668 • Climate-Related Scenarios Applied to Insurers and Other Financial  
669 Institutions<sup>10</sup>
- 670 • Application of Climate-Related Risk Scenarios to Asset Portfolios<sup>11</sup>
- 671 • Climate Change and Mortality<sup>12</sup>

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<sup>9</sup> [https://actuaries.org/app/uploads/2025/04/CRTF\\_Introduction\\_Climate\\_Scenarios.pdf](https://actuaries.org/app/uploads/2025/04/CRTF_Introduction_Climate_Scenarios.pdf)

<sup>10</sup> [https://actuaries.org/app/uploads/2025/04/CRTF\\_Application\\_Climate\\_Scenarios.pdf](https://actuaries.org/app/uploads/2025/04/CRTF_Application_Climate_Scenarios.pdf)

<sup>11</sup> [https://actuaries.org/app/uploads/2025/04/CRTF\\_Paper4\\_Asset\\_Portfolios.pdf](https://actuaries.org/app/uploads/2025/04/CRTF_Paper4_Asset_Portfolios.pdf)

<sup>12</sup> <https://actuaries.org/paper/climate-change-and-mortality/>

672 **e. How could Climate-Related Scenario Analysis be defined?**

673 The actuary can treat the process of climate-related scenario analysis as being  
674 subject to ISAP 1 paragraph 2.7.1 or 2.8.2<sup>13</sup> and having regard to the circumstances  
675 of the entity as described in IFRS S2 paragraph B2-B3.

676 The process would include the following steps:

- 677 • Step 1: Selecting the scenarios;
- 678 • Step 2: Evaluating the financial impact; and
- 679 • Step 3: Identifying potential responses.

680 In the following, these 3 steps are discussed in more detail as well as further  
681 considerations regarding model governance and assumptions.

682 **Step 1: Selecting the scenarios**

683 **f. How may the Scenarios be selected?**

684 When selecting scenarios for climate-related scenario analysis, the actuary may  
685 consider:

686 i. Scoping of the scenario analysis:

- 687 • Identifying a broad range of stakeholders across the entity's value chain  
688 to involve and how to engage them in order to support robust internal  
689 debate around the scoping of the scenario analysis;
- 690 • Ensuring the objectives of the analysis, as defined in paragraph B13 of  
691 IFRS S2 as well as other related objectives of the principal<sup>14</sup>, are met;
- 692 • Considering the specificities of the entity's business (e.g., solo/group,  
693 insurance/pensions/other, strategic context, geographic locations where  
694 the entity's operations are concentrated, the products/services it provides,  
695 and its current and prospective customer and client base);
- 696 • Choosing appropriate scope of the analysis by applying a range of  
697 scenarios capturing different combinations and severity of transition and  
698 physical risks.;
- 699 • Performing exposure analysis to identify climate-related risks and  
700 opportunities over different time horizons; and
- 701 • Determining whether qualitative as well as quantitative scenarios are  
702 required, recognizing the limitations of any  
703 data/assumptions/models/evaluation tools.

704 ii. Design of the scenarios including their narratives:

- 705 • Identifying relevant third-party/publicly available scenarios from  
706 recognized organizations in the field of climate change such as the

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<sup>13</sup> [https://actuaries.org/actuarial\\_practices/isap-1-general-actuarial-practice/](https://actuaries.org/actuarial_practices/isap-1-general-actuarial-practice/)

<sup>14</sup> The party who engages the provider of actuarial services. The principal will usually be the client or the employer of the actuary (definition in the IAA Glossary for ISAPs)

- 707 NGFS<sup>15</sup> or IPCC, e.g., IPCC’s Representative Concentration Pathways,  
708 Shared Socioeconomic Pathways;
- 709 • Developing plausible narratives around factors that could affect future  
710 climate-related exposures;
  - 711 • Considering climate factors such as emission pathways, socio-economic  
712 consequences such as involuntary mass migration, technological  
713 evolution, climate policy landscape, or loss of biodiversity;
  - 714 • Considering decarbonization or transition activities arising from  
715 technology or government mandates, including their effect on  
716 communities or industries;
  - 717 • Analyzing how adaptation measures may impact climate factors; and
  - 718 • Considering interdependencies and feedback loops between these  
719 climate factors over time to identify and capture potential non-linear  
720 behavior, including tail event scenario(s) and potential ecosystem tipping  
721 points.
  - 722 • Considering appropriate time horizons (short, medium, long term), and the  
723 implications of the different timelines for the development of the  
724 underlying climate-related risks and opportunities; the time horizons can  
725 be aligned to the nature and duration of the entity’s assets and liabilities.
  - 726 • Review the scenarios to ensure they are plausible, relevant, and wide  
727 ranging enough to capture different significant carbon net-zero transition  
728 outcomes.
  - 729 • Perform a materiality analysis to inform decision making to focus degree  
730 of sophistication in approach to the evaluation of the financial impact  
731 (step 2 below), possibly using an actuarial cashflow model.
- 732 **g. What level of granularity can be applied to model the financial impacts?**
- 733 Consider associated financial impacts at a sufficiently granular level in relation to  
734 the objective of the analysis:
- 735 • Broad economic factors such as pathways of gross domestic product,  
736 inflation and interest rates;
  - 737 • Implications on economic sectors and geographies;
  - 738 • Implications for individual assets including whether those assets could be  
739 impaired in a carbon net-zero scenario; and
  - 740 • Implications for specific economic activities.

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<sup>15</sup> Note the IFoA Risk Alert dated 6 June 2024 that there is a risk, when using current published scenarios that an Actuary will underestimate climate risk.  
<https://actuaries.org.uk/media/ue4hdq3l/risk-alert-climate-change-scenario-analysis.pdf>

**741 Step 2: Evaluating the financial impact****742 h. How may the Financial Impact be evaluated?**

743 When evaluating the financial impact of climate-related scenario analysis, the  
744 actuary may consider:

- 745 i. Choosing appropriate evaluation tools; if a model is chosen, refer to source of  
746 model. For the avoidance of doubt, the term model may include elements of the  
747 following for the purpose of this Standard:
- 748 • Models for chronic climate impacts (e.g., Earth System Models, Climate  
749 Impact Models)
  - 750 • Models for acute climate impacts (e.g., Natural Catastrophe Models)
  - 751 • Climate transition models (e.g., Integrated Assessment Models)
  - 752 • Macroeconomic models
  - 753 • Actuarial cash flow models
- 754 ii. Defining a baseline scenario;
- 755 iii. Defining modelling approaches for the analysis, for example:
- 756 • Type of scenario analysis:
    - 757 ○ Quantitative vs. qualitative analysis;
    - 758 ○ Change of one risk vs. a number of different (related or unrelated)  
759 risks;
    - 760 ○ Reverse stress test, i.e., stress test that starts with the identification  
761 of a pre-defined outcome, e.g., threatened solvency of the entity;
    - 762 ○ Exploratory stress test, i.e., explore emerging risks that are typically  
763 beyond what is used for capital planning;
  - 764 • If performing a valuation as at a future valuation date, consider the  
765 methodology for changing the current balance sheet to the balance sheet  
766 as at that future valuation date, e.g., leaving the balance sheet unchanged,  
767 or applying a forecasted balance sheet, or projecting the full balance  
768 sheet;
  - 769 • Application of an instantaneous shock at one or more selected points in  
770 time versus continuous consideration over a specified time interval;
  - 771 • Consideration of reactive management actions (static vs. dynamic  
772 balance sheet);
  - 773 • Development of management actions that are of relevance for mitigation  
774 of climate related risk, increasing resilience and/or adaptation in response  
775 to how climate risks may play out;
  - 776 • Consideration of long term trends generating short term disruptive events;  
777 and

- 778           • Capture all key impacts that may impact long term severity and care  
779           would be given as to whether assumptions could default to steady state  
780           assumptions.
- 781 iv. Defining the relevant evaluation metrics to assess the financial impact, i.e., the  
782       financial position, financial performance and cash flows as mentioned in IFRS  
783       S2 paragraph 15;
- 784 v. If the chosen evaluation tool includes an actuarial cash flow model, assessing  
785       the financial impact by considering the impact on both assets and liabilities;  
786       and
- 787 vi. Whether the limitations of the evaluation are material and if so, how these can  
788       be addressed (e.g., by communicating these to the principal or the entity).

789

### 790 **Step 3: Identifying potential responses**

#### 791 **i. How may potential responses be identified?**

792 When advising the principal or the entity on identifying potential responses to the  
793 climate-related scenario analysis to manage the identified risks and opportunities,  
794 the actuary may consider matters such as the following:

- 795       • Capacity to adjust or adapt business model, strategy and financial plans;
- 796       • Changes to business mix;
- 797       • Investments in capabilities and technologies;
- 798       • Extending internal controls and risk dashboards; and
- 799       • Changes to the governance around climate-related scenario analysis.

### 800 **Further considerations regarding model governance and assumptions**

#### 801 **j. What could be considered regarding model governance and assumptions?**

802 Model Governance – Further to ISAP 1 paragraph 2.10, the actuary may consider  
803 matters such as:

- 804       • If relying on third-party/publicly available models, understanding key model  
805       limitations, judgements and choice of assumptions;
- 806       • Ensuring that the choices of macro-economic model (e.g., Computable  
807       General Equilibrium (CGE) models) and loss/damage function are appropriate  
808       for the circumstances of the work. Models may contemplate a cycle from  
809       emissions rates, to warming, to consequences, then to entity specific  
810       impacts. In particular, models can be transparent on the progression of  
811       greenhouse gas emissions assumed and consequent speed/rate of warming  
812       in each scenario;
- 813       • Explaining results which appear to be counter-intuitive;
- 814       • Assessing whether models take into account the current state of climate  
815       change (e.g., the starting point for model projections and the baseline

- 816 scenario of models may reflect current conditions and scientific consensus);  
817 and
- 818 • Disclosing whether or not the entity is relying on third party/publicly available  
819 physical climate and economic models and describing the  
820 links/interconnectedness between each of these models (e.g., does the  
821 physical climate model inform the economic model, does the economic  
822 model inform the insurance cash flow/valuation model, etc.). The actuary may  
823 seek to ensure that related assumptions across different models are  
824 consistent, to the extent possible, where appropriate.

825 Assumptions - When advising the principal or the entity on assumptions, the actuary  
826 may consider assumptions such as:

- 827 i. Socioeconomic context (including policy ambition / change tolerance – e.g.,  
828 IPCC’s Shared Socioeconomic Pathways);
- 829 ii. Emissions pathway (e.g., IPCC’s Representative Concentration Pathway);
- 830 iii. Climate-related policies;
- 831 iv. Energy usage and mix;
- 832 v. Developments in technology;
- 833 vi. Adaptation measures;
- 834 vii. Macroeconomic trends; and
- 835 viii. National or regional level variables:
  - 836 • Local weather patterns
  - 837 • Demographics
  - 838 • Land use
  - 839 • Infrastructure
  - 840 • Availability of natural resources

841 Assumptions - When advising the principal or the entity on assumptions, the actuary  
842 may consider factors such as:

- 843 i. Interdependencies between assumptions, where material, including feedback  
844 loops and its implications for scenario pathways;
- 845 ii. Importance of attempting to distinguish between climate versus non climate  
846 impacts;
- 847 iii. The extent to whether assumptions developed in other contexts, for example  
848 pricing assumptions, assumptions in natural catastrophe models, or  
849 assumptions driving investment decisions, would be appropriate for IFRS S2  
850 purposes. One potential reason that would render these assumptions  
851 inappropriate is a different time horizon;
- 852 iv. The credibility of data when combining information from various sources or  
853 time periods; and

- 854 v. Long term trends and seasonal variations, and other changes in the  
855 environment (e.g., macro-economic trends, current policies and policy ambition  
856 in the jurisdictions in which the entity operates, technological developments,  
857 changes in consumer preferences).
- 858 vi. The purpose of the assumptions should also be stated, for example, for  
859 transition risk modelling, physical risk modelling, or evaluating the financial  
860 position.

Exposure Draft

## 861 4. Metrics and Targets

### 862 4.1 Introduction

863 One of the key areas of climate reporting is the need to develop metrics to report on  
864 current emissions and other items that are important to monitoring climate impacts,  
865 along with the targets used to gauge success in the journey to reduce emissions,  
866 climate related risk to physical assets, transition risks and opportunities, and other  
867 relevant aspects of a firm's operations. This section will discuss the primary metrics  
868 that are relevant to actuaries when it comes to climate reporting along with the ways  
869 in which actuaries may be involved in helping their constituencies in meeting the  
870 various climate targets.

871 At a high level the metrics and targets disclosures may aim to cover items such as:

- 872 a. Metrics which include carbon intensity of asset and liability portfolios, scope 3  
873 emissions from claims handling and the broader supply chain, green revenues,  
874 and projected annual expected loss from climate risks
- 875 b. Description of scope 3 emissions calculation methodology
- 876 c. Data quality score included for emissions data, ranging from highest to lowest  
877 quality
- 878 d. Reported emissions targets (e.g., net zero by 2050) along with intermediate  
879 targets.
- 880 e. Other relevant metrics related to physical and transition risks.

881 It is common practice for this section to not only focus on the targets themselves,  
882 but also how targets will be achieved. For example, percentage of high-emission  
883 assets to total assets can be used for restriction on supply chain; alternatively high-  
884 emission sector or industry would be monitored during investment or underwriting  
885 process. In order to control climate-related risk, some risk factors like Probably  
886 Maximum Loss (PML) and Annual Aggregate Loss (AAL), or total value exposed to  
887 certain peril is also monitored.

### 888 4.2 What are some common climate metrics used in the financial services 889 industry?

890 Financial services firms have begun reporting under the Task Force on Climate-  
891 related Financial Disclosures (TCFD) and Standards based on IFRS S1 and S2 in  
892 several jurisdictions. While the development of climate metrics is ongoing and  
893 expected to increase in sophistication over time, several trends can be seen in  
894 reporting to date.

895 The TCFD provided specific guidance to banks and insurance companies on climate  
896 metrics.<sup>16</sup> For banks, this included metrics to assess the impact of physical and  
897 transition risks on their lending and other financial intermediary business over the  
898 short, medium and long term. This also included information on carbon-related  
899 assets and the extent to which their activities are aligned with decarbonization

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<sup>16</sup> Source [Metrics and Targets - TCFD Knowledge Hub](#)

900 targets. For insurance companies, this included metrics on risk exposure to weather-  
901 related catastrophes and the extent to which their underwriting activities supported  
902 decarbonization targets.

903 The TCFD has now been incorporated into the ISSB. IFRS S1 and S2 are anchored in  
904 the TCFD, but requirements are more detailed. For insurers, this includes quantified  
905 disclosure of insured exposure under multiple climate scenarios, quantified  
906 disclosure of exposure to high-emission sectors, and disclosure of Scope 3  
907 emissions if material.

908 For banks, metrics include the emissions intensity of lending portfolios or the  
909 proportion of loans on properties exposed to climate-related physical risks. For  
910 insurance companies, metrics include the emissions intensity of assets in their  
911 investment portfolio, emissions on insured assets, or the proportion of insured risks  
912 subject to climate related physical risk.

913 Specific climate metrics could include:

- 914 • Absolute Scope 1, Scope 2, and Scope 3 GHG emissions, which can be  
915 separated by asset class;
- 916 • Volume of carbon intensive assets which are highly exposed to transition risk  
917 (e.g., real estate, coal mining, transportation);
- 918 • Number and value of mortgage loans/credit business in 100-year  
919 flood/typhoon zones;
- 920 • Total asset exposure to flood/typhoon risks;
- 921 • Proportion of property, infrastructure, or other alternative asset portfolios in an  
922 area subject to flooding, heat stress, or water stress;
- 923 • Proportion of real assets exposed to 1:100 or 1:200 climate-related hazards;  
924 and
- 925 • 200-year loss due to climate change that can be used for capital purposes.

#### 926 **4.3 What are the cross-industry metric categories defined in IFRS S2?**

927 Paragraph 29 in the IFRS S2 Standard sets out the requirements for disclosing the  
928 cross-industry metrics, which is complemented by examples in paragraph IG1 in the  
929 “Accompanying Guidance on Climate-related Disclosures”. The Standard sets out  
930 definitions on each of the metrics which may be used as the primary guidance for  
931 the actuary helping to develop and monitor these metrics.

932 The table below provides additional illustrative examples of commonly disclosed  
933 financial services climate metrics.

934

935 **Table 1: Examples of Commonly Disclosed Financial Services Climate Metrics**

Category	Metric description and illustrative examples	Unit of measurement
<b>Greenhouse Gas (GHG) – Scope 1</b> Direct GHG emissions from owned or controlled sources	Direct operational carbon footprint sources: <ul style="list-style-type: none"> <li>• Combustion of fuel</li> <li>• Company owned vehicles</li> </ul>	Metric tons of CO <sub>2</sub>
<b>GHG - Scope 2</b> Indirect GHG emissions	Indirect operational carbon footprint sources: <ul style="list-style-type: none"> <li>• Location based (e.g. non-owned sources of energy)</li> <li>• Market based (e.g. contractual arrangements for electricity)</li> </ul>	Metric tons of CO <sub>2</sub>
<b>GHG - Scope 3</b> Other indirect emissions not covered in Scope 2 that occur in the value chain of an entity	Other indirect operational carbon footprint sources: <ul style="list-style-type: none"> <li>• Purchased goods and services</li> <li>• Business travel</li> <li>• Water consumption</li> <li>• Waste to landfill generation</li> <li>• Employee commuting</li> </ul> Other indirect sources within the insurance value chain: <ul style="list-style-type: none"> <li>• Emissions of the investment portfolio</li> <li>• Emissions of the underwriting portfolio</li> <li>• Claims supply chain emissions</li> </ul>	Metric tons of CO <sub>2</sub>
<b>Climate transition risks</b> Risks that arise from transitioning to a lower-carbon economy	Costs to research, develop and deploy new practices, processes and alternative technologies	Presentation currency
	<ul style="list-style-type: none"> <li>• Impact on revenue from change of revenue mix and sources</li> <li>• Impact on value of invested assets held as climate transition affects market values</li> </ul>	Presentation currency

Category	Metric description and illustrative examples	Unit of measurement
<p><b>Climate physical risks</b></p> <p>Risks resulting from extreme weather (acute) or changing climate conditions (chronic)</p>	<p>Climate Value-at-Risk (CVaR) to assess the financial impacts of future climate-related risks. It can be calculated by conducting scenario analysis of a range of best- and worst-case climate related scenarios and assessing the potential percentage of the market value of the portfolio of assets that is at risk.</p>	<p>Percentage (%)</p>
	<p>Actual climate-related losses versus expected losses</p>	<p>Percentage (%)</p>
	<p>Weather impact on the combined operating ratio</p>	<p>Percentage (%)</p>
	<p>Number and value of mortgage loans/credit business in 100-year flood/typhoon zones;</p>	<p>Percentage (%)</p>
<p><b>Climate opportunities</b></p> <p>Potential positive effects arising from climate change for an entity</p>	<p>Level of investment in companies developing climate-aware investment strategies and solutions</p>	<p>Presentation currency</p>
	<p>Impact of potential operating cost reduction from gains in efficiency and reduced energy or water consumption</p>	<p>Presentation currency</p>
<p><b>Capital deployment</b></p> <p>Amount of capital expenditure, financing or investment deployed towards climate-related risks and opportunities</p>	<p>Level of investment in sustainable assets</p>	<p>Presentation currency</p>
	<p>Weighted average of investment portfolio economic carbon intensity</p>	<p>Metric tons of CO<sub>2</sub> per unit of sales revenue</p>
	<p>Implied temperature alignment score, relating to a maximum warming potential of the investment portfolio to the Paris Agreement target of 1.5°C above pre-industrial levels.</p>	<p>°C</p>
<p><b>Internal carbon prices</b></p> <p>Price used by an entity to assess the financial implications of changes relating to transition</p>	<p>A hypothetical carbon price which can be input into investment, research and capital expenditure, with no actual cash flow implications</p>	<p>Presentation currency</p>
	<p>An internal carbon price, based on the GHG an entity emits, allocated to the divisions of the entity</p>	<p>Presentation currency</p>

Category	Metric description and illustrative examples	Unit of measurement
Remuneration Climate-related targets in executive management remuneration	Percentage of annual variable pay based upon achievement of climate-related strategic targets	Percentage (%)
	Vesting level of awarded shares based on progress against climate-related strategic targets	Percentage (%)

936 The above illustrative examples are relevant to broad range of business units within  
937 an insurance company.

938 Areas which might be particularly relevant to actuarial judgement are as follows:

939 • **Scope 3 GHG emissions**

940 Scope 3 GHG emissions cover indirect emissions not covered in Scope 2. These are  
941 emissions that occur in the value chain of an entity and result from sources not  
942 owned or controlled by the company. However, estimating the impact of Scope 3  
943 emissions can be challenging, more so than Scope 1 or Scope 2, due to the limited  
944 reliability, coverage and transparency of Scope 3 data.

945 Insurers may consider engaging with various bodies to develop frameworks and  
946 approaches to calculate Scope 3 emissions, for example, regulators, industry bodies  
947 and other companies.

948 • **Climate VaR to measure physical climate risks**

949 Climate Value-at-Risk (CVaR) is a model that can be developed and used to assess  
950 the financial impacts of future climate-related risks and opportunities. It can be  
951 calculated by conducting scenario analysis, which involves identifying a range of  
952 best- and worst-case climate-related scenarios across a set time horizon. Commonly  
953 used scenarios cover specific likely temperature rises based on the level of global  
954 GHG mitigation. This analysis is then used to determine the potential percentage of  
955 the market value of the portfolio that is at risk. Risks can also be aggregated  
956 together to determine an overall impact for a given scenario by calculating a single  
957 CVaR metric.

958 • **Insurance Sector Metrics as defined in IFRS S2**

959 Paragraph B63 in the IFRS S2 sets out the disclosure requirements for the Insurance  
960 sector, which is completed by Volume 17 in the “Industry-based Guidance”. The  
961 guidance sets out clear metrics, unit of measurement and definitions on each of  
962 these requirements which may be used as the primary source for the actuary helping  
963 to develop and monitor these.

964 **Table 2: Summary of Key Metrics and Considerations on Key Actuarial Judgements**  
 965 **(Insurance Sector)**

Metric	Category	Unit of measure	Considerations on key actuarial judgements
Description of approach to incorporation of climate change factors in investment management processes and strategies	Discussion and Analysis	n/a	<ul style="list-style-type: none"> <li>• What are the considerations around conducting scenario analysis or modeling in which the risk profile of future climate change factors at the portfolio level is calculated?</li> </ul>
Net premiums written related to energy efficiency and low carbon technology	Quantitative	Presentation currency	
Discussion of products or product features that incentivize health, safety or environmentally responsible actions or behaviors	Discussion and Analysis	n/a	<ul style="list-style-type: none"> <li>• Are there any specific considerations in the calculation of actuarially adjusted premiums for the use of low-emission vehicles, fuel-efficient non-hybrid vehicles or alternative-fuel vehicles?</li> <li>• What are some of the other quantitative measures related to performance of underwriting of products with clauses incentivizing healthy, safe or environmentally responsible actions or behaviors beyond those stated in FN-IN-410b.2 (Section 3)?</li> </ul>
Probable Maximum Loss (PML) of insured products from weather-related natural catastrophes	Quantitative	Presentation currency	<ul style="list-style-type: none"> <li>• What are the appropriate climate scenarios that may be used for calculating the PML?</li> <li>• What is the appropriate time horizon for disclosing the PML?</li> </ul>

Metric	Category	Unit of measure	Considerations on key actuarial judgements
Total amount of monetary losses attributable to insurance pay-outs from (1) modelled natural catastrophes and (2) non-modelled natural catastrophes, by type of event and geographical segment (net and gross of reinsurance)	Quantitative	Presentation currency	<ul style="list-style-type: none"> <li>• How can the results of catastrophe models be adjusted to allow for climate change impacts?               <ul style="list-style-type: none"> <li>○ Bottom-up approach</li> <li>○ Top-down approach</li> </ul> </li> <li>• Are there any materiality considerations with respect to disclosing the quantitative targets and metrics?</li> </ul>
Description of approach to incorporation of environmental risks into (1) the underwriting process for individual contracts and (2) the management of entity-level risks and capital adequacy	Discussion and Analysis	n/a	What are the key considerations in designing methodologies to expand current models that test sensitivity of cashflows and capital to accommodate climate scenarios?

966 • **Asset Management Sector Metrics as defined in IFRS S2**

967 Paragraph B61 in IFRS S2 sets out the disclosure requirements for the Asset  
 968 Management Sector which is complemented by Volume 15 in the “Industry-based  
 969 Guidance”. The guidance sets out clear metrics, unit of measurement, and  
 970 definitions on each of these requirements which may be used as the primary source  
 971 for the actuary helping to develop and monitor these.

972 The table below summarizes the key metrics outlined in Volume 15, alongside  
 973 considerations on key actuarial judgements required to derive these metrics.

974 **Table 3: Summary of Key Metrics and Considerations on Key Actuarial Judgements**  
 975 **(Asset Management Sector)**

Metric	Category	Unit of measure	Considerations on key actuarial judgements
Amount of assets under management (AUM), by asset class, that employ (1) integration of climate change issues, (2) sustainability themed investing and (3) screening	Quantitative	Presentation in currency	<p>AUM will already be a metric that is derived by the company.</p> <p>Corporate Governance and Investment Policies will be prepared by the company describing how to apportion the AUM to assets that employ (1), (2) and (3), and the guidance specifies that this needs to align with PRI Reporting Framework – Main definitions 2018.</p> <p>The Standard requires that both passive and active strategies be considered in this disclosure.</p>
Description of approach to incorporation of climate change factors in investment or wealth management processes and strategies	Discussion and Analysis	N/A	<b>N/A</b> – This is a qualitative disclosure that is required by the guidance.
Description of proxy voting and investee engagement policies and procedures	Discussion and Analysis	N/A	<b>N/A</b> – This is a qualitative disclosure that is required by the guidance.
Total assets under management (AUM)	Quantitative	Presentation in currency	This metric will already be derived by the company. It does not require actuarial judgement specific to climate change matters.
Total assets under custody and supervision	Quantitative	Presentation in currency	This metric will already be derived by the company. It does not require actuarial judgement specific to climate change matters.

976 **4.4 What are some common climate targets set by corporate entities?**

977 There are several different targets that companies are setting to meet their climate  
 978 targets. The targets an entity sets are designed to monitor progress towards  
 979 achieving strategic goals. Some of the common targets disclosed by insurers  
 980 include:

981 **Table 4: Common Climate Targets Set by Insurers**

<b>Cross-industry Metric Category</b>	<b>Target</b>
<b>GHG emissions</b>	Reduce GHG emission by X% by a set target date
	Achieve net zero emission by a set target date
	Reduce absolute Scope 1 and 2 GHG emissions by X% by a set target date
<b>Capital deployment</b>	Achieve net zero asset portfolio in line with a 1.5 degree Celsius Paris objective by 2050
	Reduce carbon intensity of the total portfolio of assets by X% by a set target date
<b>Insurance-associated emissions</b>	Reduce Underwriting capacity in commercial portfolio to carbon intensive industries (e.g. thermal coal power and utilities, oil and gas) to x% of portfolio.
	Reduce attributed emissions by increasing underwriting capacity for lower emitting vehicles (hybrid, electric) and limit exposure to higher emitting vehicles (carbon fuel) to x% of premium of personal lines motor portfolio.
<b>Climate physical risks</b>	Reduce concentration risk for physical written risks by X% by a set target date
<b>Climate transition risks</b>	Purchase X% of directly procured energy from renewable sources
	Reduce water consumption volumes by X% per occupied office
	Reduce waste to landfill volumes by X% per occupied office
<b>Internal carbon prices</b>	Increase internal carbon price by X% by a set target date to reflect changes in policy

Cross-industry Metric Category	Target
Remuneration	Increase amount of executive management remuneration impacted by climate considerations to X% by a set target date

982

983 Companies may also set internal targets aimed at influencing partners and suppliers,  
 984 such as targets based on % of policyholders committed to align to net zero by 2050,  
 985 or net zero targets being incorporated into service level agreements with repair and  
 986 supply chain partners.

#### 987 **4.5 How might companies determine their climate targets?**

988 There are various methods companies can use to determine climate targets. The  
 989 targets may be set to achieve the following objectives:

- 990 a. As a company directive based on globally understood goals
- 991 b. To be competitive as compared to peer companies
- 992 c. To comply with local or international regulations
- 993 d. To achieve a risk management metric

994 Companies may use a phased approach to establish climate targets.

#### 995 **4.6 What are some common strategies companies will use to meet their emission** 996 **targets?**

997 There are a number of different strategies that companies are adopting to meet their  
 998 emission targets. Some of the common strategies disclosed by insurers and asset  
 999 managers include:

- 1000 a. Reduced travel
- 1001 b. Revised investment mix
- 1002 c. Development of products which aid consumers in responding to climate risks
- 1003 d. Embedding climate-related planning into the business planning process
- 1004 e. Investment exclusion policies:
  - 1005 i. Companies are setting investment exclusion policies to reduce their  
 1006 financed emissions. There are a variety of approaches to defining an  
 1007 “exclusion” including:
    - 1008 • Exclusion of sectors or subsectors that investment assets operate  
 1009 in;
    - 1010 • Case by case basis for individual issuers of assets; and
    - 1011 • The proportion of revenue the issuer of assets receives from  
 1012 ‘excluded operations’.

- 1013 ii. Common sectors or criteria included by companies in their investment  
1014 exclusion policies include securities in the fossil fuel sectors or high  
1015 carbon intensity investments.
- 1016 f. Re/Insurance Companies are recognizing insurance-associated emission that  
1017 reflect the carbon footprint of the industries they underwrite by
- 1018 i. Developing methodologies and reliable data sources to quantifying  
1019 emissions linked to underwriting portfolios
- 1020 ii. Defining exclusions or conditional coverage for carbon-intensive  
1021 industries
- 1022 iii. Leveraging client relationships to encourage emissions reductions or  
1023 incentivize low-carbon transitions
- 1024 g. Active stewardship:
- 1025 i. Stewardship can be defined as ‘the responsible allocation, management  
1026 and oversight of capital to create long term value for clients and  
1027 beneficiaries leading to sustainable benefits for the economy, the  
1028 environment and society.’
- 1029 ii. Stewardship may involve insurers or asset managers engaging and  
1030 collaborating with investee companies on climate change issues, with the  
1031 aim to support the transition to a net zero economy.
- 1032 h. Balancing exclusion policies and stewardship:
- 1033 i. Investment exclusion policies are increasingly becoming more  
1034 sophisticated with companies using a blended approach of stewardship  
1035 and exclusion in a proportionate way. This is because blanket exclusions  
1036 by sector may exclude certain companies which, although they may be  
1037 carbon intensive today, could play a key role in the transition to a low  
1038 carbon economy and so investments in these companies could be an  
1039 opportunity to engage with their management team to ensure that  
1040 progress is made.
- 1041 ii. A blended approach may begin with stewardship and engagement with  
1042 portfolio companies and then move towards exclusion over time if  
1043 insufficient progress is made.
- 1044 i. Impact investing: This is defined by the Global Impact Investing Network as  
1045 ‘investments made with the intention to generate positive, measurable social  
1046 and environmental impact alongside a financial return.’

1047 **4.7 How might actuaries get involved in assisting with monitoring such climate**  
 1048 **metrics?**

- 1049 a. Modelling – Development of sophisticated models reflective of system-wide  
 1050 thinking regarding climate-related risks<sup>17</sup>
- 1051 b. Design of climate scenario analysis (see scenario section)
- 1052 c. Facilitating the accuracy, consistency, and reliability of data over time and  
 1053 understanding data limitations
- 1054 d. Define and document the assumptions used
- 1055 e. Apply risk management and business planning skills
- 1056 f. Refine analysis over time through application of ‘control cycle’ techniques
- 1057 g. Training in specialized areas including catastrophe modelling in general  
 1058 insurance, measurement of carbon footprints in pensions and investment

1059 **4.8 How might actuaries get involved with assisting their employers or clients**  
 1060 **measuring progress with climate goals and targets?**

1061 Actuaries can play a role in enhancing the quality and accelerating the development  
 1062 of the disclosures by supporting their preparation (metrics and targets):

- 1063 a. Assuming Scopes 1 and 2 emissions are managed elsewhere in the actuaries’  
 1064 organization (although this may not be the case), actuaries are well suited to be  
 1065 involved in management around Scope 3 GHG emissions
- 1066 b. Physical and Transition Risk Assessment
- 1067 i. Physical risk assessment and CAT model adaptations
- 1068 ii. Transition risk assessment
- 1069 c. Scenario analysis and stress testing
- 1070 d. Responsible product design
- 1071 e. Climate-friendly investment strategies
- 1072 i. Negative screening
- 1073 ii. Positive screening
- 1074 iii. Activist investing
- 1075 f. Providing data driven analysis to support decisions by the entity relating to  
 1076 sustainability
- 1077 g. Validating the sources of information used
- 1078 h. Reporting – prepare reports and disclosures on climate-related metrics in  
 1079 compliance with regulatory requirements and industry standards

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<sup>17</sup> [Climate-Related Scenarios Applied to Insurers and Other Financial Institutions – International Actuarial Association](#)

- 1080 i. Business planning – integrate climate goals into the overall business strategy  
1081 and financial planning
- 1082 j. Quantification and communicating the uncertainty associated with quantitative  
1083 metrics and targets
- 1084 k. Actuaries can help to ensure that any limitations and uncertainties in climate-  
1085 related analyses are understood and adequately explained to manage  
1086 greenwashing risk.

1087 **4.9 Which stakeholders would actuaries consider when supporting companies’**  
1088 **climate disclosures?**

1089 Actuaries may work in multi-disciplinary teams with a range of experts such as  
1090 meteorologists, economists, and climate scientists to make use of broader scientific  
1091 information.

1092 Actuaries may collaborate with business, regulators, government and other relevant  
1093 stakeholders in understanding the economic consequences of climate-related risks,  
1094 to advise on solutions to gaps in insurance coverage and develop potential  
1095 mitigation and adaptation strategies.

1096 **4.10 Considerations on data sources and frameworks**

1097 In developing and monitoring these metrics, actuaries may consider the variety of  
1098 data sources available to them as well as frameworks to develop these.

1099 **Data sources**

- 1100 a. Despite recent consolidation and acquisition within the ESG data market, the  
1101 possible data options for insurers are still a large and fragmented market.
- 1102 b. Insurers and asset managers can work to understand the strengths and  
1103 limitations of each data source and identify how certain data sources could be  
1104 appropriately integrated into existing data sources. For example, different data  
1105 sources may be more appropriate to value different asset classes.
- 1106 c. We note that this is a continually evolving landscape and actuaries may want to  
1107 consider what the most reputable data sources are for the relevant metrics at  
1108 the time.

1109 **Frameworks**

- 1110 a. There are a number of sustainability frameworks and initiatives in the market  
1111 that contain methodologies for calculating particular metrics (e.g. Scope 3  
1112 emissions).
- 1113 b. Actuaries may wish to consider the latest market practice in using these  
1114 frameworks to help them in developing metrics to align with the industry.

1115 **4.11 How Might Measurement Uncertainty be Addressed?**

1116 IFRS S1 makes specific reference to treatment of Measurement Uncertainty (S1,  
1117 paragraphs 77-82). While no reference is made in the Standard to the discipline and  
1118 potential comparability added by the use of mathematical distributions and curve-

1119 fitting to trends, it is apparent that the use of such methods would be helpful in  
1120 achieving the Standard's aims.

1121 In developing metrics and targets, the actuary may estimate the range of outcomes  
1122 by fitting distributions to the emerging data in order to project outcomes that may  
1123 then be compared with experience in a disciplined manner. As practice becomes  
1124 established, this may also offer comparability between entities if similar approaches  
1125 to measurement uncertainty become established.

Exposure Draft