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# Environmental management systems and climate risks

## Analysis of standards for environmental management systems with regard to the management of climate-related risks and TCFD. Opportunities for the further development of ISO 14001 and EMAS.

For our environment

Umwelt Bundesamt

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Analysis of standards for environmental management systems with regard to the management of climate-related risks and TCFD. Opportunities for the further development of ISO 14001 and EMAS.

by

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**Abstract: Environmental management systems and climate risks**

Over the past few years it has become increasingly clear that the physical consequences of climate change and the transition to a carbon-neutral economy are posing risks to companies and must be managed accordingly. At the same time, around half a million sites belonging to companies and other organisations feature ISO 14001-certified environmental management systems (ISO 2020). A further 12,000 sites also have EMAS certification (European Commission, 2021a).

With this in mind, this study was up to determine to what extent these and other environmental management standards contribute to the systematic management of climate-related risks. The study also looked into the question of how environmental management systems can be used to support or even safeguard the systematic management of climate-related risks. A number of options were reviewed, including amending the ISO 14001 standard or adding a climate-specific supplement to the ISO 14002 series. One of the purposes of this study is to augment the debate on the revision of ISO 14001.

The second part of the study looks into small and medium-sized enterprises and public authorities that have implemented environmental management systems. The study looked into whether these systems cover climate-related risks and, as a consequence, are able to influence such issues. A total of 40 EMAS environmental statements were analysed for this purpose.

**Kurzbeschreibung: Environmental management systems and climate risks**

Die Entwicklungen der vergangenen Jahre machen deutlich, dass für Unternehmen sowohl aus den physischen Folgen des Klimawandels als auch aus der Transition hin zu einer klimaneutralen Wirtschaft Risiken erwachsen, die angemessen gemanagt werden müssen. Zugleich verfügen etwa eine halbe Million Standorte von Unternehmen und anderen Organisationen über ein Umweltmanagementsystem gemäß ISO 14001 (ISO 2020). Hinzu kommen über 12.000 Standorte mit einer EMAS Zertifizierung (Europäische Kommission, 2021a).

Vor diesem Hintergrund wurde untersucht, inwiefern diese und weitere Umweltmanagementnormen zu einem systematischen Management von klimabezogenen Risiken beitragen. Darauf aufbauend wurde der Frage nachgegangen, wie zukünftig mit den Umweltmanagementsystemen ein systematisches Management von klimabezogenen Risiken gefördert oder gar sichergestellt werden kann. Dazu wurden mehrere Optionen wie beispielsweise eine Anpassung der ISO 14001 oder eine klimaspezifische Ergänzung der ISO 14002er-Reihe geprüft. Die Ergebnisse dienen insbesondere, aber nicht nur, als Diskussionsbeitrag zur Novellierung der ISO 14001.

Der zweite Teil der Studie betrachtet mittelständische Unternehmen und Behörden, die ein Umweltmanagementsystem implementiert haben. Bei diesen wurde untersucht, ob sie sich mit klimabezogenen Risiken befassen, denn hier wäre zu erkennen, ob Umweltmanagementsysteme darauf einen Einfluss haben. Dazu wurden insgesamt 40 EMAS-Umwelterklärungen analysiert.

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## List of abbreviations

| | |
|---|---|
| **BMU** | Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit |
| **CDP** | formerly “Carbon Disclosure Project”, now CDP is a name. |
| **CSRD** | Corporate Sustainability Reporting Directive |
| **DAX** | Deutscher Aktienindex |
| **Destatis** | Statistisches Bundesamt |
| **DIHK** | Deutscher Industrie- und Handelskammertag |
| **DIN** | Deutsches Institut für Normung |
| **EMAS** | Eco Management and Audit Scheme |
| **EU** | European Union |
| **FSB** | Financial Stability Board |
| **G7** | Group of Seven |
| **GHG Protocol** | Greenhouse Gas Protocol |
| **GmbH** | Gesellschaft mit beschränkter Haftung |
| **IEMA** | Institute of Environmental Management & Assessment |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **ISO** | International Organization for Standardization |
| **ISSN** | International Standard Serial Number |
| **JRC** | Joint Research Centre |
| **KomPass** | Kompetenzzentrum Klimafolgen und Anpassung (des Umweltbundesamts) |
| **LAGA** | Bund/Länder-Arbeitsgemeinschaft Abfall |
| **LCA** | Life Cycle Assessment |
| **NFRD** | Non-Financial Reporting Directive |
| **NGFS** | Network for Greening the Financial System |
| **TCFD** | Taskforce on Climate-related Financial Disclosures |
| **GHG** | Greenhouse Gas |
| **UAG** | Umweltauditgesetz |
| **UBA** | Umweltbundesamt |
| **VO** | Verordnung |
| **WBCFD** | World Business Council for Sustainable Development |
| **WWF** | World Wide Fund for Nature |

## Summary

The most recent extreme weather events (such as drought and forest fires in Germany, Australia, the United States and Russia; drought and famine in Madagascar; flooding and landslides in Germany, Belgium, Turkey, Japan and Canada) demonstrate the dangerous impact that the climate crisis is already having today and how urgent the need for action is. To minimise the consequences of climate change, greenhouse gas emissions in particular must be dramatically reduced and more action to protect the environment must be taken.

At the same time, there is a growing understanding that the consequences of both climate change and an effective climate policy pose significant risks (and offer opportunities) for companies. What is more, there are fears that climate-related risks may drift across to the financial markets and seriously undermine market stability. The Task Force on Climate-related Financial Disclosures has therefore drawn up reporting recommendations (TCFD, 2017) that are designed to enable the management of climate-related risks in the financial sector.

The view that both the consequences of climate change and the impact of effective climate policy pose significant risks and therefore require measures is also covered in the EU Taxonomy and will be reflected in the planned EU sustainability reporting standards (EFRAG 2021; European Commission, 2021b; European Union, 2020).

International standards for management systems are another important lever in promoting the systematic management of climate-related risks. There are currently some good opportunities in this area to deploy effective strategies in the near future. The question of whether the ISO 14001 standard for environmental management systems, which is in use all over the world, should be revised is currently being explored.[1] The decision on whether a revision will go ahead and what direction it will take is expected to be made in late 2021 or early 2022.

Moreover, discussions as to how the management of climate-related risks can be more strongly anchored in the European Eco-Management and Audit Scheme (EMAS) are under way at a European level. At its core, the EMAS contains the requirements under ISO 14001 and goes beyond them in certain respects.

### Objective and methods

With this in mind, the study investigated, among other things, the extent to which existing environmental management standards and comparable frameworks contribute to the systematic management of climate-related risks. A number of options were reviewed, including amending ISO 14001 or adding a climate-specific addendum to the ISO 14002 series. This forms the first part of the study.

The second part of the study looks into small and medium-sized enterprises and public authorities that have implemented environmental management systems according to EMAS. The study looked into whether these systems cover climate-related risks and, as a consequence, are already able to influence such issues. A total of 40 current EMAS environmental statements were analysed for this purpose.

The path of systematically managing climate risks through environment-related ISO standards and EMAS is of particular importance because it can be used to reach companies all over the

[1] ISO standards are generally reviewed for any need for revision every five years, with a review taking place if necessary. The first revision of ISO 14001:1996 was conducted because the standard was found to require updating (Glatzner, 2001). This revision resulted in ISO 14001:2004. Further revisions took place primarily for reasons of harmonisation and led to the current valid version, ISO 14001:2015. The need for a revision of ISO 14001:2015 is currently being reviewed.

world, including small and medium-sized enterprises. In addition, this approach would help create a common international understanding of the challenges and potential solutions.

### Key terms

In political processes and publications concerning companies' management of climate risks (European Commission, 2019a; TCFD, 2017), a distinction is made between the following risks:

- **Physical risks of climate change**, i.e. risks resulting from the consequences of climate change, such as extreme weather events, droughts or rising sea levels.
- **Transition risks**, i.e. risks for companies resulting from the long-term transition towards a carbon-neutral economy. They include risks from climate mitigation policies as well as the potential impact of changes in consumer and investor behaviour.

Physical and transition risks are both summarised as climate-related risks.

In ISO standards, risk is defined as an "effect of uncertainty" (ISO 14001:2015) or as "effects of uncertainty on objectives" (ISO 31000:2018) and so can include both potentially negative and potentially positive consequences. However, in a corporate environment and in the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD), which are widely recognised around the world, a distinction is made between risks and opportunities, with risks referring exclusively to potentially adverse effects. As a result, this is the definition of risk used in this study.

## PART 1.
## ANALYSIS OF THE STANDARDS FOR ENVIRONMENTAL MANAGEMENT SYSTEMS AND RECOMMENDATIONS FOR THE REVISION OF ISO 14001

ISO 14001[2] was chosen for detailed analysis on the basis of TCFD recommendations due to its global use and prominent position. Given that the EMAS environmental management system[3] is based on ISO 14001, the study only looked at the requirements in EMAS that go above and beyond the scope of ISO 14001. The study also looked into whether the ISO 14002[4], ISO 14004[5], ISO 14090[6] and ISO 26000[7] standards cover the management of physical and transition risks and, if so, what recommendations and requirements they contain.

### Findings of the analysis of ISO 14001

Due to the fact that ISO 14001 is a broadly defined management system standard geared towards addressing all manner of environmental issues and is able to be applied by organisations of any nature or size and operating in any industry, an ISO 14001 environmental management system should be oriented towards the organisation's relevant environmental

[2] ISO 14001:2015 Environmental management systems – Requirements with guidance for use.

[3] EU Eco-Management and Audit Scheme (EMAS), defined in Regulation (EU) No. 1221/2009

[4] ISO 14002-1:2019 Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 1: General

[5] ISO 14004:2016 Environmental management systems – General guidelines on implementation

[6] ISO 14090:2019 Adaptation to Climate Change – Principles, Requirements and Guidelines

[7] ISO 26000:2010 Guidance on Social Responsibility

aspects and the relevant environmental conditions in a context- and organisation-specific manner.

Generally speaking, ISO 14001 also provides a solid framework for addressing climate-related risks. Given that the consequences of climate change and the increasing pressure from social and political actors as well as those in the financial sector have become significantly clearer only in the past few years, it is unsurprising that the "generic", internationally agreed and currently applicable ISO 14001:2015 environmental management system standard does not offer many details with regard to the management of climate-related risks.

Alongside the traditional focus on mitigation, ISO 14001 also addresses the management of the consequences of climate change (adaptation) and the associated risks, but only on a very rudimentary level. Unlike the "impact of the organisation on the environment", the inclusion of "environmental conditions that can affect the organisation" is formulated in a very generalised manner as a call to address relevant environmental conditions and risks.

**No specific requirements on climate-related risks and opportunities**

Analysis of ISO 14001 compared with the TCFD recommendations led to the following conclusions:

- ISO 14001 provides a framework in which potential risks can be determined and assessed. It does not contain any further, more specific requirements with regard to climate-related risks.
- ISO 14001 generally requires action to be planned and systematically implemented with regard to identified risks. It does not contain any further, more specific requirements with regard to climate-related risks.
- ISO 14001 generally defines a systematic approach to achieving set objectives under the leadership and responsibility of top management. It does not contain any requirements with regard to objectives based on climate risk.
- ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned as a rule. It does not contain any more specific requirements with regard to individual tasks, such as assigning activities linked to climate risk to overarching risk management.
- ISO 14001 defines a basic materiality assessment process for environmental aspects, but leaves it up to the user to determine the criteria and methods, such as quantification. It does not contain any more specific requirements with regard to accounting for greenhouse gas emissions, for example.

In addition, the risk concept applied by ISO 14001 is not clear concerning the extent to which the intended outcomes of the environmental management system also extend to the potential financial impact of climate risks on companies as described in the TCFD recommendations.

**Consequences of the lack of more specific requirements on climate-related risks and opportunities**

As ISO 14001 does not provide any specific requirements on addressing climate risks, the question of whether and to what extent the environmental management system modelled in ISO 14001 can be used to manage physical and/or transition climate risks depends heavily on the manner in which it is applied. Top management plays a particularly key role here, as it determines the general orientation of the organisation and the characteristics of its management system. In reality this can range from good environmental, climate and sustainability

management practices to simply fulfilling the minimum requirements of the environmental management system standard.

**Improving the effectiveness of the current version, ISO 14001:2015, with regard to the management of climate-related risks**

The following developments could lead to physical and transition risks being determined and managed more systematically within the scope of the existing ISO 14001 environmental management standard:

More leadership: ISO 14001:2015 would become more useful and effective in terms of climate risks if the top management of an organisation feels or is caused to add the issue of climate-related risks to the agenda and correspondingly take action with the help of the management system.

More obligation: An ISO 14001:2015-compliant environmental management system must include the issues of climate risks and climate consequences if a compliance obligation exists in this regard (for instance due to legal regulations or contractual agreements).

More relevance: If an organisation cannot help but identify the consequences of climate change for the organisation as a relevant contextual issue posing corresponding risks (e.g. due to heightened risk situations), the issue must be addressed as part of the management system according to ISO 14001:2015.

The current unamended version of ISO 14001:2015 can be applied as needed in the management of climate-related risks, taking into account further standards, guidelines or specifications. However, if none of the aforementioned reasons exist, this is not required by ISO 14001, but is left to the will of the respective user.

**Improving effectiveness by developing ISO 14001:2015 further**

ISO 14001:2015 could be developed further with a view to incorporating climate risks to a greater extent through:

Additional requirements and normative formulations, particularly regarding “environmental policy”, performing “context analysis”, determining relevant “stakeholder requirements” or addressing “risks and opportunities” with the aim of improving the application of the environmental management system from the perspective of climate change consequences and climate risks.

Additional instruction for better application of the standard in view of climate change and climate risks, such as through the inclusion of one or more annexes providing in-depth guidance on how to perform context analysis, stakeholder analysis, risk analysis, or through a dedicated annex on the subject of “climate management”.

Additional interfaces compelling users of ISO 14001 to incorporate further standards, guidelines or specifications on the subject of climate change and climate risks and to consider or implement these issues within the scope of environmental management.

Against this background, there are several ways and approaches to promote the consideration of

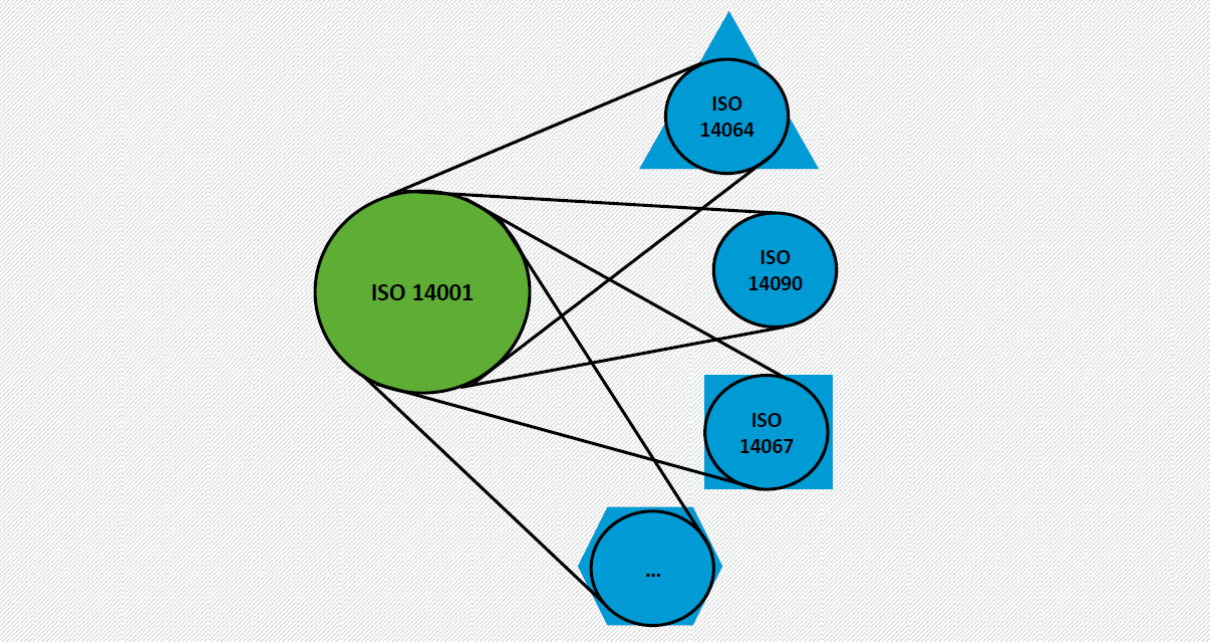
climate-related risks in ISO management system standards. The following options are examined and assessed in more detail in this report:

- Option A: Better combination and linking of the existing standards and tools with ISO 14001
- Option B: Climate-specific further development of ISO 14001
- Option C: Development of supplementary climate management guidance (ISO 14002-x)
- Option D: Drafting of a new climate management system standard

**Option A: Better combination and linking of the existing standards and tools**

This option raises the question of the extent to which a meaningful link can be established between existing guidance, tools and standards (Figure 1).

**Figure 1: Link to ISO 14001 and combination with existing standards and tools**




The ISO standards mentioned in the figure are an illustrative selection of climate-relevant standards.

Source: by the authors (Ludwig Glatzner)

The aim would be to use these resources and the environmental management system as a vehicle to promote the consideration of climate-related risks without having to intervene in the content of the overarching management system standard, ISO 14001.

This could be supported and achieved by the provision of "Bridging Documents" or "White Papers", such as the White Paper on the application of ISO 14090 and ISO 14001 (ISO, 2021a).

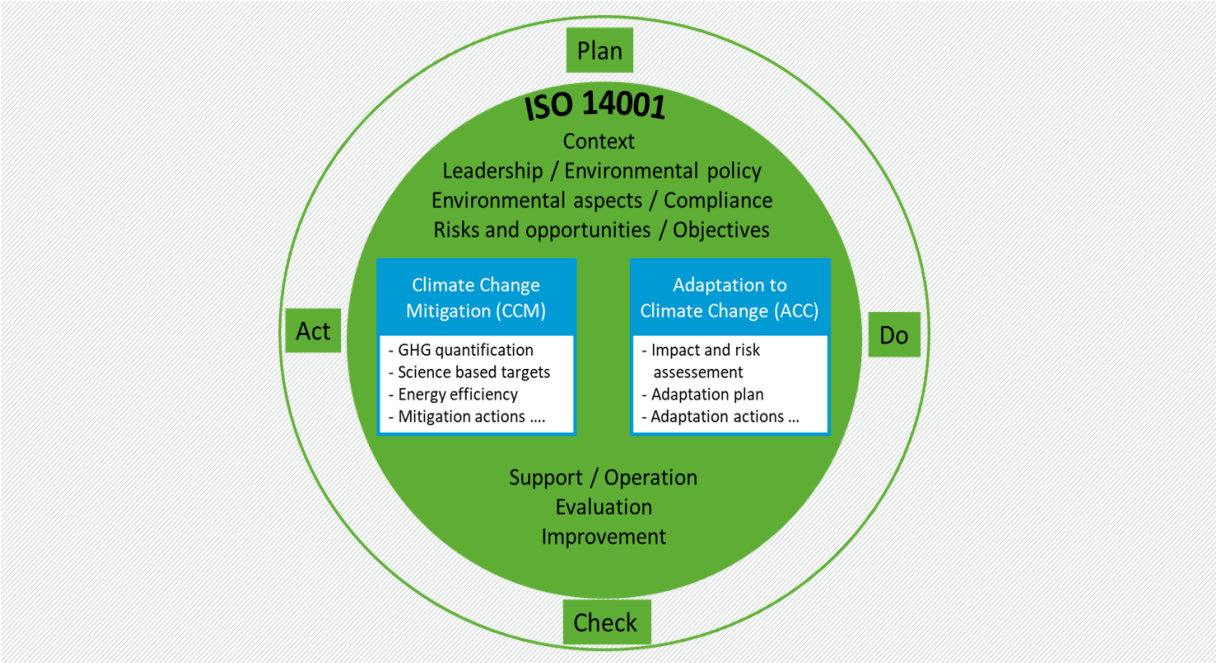
**Option B: Climate-specific further development of ISO 14001**

ISO 14001 is very "generic" in terms of the level of detail and methodology as well as its application. Changes would have to be made to the normative text of ISO 14001 in order to achieve more binding force with regard to climate-related risks. For example, the requirements of the context analysis regarding "environmental conditions ... capable of affecting the organisation" (section 4.1 of the standard) could be deepened and specified in climate-specific terms. Also, specifications for the organisation's orientation towards climate protection and dealing with climate impacts could be added to the "Environmental Policy".

The system elements and method-related steps essential for the management of climate risks (such as the quantification of greenhouse gases, the identification of climate-related risks, the definition of target paths and performance indicators, process design, performance assessment, audits and reviews) would also need to be added. Requirements regarding the handling of climate-specific risks and opportunities will need to be of equal importance to the traditional assessment of environmental aspects. It would also make sense to introduce a specific definition of risk (in addition to the ISO management system standard definition, which would be possible under the ISO rules) that clearly states that risk management within the scope of ISO 14001 may also entail potential financial risks for the organisation according to the TCFD recommendations.

Such a climate-risk-specific development of ISO 14001 could be part of a revision (Figure 2).

**Figure 2: Climate-specific further development of ISO 14001**

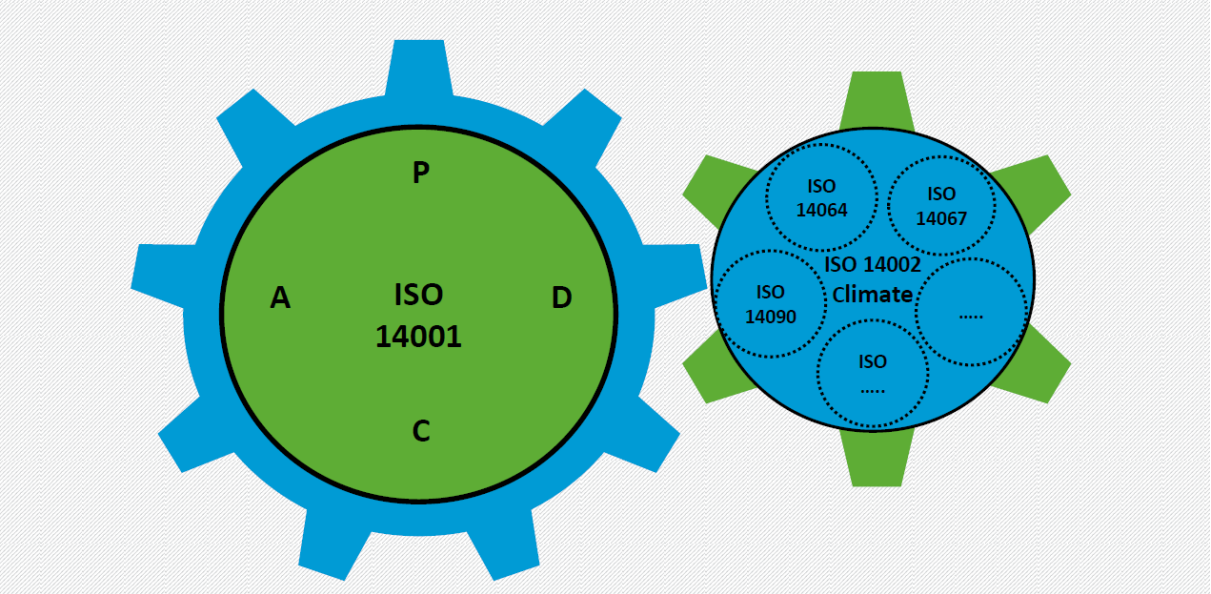



Source: by the authors (Ludwig Glatzner)

**Option C: Development of a supplementary climate management module (ISO 14002-x)**

The ISO 14002 series was created to maintain ISO 14001 as an integrated framework while still incorporating important environmental topics in detail, rather than developing a separate management system standard for each environmental topic. It makes sense to adopt this approach for the topic of the climate as well (Figure 3).

**Figure 3: Relationship between ISO 14001 and an ISO 14002-climate module**




Source: by the authors (Ludwig Glatzner)

By requiring the identification of relevant environmental aspects, contextual issues and risks, the interface for the management of climate mitigation and climate consequences is existent in environmental management under ISO 14001, but not defined specifically for the issue of the climate. However, further ISO standards with tools and approaches for climate protection and adaptation to climate change are restricted to a limited number of individual topics (such as determining greenhouse gas emissions, determining physical climate risks and taking adaptation measures). Usually, these tools and approaches are described either without management structures (as is the case with ISO 14064) or in management processes that are not very consistent with the plan-do-check-act concept (cf. "White Paper on ISO 14090") (ISO, 2021a). A climate module in the ISO 14002 series could solve these shortcomings and possibly also address non-ISO tools (such as the TCFD recommendations).

**Option D: Drafting of a new climate management system standard**

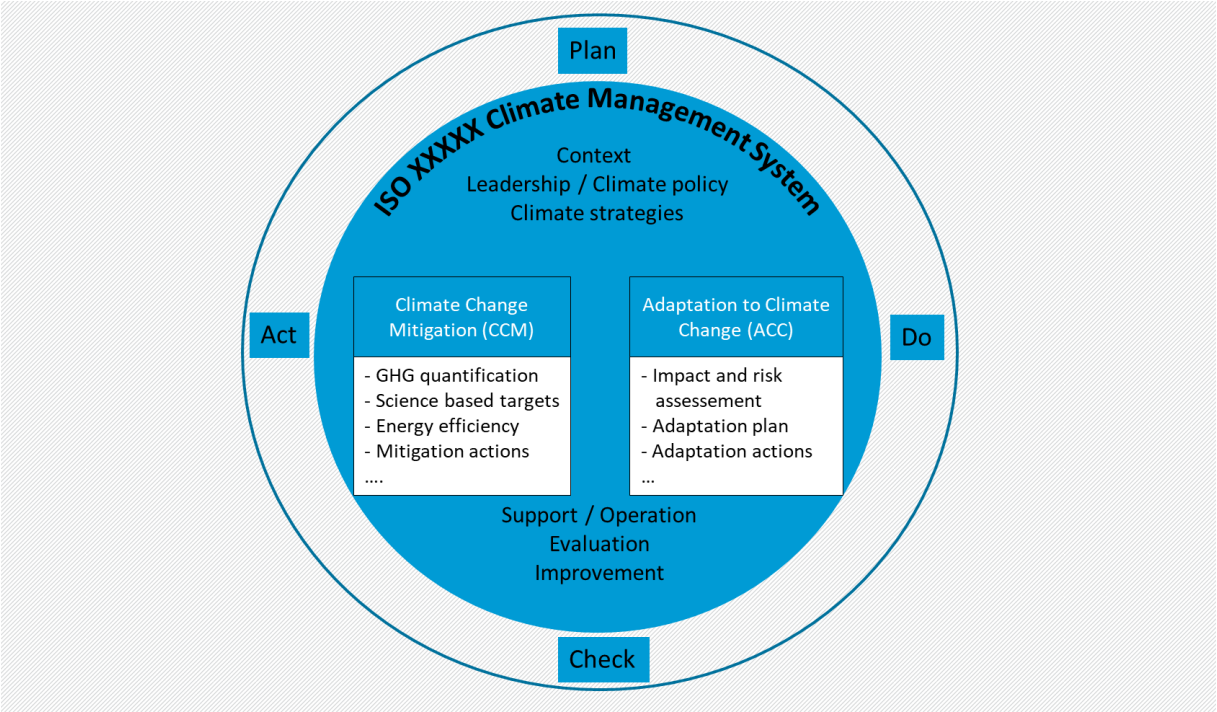
To date, there is no management system standard for climate management that is equivalent with ISO 14001 (or ISO 50001 and the like). However, the relatively high number of management system standards with varying objectives already in existence is the subject of critical debate. Even those outside standardisation circles feel that the system of standards is increasingly becoming a jungle.

The development of a separate series of standards for energy management systems (ISO 50001 et seq.) is seen by some as a negative example of the trend towards a constantly growing number of standards, given that energy consumption and energy efficiency have traditionally been treated as aspects of environmental management.

However, the example of energy management under ISO 50001 illustrates that standards focused on a single topic are seen as attractive and useful because their narrower focus makes them more specific, even though they are no longer embedded in an overall context.

A separate climate management system standard could therefore be developed and introduced using the harmonised structure defined by ISO (previously known as the "high-level structure"). It would then be possible to use that standard independently or in combination with ISO 14001 (environmental management system), ISO 50001 (energy management system) or other management systems (Figure 4). Separate certification would be a possibility too.

**Figure 4: Creating a new climate management system standard**




Source: by the authors (Ludwig Glatzner)

Please note that the study looks "only" at the possibility of creating a new climate management system standard, as well as the associated advantages and disadvantages. No detailed recommendations regarding the specifics have been developed.

**Recommendations for the review of ISO 14001**

Each of the options outlined here has advantages and disadvantages, as examined in greater detail in the study. Option A (Better combination and linking of the existing standards and tools with ISO 14001) would result in little progress. Option B (Climate-specific further development of ISO 14001) could result in a material "one-sided" change in ISO 14001 that would constitute a break with the generic character of the standard. Option C (Development of supplementary climate management guidance (ISO 14002)) could be a potentially helpful but non-binding offer for promoting climate management without significant intervention in ISO 14001, whereas Option D (Development of a new climate management system standard) could potentially advance climate management to the detriment of environmental management under ISO 14001 and contribute to the further fragmentation of the system of standards.

Given the challenge of climate change and the wide range of situations that organisations face, it

appears appropriate to use an overall strategy that takes advantage of the approaches available:

- Better use of the existing environmental management standards
- Development of a separate climate (risk) management system standard
- Supplementary climate management guidance (ISO 14002) as a driving force

**1. Better use of the existing environmental management standards**

The investigation demonstrates that the relevant environmental management standards set few specific requirements when it comes to managing climate risks and do not lead to the supplementary use of climate-specific standards for additional depth. At the very least, approaches and tools that enable the use of suitable climate-specific standards within the scope of environmental management must be outlined and offered through instruments such as White Papers, for example the White Paper on ISO 14090. The user-oriented linkage of environmental management (ISO 14001) with climate-specific standards (such as ISO 14064 and ISO 14090) through systematic further guidance that provides a proper structure promises greater impact (see below regarding ISO 14002).

**2. Development of a separate climate (risk) management system standard**

Although talk of a "proliferation of management system standards" may be making the rounds in some circles, along with the consciously negative connotations to match, experience shows that a certifiable management system standard can support an organisation's systematic approach to a topic and encourage use through customer demands or political programmes, thereby fostering envisioned outcomes such as a systematic response to the challenges of climate change. The simpler and faster option of developing a climate (risk) management system at national level remains a possibility should the chances of a successful New Work Item Proposal (NWIP) be seen as too low – or the necessary development time as too long – at an international level.[8] However, the decisive disadvantage of a specific single-issue standard remains the potential disintegration of environmental issues and the erosion of the required holistic environmental management.

**3. Supplementary climate management guidance (ISO 14002) as a driving force**

ISO 14002 offers a way to strengthen climate policy and the use of climate-specific standards without also weakening ISO 14001 as an environmental management framework and suitable basis for the management of climate mitigation and climate consequences. It has the potential to serve organisations that intend to report on climate-related environmental aspects, environmental conditions and the associated risks and opportunities within an ISO 14001 environmental management system or are required to address such issues in greater depth. Furthermore, it can be used to examine the environmental issue of the climate from both perspectives – the management of greenhouse gas emissions (mitigation) and the associated (transition) risks, as well as the management of climate-related physical risks and opportunities, including adaptation measures – while providing support for the implementation process that is

[8] The German Environment Agency is currently working on a certifiable climate management approach that is to be largely integrated into the EMAS system and is designed for use even by organisations with a full EMAS environmental management system upon initial expansion. The integration into the EMAS framework is intended to leverage the German environmental verifier system in order to ensure high audit quality and credibility at a fair price while avoiding a climate management system that competes with EMAS and ISO 14001.

compatible with the plan-do-check-act approach under ISO 14001 and other management system standards. The result is a link between the ISO 14001 framework and further useful climate- and climate-risk-related standards already in existence.

### Summary and conclusion

The development of an "ISO 14002-Part: Climate", in combination with an interface requirement in ISO 14001, would play a pivotal role in promoting the management of climate risks and opportunities with the help of environmental management system standards. The responsible German standardisation bodies have already drawn up proposals to this end.

An ISO 14002-Part: Climate would also make it possible to leverage existing, proven tools from the ISO 14000 series while potentially taking advantage of approaches from the energy management series (such as ISO 50006) and beyond (TCFD recommendations, SBTi methodology, GHG protocol, et cetera) – without having to "reinvent the wheel".

Whether the guideline character of the ISO 14002 series categorically rules out designing an "ISO 14002 Part: Climate" in such a way that its implementation can be proven (verified, certified, validated) would have to be examined.[9] Doing so would make management in accordance with ISO 14001 and ISO 14002 more appealing for those who believe that the ability to demonstrate that they have an ISO-compliant functional climate (risk) management system offers potential benefits and advantages.

## PART 2: ANALYSIS OF REPORTING ON CLIMATE-RELATED RISKS IN EMAS ENVIRONMENTAL STATEMENTS

Prior to the analysis of EMAS environmental statements described here, the status of climate-related reporting activities by the 100 largest German companies was assessed through an empirical investigation of sustainability reports, non-financial statements and the CDP[10] database for climate disclosures provided by companies (hereinafter referred to as "CDP-climate".). The findings are published in the first partial report of the research project (Loew et al., 2021). For an overview, see the English short version[11].

### Objective of the analysis of EMAS environmental statements

The empirical basis of the previous investigation was expanded by analysing 40 EMAS environmental statements. The aim was to gain insights into the situation of small and medium-sized enterprises and public authorities and to examine which of the findings obtained thus far can be applied to these organisations and the reporting in environmental statements.

### Sample

Twenty companies with 50 to 250 employees from typical EMAS industries were selected for the investigation of the environmental statements of small and medium-sized enterprises.

The starting point for determining the sample of public authorities was the decision to consult 20 EMAS environmental statements from the public administration sector. Because of previous

[9] Despite being merely guidance, evidence that an organisation fulfils a certain level of ISO 50005 is envisaged within the scope of the carbon-leakage provisions of Germany's Act on a National Emissions Trading Scheme for Fuel Emissions (BEHG).

[10] Formerly the Carbon Disclosure Project (CDP). CDP provides several databases e.g. regarding forestry and water.

[11] Title "Corporate reporting on climate-related risks: Key findings of a German survey for decision-makers and multipliers". Available at www.umweltbundesamt.de/publikationen/management-von-klimarisiken-in-unternehmen

evidence that major companies tend to prepare more thorough reports, and because of the assumption that this size-related effect can also be expected outside the private sector, the investigators mainly selected federal and state agencies, which are usually larger than municipal public administration organisations (Table 1). As a result of this selection, public authorities with similar areas of responsibility, mostly environment, were investigated.

**Table 1: Sample of environmental statements – composition by size**

| Size | Federal agencies | State agencies | Small and medium-sized enterprises |
|---|---|---|---|
| Over 5,000 employees | 1 | 0 | 0 |
| 501-5,000 employees | 4 | 7 | 0 |
| 251-500 employees | 1 | 3 | 0 |
| 50-250 employees | 0 | 4 | 20 |
| **Total** | **6** | **14** | **20** |

Source: by the authors (akzente)

When interpreting analyses of the reports submitted by organisations, it is important to note that such reports do not provide a complete representation of the situation within said organisations. In view of the analysis conducted, it is possible that more action is being taken to address climate-related risks than has been reported.

**Reporting by small and medium-sized enterprises in EMAS environmental statements**

Only three of the twenty investigated environmental statements by small and medium-sized enterprises explicitly address climate-related risks.

Märkisches Landbrot, a bakery, explains that climate change poses a risk to the availability of regional cereals. The bakery also reports on the measures already taken to counteract this risk. Aicher, a company that manufactures parts for car makers, addresses the protests for greater climate protection and the anticipated tightening of climate policy. It concludes that the company itself and its customers will be affected by stricter climate protection regulation, thereby necessitating a re-evaluation of its strategy. Trompetter Guss, a foundry, expects the prices for $CO_2$ emissions to rise and predicts that these emissions will therefore become an even more important issue.

The 20 environmental statements by small and medium-sized enterprises therefore contained two declarations on transition risks and one on physical risks. This seems to correspond to the results of the representative analysis of reports by the largest German companies. Here we discovered that businesses address transitional risks twice as often as physical risks (Loew et al., 2021).

**Reporting by public authorities**

The analysis of environmental statements by public authorities reveals that only Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) reports on a fundamental review of the risks due to climate change. It should be noted that GIZ, with roughly 22,000 employees, is the largest public authority in the sample and sees itself as a “federal enterprise” rather than a government agency.

The second instance in which climate change is described as a risk comes from Abtei Brauweiler, a former abbey now run as a cultural centre by the North Rhine-Westphalian state agency Landschaftsverband Rheinland. The abbey's management noticed an increase in drinking water consumption during the summer 2018 drought and sees a risk that such events could occur more frequently in the future.

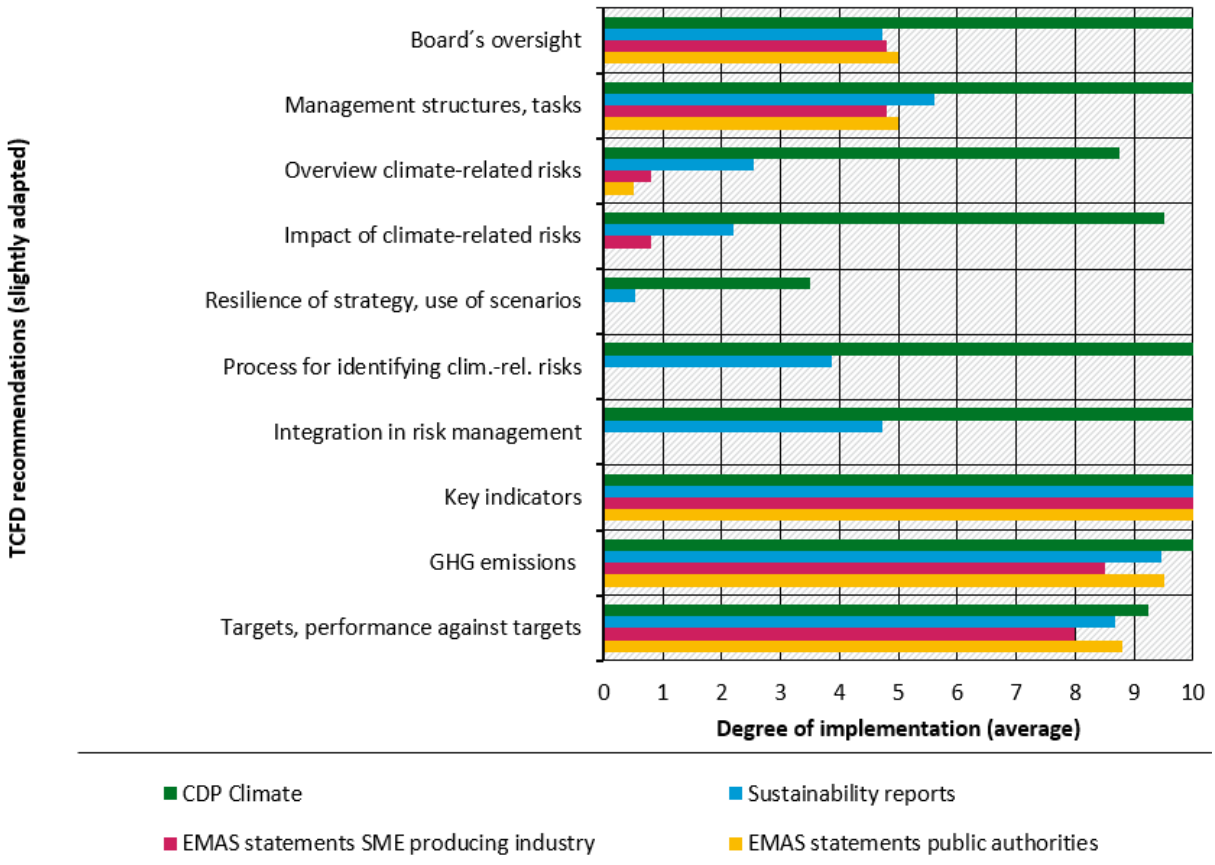
In its environmental statement, the Federal Ministry for Economic Cooperation and Development (BMZ) reports that it is supporting the private sector in adapting to climate change. The report is one example of an environmental statement by a public authority that discusses not only the environmental aspects of its operations, but also the environmental aspects of its services.

**Degree of reporting with regard to the recommendations of the TCFD**

The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD 2017) are shaping the further development of reporting requirements and the reporting practices of large companies around the world. The extent to which the sustainability reports, non-financial statements and reports to CDP (Loew et al. 2021) fulfil the recommendations of the TCFD was therefore investigated during the analysis.

Figure 5 illustrates the average level of climate-related reporting as measured against the TCFD recommendations. In it, the reporting in the investigated environmental statements is compared with the disclosures by large companies in sustainability reports and to CDP.

**Figure 5: Degree of reporting with regard to the recommendations of the TCFD**




Source: by the authors (akzente)

The large-scale analysis demonstrated that the size of the company, the type of report and the sector all have an influence on climate-related reporting (loc. cit., p. 121). These interrelations must also be taken into account when interpreting the findings regarding the EMAS environmental statements. Particularly with regard to the type of report, the large-scale analysis itself illustrates that the underlying frameworks reflect TCFD-recommended reporting requirements to a varying extent. CDP, for instance, takes into account most of the TCFD recommendations, whereas the requirements for non-financial statements do not contain any specific guidelines on this particular matter (and others). Likewise, the environmental statement requirements do not contain any specific demands regarding climate-related reporting.

**Conclusion regarding reporting in EMAS environmental statements**

The analysis of the environmental statements did not lead to any surprising findings. As expected, environmental statements contain indicators on greenhouse gas emissions and energy consumption, as well as disclosures related to climate objectives and the structure of the environmental management system. The assumption that the environmental statements would not report on the use of climate scenarios and the resilience of an organisation's strategy, as such aspects have yet to be included in the specific requirements for environmental management systems (see above), was also confirmed.

It can be assumed that the level of reporting largely reflects the state of affairs at the companies. It stands to reason that small and medium-sized enterprises have so far devoted little time and effort to addressing their climate-related risks, particularly physical climate risks. The following approaches exist to help change this at companies with environmental management systems according to EMAS:

- **Changing the requirements within ISO 14001 or in the context of ISO 14001.** The EMAS Regulation incorporates the requirements under ISO 14001 and goes beyond them. Future new requirements within ISO 14001 or in the context of ISO 14001 will probably once again be reflected in the EMAS Regulation. Please see above for potential ways to contribute to the better consideration of physical climate risks within the scope of ISO standards.
- **Introducing more demanding requirements within EMAS or adding a voluntary climate module.** The approach of developing a voluntary EMAS climate module is already being pursued (see page 67).
- **Mandating reporting on climate-related risks, especially physical climate risks, in EMAS environmental statements.** Theoretically, stakeholders could claim that the disclosure of climate-related risks is already envisioned as part of the European sustainability reporting directive currently in preparation and that most G20 countries are also working on such reporting obligations (FSB, 2021). However, this approach would constitute a break with the current principle that an environmental statement describes the environmental management system and its outcomes.

**Consequently, the findings of the analysis of the environmental statements confirm the need to improve the requirements in place for environmental management systems.**

## Zusammenfassung

Die zuletzt aufgetretenen Extremwetterereignisse (u.a. Dürre und Waldbrände in Deutschland, Australien, USA und Russland, Dürre und Hunger in Madagaskar, Überschwemmungen und Erdrutsche in Deutschland, Belgien, Türkei und Japan) führen mit bedrückenden Bildern vor Augen, welche gefährlichen Auswirkungen die Klimakrise bereits heute hat und wie dringlich der Handlungsbedarf ist. Um die Folgen des Klimawandels so gering wie möglich zu halten, müssen insbesondere die Treibhausgasemissionen drastisch reduziert werden und zugleich mehr Maßnahmen zur Klimavorsorge getroffen werden.

Zugleich setzt sich die Erkenntnis durch, dass sowohl die Folgen des Klimawandels als auch Auswirkungen einer wirksamen Klimapolitik erhebliche Risiken (aber auch Chancen) für Unternehmen darstellen. Zudem wird befürchtet, dass diese klimabezogenen Risiken auf die Finanzmärkte durchschlagen und somit deren Stabilität gravierend gefährden. Daher wurden von der Task Force on Climate-related Financial Disclosures Berichtsempfehlungen entwickelt (TCFD, 2017), die ein Management von klimabezogenen Risiken in der Finanzwirtschaft ermöglichen sollen.

Die Sichtweise, dass sowohl die Folgen des Klimawandels als auch Auswirkungen einer wirksamen Klimapolitik erhebliche Risiken darstellen und somit Maßnahmen erfordern, ist auch in der EU-Taxonomie enthalten und wird zudem in den geplanten EU Sustainability Reporting Standards zum Tragen kommen (EFRAG 2021; Europäische Kommission, 2021b; Europäische Union, 2020).

Ein weiterer wichtiger Ansatzpunkt, um das systematische Management klimabezogener Risiken zu fördern, sind die internationalen Normen für Managementsysteme. Hier besteht aktuell eine gute Möglichkeit geeignete Ansätze zeitnah zu realisieren. Denn derzeit wird geprüft, ob die weltweit vielfach angewendete ISO 14001 für Umweltmanagementsysteme novelliert werden soll.[12] Die Entscheidung, ob eine Novellierung durchgeführt werden soll und wenn ja mit welcher Stoßrichtung, wird voraussichtlich zum Jahresende 2021 oder Anfang des Jahres 2022 erfolgen.

Zudem werden auf europäischer Ebene Ansätze diskutiert, wie das Management klimabezogener Risiken stärker im europäischen System für Umweltmanagement und Umweltaudit (EMAS) verankert werden kann. EMAS enthält im Kern die Anforderungen der ISO 14001 und geht in einigen Punkten darüber hinaus.

### Zielsetzung und Vorgehen

Vor diesem Hintergrund wurde unter anderem untersucht, inwiefern die vorliegenden Umweltmanagementnormen und vergleichbare Rahmenwerke zu einem systematischen Management von klimabezogenen Risiken beitragen. Darauf aufbauend wurden verschiedene Optionen geprüft, wie beispielsweise Anpassungen der ISO 14001 oder deren klimaspezifische Ergänzung durch die ISO 14002er-Reihe aussehen können. Dies erfolgt im ersten Teil der Studie.

Der zweite Teil der Studie betrachtet mittelständische Unternehmen und Behörden, die ein Umweltmanagementsystem gemäß EMAS implementiert haben. Bei diesen wurde untersucht,

[12] ISO-Standards werden grundsätzlich alle fünf Jahre auf Revisionsbedürftigkeit hin überprüft und dann gegebenenfalls novelliert: Die erste Revision der ISO 14001:1996 erfolgte, da Bedarf nach Überarbeitung bzw. Weiterentwicklung festgestellt wurde (Glatzner, 2001), und resultierte in der Fassung ISO 14001:2004. Deren weitere Überarbeitung erfolgte vor allem aus Harmonisierungsgründen und führte zur aktuell gültigen Fassung ISO 14001:2015. Die Revisionsbedürftigkeit der ISO 14001:2015 wird derzeit geprüft.

ob sie sich mit klimabezogenen Risiken befassen, denn hier wäre zu erkennen, ob Umweltmanagementsysteme darauf bereits einen Einfluss haben. Dazu wurden insgesamt 40 aktuelle EMAS-Umwelterklärungen analysiert.

Der Weg, das systematische Management von Klimarisiken über die umweltbezogenen ISO-Normen und EMAS anzustoßen, ist insofern von besonderer Bedeutung, als damit weltweit Unternehmen und zudem auch klein- und mittelständische Unternehmen erreicht würden. Zudem würde international zu einem gemeinsamen Verständnis hinsichtlich der Herausforderungen und möglicher Vorgehensweisen beigetragen.

#### Zentrale Begriffe

In den politischen Prozessen und den Veröffentlichungen zum Management von Klimarisiken in Unternehmen (Europäische Kommission, 2019a; TCFD, 2017) wird zwischen folgenden Risiken unterschieden:

- **Physische Risiken des Klimawandels**, also Risiken, die aus den Folgen des Klimawandels, wie etwa Extremwetterereignissen, Dürren oder dem des Meeresspiegels resultieren.
- **Transitorische Risiken**, also Risiken für Unternehmen, die sich aufgrund der Veränderungen hin zu einer langfristig dekarbonisierten Wirtschaftsweise ergeben. Im Mittelpunkt stehen hier Risiken durch die Klimaschutzpolitik aber auch mögliche Effekte von verändertem Verhalten der Verbraucher und Investoren.

Zusammenfassend werden physische und transitorische Risiken als klimabezogene Risiken bezeichnet.

In ISO-Normen wird Risiko als eine „Auswirkung von Ungewissheit“ (ISO 14001:2015) oder als Auswirkungen von Unsicherheit in Bezug auf die Erreichung von Zielen („Effects of Uncertainty on Objectives“, ISO 31000:2018) verstanden, sodass darunter sowohl mögliche negative als auch mögliche positive Auswirkungen gemeint sind. In der Unternehmenspraxis, wie auch in den international viel beachteten Empfehlungen der Task Force on Climate-related Financial Disclosures (TCFD) wird jedoch zwischen Risiken und Chancen unterschieden, sodass mit Risiken also ausschließlich potentiell negative Auswirkungen gemeint sind. Dieses Begriffsverständnis wird auch in diesem Bericht verwendet.

## TEIL 1.
## ANALYSE DER STANDARDS FÜR UMWELTMANAGEMENTSYSTEME UND EMPFEHLUNGEN HINSICHTLICH DER NOVELLIERUNG DER ISO 14001

Aufgrund ihrer weltweiten Verbreitung und herausragenden Stellung, wurde die ISO 14001[13] in dieser Studie anhand der Empfehlungen der TCFD detailliert analysiert. Weil das Umweltmanagementsystem von EMAS[14] auf der ISO 14001 aufbaut, wurden bei EMAS nur die Anforderungen untersucht, die über die ISO 14001 hinaus gehen. Dann wurde für die Normen ISO 14002[15], ISO 14004[16], ISO 14090[17] und ISO 26000[18] geprüft, ob sie auf das Management physischer und transitorischer Klimarisiken eingehen und falls ja, welche Empfehlungen oder Vorgaben dazu gemacht werden.

### Ergebnisse der Analyse der ISO 14001

Da die ISO 14001 ein „breit" angelegter Managementsystem-Standard zum Umgang mit allen möglichen Umweltthemen sowie für die Anwendung durch Organisationen jedweder Art, Größe und Branche ist, soll sich ein Umweltmanagementsystem nach ISO 14001 kontext- und organisationsbezogen auf die relevanten Umweltaspekte der Organisation und die relevanten Umweltzustände hin ausrichten.

Grundsätzlich gibt die ISO 14001 einen guten Rahmen auch für den Umgang mit klimabezogenen Risiken vor. Da die Konsequenzen des Klimawandels und das zunehmende Drängen gesellschaftlicher und politischer Akteure sowie Akteure des Finanzmarktes erst in den letzten Jahren deutlich spürbarer geworden sind, ist es nicht verwunderlich, dass die „generische", international vereinbarte, und aktuell gültige Umweltmanagementsystem-Norm ISO 14001:2015 zum Thema Management klimabezogener Risiken nicht viel Konkreteres zu bieten hat.

Neben dem traditionellen Fokus auf den Klimaschutz (Mitigation) ist der Umgang mit den Folgen des Klimawandels (Adaptation) und den damit verbundenen Risiken in der ISO 14001 zwar angelegt, aber nur sehr rudimentär. Die Einbeziehung der „Umweltzustände, die die Organisation beeinflussen können" wird - anders als die Einbeziehung der „Auswirkungen der Organisation auf die Umwelt" - nur sehr pauschal als Aufforderung formuliert, mit relevanten Umweltzuständen und Risiken umzugehen.

[13] DIN EN ISO 14001:2015 Umweltmanagementsysteme - Anforderungen mit Anleitung zur Anwendung (ISO 14001:2015)

[14] EU Eco-Management and Audit Scheme (EMAS), definiert in der EU-Verordnung Nr. 1221/2009

[15] DIN EN ISO 14002-1:2020 Umweltmanagementsysteme - Leitlinien für die Nutzung von ISO 14001 zur Behandlung von Umweltaspekten und -zuständen innerhalb eines Umweltthemengebiets - Teil 1: Allgemeines (ISO 14002-1:2019)

[16] DIN EN ISO 14004:2016 Umweltmanagementsysteme - Allgemeine Leitlinien zur Verwirklichung (ISO 14004:2016)

[17] DIN EN ISO 14090:2020 Anpassung an die Folgen des Klimawandels - Grundsätze, Anforderungen und Leitlinien (ISO 14090:2019)

[18] DIN EN ISO 26000:2021 Leitfaden zur gesellschaftlichen Verantwortung (ISO 26000:2010)

**Keine konkreten Anforderungen zu klimabezogenen Chancen und Risiken**

Die Analyse der ISO 14001 im Abgleich mit den TCFD-Empfehlungen ergab folgendes Bild:

- Die ISO 14001 gibt einen Rahmen vor, innerhalb dessen eventuelle Risiken ermittelt und bewertet werden können. Weiter konkretisierende Vorgaben hinsichtlich klimabezogener Risiken macht sie nicht.
- Die ISO 14001 gibt grundsätzlich vor, dass Maßnahmen hinsichtlich ermittelter Risiken zu planen und systematisch umzusetzen sind. Weiter konkretisierende Vorgaben hinsichtlich klimabezogener Risiken macht sie nicht.
- Die ISO 14001 gibt grundsätzlich ein systematisches Vorgehen zur Umsetzung gesetzter Ziele unter Führung und Verantwortung der obersten Leitung vor. Vorgaben hinsichtlich einer klimarisikobezogenen Zielsetzung macht sie nicht.
- Die ISO 14001 gibt generell vor, dass die Verantwortlichkeiten und Befugnisse für relevante Aufgaben/Rollen zugewiesen werden. Konkretere Vorgaben hinsichtlich einzelner Aufgaben, z.B. der Zuordnung klimarisikospezifischer Tätigkeiten zu einem übergeordneten Risikomanagement, macht sie nicht.
- Die ISO 14001 gibt ein Grundverfahren der Wesentlichkeitsbewertung von Umweltaspekten vor, überlässt jedoch dem Anwender die Festlegung der Kriterien und Methoden beispielsweise der Quantifizierung. Konkretere Vorgaben z.B. hinsichtlich der Bilanzierung von Treibhausgasemissionen macht sie nicht.

Zudem ist das von der ISO 14001 verwendete Risikokonzept unklar in der Frage, inwieweit es sich über die „beabsichtigten Ergebnisse des Umweltmanagementsystems“ auch auf die von den TCFD-Empfehlungen avisierten möglichen finanziellen Auswirkungen von Klimarisiken für Unternehmen erstreckt.

**Folgen des Fehlens konkreterer Anforderungen zu klimabezogenen Chancen und Risiken**

Weil die ISO 14001 keine konkreten Anforderungen zum Umgang mit Klimarisiken enthält, hängt es sehr stark von der Anwendungspraxis ab, ob und inwieweit das in ISO 14001 modellierte Umweltmanagementsystem für das Management von physischen und/oder transitorischen Klimarisiken verwendet wird. Insbesondere die „oberste Leitung“ hat hier eine Schlüsselstellung inne, denn sie bestimmt die grundsätzliche Ausrichtung der Organisation und die Ausprägung ihres Managementsystems. Dieses bewegt sich daher in der Realität zwischen „Guter Praxis eines Umwelt-, Klima- und Nachhaltigkeitsmanagements“ und der „Minimalumsetzung der Anforderungen der Umweltmanagementsystemnorm“.

**Verbesserung der Wirksamkeit der bestehenden Fassung ISO 14001:2015 bezüglich des Managements klimabezogener Risiken**

Folgende Entwicklungen könnten dazu beigetragen, dass bei der Anwendung der bestehenden Umweltmanagement-Norm ISO 14001 physische und transitorischen Klimarisiken konsequenter durch die Organisationen erfasst und gesteuert werden:

- Mehr Führung: Die Nutzung und Wirksamkeit der Anwendung der ISO 14001:2015 mit Blick auf die Klimarisiken wird erhöht, wenn die oberste Leitung einer Organisation sich veranlasst sieht bzw. dazu veranlasst wird, das Thema der klimabezogenen Risiken „auf die Agenda zu setzen“ und entsprechend mithilfe ihres Managementsystems umzusetzen.

- Mehr Verpflichtung: Ein Umweltmanagement nach ISO 14001:2015 muss das Thema Klimarisiken und Klimafolgen einbeziehen, wenn es dazu eine bindende Verpflichtung (z.B. aus Rechtsvorschriften, aus vertraglichen Vereinbarungen) gibt.
- Mehr Relevanz: Wenn eine Organisation methodisch nicht umhin kann, das Thema „Folgen des Klimawandels für die Organisation" als relevantes Kontextthema mit entsprechenden Risiken zu identifizieren (z.B. aufgrund gestiegener Risikolagen), ist es im Rahmen des Managementsystems nach ISO 14001:2015 zu behandeln.

Die aktuelle, unveränderte Fassung der ISO 14001:2015 kann je nach Bedarf unter Berücksichtigung weiterführender Standards, Leitfäden oder Anforderungskatalogen zum Management von klimabezogenen Risiken genutzt werden. Solange es hierzu jedoch keine der angeführten Veranlassungen gibt, wird dies von der ISO 14001 nicht gefordert, sondern bleibt dem Belieben des jeweiligen Anwenders überlassen.

**Verbesserung der Wirksamkeit durch Fortentwicklung der ISO 14001:2015**

Die ISO 14001:2015 könnte mit Blick auf den verstärkten Einbezug von Klimarisiken fortentwickelt werden, durch:

- Zusätzliche Anforderungen und normative Ausführungen insbesondere zur festzulegenden „Umweltpolitik", zur Durchführung der „Kontextanalyse", zur Ermittlung relevanter „Stakeholder"-Anforderungen oder zum „Umgang mit Risiken und Chancen" mit dem Ziel der Verbesserung der Anwendung des Umweltmanagementsystems mit Blick auf „Klimawandelfolgen und Klimarisiken";
- Zusätzliche Anleitung zur besseren Anwendung der Norm mit Blick auf Klimawandel und Klimarisiken beispielsweise durch einen oder entsprechend mehrere Anhänge, die vertiefte Hilfestellungen zur Durchführung der Kontextanalyse, Stakeholderanalyse, Risikoanalyse geben - oder auch durch einen eigenen spezifischen Anhang zum „Klimamanagement".
- Zusätzliche Schnittstellen, die den Anwender der ISO 14001 verpflichten würden, weiterführende Standards, Leitfäden oder Anforderungskatalogen zum Thema Klimawandel und Klimarisiken einzubeziehen und im Rahmen des Umweltmanagements zu berücksichtigen oder umzusetzen.

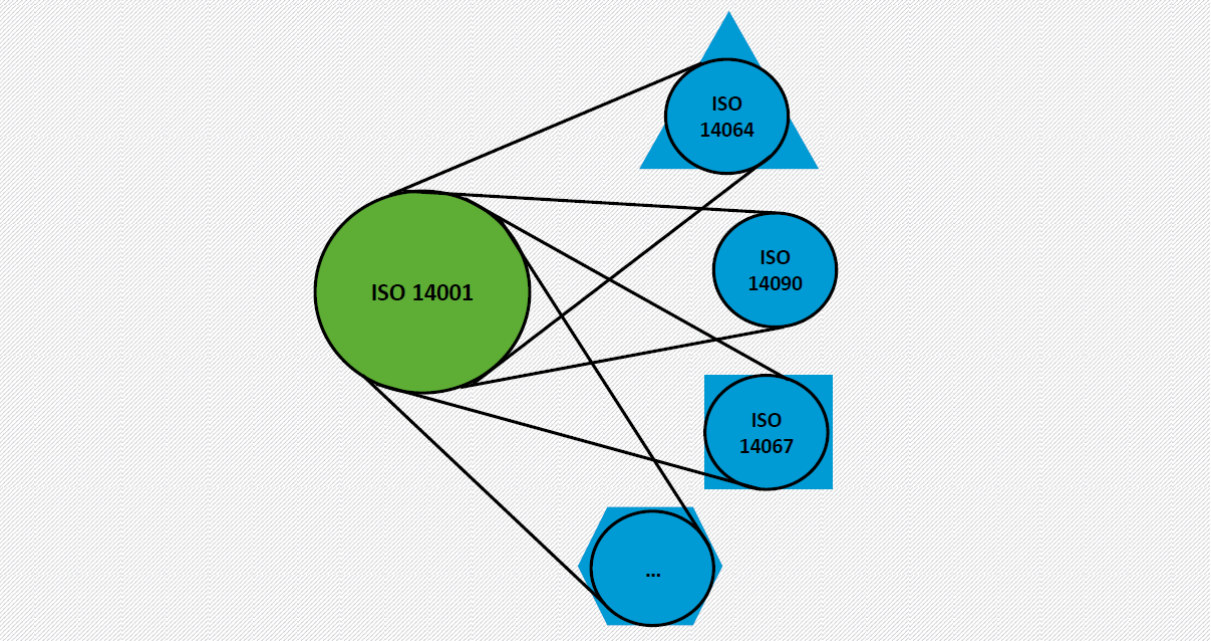
Vor diesem Hintergrund sind mehrere Wege und Ansätze zur Förderung der Betrachtung klimabezogener Risiken in ISO-Managementsystemnormen denkbar. In dem vorliegenden Bericht werden folgende Optionen näher beleuchtet und bewertet:

- Option A: Bessere Kombination und Anbindung der bestehenden Standards und Tools an die ISO 14001
- Option B: Klimaspezifische Fortentwicklung der ISO 14001
- Option C: Entwicklung eines ergänzenden Klimamanagement–Leitfadens (ISO 14002)
- Option D: Erarbeitung eines neuen Klimamanagementsystem-Standards

**Option A: Bessere Kombination und Anbindung der bestehenden Standards und Tools**

Es stellt sich die Frage, inwieweit sich eine sinnvolle Verknüpfung der bestehenden Leitfäden, Tools und Standards herstellen lässt (Abbildung 6).

**Abbildung 6: Anbindung an ISO 14001 und Kombination bestehender Standards und Tools**




Bei den in der Abbildung genannten ISO-Standards handelt es sich um eine beispielhafte Auswahl klimarelevanter Normen.
Quelle: Eigene Darstellung (Ludwig Glatzner)

Ziel wäre, mithilfe dieser Ressourcen und des Umweltmanagementsystems als Vehikel die Berücksichtigung klimabezogener Risiken zu fördern, ohne inhaltlich in die übergeordnete Managementsystemnorm ISO 14001 eingreifen oder Revisionen erforderlich machen zu müssen.

Dies könnte durch die Bereitstellung von „Brückendokumenten“ oder „Whitepapers“, wie z.B. das „Whitepaper“ zur Anwendung der ISO 14090 und ISO 14001 (ISO, 2021a), unterstützt und erzielt werden.

**Option B: Klimaspezifische Fortentwicklung der ISO 14001**

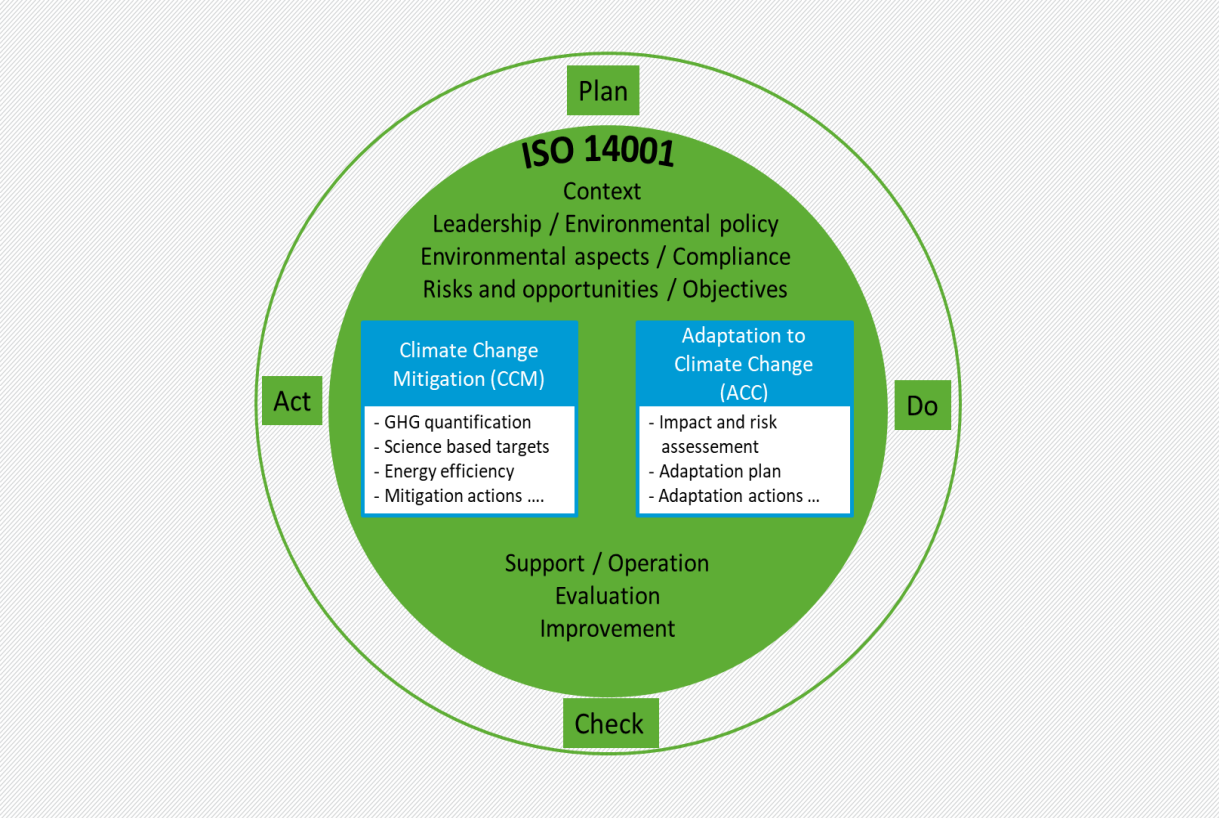
Die ISO 14001 ist von Detaillierungsgrad und Methodik sowie mit Blick auf ihre Anwendung her sehr „generisch“ gehalten. Im normativen Text der ISO 14001 müssten Änderungen vorgenommen werden, um mehr Verbindlichkeit hinsichtlich der klimabezogenen Risiken zu erreichen.

Hierzu könnten beispielsweise die Anforderungen der Kontextanalyse hinsichtlich „environmental conditions … capable of affecting the organization“ (Abschnitt 4.1 der Norm) klimaspezifisch vertieft und konkretisiert werden. Zudem könnten Vorgaben für die Ausrichtung der Organisation auf Klimaschutz und den Umgang mit Klimafolgen im Rahmen der „Environmental Policy“ ergänzt werden.

Auch würden die für das Management von Klimarisiken unverzichtbaren Systemelemente und methodischen Schritte (z.B. Quantifizierung der Treibhausgase, Identifizierung von klimabezogenen Risiken, Festlegung von Zielpfaden und Kennzahlen, Prozessgestaltung, Erfolgsmessung, Audits und Reviews) einzubringen sein. Anforderungen zum Umgang mit klimaspezifischen Risiken und Chancen würden gleichrangig neben der klassischen „Umweltaspektebewertung" Eingang finden müssen. Sinnvoll wäre auch die Einführung eines spezifischen Risikobegriffs (zusätzlich zur ISO-Managementsystem-Standard-Definition, was nach ISO-Regularien möglich wäre), der deutlich macht, dass Risikomanagement im Rahmen der ISO 14001 auch die möglicherweise finanziellen Risiken für die Organisation im Sinne der TCFD-Empfehlungen beinhaltet.

Eine solche klimarisikospezifische Fortentwicklung der ISO 14001 könnte im Rahmen einer Revision erfolgen (Abbildung 2).

**Abbildung 7: Klimaspezifische Weiterentwicklung der ISO 14001**

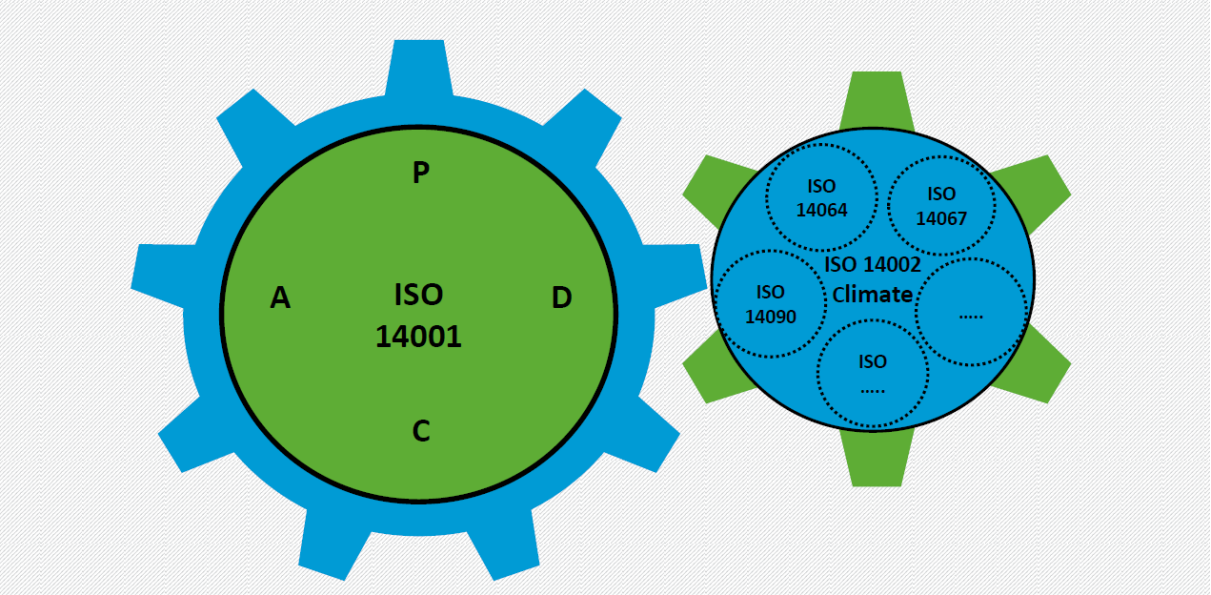



Quelle: Eigene Darstellung (Ludwig Glatzner)

**Option C: Entwicklung eines ergänzenden Klimamanagement-Moduls (ISO 14002-x)**

Die ISO 14002er-Reihe wurde ins Leben gerufen, um nicht für jedes Umweltthema eine eigenständige Managementsystemnorm zu entwickeln, sondern die ISO 14001 als integrierendes Rahmenwerk zu erhalten und dennoch wichtige Umweltthemen vertiefend einzubeziehen. Es liegt auf der Hand, dies auch zum Thema Klima entsprechend zu tun (Abbildung 8).

**Abbildung 8: Zusammenspiel von ISO 14001 mit einem Klimamodul in der ISO 14002-Reihe**




Quelle: Eigene Darstellung (Ludwig Glatzner)

Durch den Auftrag der Identifizierung relevanter Umweltaspekte, relevanter Kontextthemen und relevanter Risiken ist die Schnittstelle für ein Klimaschutz- und Klimafolgenmanagement im Umweltmanagement nach ISO 14001 angelegt, nur nicht klimaspezifisch konkretisiert. Weitere ISO-Normen mit Tools und Ansätzen für Klimaschutz und Anpassung an den Klimawandel auf der anderen Seite beschränken sich auf eine überschaubare Zahl an Einzelthemen (z.B. Ermittlung der Treibhausgasemissionen, Ermittlung der physischen Klimarisiken und Ergreifung von Anpassungsmaßnahmen). Meist werden diese Tools und Ansätze entweder ohne Managementstrukturen (wie bei ISO 14064) oder in nicht zur Plan-Do-Check-Act-Systematik passenden Managementabläufen beschrieben (vgl. das „Whitepaper zur ISO 14090“ (ISO, 2021a). Ein Klimamodul in der ISO 14002er Reihe könnte diese Defizite beheben und ggfls. auch nicht-ISO-Tools (wie z.B. TCFD-Empfehlungen) adressieren.

**Option D: Erarbeitung eines neuen Klimamanagement-System-Standards**

Bislang gibt es noch keinen mit der ISO 14001 (oder ISO 50001 o.ä.) vergleichbaren Managementsystemstandard für das Klimamanagement. Allerdings wird die schon jetzt bestehende relativ hohe Zahl von Managementsystemstandards unterschiedlichster Zielrichtungen kritisch diskutiert – nicht nur in Normungskreisen ist davon die Rede, dass das Normenwerk zunehmend zu einem Normendschungel wird.

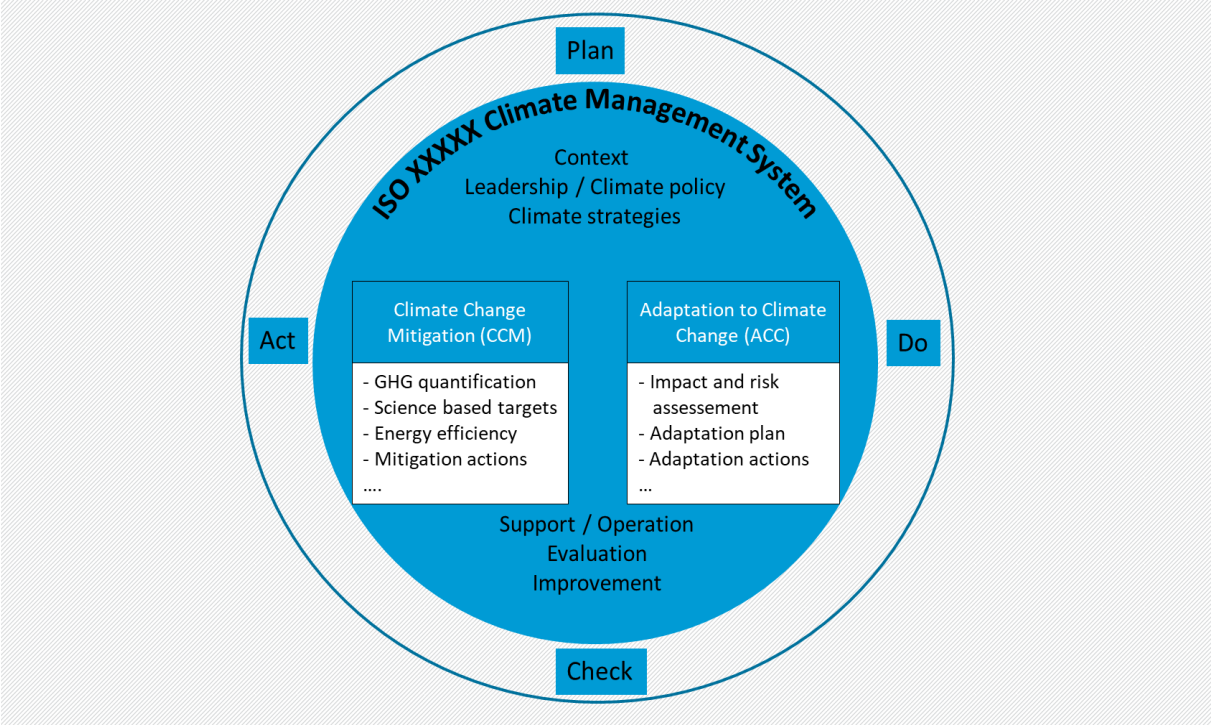
Die bereits erfolgte Entwicklung einer eigenen Normenreihe für Energiemanagementsysteme (ISO 50001ff) wird angesichts dessen, dass Energieverbrauch und Energieeffizienz traditionell

als Gegenstände des Umweltmanagements behandelt werden, von manchen als negatives Beispiel für den Trend zu einer stetig steigenden Zahl an Normengesehen.

Andererseits kann man am Beispiel Energiemanagement nach ISO 50001 sehen, dass themenspezifisch ausgerichtete Standards zwar tendenziell die Einbettung in den Gesamtzusammenhang aufgeben, jedoch durch ihre spezifischere und engere Ausrichtung als attraktiv und nützlich, weil konkret, angesehen werden.

Also könnte auch eine eigenständige Norm zum „Klimamanagementsystem“ mit dem von ISO vorgegebenen Standardaufbau (Harmonized Structure, früher High Level Structure) entwickelt und eingeführt werden, der kombiniert mit oder unabhängig von ISO 14001 (Umweltmanagementsystem), ISO 50001 (Energiemanagementsystem) oder anderen Managementsystemen zur Anwendung kommen kann (Abbildung 9). Auch eine eigenständige Zertifizierung käme in Betracht.

**Abbildung 9: Erstellung eines neuen Klimamanagement-System-Standards**




Quelle: Eigene Darstellung (Ludwig Glatzner)

Um keine falschen Erwartungen zu wecken: In der Studie werden „nur“ die Möglichkeit zur Erstellung eines neuen Klimamanagement-System-Standards und die damit verbundenen Vor- und Nachteile betrachtet. Es wurden aber keine detaillierten Vorschläge zur etwaigen Ausgestaltung entwickelt.

### Empfehlungen hinsichtlich der Novellierung der ISO 14001

Jede der hier skizzierten Optionen hat Vor- und Nachteile, die in Abschnitt 3.3 „Options“ näher erörtert werden (siehe hier ab Seite 80 oder auch die Deutsche Fassung der Studie[19]). Option A (Bessere Kombination und Anbindung der bestehenden Standards und Tools an die ISO 14001)

[19] Glatzner, Ludwig; Loew, Thomas (2022) Umweltmanagementsysteme und Klimarisiken. Analyse der Standards für Umweltmanagementsysteme bezüglich des Managements klimabezogener Risken und TCFD. Möglichkeiten zur Weiterentwicklung von ISO 14001 und EMAS.

würde wenig Fortschritte bringen. Option B (Klimaspezifische Fortentwicklung der ISO 14001) könnte eine wesentliche „einseitige" Veränderung der ISO 14001 zur Folge haben, die einen Bruch zu dem generischen Charter der Norm darstellen würde. Option C (Entwicklung eines ergänzenden Klimamanagement–Leitfadens (ISO 14002)) könnte ein potenziell hilfreiches, aber auch unverbindliches Angebot zur Förderung des Klimamanagements ohne starke Eingriffe in die ISO 14001 sein und Option D (Erarbeitung eines neuen Klimamanagement-System-Standards) das Klimamanagement potenziell zulasten des Umweltmanagements nach ISO 14001 voranbringen und zur weiteren Fragmentierung des Normenwerks beitragen.

Der Herausforderung des Klimawandels und der Vielfalt der Ausgangssituationen von Organisationen erscheint es angemessen, eine Gesamtstrategie unter Nutzung der zur Verfügung stehenden Ansatzpunkte anzuwenden:

- Bessere Nutzung der bestehenden Standards des Umweltmanagements
- Entwicklung einer eigenständigen Klima(risiko)managementsystem-Norm
- Ergänzender Klimamanagementleitfaden ISO 14002 als Transmissionsriemen

**1. Bessere Nutzung der bestehenden Standards des Umweltmanagements**

Die Untersuchung zeigt, dass die einschlägigen Umweltmanagementstandards wenig Spezifisches zum Management von Klimarisiken fordern und nicht dazu führen, dass bei der Anwendung klimaspezifische Normen ergänzend oder vertiefend genutzt werden. Zumindest müssten Möglichkeiten und Wege aufgezeigt und Hilfsmittel angeboten werden, wie geeignete klimaspezifische Standards im Rahmen des Umweltmanagements eingesetzt werden können, z.B. im Wege sogenannter „Whitepapers", wie es zur ISO 14090 eines gibt. Mehr Wirkung verspricht die anwenderorientierte Verknüpfung des Umweltmanagement (ISO 14001) mit den klimaspezifischen Standards (wie ISO 14064, ISO 14090 etc.) durch einen ordnenden, systematisierenden und weiterführenden Leitfaden (siehe unten zur ISO 14002).

**2. Entwicklung einer eigenständigen Klima(risiko)managementsystem-Norm**

Auch wenn in manchen Kreisen das Wort von der „Proliferation von Managementsystemstandards" mit bewusst negativer Konnotation die Runde macht, zeigt die Praxis, dass ein zertifizierungsfähiger Managementsystemstandard den systematischen Umgang einer Organisation mit einem Thema unterstützen, die Anwendung z.B. durch Forderung seitens der Kunden oder politische Programme enorm verbreiten und damit die beabsichtigten Ergebnisse, wie eine systematische Reaktion auf die Herausforderungen des Klimawandels, fördern kann. Sollten auf internationaler Ebene die Aussichten auf einen erfolgreichen NWIP (New work item proposal) als zu gering oder die erforderliche Erarbeitungszeit als zu langwierig erachtet werden, bleibt als Variante die einfachere und schnellere Entwicklung eines Klima(risiko)managementsystems auf nationaler Ebene.[20] Allerdings bleibt der entscheidende Nachteil themenspezifischer Sub-Standards die potentielle Desintegration von Umweltthemen und Aushöhlung eines erforderlichen ganzheitlichen Umweltmanagements.

[20] Das Umweltbundesamt arbeitet aktuell an einem zertifizierungsfähigen Klimamanagement, das weitgehend in das EMAS-System integriert werden soll, in einer ersten Ausbaustufe aber auch für Organisationen ohne vollständiges Umweltmanagementsystem nach EMAS anwendbar ist. Durch die Integration in das EMAS-System soll über das deutsche Umweltgutachtersystem eine hohe Qualität und Glaubwürdigkeit der Prüfung bei leistungsgerechter Kostenbelastung realisiert und ein zu EMAS und ISO 14001 in Konkurrenz tretendes Klimamanagementsystem vermieden werden.

### 3. Ergänzender Klimamanagementleitfaden ISO 14002 als Transmissionsriemen

Um sowohl das Klimathema und die Anwendung klimaspezifischer Standards zu stärken ohne zugleich die ISO 14001 als Rahmenwerk des Umweltmanagements und geeignete Basis für ein Klimaschutz- und Klimafolgenmanagement zu schwächen, bietet sich die ISO 14002 an. Sie kann Organisationen dienen, die sich mit klimabezogenen Umweltaspekten, Umweltbedingungen und den damit verbundenen Risiken und Chancen innerhalb eines Umweltmanagementsystems nach ISO 14001 vertieft befassen bzw. darüber berichten möchten oder müssen. Dabei kann sie das Umweltthemenfeld Klima aus beiden Perspektiven, dem Management von Treibhausgasemissionen (Mitigation) und damit verknüpften Transitionsrisiken und dem Management von klimabedingten physischen Risiken und Chancen inklusive Anpassungsmaßnahmen (Adaptation) aufgreifen und eine Umsetzungshilfe geben, die mit dem "Plan-Do-Check-Act"-Ansatz der ISO 14001 und anderer Managementsystemstandards kompatibel ist. So lässt sich eine Verbindung herstellen zwischen dem Rahmenwerk der ISO 14001 und weiteren nützlichen existierenden klima- und klimarisikorelevanten Standards.

#### Resümee

Vor dem Hintergrund der Ausgangsfragestellung - Wie kann das Management von Klimarisiken und -chancen mithilfe der Umweltmanagementsystemstandards forciert werden? - wäre die Entwicklung einer „ISO 14002-Teil: Klima“ in Verbindung mit einer Schnittstellen-Anforderung in der ISO 14001 der zentrale Hebel (hierzu gibt es bereits Vorschläge des zuständigen deutschen Normungsgremiums).

Der Charme eines „ISO 14002 Teil: Klima“ läge auch darin, dass einerseits „das Rad nicht neu erfunden werden muss“, sondern existente bewährte Tools in Bezug genommen werden können, die nicht nur aus der ISO-14000er Reihe stammen, sondern möglicherweise auch aus der Energiemanagementreihe (z.B. ISO 50006) und darüber hinaus (TCFD-Empfehlungen, SBTi-Methodik, GHG-Protocol o.ä.).

Ob der Leitfadencharakter der ISO 14002 kategorisch ausschließt, die Empfehlungen einer „ISO 14002 Teil: Klima“ als Anforderungen aufzugreifen, deren Umsetzung belegbar (überprüfbar, zertifizierbar, validierbar) ist, wäre noch zu klären.[21] Denn damit würde das Management gemäß „ISO 14001 & ISO 14002“ für diejenigen attraktiver, die sich etwas davon versprechen nachweisen zu können, dass sie ein funktionierendes Klima(risiko)management nach ISO-Standard anwenden.

## TEIL 2: ANALYSE DER BERICHTERSTATTUNG ZU KLIMABEZOGENEN RISIKEN IN EMAS-UMWELTERKLÄRUNGEN

Vor der hier beschriebenen Analyse von EMAS Umwelterklärungen wurde der Stand der klimabezogenen Berichterstattung der 100 größten deutschen Unternehmen ermittelt. Dazu erfolgte eine empirische Untersuchung von Nachhaltigkeitsberichten, Nichtfinanziellen Erklärungen und der Klimadatenbank von CDP[22] (im Folgenden „CDP-Klima“ genannt). Die Ergebnisse sind in dem ersten Teilbericht des Forschungsvorhabens veröffentlicht (Loew et al., 2021)[23], für eine Übersicht siehe Figure 22 auf Seite 92.

[21] Im Rahmen der Bestimmungen der deutschen BEHG-Carbon-Leakage-Verordnung ist ein Nachweis der Erfüllung eines bestimmten Levels der ISO 50005, obgleich nur ein Leitfaden, vorgesehen.

[22] Früher Carbon Discloure Projekt (CDP).

[23] Download auf der Seite https://www.umweltbundesamt.de/publikationen/management-von-klimarisiken-in-unternehmen

**Zielsetzung der Analyse von EMAS-Umwelterklärungen**

Mit der Analyse von 40 EMAS-Umwelterklärungen wurde die empirische Grundlage der vorangegangenen Untersuchung erweitert. Ziel war es Einblicke in die Situation von mittelständischen Unternehmen und von Behörden zu gewinnen und zu prüfen, welche der bislang gewonnenen Erkenntnisse sich auf diese Organisationen und die Berichterstattung in Umwelterklärungen übertragen lassen.

**Stichprobe**

Für die Untersuchung der Umwelterklärungen mittelständischer Unternehmen wurden im EMAS-Register 20 Unternehmen mit 50 bis 250 Mitarbeitenden aus typischen EMAS-Branchen ausgewählt.

Ausgangspunkt bei der Bestimmung der Behörden-Stichprobe war die Festlegung, 20 EMAS Umwelterklärungen der öffentlichen Verwaltung heranzuziehen. Weil sich bereits gezeigt hatte, dass große Unternehmen tendenziell besser berichten und angenommen wird, dass dieser Größeneffekt auch außerhalb der Wirtschaft zu erwarten ist, wurden primär Bundes- und Landesbehörden ausgewählt, die in der Regel größer sind als kommunale Organisationen der öffentlichen Verwaltung. Diese Auswahl hat zugleich dazu geführt, dass Behörden mit ähnlichen Aufgaben untersucht wurden (Table 7).

**Tabelle 2: Stichprobe Umwelterklärungen - Zusammensetzung nach Größe**

| Größe | Bundesbehörden | Landesbehörden | Mittelständische Unternehmen |
|---|---|---|---|
| Über 5.000 Mitarbeitende | 1 | 0 | 0 |
| 501-5.000 Mitarbeitende | 4 | 7 | 0 |
| 251-500 Mitarbeitende | 1 | 3 | 0 |
| 50-250 Mitarbeitende | 0 | 4 | 20 |
| **Summe** | **6** | **14** | **20** |

Quelle: Eigene Darstellung (akzente)

Bei der Interpretation von Analysen der Berichterstattung von Organisationen muss grundsätzlich berücksichtigt werden, dass die Berichterstattung kein vollständiges Abbild der Sachverhalte in den Organisationen wiedergeben. Mit Blick auf die vorgenommene Analyse ist es möglich, dass es mehr Aktivitäten zu klimabezogenen Risiken gibt als berichtet werden.

**Berichterstattung mittelständischer Unternehmen in EMAS-Umwelterklärungen**

Nur in drei der zwanzig untersuchten Umwelterklärungen von mittelständischen Unternehmen wird explizit auf klimabezogene Risiken eingegangen.

Die Bäckerei Märkisches Landbrot erläutert, dass der Klimawandel ein Risiko für die Verfügbarkeit von regionalem Getreide darstellt. Die Bäckerei berichtet auch, welche Maßnahmen gegen dieses Risiko bereits ergriffen wurden. Die Firma Aicher, die Teile für Automobilhersteller produziert, spricht die Proteste für mehr Klimaschutz und die zu erwartende Verschärfung der Klimapolitik an. Ihre Schlussfolgerung ist, dass sie selbst und ihre Kunden von verschärfter Klimaschutzregulierung betroffen sein werden und somit die Strategie hinterfragt werden muss. Die Auftragsgießerei Trompetter Guss erwartet, dass die Preise für

$CO_2$-Emissionen steigen werden und diese Emissionen daher zu einem noch bedeutenderen Thema werden.

Somit wurden in den 20 Umwelterklärungen von mittelständischen Unternehmen zwei Angaben zu Transitionsrisiken und eine Angabe zu physischen Risiken identifiziert. Dass Unternehmen doppelt so viel über transitorische Risiken als über physische Risiken schreiben, wurde bereits in der Analyse der Berichterstattung großer Unternehmen festgestellt (Loew et al., 2021).

**Berichterstattung von Behörden**

Die Analyse der Umwelterklärungen von Behörden hat ergeben, dass nur die Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) über eine grundlegende Prüfung der Risiken aufgrund des Klimawandels berichtet. Hier sei angemerkt, dass die GIZ mit rund 22.000 Mitarbeitenden die größte Behörde in der Stichprobe ist und sich selbst nicht als Behörde, sondern als staatliches Unternehmen versteht.

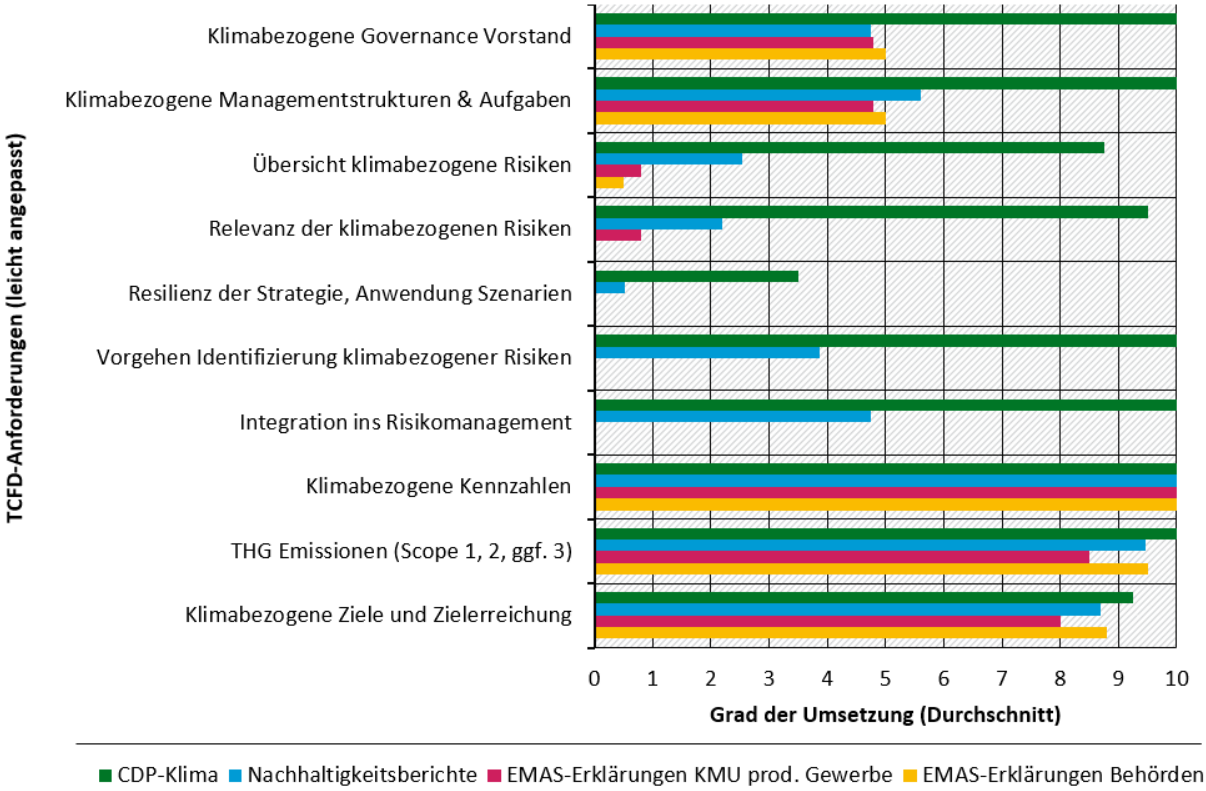
Der zweite Fall, in dem der Klimawandel als Risiko bezeichnet wird, stammt von der Abtei Brauweiler des Landschaftsverbands Rheinland. Die Verwaltung der Abtei hat im Dürresommer 2018 einen höheren Trinkwasserverbrauch festgestellt und sieht das Risiko, dass derartiges in Zukunft häufiger auftreten könnte.

Das Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ) berichtet in seiner Umwelterklärung, dass es die Privatwirtschaft bei der Anpassung an den Klimawandel unterstützt. Das ist ein Beispiel für eine Umwelterklärung einer Behörde, in der nicht nur über die Umweltaspekte des Betriebs, sondern auch über Umweltaspekte der Leistungen berichtet wird.

**Grad der Berichterstattung in Bezug auf die Empfehlungen der TCFD**

Die Empfehlungen der Task Force on Climate-related Financial Disclosures (TCFD 2017) prägen international sowohl die Weiterentwicklung von Berichtsanforderungen als auch die Berichtspraxis großer Unternehmen. Daher wurde bereits bei der Analyse der Nachhaltigkeitsberichte, der Nichtfinanziellen Erklärungen und der Berichterstattung an CDP-Klima (Loew et al. 2021) untersucht, zu welchem Grad sie die Empfehlungen der TCFD erfüllen.

**Abbildung 10: Grad der Berichterstattung in Bezug auf die Empfehlungen der TCFD**




Quelle: eigene Darstellung (akzente)

Vorstehende Figure 24 zeigt den durchschnittlichen Stand der klimabezogenen Berichterstattung gemessen an den TCFD Empfehlungen. Dort wird die Berichterstattung in den untersuchten Umwelterklärungen mit den Angaben großer Unternehmen in Nachhaltigkeitsberichten und bei CDP-Klima verglichen.

Bereits bei der „großen“ Analyse wurde nachgewiesen, dass sowohl die Unternehmensgröße, als auch der Berichtstyp und die Branche einen Einfluss auf die klimabezogene Berichterstattung haben (a.a.O. S. 121). Diese Einflussfaktoren sind auch bei der Interpretation der Ergebnisse für die EMAS-Umwelterklärungen zu berücksichtigen. Speziell mit Blick auf den Berichtstyp zeigte schon die „große“ Analyse, dass die zugrunde liegenden Rahmenwerke in unterschiedlichem Umfang von TCFD empfohlene Berichtsanforderungen enthalten. So hat CDP-Klima die meisten TCFD-Empfehlungen berücksichtigt, während die Anforderungen an nichtfinanzielle Erklärungen (nicht nur) diesbezüglich keine konkreten Vorgaben enthalten. Ebenso enthalten die Anforderungen an die Umwelterklärung keine expliziten Anforderungen zu einer klimabezogenen Berichterstattung.

#### Fazit zur Berichterstattung in EMAS-Umwelterklärungen

Die Analyse der Umwelterklärungen hat nicht zu überraschenden Erkenntnissen geführt. Wie erwartet enthalten Umwelterklärungen Kennzahlen zu Treibhausgasemissionen und Energieverbräuchen sowie Angaben zu Klimaschutzzielen und zur Aufbauorganisation des Umweltmanagements. Ebenso wurde vermutet, dass in Umwelterklärungen nicht über die Anwendung von Klimaszenarien und der Resilienz der Unternehmensstrategie berichtet wird, da dies bislang keine konkrete Anforderung an das Umweltmanagementsystem ist (siehe oben). Auch dies hat sich bestätigt.

Es ist davon auszugehen, dass der Stand in der Berichterstattung den Sachstand in Unternehmen weitgehend widerspiegelt. Die klein- und mittelständischen Unternehmen haben sich sehr wahrscheinlich bislang kaum mit ihren klimabezogenen Risiken und insbesondere auch nicht mit physischen Klimarisiken befasst. Um dies bei Unternehmen mit Umweltmanagementsystemen gemäß EMAS zu ändern, gibt es prinzipiell folgende Ansatzpunkte:

- **Änderungen der Anforderungen innerhalb oder im Kontext von ISO 14001**. Die EMAS-Verordnung hat die Anforderungen von ISO 14001 übernommen und geht darüber hinaus. Zukünftig neue Anforderungen innerhalb oder im Kontext von ISO 14001 dürften erneut in der EMAS-Verordnung nachvollzogen werden. Zu den Möglichkeiten im Rahmen der ISO-Normen zu einer besseren Berücksichtigung von physischen Klimarisiken beizutragen siehe oben.

- **Einführung von anspruchsvolleren Anforderungen innerhalb von EMAS oder Ergänzung eines freiwillig anzuwendenden Klimamoduls.** Hier wird bereits der Ansatz verfolgt ein freiwillig anzuwendendes EMAS-Klimamodul zu entwickeln (siehe Seite 67).

- **Verpflichtung in der EMAS-Umwelterklärung explizit über klimabezogene Risiken, speziell über physische Klimarisiken zu berichten.** Hierzu könnte man sich theoretisch darauf beziehen, dass auch im Rahmen der in Vorbereitung befindlichen europäischen Nachhaltigkeitsberichtspflicht eine Offenlegung zu klimabezogenen Risiken vorgesehen ist und dass darüber hinaus in den meisten G20 Staaten an solchen Berichtspflichten gearbeitet wird (FSB, 2021). Aber dieser Weg würde das bisherige Prinzip durchbrechen, dass die Umwelterklärung das Umweltmanagementsystem und dessen Ergebnisse beschreibt.

Mithin bestätigen die Ergebnisse der Analyse der Umwelterklärungen den Handlungsbedarf die Anforderungen an Umweltmanagementsysteme zu verbessern.

# 1 Introduction

The increasing number of extreme weather events around the world illustrates the dangerous impact that the climate crisis is already having today and how urgent the need for action is. To minimise the consequences of climate change, greenhouse gas emissions in particular must be dramatically reduced and more action to protect the environment must be taken. After all, the climate crisis is unavoidable, even with a radical cut in greenhouse gases.

The Intergovernmental Panel on Climate Change (IPCC) regularly refers to the urgent need for action, and its most recent reports indicate that the threat has further intensified (IPCC 2018, 2019, 2021). Dramatic images of extreme weather (such as drought and forest fires in Germany, Australia, the United States and Russia; drought and famine in Madagascar; flooding and landslides in Germany, Belgium, Turkey and Japan) in the news show how much of an impact inaction is already having.

At the same time, there is a growing understanding that the consequences of both climate change and an effective climate policy pose significant risks for companies. What is more, finance ministers and financial regulators fear that climate-related risks may drift across to the financial markets and seriously undermine market stability. In light of this, there are increasing calls for companies in the real economy and financial market actors to systematically manage and transparently report on their climate-related risks (e.g. G7 Finance Ministers and Central Bank Governors, 2021; NGFS, 2019).

The prioritisation of this point of view is also reflected in the updating of reporting obligations at European level: from 2022, reporting according to the EU taxonomy will "only" require the climate mitigation and climate adaptation requirements of the taxonomy to be taken into consideration (European Union, 2020). The requirement to report on the other four EU environmental objectives is not expected to be included until 2023. With regard to the planned EU Sustainability Reporting Standards, which will be binding for many European companies from 2024 under the draft EU Corporate Sustainability Reporting Directive, the standard concerning climate-related reporting obligations is likely to be the most comprehensive (EFRAG 2021; European Commission, 2021b).

International standards for management systems are another important lever in promoting the systematic management of climate-related risks, and there are currently some good opportunities in this area to deploy effective strategies in the near future. The question of whether the ISO 14001 standard for environmental management systems, which is in use all over the world, should be revised is currently being explored. The committee responsible for ISO 14001, ISO/TC 207, is currently gathering proposals for revision. The decision on whether the revision will go ahead and what direction it will take is expected to be made in late 2021 or early 2022.[24]

With this in mind, one of the main reasons this study was set up was to determine to what extent existing environmental management standards and comparable frameworks contribute to the systematic management of climate-related risks. A number of options were reviewed, including amending ISO 14001 or adding a climate-specific addendum to the ISO 14002 series. This forms the first part of the study.

[24] ISO standards are generally reviewed for any need for revision every five years, with a review taking place if necessary. The first revision of ISO 14001:1996 was conducted because the standard was found to require updating (Glatzner, 2001). This revision resulted in ISO 14001:2004. Further revisions took place primarily for reasons of harmonisation and led to the current valid version, ISO 14001:2015. The need for a revision of ISO 14001:2015 is currently being reviewed.

The second part of the study looks into small and medium-sized enterprises and public authorities that have implemented environmental management systems. The study looked into whether these systems cover climate-related risks and, as a consequence, are able to influence such issues. A total of 40 current EMAS environmental statements were analysed for this purpose.

The two parts of the study take into account the varying interests of the target groups and serve to establish better transparency. International experts looking into the review of ISO 14001 are the target audience for part one of the study. However, the further development of ISO 14001 also has an indirect influence on EMAS, as ISO 14001 requirements form part of EMAS. The analysis of EMAS environmental statements is primarily targeted at experts in the field in Europe and Germany, although it goes without saying that there is a certain amount of overlap between these two groups.

This study was produced as part of the Economics of Climate Change[25] research project, which aims to ensure that companies in the real economy and in the financial sector systematically take physical climate risks into consideration. The various approaches to achieve this goal are being published in a variety of reports.

The path of systematically managing climate risks through environment-related ISO standards and EMAS is of particular importance because it can be used to reach companies all over the world, including small and medium-sized enterprises. In addition, this approach would help create a common international understanding of the challenges and potential solutions.

**Key terms**

In political processes and publications concerning companies' management of climate risks (European Commission, 2019a; TCFD, 2017), a distinction is made between the following risks:

- **Physical risks of climate change**, i.e. risks resulting from the consequences of climate change, such as extreme weather events, droughts or rising sea levels. Referring to these risks as "physical risks" is very useful in most contexts[26]. However, in practice, this term is too imprecise, as some climate change risks affect companies indirectly, such as through disruption to supply chains and high raw materials prices, rather than having a direct, physical impact. Nevertheless, the term "physical risks" has already established itself and is therefore used in this study.

- **Transition risks**, i.e. risks for companies resulting from the long-term transition towards a carbon-neutral economy. They include risks from climate mitigation policies such as higher pricing on greenhouse gas emissions (e.g. by changes to European emissions trading), efficiency regulations (e.g. standards on vehicle fleet efficiency) as well as the potential impact of changes in consumer and investor behaviour.

[25] The research project has been commissioned by the German Environment Agency (UBA) and is being conducted by the Frankfurt School of Finance and Management, the Munich Climate Insurance Initiative (MCII), akzente kommunikation und Beratung GmbH and Dr. Ludwig Glatzner – Büro für Umwelt, Qualität, Sicherheit. Duration: 2019 to 2022. Further information and a list of all publications is available at https://www.akzente.de/blog/oekonomie-des-klimawandels/

[26] Viewing physical and transition risks as the same category of risk in a political and corporate context ensures that the focus is broader than simply the negative aspects of the transition to a carbon-neutral economy and the damage caused by climate change is ignored. Another advantage of viewing transition and physical risks as the same category (as the TCFD and others do) is that it encourages companies to also address their physical risks systematically. This can be seen in reporting practices (Loew et al., 2021) and was also recently confirmed in interviews (Loew, 2021).

Physical and transition risks are both summarised as climate-related risks. Besides risks, this study also looks into climate-related opportunities, the climate-related governance system and climate-related reporting and associated topics.

At this point it is important to briefly go into the understanding of risk: In ISO standards, risk is defined as an “effect of uncertainty” (ISO 14001:2015) or as “effects of uncertainty on objectives” (ISO 31000:2018) and so can include both potentially negative and potentially positive consequences.

However, in a corporate environment and in the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) relevant to the project, a distinction is made between risks and opportunities, with risks referring exclusively to potentially adverse effects. As a result, this is the definition of risk used in this study.

# Part 1: Analysis of the standards for environmental management systems and recommendations for the revision of ISO 14001

# 2 Analysis of the standards for environmental management systems

## 2.1 Objectives and methods

### Objectives

The aim of analysing relevant frameworks for environmental and sustainability management systems is to determine to what extent these standards contribute to the identification and assessment of climate-related risks and opportunities. In particular, the study focused on the following questions:

- How good are environmental management standards at determining and assessing climate-related risks?
- When applying environmental management standards, are reliable checks made as to which climate-related risks companies are exposed to?
- What can be done to ensure that the climate-related risks companies are exposed to are always checked when applying environmental management standards?

For this purpose, the study analysed the widely used environmental management standards ISO 14001[27] and EMAS[28], as well as the supporting environmental management guidelines ISO 14002[29] and ISO 14004[30]. In addition, the study looked into ISO 14090[31] Adaptation to Climate Change and ISO 26000[32] Guidance on Social Responsibility.

In view of a potential revision of ISO 14001, this study aims to shed light on the options available to companies in determining the environmental risks they are exposed to and the risk management action they can take within the scope of their environmental management, with the overall objective of identifying the most viable option.

### Methods

ISO 14001 was chosen for detailed analysis on the basis of TCFD recommendations due to its global use and prominent position (further details from page 49). Given that the EMAS environmental management system is based on ISO 14001, the study only looked at the requirements in EMAS that go above and beyond the scope of ISO 14001. The study also looked into whether other selected ISO standards cover the management of physical and transition risks and, if so, what recommendations and requirements they contain (Table 3).

[27] ISO 14001:2015 Environmental management systems – Requirements with guidance for use

[28] Regulation (EC) No 1221/2009 of the European Parliament and of the Council on the voluntary participation by organisations in a Community eco-management and audit scheme (EMAS)

[29] ISO 14002-1:2019 Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 1: General

[30] ISO 14004:2016 Environmental management systems – General guidelines on implementation

[31] ISO 14090:2019 Adaptation to Climate Change – Principles, Requirements and Guidelines

[32] ISO 26000:2010 Guidance on Social Responsibility

**Table 3: Overview of analysis**

| Standard | Content and reference to ISO 14001 | Analysis conducted |
|---|---|---|
| **ISO 14001**<br>Environmental management systems – Requirements with guidance for use | **ISO 14001 is the most important and most frequently applied global standard governing environmental management systems** | Detailed analysis on the basis of significant components of TCFD recommendations |
| **EMAS**<br>European Eco-management and Audit Scheme | **Includes ISO 14001 requirements as well as additional requirements**<br><br>**EMAS is relevant to the EU and Germany.** | Detailed analysis of the requirements that go above and beyond the scope of ISO 14001.<br><br>Analysis of EMAS environmental statements (Section 4) |
| **ISO 14004**<br>Environmental management systems – General guidelines on implementation | **Guidance on the implementation of an environmental management system modelled on ISO 14001** | Exploration of references or requirements concerning the management of climate-related risks |
| **ISO 14002**<br>Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area | **Additional guidance on broadening an ISO 14001 environmental management system to cover specific topics** | Exploration of references or requirements concerning the management of climate-related risks |
| **ISO 14090**<br>Adaptation to Climate Change – Principles, Requirements and Guidelines | **Topic-specific guidance for and requirements on management regarding adaptation to the consequences of climate change**<br>ISO 14090 can be applied in conjunction with ISO 14001 or separately. | Exploration of references or requirements concerning the management of climate-related risks |
| **ISO 26000**<br>Guidance on Social Responsibility | **Comprehensive guidance addressing environmental and climate action topics within the scope of social responsibility.**<br>ISO 26000 is not a management system standard and is not congruent with ISO 14001. | Exploration of references or requirements concerning the management of climate-related risks |

Source: by the authors (Glatzner & Loew)

## 2.2 Analysis of ISO 14001

### 2.2.1 General applicability to the management of climate-related risks

ISO 14001 defines requirements for environmental management systems that can be applied by any organisation, irrespective of its size, nature or characteristics, concerning the enhancement of environmental performance and the achievement of other intended outcomes, such as the fulfilment of compliance obligations or the achievement of environmental objectives.

It covers all environmental aspects of practices, services and products, in consideration of their life cycle, that are able to be controlled or influenced by the organisation.

In the introduction (which does not contain any binding requirements), the standard states in the initial paragraphs that societal expectations of organisations are rising and there are growing pressures on the environment from factors such as climate change.

In its primary definition in relation to environmental management of what "environment" means (definition 3.2.1), ISO 14001 notes that "environment," or the "surroundings in which an organization (3.1.4) operates, include air, natural resources, flora and fauna but can also be described in terms of aspects such as "biodiversity" or "climate".

According to ISO 14001, one of the main features of an environmental management system is that it is defined by the general specifications of "environmental policy" determined by an organisation's "top management". The environmental policy (clause 5.2) must, of course, contain a (voluntary) commitment to protect the environment as well as other commitments that are relevant in the context of the organisation (see below), such as a commitment to "climate change mitigation and adaptation" – as explicitly referenced in the related note.

With the most recent revision of ISO 14001[33], the "traditional focus" of this standard on environmental action, namely the environmental impact of organisations, was broadened to include disruption to organisations caused by environmental conditions. This is already made clear in the requirements on "environmental policy" (clause 5.2 – see above) and is explained in further detail in other requirements (e.g. "context analysis" – see below).

In addition, ISO 14001 has followed a "risk-based approach" since the latest revision in 2015, as now do all recent ISO management system standards. Risks and opportunities originating from the particular context and from stakeholder requirements as well as from legal and other binding obligations and from environmental aspects, including product life cycle, must be systematically addressed using appropriate actions (clause 6.1). As a result, under ISO 14001, an environmental management system is the "part of the management system used to manage environmental aspects, fulfil compliance obligations and address risks and opportunities" (definition 3.1.2, emphasis added).

In this respect, ISO 14001 focuses primarily on risks and opportunities associated with the achievement of the intended outcomes of the environmental management system, which include "enhancement of environmental performance, fulfilment of compliance obligations and achievement of environmental objectives" (see clauses 1, 6.1.1. and A.6.1.1), whereas the recommendations of the TCFD (see following section) are targeted at the financial impact of climate risks on companies and financial actors. However, under ISO 14001, an organisation must determine risks and opportunities to "prevent or reduce undesired effects, including the potential for external environmental conditions to affect the organisation" (clause 6.1.1). "Climate" is cited as an example of an "environmental condition" that can be the cause of risks and opportunities for the organisation, the organisation's purpose or the organisation's environmental management system (annex clause A.4.1).

Up to this point, the following conclusions can be drawn: Fundamentally, ISO 14001 states that a compliant environmental management system can serve to achieve a variety of "intended outcomes" and therefore also the management of climate risks. One important lever here is the

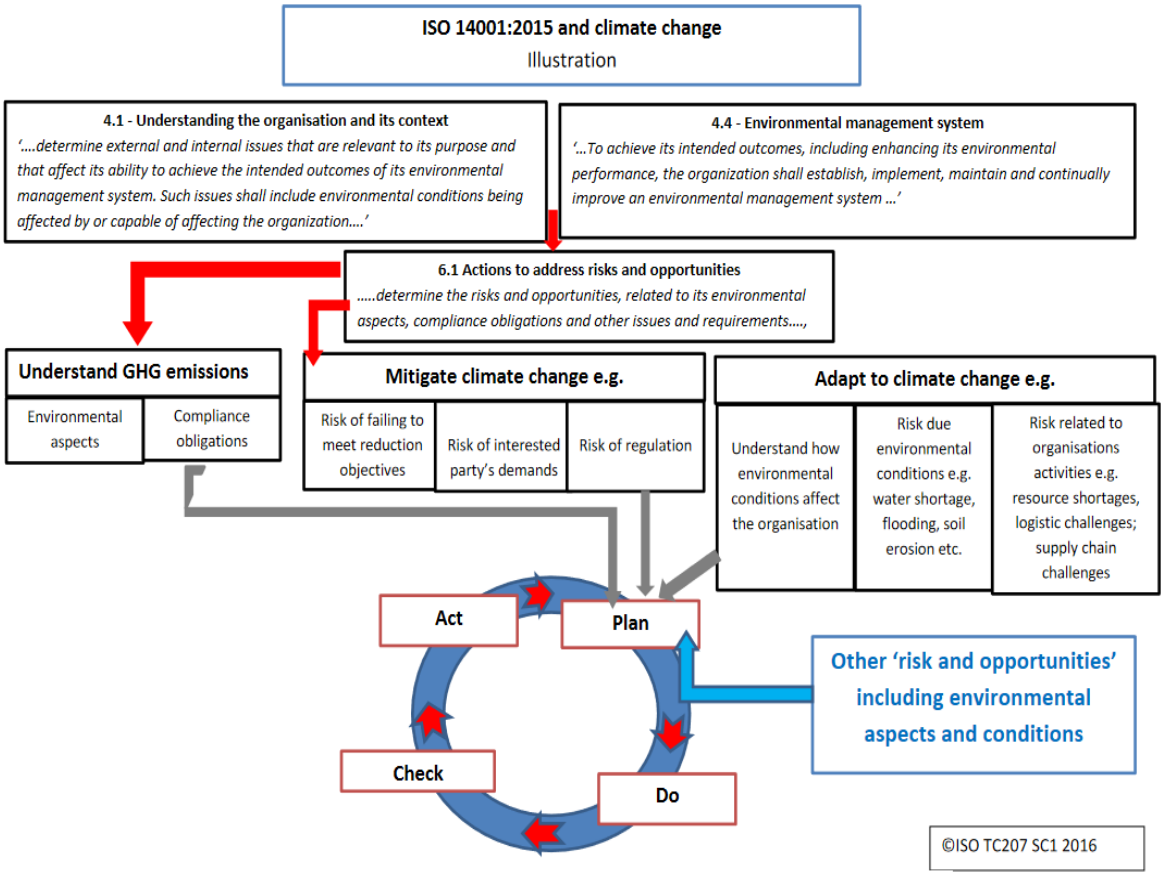
[33] In its most recent revision, ISO 14001 was amended in line with the ISO's "high-level structure" (HLS; now known as the "harmonised system"), which is a standardised framework containing basic elements for management system standards; elements added to ISO 14001 as a result of these changes include context analysis and a risk-based approach.

"policy" of an organisation's "top management"[34], which can decide itself whether the management system is also used to manage physical climate risks and, if applicable, also transition risks. However, if legal and other compliance obligations exist and the analysis of the environmental aspects or the context analysis reveals that certain risks are highly relevant, ISO 14001 states that these risks must be addressed appropriately.

One constraint here is that the main focus of the ISO 14001 risk concept is on ensuring the intended outcomes of the environmental management system. The undesired effects of environmental conditions (climate) on the organisation are indeed addressed (in the "informative guidance"), but not in great detail. It is merely suggested that financial consequences ("can affect the organisation's purpose", clause A.4.1) may be referred to here.

The figure below shows how ISO believes that ISO 14001 can help organisations mitigate and adapt to climate change.

**Figure 11: How ISO 14001 supports climate change mitigation and adaptation**




Source: ISO/TC207/SC1 (2016)

[34] "Top management" within the meaning of the standard is a person or group of people who directs and controls an organisation at the highest level (definition 3.1.5). In the case of companies, this may be the management of a limited liability company (GmbH) or the management board of a stock corporation (AG), although this depends on the organisation's own definitions and systemic boundaries. The top management of a business is the business management, the top management of a cafeteria is the cafeteria management, etc. Non-executive, supervisory or advisory committees (supervisory boards, advisory boards, etc.) are not addressed in ISO 14001.

### 2.2.2 Analysis of ISO 14001's coverage of climate risks according to TCFD recommendations

This study draws on the recommendations of the Task Force for Climate-related Financial Disclosures (TCFD, 2017) for a more detailed exploration of ISO 14001. These recommendations, which were developed at the request of the G20 finance ministers and published in 2017, are receiving considerable recognition and are increasingly influencing corporate reporting[35]. Numerous central banks and regulatory authorities, among other institutions, are calling for TCFD-compliant reporting (NGFS, 2019). In addition, the G7 finance ministers and central bank directors expressed their support for this at the G7 summit in the UK (2021). Corresponding legislative processes have already begun in Australia and the UK. The European Commission (2021) is currently preparing a sustainability reporting directive that should also include significant parts of the TCFD recommendations. Table 4 shows which TCFD recommendations were analysed and in which section the analysis is contained. It should be noted that the TCFD recommendations constitute guidance for corporate reporting, whereas ISO 14001 defines requirements for environmental management.

**Table 4: Overview of analysis of ISO 14001 on the basis of TCFD recommendations**

| Topic | Underlying TCFD recommendation (bold) and reference to relevant section of the analysis |
|---|---|
| Governance | **TCFD: Describe the management/executive board and supervisory board's oversight of climate risks and opportunities.**<br>→ Requirements concerning the definition of objectives, following-up on objective achievement and the monitoring of climate risks and opportunities by the management (2.2.5)<br><br>**TCFD: Describe management's role in assessing and managing climate-related risks and opportunities**<br>→ Requirements concerning how responsibilities and tasks below management level relating to the management of climate-related risks and opportunities are to be defined (2.2.6) |
| Strategy | **TCFD: Describe the climate-related risks and opportunities the organisation has identified over the short, medium and long term.**<br>→ Requirements concerning the definition and assessment of climate-related risks (2.2.3)<br><br>**TCFD: Describe the impact of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning.**<br>→ Requirements concerning the definition and assessment of climate-related risks (2.2.3)<br><br>**TCFD: Describe the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.**<br>→ Requirements concerning the definition and assessment of climate-related risks (2.2.3) |
| Risk management | **TCFD: Describe the organisation's processes for identifying and assessing climate-related risks.**<br>→ Requirements concerning the definition and assessment of climate-related risks (2.2.3)<br><br>**TCFD: Describe the organisation's processes for managing climate-related risks.**<br>→ Requirements concerning the management of climate-related risks (2.2.4) |

[35] For an overview of developments please refer to the Financial Stability Board (2021) Report on Promoting Climate-Related Disclosures.

| Topic | Underlying TCFD recommendation (bold) and reference to relevant section of the analysis |
|---|---|
| | **TCFD: Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organisation's overall risk management.** → Requirements concerning integration into risk management (2.2.7) |
| Metrics and objectives | **TCFD: Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas (GHG) emissions** and the related risks. → Requirements concerning the calculation of greenhouse gas emissions (Scope 1-3) and other climate-related metrics (2.2.8)<br><br>Note: Empirical analysis of reporting practices has shown that most organisations publish Scope 1 and Scope 2 metrics and, if they analyse climate-related risks, they do so separately. |
| | **TCFD:** Disclose the **metrics** used by the organisation to assess climate risks and opportunities in line with its strategy and risk management process. → Requirements concerning the calculation of greenhouse gas emissions (Scope 1-3) and other climate-related metrics (2.2.8)<br><br>Reason: It is conceivable that organisations explicitly state which metrics are relevant to their strategic and risk management processes. However, empirical analysis of reporting practices shows that no such statements are provided. It is not possible to judge to what extent published metrics are also relevant to the strategic and risk management processes. |
| Metrics and objectives | **TCFD: Describe the organisation's objectives and objective achievement** with regard to the management of climate-related risks and opportunities. → Requirements concerning the definition of objectives, following-up on objective achievement and the monitoring of climate risks and opportunities by the management (2.2.5)<br><br>Note: Empirical analysis of reporting practices shows that many organisations declare their climate objectives. There is usually no way of ascertaining whether these objectives have been set to reduce transition risks or for other reasons (costs, reputation, voluntary contribution to climate mitigation). The study also looked into whether objectives to reduce the physical risks of climate change had been set, but this was not found to be the case. |

Source: by the authors (Glatzner und Loew) based on Loew et al. 2021.

### 2.2.3 Requirements concerning the definition and assessment of climate-related risks

As part of the context analysis required by ISO 14001 (clause 4.1), organisations must determine physical issues but also legal, political, economic and other issues that are relevant to them or the intended outcomes of their environmental management. Such issues must include environmental conditions being affected by the organisation (from the inside out) and those capable of affecting the organisation (from the outside in). With climate change having become a driving force behind many legal, political and economic developments, it and the associated transition risks should be issues addressed directly or indirectly within the scope of context analysis. In addition, climate change is also having an impact and leading to risks that may physically affect organisations and companies and their locations, but also their supply chains.

In the stakeholder analysis (clause 4.2), the organisation must understand and determine the needs and expectations of relevant interest parties, determine which of the needs and expectations are so relevant to the organisation that they are to be treated as compliance obligations and how these needs and expectations are to be systematically addressed within the scope of the management system. Parties interested in the organisation include public

authorities, investors and customers. There are growing calls from such parties for a more environmentally friendly approach, but also for the adequate management of climate risks, whose adverse consequences may affect them too.

In a conventional ISO 14001 environmental management system, significant environmental aspects associated with an organisation or its activities, products or services must be determined and assessed (clause 6.1.2). At the very least, this assessment of environmental aspects should include energy-related greenhouse gas emissions. Greenhouse gas emissions are not only a physical effect of climate change and its consequences, efforts to reduce them are also part of political and legal activities and programmes with corresponding transition risks for organisations.

Climate-specific environmental aspects, stakeholder requirements and political requirements can lead to compliance obligations (clause 6.1.3), which in turn may be the source of risks and opportunities and must be determined and implemented systematically in accordance with ISO 14001.

Annex A.6.1.1 of ISO 14001 contains the following note on addressing risks: "It is up to the organization to select the method it will use to determine its risks and opportunities. The method may involve a simple qualitative process or a full quantitative assessment …". This demonstrates the standard's open approach to the issue of how to implement the requirements it lays down.

The analyses and assessments stipulated by the standard do not define any other specific requirements on determining and assessing the risks and opportunities of climate change. As a result, both ISO 14001 and the TCFD provide no explicit definition of how to monitor the impact of climate-related risks and opportunities on ongoing business activities, business strategy and financial planning. There are also no provisions for the application of climate scenarios.

However, if issues related to climate change, climate mitigation, climate consequences or climate risks

- have been identified as being significant to the organisation on the basis of context and stakeholder analysis or the assessment of environmental aspects and/or
- are the subject of legal or other compliance obligations and/or
- are used as a basis by the top management in the structuring of the organisation and its environmental policy,

these issues are to also be systematically addressed. For this to happen, the associated risks and opportunities must be determined and the environmental management system must be geared towards this aim – beginning with planning and setting objectives, as well as defining structures and processes, through to internal and external reviews.

**Summary – requirements concerning the definition and assessment of climate-related risks**

TCFD recommendation:
Describe the climate-related risks and opportunities the organization has identified over the short, medium and long term; the impact of climate-related risks and opportunities on the organisation's businesses, strategy and financial planning; the resilience of the organisation's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario; and the organisation's processes for identifying and assessing climate-related risks.

ISO 14001 requirement:
Determine the risks and opportunities in relation to any potentially relevant, climate-related environmental aspects, compliance obligations, context issues and the needs and expectations of interested parties in order to achieve the objectives of the environmental management system and to prevent or reduce undesired effects, including climate-related influences.

Conclusion:
ISO 14001 provides a framework in which potential risks can be determined and assessed. It does not contain any further, more specific requirements with regard to climate-related risks.

### 2.2.4 Requirements concerning the management of climate-related risks

In its clause on planning (clause 6), ISO 14001 covers the subject of "actions to address risks and opportunities" resulting from environmental aspects, compliance obligations and the organisation and its context.

When it comes to addressing significant environmental aspects (such as greenhouse gas emissions), compliance obligations (such as emissions certificates) and the assessed risks and opportunities (possible climate-related risks for the environmental management system or the organisation), the organisation needs to determine (clause 6.1.1) in accordance with ISO 14001 how action is taken, how this action is integrated into the environmental management system and business processes and how it is checked for efficiency (clause 6.1.4). The standard contains further general requirements regarding planning, implementation and assessment.

So, in accordance with ISO 14001, an organisation must establish and implement the structures and processes necessary to properly address the risks and opportunities of its context, its compliance obligations and its environmental aspects as determined within the scope of its management system. Any physical climate risks or transition risks determined in this process must be included in the planning of action and processes and in the definition of objectives and measures.

**Summary – requirements concerning the management of climate-related risks**

TCFD recommendation:
Describe the organisation's processes for managing climate-related risks.

ISO 14001 requirement:
Determine and plan action to address identified risks and opportunities, including implementation and assessing effectiveness.

Conclusion:
ISO 14001 generally requires action to be planned and systematically implemented with regard to identified risks. It does not contain any further, more specific requirements with regard to climate-related risks.

### 2.2.5 Requirements concerning the definition of objectives, following-up on objective achievement and the monitoring of climate risks and opportunities by the management

Under ISO 14001, top management must demonstrate "leadership and commitment" and take "accountability" for the effectiveness of the environmental management system (clause 5.1).

ISO 14001 stipulates that top management make sure that the environmental policy and corresponding environmental objectives are compatible with the strategic direction and the context of the organisation. In clause 5.2, the standard also stipulates that top management must establish the environmental policy. Environmental objectives must be defined for relevant functional areas and levels in accordance with the environmental policy.

The environmental targets must "take into account significant environmental aspects and associated compliance obligations of the organisation" but also "consider" the organisation's risks and opportunities (although annex A.3 states that, unlike "take into account", the word "consider" means it is necessary to think about the topic but it can be excluded).

In the context of their analysis and identified risks and opportunities, organisations must not only set objectives and plan their implementation, they must also organise and monitor the implementation and take action in case of deviations. This is the classic plan-do-check-act (PDCA) cycle on which ISO 14001 is based (clauses 6, 7, 8, 9).

According to clause 9.3, top management must conduct management reviews at planned intervals, in which it determines changes in context or the risk situation, assesses the achievement of objectives and makes decisions on potential non-conformity and corrective action (clause 10).

**Summary – requirements concerning the definition of objectives, following-up on objective achievement and the monitoring of climate risks and opportunities by the management**

TCFD recommendation:
Describe the management/executive board and supervisory board's oversight of climate risks and opportunities.
Describe the targets used by the organisation.

ISO 14001 requirement:
Environmental objectives must be defined in accordance with the environmental policy and be compatible with the strategic direction and the context of the organisation, but do not necessarily need to be risk- and opportunity-based.
If objectives are defined, they must be implemented in accordance with the PDCA concept. Top management is accountable for the function and effectiveness of environmental objectives.

Conclusion:
ISO 14001 generally defines a systematic approach to achieving set objectives under the leadership and responsibility of top management. It does not contain any requirements with regard to objectives based on climate risk.

### 2.2.6 Requirements concerning how responsibilities and tasks below management level relating to the management of climate-related risks and opportunities are to be defined

Top management must ensure that the responsibilities and authorities for relevant roles in the management system are assigned and communicated within the organisation (clause 5.3). This is particularly important in terms of the function of the environmental management system and internal reporting. In addition, top management must ensure that the environmental management system requirements are integrated into the organisation's business processes (clause 5.1) and that the processes required to meet the requirements and implement all planned actions and programmes are established (clause 6.1.1).

The requirement to define risks and opportunities alone necessitates the definition of processes and responsibilities both for this task itself and for the further implementation of actions. Under ISO 14001, this process, which can be described as the structural organisation and the process organisation, must include assigning all relevant tasks, authorities and responsibilities to the right people, representatives, functions, positions, levels, etc. in a targeted and transparent manner. However, there is a general level of organisational freedom in terms of how to conduct processes and who should be responsible for conducting them.

**Summary – requirements concerning how responsibilities and tasks below management level relating to the management of climate-related risks and opportunities are to be defined**

TCFD recommendation:
Describe management's role in managing and assessing climate-related risks and opportunities

ISO 14001 requirement:
ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned and communicated.

Conclusion:
ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned as a rule. It does not contain any more specific requirements with regard to individual tasks, such as assigning activities linked to climate risk.

### 2.2.7 Requirements concerning integration into risk management

ISO 14001 defines the environmental management system as a part of an organisation's overall management system that pursues a specific purpose. As a result, an organisation is free to integrate the environmental management system into the overall management system (or another sub-system) any way it sees fit. In turn, other systems and purposes can be integrated into elements of the management system developed in accordance with ISO 14001.

If climate-related risks and opportunities are relevant to the organisation or it is determined by the top management that said risks and opportunities require consideration, they can be addressed in both the structures of the environmental management system and within the scope of the existing risk management system. Where this takes place is a question of practicality and is at the discretion of the organisation, provided the requirements of ISO 14001 are met.

**Summary – requirements concerning integration into risk management**

TCFD recommendation:
Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organisation's overall risk management.

ISO 14001 requirement:
ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned and communicated.

Conclusion:
ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned as a rule. It does not contain any more specific requirements with regard to individual tasks, such as assigning activities linked to climate risk to overarching risk management.

### 2.2.8 Requirements concerning the calculation of greenhouse gas emissions (Scope 1-3) and other climate-related metrics

Determining greenhouse gas emissions usually falls within the scope of ISO 14001 as part of environmental mitigation. Greenhouse gas emissions are direct and/or indirect environmental aspects associated with a practice, a service or a product over the respective life cycle. Any potentially significant environmental aspects (clause 6.1.2) and their environmental impact must be determined (using data and criteria such as the volume of emissions or the extent of the environmental impact), corresponding actions must be taken and objectives must be defined (clause 6.2). In this context, it must also be determined how the effectiveness of actions and the achievement of objectives are to be monitored (metrics).

Evaluating environmental performance (clause 9) includes monitoring, measuring, analysing and assessing the results achieved. If greenhouse gas emissions have been classified as having a significant environmental aspect, it is good practice to apply the Greenhouse Gas Protocol or ISO 14064-1 and, for example, differentiate between direct and indirect GHG emissions or Scope 1, Scope 2 and Scope 3 emissions. ISO 14001 does not include any specific requirements in this regard. It does not address which data is to be gathered, which metrics are to be calculated and which systems and methods are to be implemented. It also makes no reference to corresponding standards (such as the Greenhouse Gas Protocol (2004, 2021) or ISO 14064-1[36]).

**Summary – requirements concerning the calculation of greenhouse gas emissions (Scope 1-3) and other climate-related metrics**

TCFD recommendation:
Disclose Scope 1, Scope 2 and, if appropriate, Scope 3 greenhouse gas emissions and the metrics used by the organisation to assess climate risks and opportunities.

ISO 14001 requirement:
ISO 14001 stipulates that the organisation's direct and indirect environmental aspects, such as greenhouse gas emissions, are determined and assessed with regard to their significance.

[36] ISO 14064-1:2018 Greenhouse Gases – Part 1: Specification with Guidance at the Organizational Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals

Conclusion:
ISO 14001 defines a basic materiality assessment process for environmental aspects, but leaves it up to the user to determine the criteria and methods, such as quantification. It does not contain any more specific requirements with regard to accounting for greenhouse gas emissions, for example.

### 2.2.9 Notes on (additional) instruments that are useful in the management of climate-related risks

In the introduction, ISO 14001 references its own annexes, which are for information purposes only, as well as ISO 14004. Implementation guidance on environmental management systems is included in ISO 14004 (see section 2.4 Analysis of ISO 14004 below).

In the bibliography, ISO 14001 references additional ISO standards that are related to the environmental management system and could be of interest to ISO 14001 users, such as relevant risk management standards. The ISO 14001 does not contain any specific notes on instruments or methods to address climate risks, or any requirements to apply such instruments and methods. The current version of the standard (ISO 14001:2015) also contains no reference to relevant new standards in the ISO 14000 series, such as ISO 14090 or ISO 14002, which could be used to address and pin down the topic of climate change for implementation as part of an environmental management system. The extent to which these newer ISO standards may be useful in the management of climate-related risks is explored later in this study.

### 2.2.10 Summary and conclusion regarding ISO 14001

Due to the fact that ISO 14001 is a broadly defined management system standard geared towards addressing all manner of environmental issues and is able to be applied by organisations of any nature or size and operating in any industry, an ISO 14001 environmental management system should be oriented towards the organisation's relevant environmental aspects and the relevant environmental conditions in a context- and organisation-specific manner

Generally speaking, ISO 14001 also provides a solid framework for addressing climate-related risks. Given that the consequences of climate change and the increasing pressure from social and political actors as well as those in the financial sector have become significantly clearer only in the past few years, it is unsurprising that the "generic", internationally agreed ISO 14001 environmental management system standard, which was published in 2015, does not offer many details with regard to the management of climate-related risks.

#### Determining and assessing climate-related opportunities and risks

Alongside the traditional focus on mitigation, ISO 14001 also addresses the management of the risks and consequences of climate change (adaptation), but only on a very rudimentary level. Unlike the "impact of the organisation on the environment", the inclusion of "environmental conditions that can affect the organisation" is formulated in a very generalised manner as a call to address relevant environmental conditions and risks.

As stated above, the following conclusion can be drawn: There are no specific requirements with regard to determining and assessing climate-related risks and opportunities. However, if the issues of climate change, climate mitigation and/or the consequences of climate change have been identified as relevant to the organisation on the basis of context and stakeholder analysis, if there are compliance obligations or the top management focuses the organisation on these

challenges by way of a policy, these issues must be addressed systematically, the associated risks and opportunities must be determined and environmental management must be aligned with these issues – from planning and defining objectives as well as designing structures and processes, through to internal and external reviews.

And vice versa: If the organisation's own context analysis has not identified the impact of climate on the organisation as a relevant issue and there are no other requirements (e.g. from top management policy), physical climate risks and transition risks will not be systematically managed as part of the environmental management system (beyond the scope of legal requirements).

**Requirements concerning adaptation actions**

ISO 14001 generally stipulates that the undesired effects of identified risks, including disruption caused by "external environmental conditions", are considered in environmental management.

As stated above, the following conclusion can be drawn: There are no specific requirements with regard taking action to adapt to climate change. However, if physical risks of climate change have been identified as relevant to the organisation on the basis of context analysis, compliance obligations exist as a result of corresponding stakeholder requirements or the top management focuses the organisation on these challenges by way of a policy, this issue must be addressed systematically as part of environmental management – from planning and defining objectives as well as designing structures and processes, through to testing and reviews. The requirements of ISO 14001 regarding emergency preparedness and response (clause 8.2) also apply in this case. The organisation decides itself (beyond the scope of any legal requirements) which methods are used and what actions are taken in view of its own requirements and objectives. The same applies to transition risks.

**Lack of specific requirements on climate-related risks and opportunities**

Analysis of ISO 14001 compared with the TCFD recommendations led to the following conclusions:

- The ISO 14001 provides a framework in which potential risks can be determined and assessed. It does not contain any further, more specific requirements with regard to climate-related risks.
- ISO 14001 generally requires action to be planned and systematically implemented with regard to identified risks. It does not contain any further, more specific requirements with regard to climate-related risks.
- ISO 14001 generally defines a systematic approach to achieving set objectives under the leadership and responsibility of top management. It does not contain any requirements with regard to objectives based on climate risk.
- ISO 14001 stipulates that responsibilities and authorities for relevant tasks/roles are assigned as a rule. It does not contain any more specific requirements with regard to individual tasks, such as assigning activities linked to climate risk to overarching risk management.
- ISO 14001 defines a basic materiality assessment process for environmental aspects, but leaves it up to the user to determine the criteria and methods, such as quantification. It does not contain any more specific requirements with regard to accounting for greenhouse gas emissions, for example.

In addition, the risk concept applied by ISO 14001 is not clear concerning the extent to which the intended outcomes of the environmental management system also extend to the potential financial impact of climate risks on companies as described in the TCFD recommendations.

**Consequences of the lack of more specific requirements on climate-related risks and opportunities**

As ISO 14001 does not provide any specific requirements on addressing climate risks, the question of whether and to what extent the environmental management system modelled in ISO 14001 can be used to manage physical and/or transition climate risks depends heavily on the manner in which it is applied. Top management plays a particularly key role here, as it determines the general orientation of the organisation and the characteristics of its management system. In reality, this can range from good environmental, climate and sustainability management practices to simply fulfilling the minimum requirements of the environmental management system standard.

In addition, it takes a certain period of time for good practice to gain a foothold, especially after the implementation of new standard requirements as was the case in the most recent revision of ISO 14001:2015. Environmental management systems are often centred on traditional environmental management issues, such as reducing environmental impact (e.g. by cutting emissions) and risks to the environment (e.g. hazardous substance management), and compliance with environmental laws. The implementation of any existing legal requirements, including on climate mitigation (and potentially also climate adaptation), is and would be addressed in this traditional understanding. Experience shows that the newly added requirements in the last review process and the approaches described in ISO 14001 lag somewhat behind good implementation practice, especially if these requirements are not already manifested in legal regulations or conventional management tools.[37] This particularly applies to the analysis of the business context, especially in relation to environmental conditions that (can) impact the organisation and the associated risks (and opportunities).

### 2.2.11 Proposals for better consideration of climate risks

**Improving the effectiveness of the current version, ISO 14001:2015**

The following proposals could lead to physical and transition risks being determined and managed more systematically within the scope of the existing ISO 14001 environmental management standard:

- More leadership: ISO 14001:2015 would become more useful and effective in terms of climate risks if the top management of an organisation feels or is caused (of its own volition or due to pressure from stakeholders) to add the issue of climate-related risks to the agenda, e.g. incorporate it as a principle in the environmental policy and correspondingly take action with the help of the management system.
- More obligation: An ISO 14001:2015-compliant environmental management system must include the issues of climate risks and climate consequences if a compliance obligation exists in this regard. A compliance obligation can result from corresponding legal regulations,

[37] Personal opinion of the author, Dr Ludwig Glatzner, from his work and practical experience as a consultant, trainer and certification auditor for environmental, energy, climate and sustainability management.

contractual agreements (e.g. with customers), commitments to stakeholders (e.g. investors or other sources of financing) or other commitments the organisation itself has made.

- More relevance: If an organisation cannot help but identify the consequences of climate change for the organisation as a relevant contextual issue posing corresponding risks (e.g. due to heightened risk situations, changes in risk weightings or the incorporation of better sources of information and methods), the issue must be implemented as part of the management system according to ISO 14001:2015.

The current unamended version of ISO 14001:2015 can be freely applied as needed, taking into account further standards, guidelines or specifications on the subject of climate risks, in order to make up for the lack of specific requirements and function as a makeshift solution. ISO 14090 on adaptation to climate change is one example of further standards that could be applied. It goes without saying that companies are also free to apply the TCFD recommendations at their own discretion as compliance obligations (voluntarily, if applicable) and implement the recommendations using existing or newly developed (environmental) management structures and processes.

**Improving effectiveness by developing ISO 14001:2015 further**

At the time of writing (second half of 2021), the ISO process to decide whether ISO 14001:2015 will be revised at all is ongoing. A final decision is expected at the end of 2021 or at the start of 2022. If a decision is made in favour of revising the standard, the scope of the revision will be determined – in other words, whether and to what extent the existing version has to be amended.

ISO 14001:2015 could be developed further with a view to incorporating climate risks to a greater extent through:

- additional requirements and normative formulations, particularly regarding environmental policy, performing context analysis, determining relevant stakeholder requirements or addressing risks and opportunities with the aim of improving the application of the environmental management system from the perspective of climate change consequences and climate risks

- additional instruction for better application of the standard in view of climate change and climate risks, such as through the inclusion of one or more annexes providing in-depth guidance on how to perform context analysis, stakeholder analysis, risk analysis, or through a dedicated annex on the subject of climate management

- additional interfaces compelling users of ISO 14001 to incorporate further standards, guidelines or specifications on the subject of climate change and climate risks and to consider or implement these issues within the scope of environmental management

The options for improving climate risk management with the help of ISO 14001 and for the potential further development of this standard are explored and assessed in more detail in section 3 Further development of international environmental management standards from the perspective of climate-related risks and opportunities.

## 2.3 Analysis of the EMAS system

### 2.3.1 EMAS Regulation and associated documents

The **Eco-Management and Audit Scheme** (**EMAS**) is an instrument combining environmental management and environmental auditing developed by the European Union to help organisations enhance their environmental performance. The ISO 14001-compliant environmental system is a core element of EMAS. EMAS defines additional requirements regarding environmental performance, reliable compliance with legal requirements, the involvement of the employees in the environmental management system and communication, particularly through the publication of environmental statements.

The EMAS Regulation comprises the regulations themselves (Verordnung (EG) Nr. 1221/2009), in other words the recitals, the articles (valid since 2009) and various annexes, and requirements for aspects such as environmental reviews, environmental management systems and environmental reporting. Most annexes have been amended on multiple occasions since 2009[38].

The Joint Research Centre (JRC) develops sectoral reference documents (SRDs) on behalf of the European Commission to ensure that the regulation is applied uniformly across the EU.

The requirements for organisations applying the EMAS Regulation are split into:

- the actual text of the regulation
- the annexes to the EMAS Regulation
- sectoral reference documents

Environmental management system requirements within EMAS are mainly defined by ISO 14001. In 2017, changes to the revised ISO 14001:2015 were implemented by amendments to Annexes I to III (European Commission, 2017a). There are also other EMAS-specific requirements beyond the scope of ISO 14001.

There are some key differences between ISO 14001 and EMAS:

- the requirement to prepare an environmental statement at least once every three years, have the statement validated by an environmental verifier and make it available to the public (EMAS Regulation, Annex IV)
- the requirement to carry out an initial environmental review as the basis of developing the management system or of changes to the existing system (EMAS Regulation Annex I)

[38] The EMAS Regulation comprises the actual text of the Regulation (Regulation (EC) No. 1221/2009), in other words the recitals and the articles (valid since 2009); it also contains annexes that have now been updated (particularly due to the amendment of the current version of ISO 14001, which entered into force in 2015):

Annexes I (Environmental Review), II (Environmental Management System), III (Internal Environmental Audit) were amended by Commission Regulation (EU) 2017/1505 of 28 August 2017 amending Annexes I, II and III to Regulation (EC) No 1221/2009 ... (European Commission, 2017a)

Annex IV (Environmental Reporting) was amended by Commission Regulation 2018/2026 of 19 December 2018 amending Annex IV to Regulation (EC) No 1221/2009 ... (European Commission, 2018a)

Annexes V (EMAS Logo), VI (Information Requirements for Registration), VII (Environmental Verifier's Declaration on Verification and Validation Activities) and VIII (Correlation Table) have not been updated and remain valid in the version published in Regulation (EC) No 1221/2009 in 2009.

- some additional requirements for EMAS environmental management systems that go above and beyond the requirements of ISO 14001:2015 (EMAS Regulation Annex II Part B and EMAS Regulation Annex III)
- the verification and registration system by an environmental verifier and bodies appointed according to the EMAS Regulation and national implementation (German Environmental Audit Act (UAG)).

The following analysis primarily explores these EMAS-specific aspects that go above and beyond the scope of ISO 14001:2015 (and the evaluation provided above).

### 2.3.2 Climate change and climate risks in EMAS

The text of the EMAS Regulation does not address issues such as climate, climate mitigation and climate consequences directly and also does not cover climate risks or general risks to organisations. However, Annex IV Environmental Reporting and the sectoral reference documents do contain references to climate change, which are explored in the following sections.

### 2.3.3 Climate change and climate risks in EMAS environmental reporting

According to the EMAS Regulation and Annex IV Environmental Reporting, EMAS organisations must prepare an environmental statement, at least every three years as a rule, and have it validated by an environmental verifier.

Validation refers to conformation from the environmental verifier (who is officially licensed and supervised in Germany in accordance with the German Environmental Audit Act) that the information and data contained in an organisation's environmental statement as well as the updates to the statement are reliable, credible, correct and in compliance with the requirements laid down in the Regulation. There is also a mandatory verification process, in which the environmental verifier examines whether the environmental statements have been prepared according to Annex IV and whether sectoral reference documents (see below) have been considered, if available.

The environmental statement must also include a description of all direct and indirect environmental aspects with a significant impact on the environment as well as a description of action that the organisation has taken or plans to take to enhance its environmental performance, achieve its objectives and ensure compliance with environmental legal obligations. The environmental verifier must consider relevant reference documents in assessing environmental performance.

According to EMAS Annex IV, the environmental statement provides a summary of the data available on the performance of the organisation and with respect to its environmental impacts. It must also contain certain environmental performance indicators (unless they are considered "not relevant"). These core indicators include "total annual emission of greenhouse gases", in other words emissions of $CO_2$, $CH_4$, $N_2O$, PFCs, HFCs, $NF_3$ and $SF_6$, expressed in tonnes of $CO_2$ equivalent. The EMAS provides the following guidance in this regard: *"The organisation should consider reporting its greenhouse gas emissions according to an established methodology, such as*

*the Greenhouse Gas Protocol."*[39]. Organisations are also required to establish further performance indicators taking sectoral reference documents (if available) into consideration.[40]

Every EMAS environmental statement from organisations whose greenhouse gas emissions are considered to be not insignificant must therefore contain corresponding performance indicators. Information on physical or transition risks with an impact on the organisation are not required but can be disclosed voluntarily.

### 2.3.4 Climate change and climate risks in EMAS reference documents

#### 2.3.4.1 Overview

The official reference documents published by the European Commission (see below) include best environmental management practices, recommendations for environmental performance indicators for specific sectors and associated benchmarks of excellence and rating systems identifying environmental performance levels. The EMAS Regulation stipulates that these reference documents must be taken into account

- when developing and implementing the environmental management system in the light of the results of the environmental review (Article 4 (1)(b)) and
- when preparing the environmental statement (Article 4 (1)(d) and Article 4 (4)

if a business operates in the sector in question.

As part of the verification process, the environmental verifier examines whether the organisation has considered the relevant sectoral reference documents.

**EU reference documents concerning the application of the EMAS Regulation**

The following sectoral reference documents have currently been issued by the European Commission:

Commission Decision (EU) 2015/801 of 20 May 2015 for the retail sector (European Commission, 2015)

Commission Decision (EU) 2016/611 of 15 April 2016 for the tourism sector (European Commission, 2016)

Commission Decision (EU) 2017/1508 of 28 August 2017 for the food and beverage manufacturing sector (European Commission, 2017b)

Commission Decision (EU) 2018/813 of 14 May 2018 for the agriculture sector (European Commission, 2018b)

Commission Decision (EU) 2019/61 of 19 December 2018 for the public administration sector (European Commission, 2019b)

Commission Decision (EU) 2019/62 of 19 December 2018 for the car manufacturing sector (European Commission, 2019c)

Commission Decision (EU) 2019/63 of 19 December 2018 for the electrical and electronic equipment manufacturing sector (European Commission, 2019d)

[39] Commission Regulation (EU) 2018/2026 amending Annex IV to Regulation (EC) No 1221/2009, Annex Part C No 2 VI
[40] Ibid, No 3

#### 2.3.4.2 Statements in the reference documents concerning climate change and climate risks

The following examples show whether and to what extent the issues of climate change and climate risks are addressed in the reference documents.

**Example: car manufacturing sector**

The reference document for the car manufacturing sector (European Commission, 2019c) specifies the significant sectoral environmental aspects and the associated environmental impacts, such as climate change. According to the reference document, the best environmental management practices, environmental performance indicators and benchmarks of excellence for the car manufacturing sector include:

- best practices for energy management, including the use of renewable and alternative energies to meet the energy needs of an automotive manufacturing facility, paired with a corresponding reduction in $CO_2$ emissions.
- best practices for value chain management and design, including Design for Sustainability using Life Cycle Assessment (LCA) with associated improvements to the $CO_2$ environmental indicator for new models compared to previous model designs
- best practices for biodiversity management, including ecosystems and biodiversity management throughout the value chain using special methodologies such as the Corporate Ecosystem Services Review (WBCSD et al 2012)

The Corporate Ecosystem Services Review, with best practices for biodiversity management, contains a reference to the Guidelines for Identifying Business Risks & Opportunities Arising from Ecosystem Change, which were developed in view of the following finding: "Ecosystem degradation is highly relevant to business because companies not only impact ecosystems and the services they provide but also depend on them. Ecosystem degradation, therefore, can pose a number of risks to corporate performance as well as create new business opportunities. Types of risks and opportunities include: operational, regulatory and legal, reputational, market and product, financing" (WBCSD et al 2012).

**Example: electrical and electronic equipment manufacturing sector**

The reference document for the electrical and electronic equipment manufacturing sector (European Commission, 2019d) refers to climate change as a consequence of significant sectoral environmental aspects. According to this reference document, the best environmental management practices, environmental performance indicators and benchmarks of excellence for the electrical and electronic equipment manufacturing sector include:

- best environmental management practices for manufacturing processes, including minimising HFC emissions (e.g. through substitution with other gases with a lower global warming potential, such as substitution of $C_2F_6$ with $C_3F_8$)
- best environmental management practices for supply chain management, including disclosure and setting of targets for supply chain greenhouse gases emissions according to recognised standards (such as the GHG protocol) and the regular disclosure of all the direct and indirect greenhouse gas and Scope 1, Scope 2 and Scope 3 emissions. The document specifies the indicators and benchmarks shown in Figure 12.

**Figure 12: Environmental performance indicators and benchmarks of excellence – excerpt from the EMAS reference document for the electrical and electronic equipment manufacturing sector**

| Environmental performance indicators | Benchmarks of excellence |
|---|---|
| (i38) Periodical (e.g. annual) publication of GHG emissions calculated with a recognised standard method (Y/N) | (b9) GHG emissions (including scope 1, 2 and the most relevant scope 3) are calculated with a recognised standard method and periodically published |
| (i39) Categories of scope 3 emissions included in the assessment | (b10) Absolute or relative GHG emission reduction targets are disclosed publicly |
| (i40) Periodical (e.g. annual) disclosure of demonstrated actual absolute and/or relative GHG emission reductions (Y/N) | (b11) Absolute and/or relative actual GHG emission reductions are demonstrated and periodically published |

Source: European Commission (2019a)

**Example: public administration**

According to the reference document, the best environmental management practices, environmental performance indicators and benchmarks of excellence for the public administration sector (European Commission, 2019b) include:

Best environmental practices for sustainable energy and climate change, including:

- establishing an inventory of energy use and emissions of the territory of the municipality
- establishing and implementing a municipal energy and climate action plan (based on the inventory of energy use and emissions)
- minimising the environmental impact of commuting and business travel
- establishing and implementing a strategy for climate change adaptation within the territory of the municipality

The EMAS reference document for public administration therefore contains best environmental practices to establish a holistic climate change adaptation strategy for the territory of the municipality "that allows protecting the built and natural environment against the adverse effects and impacts of climate change (e.g. floods, heat waves, droughts)". The document specifies the indicators and benchmarks shown in Figure 13.

**Figure 13: Environmental performance indicators and benchmarks of excellence – excerpt from the EMAS reference document for the public administration sector**

| Environmental performance indicators | Benchmarks of excellence |
|---|---|
| (i29) A holistic climate change adaptation strategy for the territory of the municipality is in place (y/n)<br>(i30) Percentage of homes and businesses protected as a result of the strategy (%) | (b10) A holistic climate change adaptation strategy for the territory of the municipality is in place |

Source: European Commission (2019b)

#### 2.3.4.3 Evaluation of the EMAS reference documents

The EMAS reference documents generally address the subject of climate change as an impact of the environmental aspects of organisations (GHG emissions). However, there are no indications or recommendations on how to address the risks of climate change and adapting to climate change, even in the reference documents for sectors that are likely to face significant risks and a need for adaptation such as the agriculture, tourism and food and beverage manufacturing sectors.

On the other hand, the reference documents for certain sectors do provide some modest sectoral recommendations relating to the consequences of climate change and the associated risks, including references to advanced concepts that contain a risk-based perspective (see automotive and ecosystem impacts) and to adaptation strategies (see public administration). However, the latter refers to climate consequences for the "municipally created, natural environment" and not in a more narrowed sense for "public administrations participating in EMAS".

The current reference documents do not provide any detail or further elaboration on good management practice for ISO and EMAS requirements of context analysis and determining risk. The more recent approaches that are relevant to the inclusion of climate risks laid down by ISO 14001:2015 have not yet been incorporated into the development of good management practices in the EMAS reference documents.

Generally speaking, sectoral reference documents should provide stimulus and guidance on how to enhance environmental performance. If they even exist at all for a sector, they must only be "considered" and do not contain any compulsory specifications or requirements. To address physical and transition risks within the scope of EMAS, the European Commission could develop the sectoral reference documents further in this direction or also work on a corresponding cross-sectoral reference document.

### 2.3.5 Summary and conclusion regarding EMAS

Given that ISO 14001:2015 is a core element of EMAS, the same conclusions that were made regarding ISO 14001 generally apply to EMAS as well. However, EMAS does extend beyond the scope of ISO 14001, particularly with the supporting annexes included in the EMAS Regulation and the sectoral reference documents.

**No additional requirements in the annexes**

The annexes do not provide any additional requirements or further details specifically relating to adapting to the consequences of climate change or physical and transition risks.

**Shortfalls of the EMAS reference documents**

Organisations operating in sectors for which the reference documents define a strategy for adapting to climate change as good practice, such as the public administration sector, must take the recommendations into account when developing and applying their environmental management system. These recommendations must also be taken into account when preparing the environmental statement and therefore in the environmental verifier's validation. That being said, in terms of the aim of this study, the EMAS reference documents have the following shortcomings:

- For the most part, they address the subject of climate change merely in the conventional sense of climate mitigation by reducing greenhouse gas emissions.
- They do not (yet) address the newer elements of ISO 14001:2015 and therefore the potential of context analysis and risk management.
- They only exist for a handful of sectors, only provide suggestions and do not contain compliance obligations.

Climate-related risks could be taken into greater consideration in environmental management and reporting not only by updating the sectoral reference documents accordingly, but also by means of cross-sectoral reference documents. Building on this, it is conceivable in principle that the application of the reference documents could be made compulsory through an amendment to the EMAS Regulation.

**Potential improvements to EMAS**

There is every indication that the existing relationship between ISO 14001 and EMAS will be maintained, in other words that ISO 14001 (and subsequent revisions) will remain a core element of EMAS. Based on this assumption, the proposals for improving ISO 14001 (as above) can be applied directly or in the same manner to EMAS. In order to improve the way in which climate-related risks are addressed, EMAS actors would need to have an interest in the improved effectiveness or revision of ISO 14001, while maintaining the added value of EMAS.

If ISO 14001 is revised in such a way that effective requirements for addressing climate risks are defined, EMAS would be improved "automatically" (potentially with some delay).

Irrespective of the revision of ISO 14001, it still makes sense to think about improving the effectiveness of EMAS with regard to the consideration of climate risks.

Improvements to EMAS can be achieved by the following means:

a) future revision of the articles in the EMAS Regulation

b) updated regulations/revisions to specific annexes

c) creating new reference documents and revising existing ones

d) applying other detailed/supplementary documents (e.g. the EMAS User's Guide).

Re a) Incorporating the consequences and risks of climate change, implementing corresponding adaptation/response strategies and ensuring reporting could and should be taken into consideration and be reflected in future EMAS revisions, but at the moment it is not clear when the next revision will take place.

Re b): Revisions to individual annexes to the EMAS Regulation are quicker and easier to implement from a legal perspective. In particular, Annex II could be updated in terms of climate-related requirements for environmental management systems in addition to ISO 14001 and existing EMAS requirements. Annex IV could also be updated in terms of reporting on an organisation's climate risks and actions. An added benefit here would be that the implementation of climate risk management and the accompanying reporting system would have to be credibly verified and validated by an environmental verifier.

Re c): As the EMAS reference documents do not have any binding force, they are less likely to prompt EMAS organisations to commit themselves more readily to tackling climate risks. However, they can have an impact as a benchmark of assessment. Additional sectoral elements could be added, as the effects on different sectors vary greatly, or, in view of the general impact of climate change and the universal application of management practices and reporting systems, a cross-sectoral reference document could be created in a relatively short space of time.

Re d): As a precursor to a/b/c, documents could and should be prepared that make up for the shortcomings identified above. Such documents could also be created as part of national implementation to ensure independent, direct application or application linked/combined with the EMAS scheme, for example. They could be completely voluntary, serve as reference documents or have binding force (e.g. through legal provisions) and could also be made attractive by being tied to certain incentives (see energy tax relief or as part of subsidy programmes). The expansion of the EMAS User's Guide and the recommendations contained therein for the introduction and operation of an environmental management system could also be specifically focused on climate risks. At the time of writing (second half of 2021), the User Guide is undergoing a comprehensive revision.

#### EMAS climate management module

The "Climate Management in Companies" study commissioned by the German Environment Agency explored the design and implementation of an "EMAS climate management module" (Steyrer & Docke, 2020). This EMAS climate management module not only takes climate mitigation approaches into account, it also incorporates transition and physical risks as defined in the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD, 2017); as part of the new module, reporting on risks (and also opportunities) is to also be included in the EMAS environmental statement.

It remains to be seen how the EMAS climate management module will be applied in practical terms. A number of options are cited, including as a "non-binding, non-verifiable guideline", a "voluntarily applicable, verifiable addition to an existing EMAS scheme", a "mandatory addition to EMAS" or a "verifiable catalogue of requirements".

## 2.4 Analysis of ISO 14004

ISO 14004 is a set of general guidelines on environmental management systems based on the requirements and approaches set out in ISO 14001 and using examples to provide practical help and guidance. It makes references – in some cases specific – to the consequences and risks of climate change, such as climate-related changes in temperature, water scarcity and precipitation levels and the impact of these factors on activities such as agriculture. As a set of guidelines, the standard contains only recommendations rather than requirements. Its purpose is not to explore specific environmental aspects, topics or areas of interest of an organisation or formulate any requirements in this regard.

## 2.5 Analysis of ISO 14002

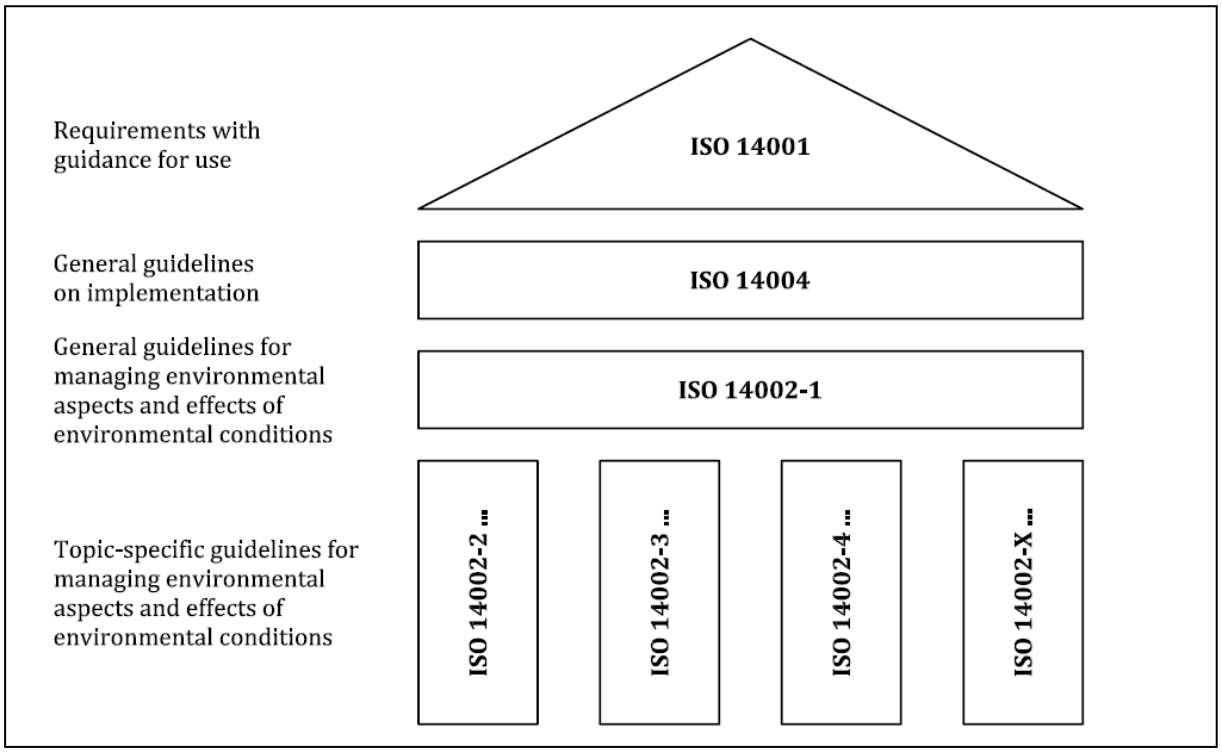
### 2.5.1 Relationship between ISO 14002 and ISO 14001 and ISO 14004

ISO 14001 provides a fundamental framework and describes generic environmental management system requirements. ISO 14004 contains general information and illustrative guidance on implementing an environmental management system.

The comparatively new ISO 14002 series, on the other hand, is geared towards providing topic-specific guidance and examples for organisations that want to apply their ISO 14001-compliant environmental management system to a more focused set of environmental aspects and environmental conditions within a certain environmental topic area. (Figure 14).

ISO 14002 consists of general guidelines (ISO 14002-1) that are to be supplemented over time with additional, topic-specific guidelines (ISO 14002-x ...). This means that the ISO 1400 framework can be "fleshed out" with topic-specific information without losing its original character. The topic-specific guidelines for water (ISO 14002-2) are currently in the process of being created.

**Figure 14: ISO 14002 series and its relationship to ISO 14001 and ISO 14004**




Source: ISO 14002-1

### 2.5.2 General applicability to the management of climate-related risks

ISO 14002-1 (Part 1: General) provides general guidance on using ISO 14001 to address certain environmental aspects and conditions within an environmental topic area. These general guidelines are a starting point for developing and applying further topic-specific parts but can also be used independently for the specific interpretation of an area of interest.

Organisations may apply one or more parts of the ISO 14002 series because they wish to take further action with regard to a particular area of interest or problem, for example if they feel

particularly compelled to address this issue and looked into relevant environmental aspects, compliance obligations or particularly risks and opportunities.

The purpose of ISO 14002-1 is to enable organisations, in view of the specific environmental topic area, to:

- plan actions (develop suitable measures from a particular starting point; clause 4)
- take suitable action (set objectives, take action and implement operational controls; clause 5)
- monitor, measure, analyse and evaluate the effectiveness of actions (clause 6) and
- make improvements (clause 7).

According to ISO 14002, managing an environmental topic area calls for an organisation to take a holistic approach to addressing: environmental aspects (such as GHG emissions) that have or can have an impact on environmental conditions (such as the climate) and can therefore affect environmental performance; changing environmental conditions (such as climate change) that can affect an organisation's ability to achieve the intended outcomes of the environmental management system (such as physical or transition risks); or a combination of these.

So far only the general part, ISO 14002-1, has been created and published. Work has started on Part 2: Water (ISO 14002-2), with a first draft expected by the end of 2021. Other topics and parts concerning material efficiency, the circular economy and biodiversity, among other things, are currently being discussed. It is not yet clear which topic areas will be addressed and when. However, the responsible German standards committee[41] has prepared a proposal for an ISO 14002 Part 3: Climate, which is to be submitted to the ISO.

### 2.5.3 Assessment and conclusion regarding ISO 14002

Generally speaking, the ISO 14002 series would be well-suited providing interested organisations, and particularly ISO 14001 users, with guidance on how to manage climate mitigation, climate adaptation and climate risk.

An ISO 14002 with a part dedicated to the climate could lead to an enhancement in environmental performance with regard to greenhouse gas emissions, a reduction in climate-related threats and risks – both of a transition and physical nature – and the ability to seize opportunities, generate new impetus and open up possibilities of strategic orientation and systematic enhancement within the scope of ISO 14001 environmental management.

That being said, the ISO 14002 series is still in the process of being established and so far[42] there is no specific ISO 14002 Part: Climate, nor would such a part be inherently mandatory in the implementation of an ISO 14001 environmental management system (given that the ISO 14002 series merely provide guidance).

[41] DIN's Standards Committee Principles of Environmental Protection (NAGUS) Environmental Management and Environmental Audit working group; the author of this study, Dr Ludwig Glatzner, is a member of this committee and co-initiator of corresponding project proposals.

[42] See above: The responsible German standards committee has drawn up an initial proposal for an ISO 14002 Part 3: Climate.

## 2.6 Analysis of ISO 14090

### 2.6.1 General applicability to the management of climate-related risks

ISO 14090: Adaptation to climate change – Principles, requirements and guidelines is aimed at helping organisations assess the impact of climate change and draw up plans to adapt effectively. It can be applied on an extremely broad basis as it addresses adaptation to a wide variety of effects, such as physical, social, financial, political, regulatory and reputational damage. It aims to "enable organizations to prioritize and develop effective, efficient and deliverable adaptation tailored to the specific climate change challenges they face" (introduction).

"Furthermore, application of this document can assist in demonstrating to interested parties that an organization's approach to climate change adaptation is credible. This document can also be of relevance to individuals and organizations involved in purchasing, investment and insurance when seeking to understand another organization's climate change adaptation. It is designed to help organizations develop measures and report on adaptation activity in a verifiable way." (ibid)

ISO 14090 collates fundamental terms relating to climate change, risks and climate adaptation from other ISO sources and introduces new terms from sources such as the IPCC "into the ISO world". It defines principles such as robustness, transparency and synergy between adaptation and mitigation of climate change, but also provides guidance and supports continuous learning and improvement processes. It covers the following steps:

- Pre-planning: Pre-planning is about preparing for the next steps (clause 5).
- Assessment The effects of climate change on the organisation's activities, products and services (chronic, acute) must be assessed (clause 6).
- Adaptation planning How the organisation draws up an adaptation plan using a variety of sources of knowledge, information and data on the basis of existing guidelines, strategies (clause 7)
- Implementation: In the implementation phase, the organisation takes the actions defined in the adaptation plan (clause 8)
- Monitoring and evaluation: The standard recommends drawing up a monitoring and evaluation plan that can be used to compare progress against the implementation plan; if necessary, additional actions can be taken or corrective actions initiated (clause 9)
- Reporting and communication: In this step, the standard describes dialogue with interested parties. Communication should be supported by a report on climate adaptation (clause 10).

It is worth noting here that the standard – as the title and the wording suggest – comprises "shall" requirements as well as principles and guidance. Here are a few examples:

- The organisation shall assess how its activities, products and services might be impacted by climate change (clause 6.1).
- The most important climate change impacts (including opportunities) shall be identified (clause 6.1).

- The organisation shall assess its existing adaptive capacity to adapt to the impacts of climate change (clause 6.3).
- The organisation shall assemble a climate change adaptation plan (clause 7.1).
- The organisation shall prepare the following as an integral part of its adaptation plan: an implementation plan, a monitoring and evaluation plan, and arrangements for reporting and communication (clause 7.4.8).
- When an organisation issues an external communication on climate change adaptation, the communication shall be supported by a climate change adaptation report that is easily accessible to any interested party and is free of charge (clause 10).

The main priority of this standard is to give organisations a means of preventing or minimising the damage that could be caused by climate change and seizing related opportunities. Given that the impact of climate change can be extremely varied, ISO 14090 should be applied "alongside other organizational priorities", including "all climate change adaptation activities in parallel with, or integrated with, climate change mitigation activities and other sustainability priorities" (introduction).

A White Paper was drawn up to incorporate the climate change adaptation requirements contained in ISO 14090 into ISO 14001 environmental management systems. By way of a reference table, the White Paper (ISO, 2021a) aims to demonstrate the links between ISO 14090 and ISO 14001 and the potential benefits of jointly applying the two standards.

ISO 14090 is the first standard in the 14090 series and aims to help organisations identify their vulnerabilities to the risks of climate change and plan and implement suitable adaptation actions. The standard is intended to serve as a framework for further standards in the 14090 series, such as ISO 14091 Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment and Technical Specification ISO/TS 14092:2020 Adaptation to climate change – Requirements and guidance on adaptation planning for local governments and communities.

### 2.6.2 Assessment and conclusion regarding ISO 14090

ISO 14090 was published in 2019. It constitutes a new product in the field of environmental management standards, focusing on the consequences of climate change and useful adaptation actions, rather than simply on protecting the environment and mitigating climate change. According to information currently available, no empirical studies have yet been carried out on the practical application of the standard and its effects on organisations.

It is worth noting here that the standard – as the title and the wording suggest – comprises verifiable "shall" requirements as well as principles and guidelines. As a result, it can be used as helpful guidance but also for auditing and certification purposes. ISO 14090 can be applied on its own but refers to the benefit of "integrated" application, i.e. in conjunction with an existing environmental or sustainability management standard.

As it focuses on climate adaptation and also includes reporting requirements, the standard can be or become a highly useful tool for improving how organisations handle climate-related risks. It should be noted that, although ISO 14090 contains detailed reporting and communication requirements, such reporting and communication is not mandatory.

## 2.7 Analysis of ISO 26000

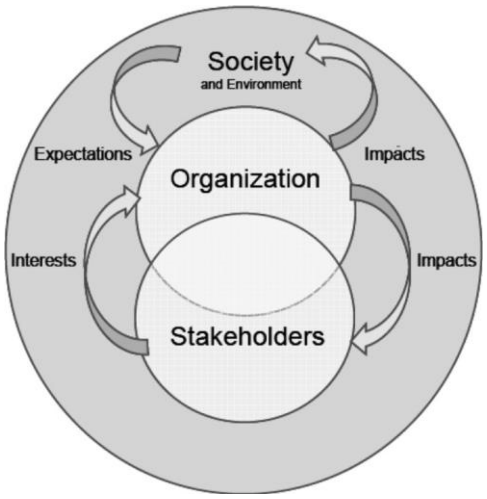
### 2.7.1 General applicability to the management of climate-related risks

ISO 2600 provides organisations with guidance on their social responsibility. It is intended to assist organisations in contributing to sustainable development, but is not a management system standard or a catalogue of requirements. The standard is not intended or appropriate for certification purposes or regulatory or contractual use (introduction).

Social responsibility is defined as the "responsibility of an organization for the impacts of its decisions and activities on society and the environment ..." (definition 2.18). According to the standard, the essential characteristic of social responsibility is "the willingness of an organization to incorporate social and environmental considerations in its decision making and be accountable for the impacts of its decisions and activities on society and the environment" (clause 3.3.1).

The standard defines certain principles, including that an organisation should account for, and be transparent regarding, the known and likely "impacts of its decisions and activities on its stakeholders, society, the economy and the environment" (clause 4.2).

**Figure 15: Relationship between an organisation, its stakeholders and society**




Source: ISO 26000

In terms of the environment, ISO 26000 recommends environmental risk management: "An organization should implement programmes using a risk-based and sustainability perspective to assess, avoid, reduce and mitigate environmental risks and impacts from its activities." (clause 6.5.2.1)

In addition, on the subject of the environment, ISO 26000 addresses the topic of "climate change mitigation and adaptation": "Every organization is responsible for some GHG emissions (either directly or indirectly) and will be affected in some way by climate change. There are implications for organizations in terms of both minimizing their own GHG emissions (mitigation) and planning for a changing climate (adaptation)." (clause 6.5.5.1)

To mitigate climate change impacts related to its activities an organization should (clause 6.5.5.2.1):

- "identify the sources of direct and indirect accumulated GHG emissions and define the boundaries (scope) of its responsibility;
- measure, record and report on its *significant* GHG emissions, preferably using methods well defined in internationally agreed standards ...;
- implement optimized measures to progressively reduce and minimize the direct and indirect GHG emissions within its control and encourage similar actions within its sphere of influence [...]"

In order to reduce "vulnerability" to climate change, an organisation should (clause 6.5.5.2.2):

- "consider future global and local climate projections to identify risks and integrate climate change adaptation into its decision making;
- identify opportunities to avoid or minimize damage associated with climate change and where possible take advantage of opportunities, to adjust to changing conditions;
- implement measures to respond to existing or anticipated impacts and within its sphere of influence, contribute to building capacity of stakeholders to adapt."

Given that ISO 26000 does not formulate any requirements, it also does not stipulate any reporting or communication processes. Instead, it offers general recommendations on internal and external communication, which is "critical to many different functions in social responsibility including [...] raising awareness both within and outside the organisation on its strategies and objectives, plans, performance and challenges for social responsibility [and] demonstrating respect for the social responsibility principles" (clause 7.5.1).

### 2.7.2 Assessment and conclusion regarding ISO 26000

ISO 26000 constitutes guidance and makes no claim to have binding force, let alone to be auditable. It has a conventional focus on the organisation's impacts on society, its stakeholders, the economy and the environment. The standard perceives risk primarily as the danger of not acting in a socially responsible manner (violating human rights, compliance risks, employee health risks, environmental risks of its activities). Somewhat unusually for a standard that is now more than a decade old, it takes an alternative stance to the topic of climate change and addresses "vulnerability" to the consequences of climate change and the possibility of suffering and avoiding damage associated with climate change and benefiting from any resulting opportunities.

ISO 26000 was published in 2010. Standardisation committees have discussed the need for revision in the past. To date, there has been no significant majority (either globally or nationally) in favour of a fundamental revision of ISO 26000, let alone converting the content into certifiable standards. However, there is broad consensus that ISO 26000 is no longer up to date in a variety of areas. The topic of addressing climate risks and climate consequences could certainly be placed on the agenda for any future development of ISO 26000. In addition, ISO 26000 references many existing initiatives and institutions as well as tools and instruments that focus

on social responsibility. Here, too, it would make sense to incorporate newer standards, requirements and recommendations both from ISO and beyond (e.g. TCFD).

That being said, as long as ISO 26000 only serves as guidance, any revision would not have any direct impact on corporate practices – all things being equal.

## 2.8 Summary: Character, distribution and potential of standards and frameworks

Table 5 below outlines the focus, character and distribution of ISO standards and other frameworks explored in this study.

First of all, it is worth noting that the frameworks have varying degrees of binding force. Generally speaking, the application of the ISO standards and the EMAS Regulation is voluntary. Once these frameworks are applied, they gain binding force in some cases. This means that certain requirements must be met in order to correctly apply the framework. Correct application can be confirmed by means of an external review (such as an audit, validation or certification). Other standards do not contain any such mechanisms and therefore merely define recommendations ("should") rather than requirements ("shall").

Standards also vary in terms of their distribution. ISO 14001 stands out in this regard as the most widely applied environmental management standard in the world.

**Table 5: Character, distribution and potential of the examined frameworks**

| Framework | Focus | Character | Application | Potential |
|---|---|---|---|---|
| ISO 14001 | Requirements for environmental management systems | Voluntary standard<br><br>with binding requirements | In widespread use around the world, in Europe and in Germany | Potential for expansion in the area of climate (risk) management |
| EMAS | Requirements for environmental management systems, environmental reporting, environmental verifier systems | Voluntary regulation<br><br>with binding requirements | In widespread use in a number of EU member states | Potential for expansion in the area of climate (risk) management; possibility of using reference documents |
| ISO 14004 | General guidance for environmental management systems | Voluntary standard<br><br>with non-binding recommendations | Only guidelines, almost no practical relevance | Possibility of topic-specific guidance and examples |
| ISO 14002 | Topic-specific guidance for environmental management systems | Voluntary standard<br><br>with non-binding recommendations | Only guidelines, recently established standard, no practical relevance (yet) | Possibility of adding a climate-specific part; possibility of linking to ISO 14001 (and EMAS) and climate-relevant standards |

| Framework | Focus | Character | Application | Potential |
|---|---|---|---|---|
| ISO 14090 | Guidelines and requirements for adaptation to the consequences of climate change | Voluntary standard<br><br>with binding requirements | Recently established standard, no practical relevance (yet) | Could become a piece of the climate risk management puzzle |
| ISO 26000 | Guidelines for social responsibility | Voluntary standard<br><br>with non-binding recommendations | Only guidelines, almost no practical relevance | Possibility of using this as a basis to define more specific, more binding elaborative standards |

Source: by the authors (Glatzner & Loew)

The analysis shows that ISO 14001, which is widely applied internationally, can in principle also be used to manage climate-related risks. Whether companies use the ISO 14001-compliant environmental management system for this purpose depends in formal terms on whether climate risks are identified as significant topics in a context analysis, whether the top management assigns corresponding significance to climate-related risks and whether the consideration of climate-related risks is a compliance (legal) obligation. The same applies to the EMAS Regulation, which includes ISO 14001 requirements.

In practice, many companies are likely to continue to focus their environmental management systems on traditional topics such as reducing environmental impacts and legal compliance. This is the view of the author and is supported by the analysis of 40 EMAS environmental statements as part of this study (see part 2, page 91 et seq.).

ISO 26000, which was published a decade ago, is also acknowledged by some companies. However, given that this is not a certifiable management system standard, ISO 26000 barely has any practical relevance compared to the aforementioned standards. From a historical perspective, it is noteworthy that ISO 26000 contains a number of approaches regarding the consideration of climate-related risks, but this is still irrelevant from an environmental policy and corporate practice perspective.

The ISO 14002 series, which is currently in the process of being drafted, is set to offer more topic-specific guidance and examples for organisations that wish to tune their environmental management systems towards certain environmental aspects and conditions. ISO 14002-1, which describes a general framework, has already been drawn up for this purpose. According to the ISO structure, specific guidance is to follow on subjects such as water. Guidance on climate-related risks would also be conceivable in this context. However, ISO 14002 “only” constitutes guidance and does not define any requirements.

ISO 14090 Adaptation to climate change – Principles, requirements and guidelines, on the other hand, is somewhat different in this regard. This ISO standard is aimed at helping organisations assess the impact of climate change and draw up plans to adapt effectively. It contains requirements that must be implemented if the standard is to be applied. However, ISO 14090 has not established itself as a widely used standard in corporate practice. This may be due to the fact that it has not existed for a very long time, was drawn up as a “neutral building block” and is

not closely modelled on any widely used management system standard such as ISO 14001.[43] The focus on physical adaptation may also be a reason for the lack of application; after all, transition risks are taken into significantly greater consideration by companies than physical risks (Loew et al., 2021).

## 2.9 Preliminary conclusion: Strategies to promote the systematic management of climate-related risks

Given that ISO 14001 and the EMAS Regulation are applied to a relevant extent, these systems could be utilised to reach a large number of companies in Europe and around the world. However, neither system can inherently guarantee integrated climate risk management.

Strategies for ISO 14001: To ensure that ISO 14001 users generally address their climate-related risks, it is theoretically possible that the standard could be adapted within the scope of the planned revision. The standard could also be complemented with additional "modules". The relevant options are explored later on in this study with the aim of determining the most promising strategy.

Strategies for EMAS: Given that ISO 14001 requirements form part of the EMAS Regulation, measures based directly on the requirements of ISO 14001 would be effective in both systems. Nevertheless, separate considerations regarding the improvement of the effectiveness of EMAS are worthwhile. This can take the form of a further development of the entire EMAS Regulation, a further development of the EMAS Regulation's annexes by drawing up additional EMAS reference documents or revising the existing reference documents, or of the development and application of more specific guidance or requirements (climate module).

While the further development of ISO 14001 or the EMAS Regulation itself is only possible as part of a laborious international drafting and coordination process, and even drawing up climate-specific guidance for ISO 14001 in the form of a new part of the ISO 14002 series or, in the case of EMAS, of a new EMAS reference document would require an international resolution and drafting process, corresponding developments at a national level would be simpler and quicker to achieve.

Past experience shows that certifiable ISO management systems can generate significant impetus in the development of corporate practices and of climate management. The successful management of climate and risk aspects requires leadership and responsibility from top management, clearly defined responsibilities and processes and a systematic overall approach, from planning to operational implementation, monitoring and continual correction and improvement processes (plan-do-check-act (PDCA)). Linking together a recognised management approach with clearly defined topic-specific requirements and established practical concepts, paired with the possibility of credible and authentic communication, reporting and audit management through validation, verification and certification, would encourage the management of climate-related risks.

[43] The ISO White Paper "How to use ISO 14090 to support adaptation to climate change in an ISO 14001 environmental management system" (ISO, 2021a) shows how ISO 14090 can be applied as part of an ISO 14001 environmental management system.

# 3 Further development of international environmental management standards from the perspective of climate-related risks and opportunities

As the analysis of the relevant management system frameworks and standards has shown, they so far only offer companies and organisations general or ineffective standards on which to systematically manage their climate-related risks and opportunities and, where necessary, take climate mitigation and adaptation actions.

With ISO 14001 potentially set to be reviewed in the next few years, the questions arises as to whether and to what extent this review, or any other process, could help companies that use an ISO 14001-compliant environmental management system

- to systematically manage their physical climate risks or, in other words, adapt to climate change, and/or
- to find compatible standards and guidance for the systematic management of their physical climate risks.

This study will present and assess the potential options and, on this basis, determine a recommended approach.

## 3.1 Preliminary considerations

Before any options and recommendations to support systematic environmental management through ISO standards or additional publications can be developed, it must be determined to what extent

- climate mitigation, i.e. minimising the impact of an organisation on the climate due to direct and indirect environmental aspects (particularly GHG emissions),
- climate adaptation, i.e. the manner in which the organisation addresses the (imminent) consequences of climate change, and

the associated climate-related risks and opportunities have to be addressed separately or whether they can or should be dealt with collectively as part of an integrated climate management system and how such a system could be reasonably incorporated into the overarching ISO 14001 or EMAS environmental management system.

As climate change poses both physical and transition risks to organisations and companies (and their banks, insurers and investors), which means that climate mitigation efforts must be stepped up and more action must be taken regarding climate adaptation, it makes sense to treat these topics as two sub-topics within the overarching issue of climate change. ISO 14001 addresses both perspectives, although climate mitigation (from the inside out) is more of a traditional approach whereas strategies to address the consequences of climate change (from the outside in) – as shown in this study – are new with only rudimentary interpretations.

As conventional areas of climate mitigation, such as the volume of GHG emissions and the potential for reducing such emissions, also provide information about vulnerability to aspects such as rising GHG emissions costs (transition risk), addressing these risks in an integrated manner appears appropriate. Addressing the risks collectively would also ensure compatibility with the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD, 2017) if it is ensured that the management of climate-related risks is awarded sufficient weighting alongside conventional climate mitigation.

Another factor in favour of addressing climate mitigation, climate adaptation and associated climate risks in an integrated manner is that this approach supports the aim of efficient and effective overall optimisation. Potentially counteractive effects can be avoided, and synergies utilised better. There are certain challenges and tasks that are best tackled together. For example, the supply chain can be a source of climate impact but also itself be affected by the consequences and risks of climate change. Both of these factors can be analysed as part of product life cycle analysis. Contingency management that is suited to mitigating the impact on the climate can also be a useful tool in protecting an organisation from climate-related effects, such as severe weather events, for example through construction-related, technical, organisational or personnel-related precautions such as barriers, alarm plans, emergency drills, etc.

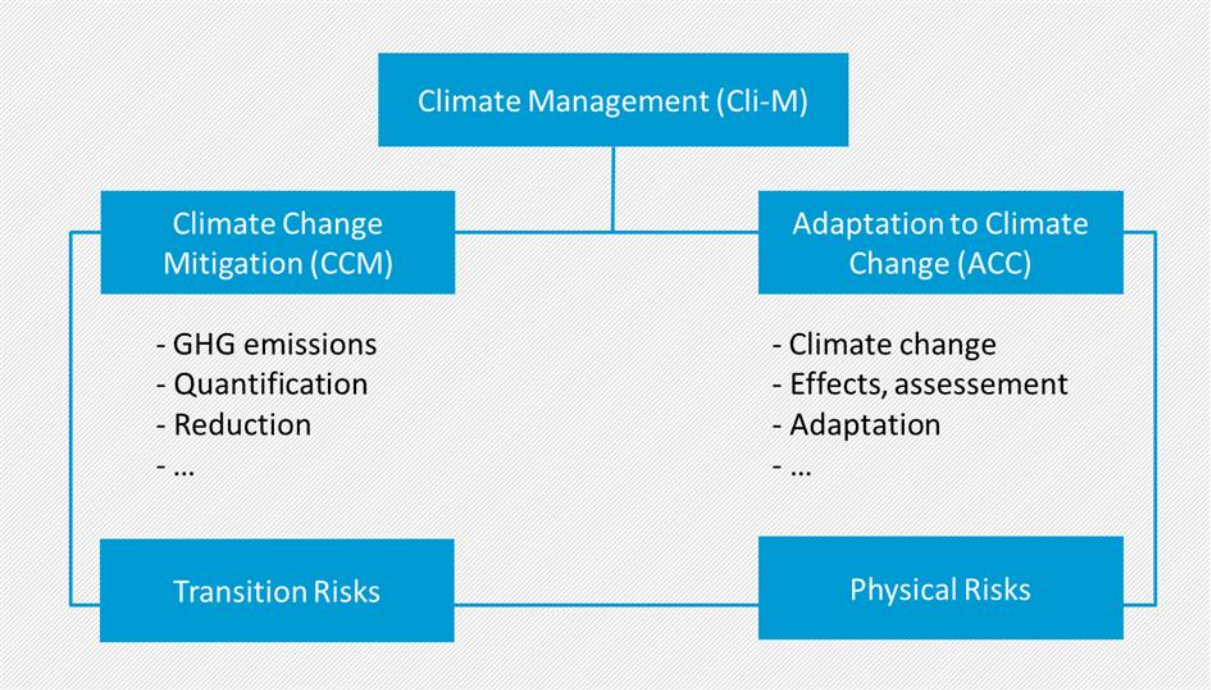
One aspect in favour of addressing the challenges of climate mitigation and adaptation to climate change separately is that central tasks such as the identification and assessment of physical climate risks appear to draw on different expertise, methods, personnel and sources of information compared to the identification of the environmental impact caused by greenhouse gases and the quantification and reduction of these gases.[44] The tasks of climate mitigation and adaptation to climate change can be so varied and diverse that organisations may wish to tackle them in a specialised manner, for instance by way of separate functions, units and personnel dedicated to risk management, sustainability management, environmental management, facility management, communication management, etc.

Approaches to climate mitigation and to addressing the consequences of climate change therefore vary in many different respects. However, there are also overlapping factors, common goals and potential for synergy. A management system standard always grants the user the organisational freedom to implement a variety of requirements in the manner that best suits the circumstances and objectives of the organisation in question. As a result, specific tasks can be assigned to individuals, functions or organisational units in a differentiated manner at any time, irrespective of whether one system is in place or multiple sub-systems.

In order to prevent any further fragmentation of environmental management, which is already split up into a wide variety of sub-topics and sub-systems, the perspectives of climate mitigation, climate adaptation and associated climate-related risks (physical and transition) can and should be addressed together and holistically within the scope of climate management in the process of developing standards for companies and organisations.

[44] See also ISO Guide 84: "Mitigation involves having knowledge about the identification and quantification of sources of GHG emissions (and removals) and the different means of reducing (and increasing) those flows to (and from) the atmosphere. Adaptation involves having knowledge about vulnerabilities to climate change and the potential for future global and local climate projections that can be used to identify potential risks and opportunities on which to base decision-making."

**Figure 16: Components of climate management**




Source: by the authors (Ludwig Glatzner), based on ISO Guide 84

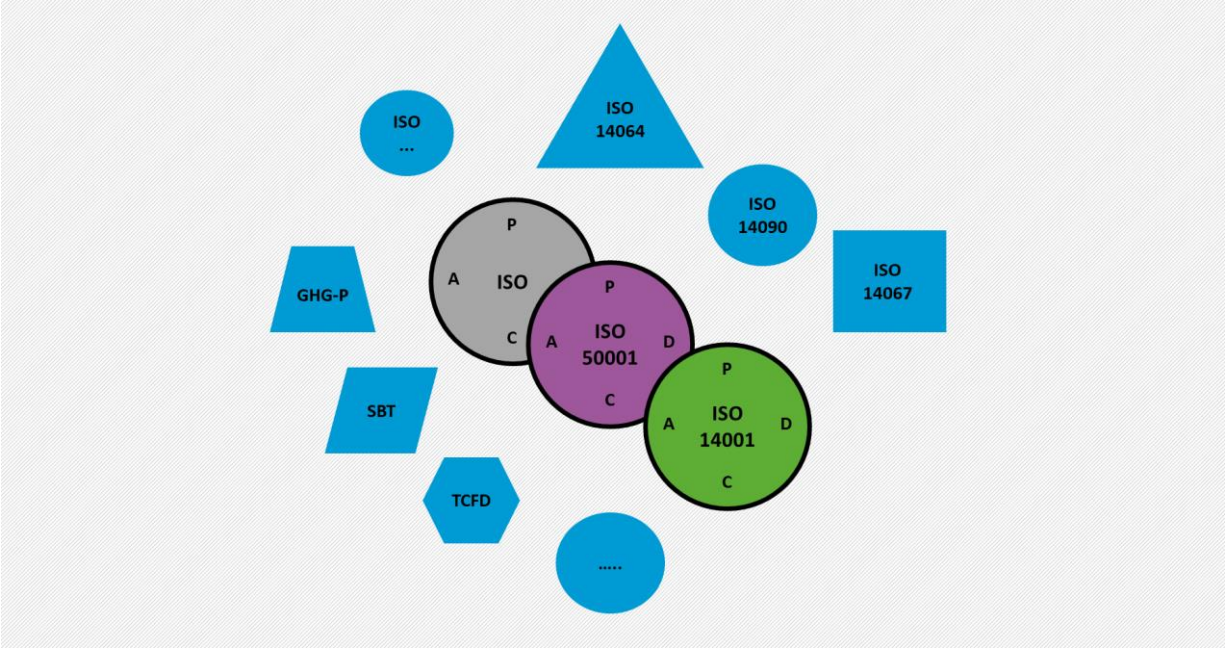
## 3.2 Starting point

There are already multiple management approaches and climate-related requirements, standards, guidelines, modules, tools, etc. that could currently be applied by organisations – and are indeed applied by some organisations – to fulfil the requirements of climate mitigation, climate adaptation and associated climate risks, namely:

- environmental and energy management systems (EMAS, ISO 14001, ISO 50001)
- guidelines for the development and expansion of environmental management systems in view of climate management (IEMA, 2018; Steyrer & Docke, 2020)
- standards for the quantification of GHG emissions (ISO 14064-1, ISO 14067, GHG Protocol)
- requirements, guidelines and recommendations for adaptation to climate change (ISO 14090, ISO 14091, ISO 14092)
- requirements for the disclosure of climate impacts, climate risks and climate mitigation action (CDP, 2020; TCFD, 2017)
- other requirements, approaches and initiatives (EU taxonomy, Science-based Targets Initiative (SBTI), UNFCCC Race to Zero, etc.) (European Union, 2020; SBTi, 2021; UNFFC, 2021)

As the analysis in section 2 showed, there is significant potential in promoting the consideration of climate risks at companies by incorporating the topic into ISO 14001[45]. ISO 14001 is a widely used standard, already contains an element of climate management and, with the most recent revision, offers strategies for climate adaptation and climate risk management. ISO 14001 is capable of ensuring that possible conflicting objectives and synergies between climate mitigation, climate adaptation and other environmental aspects can be dealt appropriately in one fell swoop. What is more, it has a binding character and is certifiable. Besides ISO 14001, ISO 50001 is also noteworthy: it is a single-issue standard that addresses the environmental aspect of energy consumption, and therefore focuses on a subject that is relevant to climate mitigation, and is applied on a widespread basis, at least in Germany.

**Figure 17: Starting point – non-binding frameworks and standards on environmental, energy and climate management as well as associated sub-topics.**




Source: by the authors (Ludwig Glatzner)

## 3.3 Options

Against this background, there are several conceivable ways and approaches for promoting the consideration of climate-related risks in ISO management system standards. The following options are examined and assessed in more detail:

- Option A: Better combination and linking of the existing standards and tools with ISO 14001.
- Option B: Climate-specific further development of ISO 14001
- Option C: Development of supplementary climate management guidance (ISO 14002)
- Option D: Drafting of a new climate management system standard

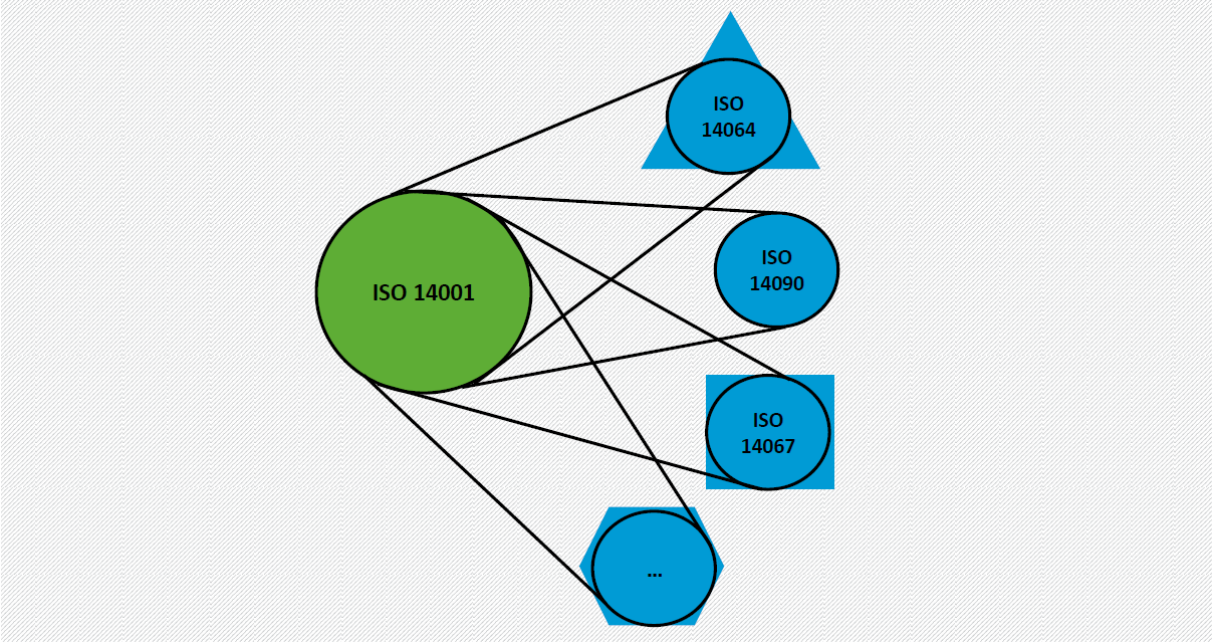
[45] The fact that ISO 14001 is also a core element of EMAS should also be considered.

### 3.3.1 Option A: Better combination and linking of the existing standards and tools

This option raises the question of the extent to which a meaningful link can be established between existing guidance, tools and standards. The aim would be to use these resources and the environmental management system as a vehicle to promote the consideration of climate-related risks without having to intervene in terms of content or make revisions.

This could be supported and achieved by the provision of "Bridging Documents" or "White Papers", such as the White Paper on the application of ISO 14090 and ISO 14001.

**Figure 18: Link to ISO 14001 and combination with existing standards and tools**




Source: by the authors (Ludwig Glatzner)

**Advantages:** (1.) An existing management system (preferably ISO 14001) and existing climate-specific guidance, etc. would be used. (2.) There would be enormous flexibility to allow the supplementary standards to be added individually as required. (3.) No major changes to, or development work on, the standards themselves would be required overall. The preparation of a bridging document (White Paper) would be relatively easy and quick to do.

**Disadvantages:** (1.) There would continue to be no explicit requirement to manage climate risks with trusted elements. (2.) The existing standards and tools would continue to develop separately from each other and remain less coordinated. (3.) The potential associated with a defined, certifiable standard, the application of which can be requested and proven, would not be exploited. (4.) If only existing ISO standards become better coordinated, there would still be a gap as none of the standards explicitly concern transition risks.

### 3.3.2 Option B: Climate-specific further development of ISO 14001

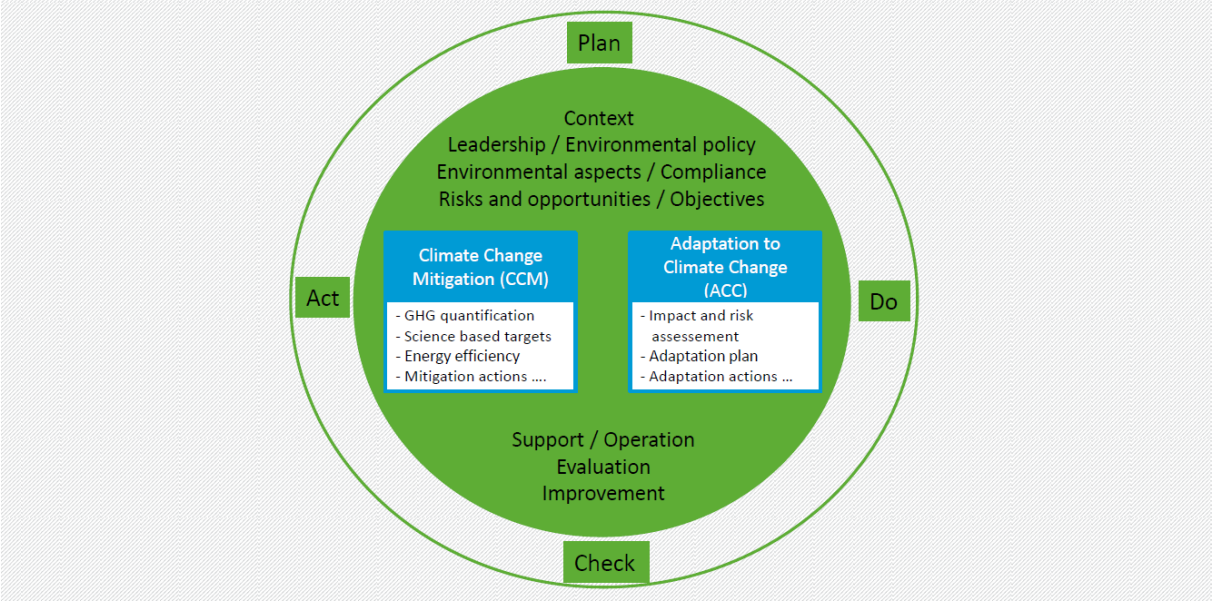
ISO 14001 is very "generic" in terms of its level of detail and methodology, as well as in terms of its application. In the normative text of ISO 14001, the requirements of the context analysis with regard to "environmental conditions ... capable of affecting the organization" (clause 4.1 of the standard), for example, must and can be defined in greater depth and specified in a climate-

specific manner, with provisions for an organisation's focus on climate mitigation and dealing with climate consequences as part of its environmental policy being added or supplemented. The system elements and method-related steps essential for the management of climate risks (such as the quantification of greenhouse gases, the identification of climate-related risks, the definition of target paths and performance indicators, process design, performance assessment, audits and reviews) will also need to be added. Requirements regarding the handling of climate-specific risks and opportunities will need to be of equal importance to the traditional assessment of environmental aspects. It would also make sense to introduce a specific definition of risk (in addition to the ISO management system definition, which would be possible under the ISO rules) that clearly states that risk management within the scope of ISO 14001 may also entail financial risks for the organisation as defined by the TCFD recommendations.

ISO 14001 could be further developed in terms of climate risks as part of a revision, in which

1. requirements are incorporated into the normative text for better consideration of climate-related risks and opportunities; depending on the decision making in the standardisation process, this could be minimalist (specific definition of risk and practical "outside-in" risk analysis) or very far-reaching, up to and including a complete, integrated environmental and climate management system;
2. one or more annexes would be included for in-depth guidance on the identification and treatment of climate risks as part of context analysis, stakeholder analysis, risk and opportunity assessment, or even on "climate management" as a whole, which may be normative or informative in nature;
3. certain interface formulations are included, which guarantee a reasonable, in-depth discussion of the climate policy, calling for further standards and guidance to be taken into account. For example, it could be made mandatory in the normative part of ISO 14001 to apply a part of ISO 14002 (cf. Option D) to the climate policy.

**Figure 19: Climate-specific further development of ISO 14001**




Source: by the authors (Ludwig Glatzner)

Depending on their specific design, these options may vary in terms of their depth of intervention in the existing ISO 14001 as well as in terms of their degree of binding force and detail.

**Advantages:** (1.) All users of ISO 14001 would have to meet the requirements set out in the standard concerning the management of climate risks[46]. (2.) Compliance with the requirements would be verified as part of the certification process and, if successful, confirmed as fulfilled. Therefore, no additional standard would be required, which might also need to be certified. (3.) The best, established systems of ISO 14001 would also be used for climate risks. (4.) The addressing of climate risks would be incorporated into the overall context of other environmental issues.

**Disadvantages:** (1.) A very far-reaching and highly detailed analysis of a specific environmental topic in the normative part of the ISO 14001 framework, which is actually holistic in its approach, could call into question its fundamental orientation and methodology, namely that of the systematic, company-specific identification of all relevant environmental aspects and their respective appropriate treatment within the framework of an integrative procedure. The specific "climate" aspect might be emphasised to the detriment of environmental aspects or topics that are not specifically defined, but could still be very relevant. This would result in a "hybrid" between an environmental management framework and a possible special climate management standard. (2.) International decisions and developments by the ISO committees are required for the review of ISO 14001 (at least 18 months).

### 3.3.3 Option C: Development of a supplementary climate management module (ISO 14002)

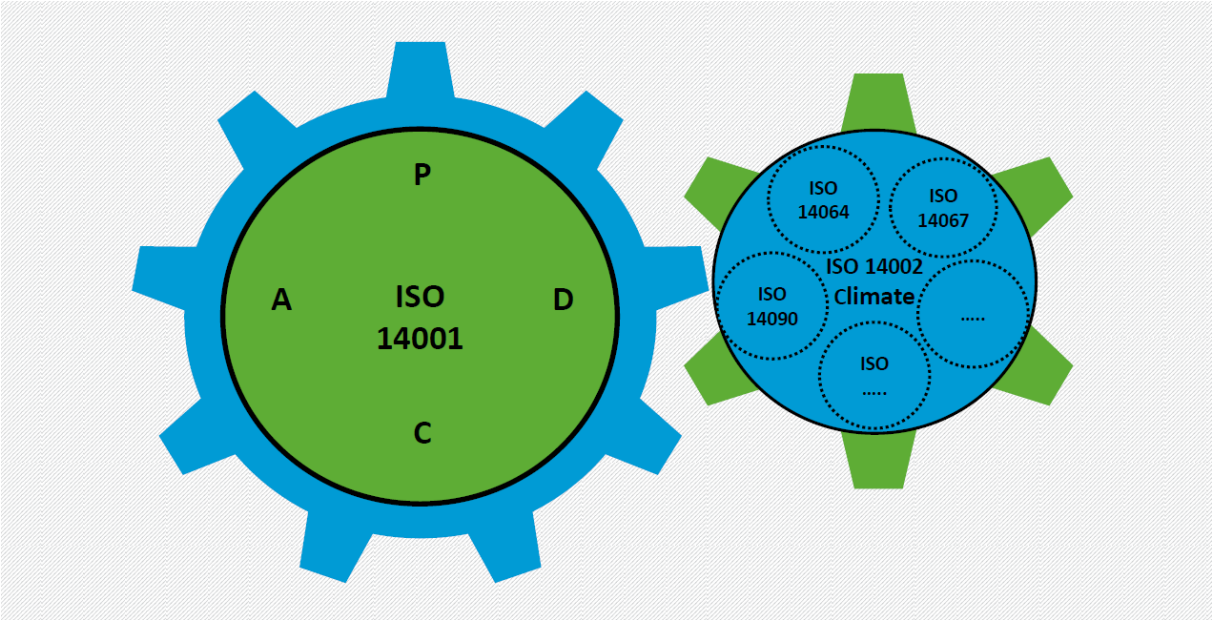
The ISO 14002 series was created to maintain ISO 14001 as an integrated framework while still incorporating important environmental topics in detail, rather than developing a separate management system standard for each environmental topic.

It makes sense to adopt this approach for the topic of the climate as well. By requiring the identification of relevant environmental aspects, relevant contextual topics and risks, the interface for the management of climate mitigation and climate consequences has been created in environmental management under ISO 14001, but not defined specifically for the issue of the climate. However, the tools for climate mitigation and adaptation to climate change are restricted to a limited number of individual topics (such as determining greenhouse gas emissions, determining physical climate risks and taking adaptation measures). Usually, these tools and approaches are described either without management structures (as is the case with ISO 14064) or in management processes that are not suitable for the plan-do-check-act concept (cf. "White Paper on ISO 14090"(ISO, 2021a)). A climate module in the ISO 14002 series could solve these shortcomings and also address the non-ISO tools if applicable (such as the TCFD recommendations).

[46] Integrating requirements into the existing standards is also supported by Kind, Terenzi & Hauer(2021): "Comprehensive incentives for contributions to the adaptation to climate change can only be developed in the field of standardisation by revising central existing standards that have a wide range of users. The development of new standards within a community very much focused on climate change cannot replace this." (loc. cit., p. 58) This assessment by Kind et al. is based on their own analysis of national standards and technical rules of DIN, DWA and VDI with references to climate change adaptation.

The combination of the best and widespread management elements of ISO 14001 and a compatible climate-specific supplement would provide an opportunity for climate (risk) management without having to develop another ISO management system standard. A new ISO 14002 part on the topic of the "climate" could act as supplementary "guidance" for ISO 14001 but also as a "link" between ISO 14001 and other climate-specific and risk-specific tools.

**Figure 20: Relationship between ISO 14001 and an ISO 14002-series climate module**




Source: by the authors (Ludwig Glatzner)

The more closely supplementary guidance follows ISO 14001, its philosophy, concept, methodology, terminology, content and structure, i.e. the more compatible it is, the easier it will be for ISO 14001 users to apply it. This is the intention behind the ISO 14002 series and is easily feasible.

On the other hand, the more the requirements of ISO 14001 itself demand an in-depth examination of the relevant issues, risks and environmental aspects identified, the greater the desire or even the need or demand to use the most useful and appropriate guidance possible for this purpose. Appropriate interface formulations in ISO 14001 itself could help with this (see Option B).

**Advantages:** (1.) Since ISO 14001 is the certifiable and widely used "flagship" in environmental management, any climate-specific supplement to the standard by way of a climate-related part of ISO 14002 can promote the concern for greater consideration of climate risks. Such a climate-related part of ISO 14002 could be the compatibility-forming link between ISO 14001 and other climate-specific tools and would not challenge the role and function of ISO 14001 as a framework. (2.) A climate-related part of ISO 14002 could also enable the realisation of helpful guidance for more comprehensive climate management with ISO 14001 (3.). A climate-related part of ISO 14002 would be close enough to the structure of ISO 14001 and clear enough for a high level of user-friendliness.

**Disadvantages:** (1.) Even if a climate-specific part of ISO 14002 would enable more climate-specific details to be provided regarding the application of ISO 14001 and would therefore promote the management of climate risks, it would still only be a voluntary, not a mandatory

(certifiable) matter on its own. ISO 14001 itself would have to be adapted to support this in order to call for the use or consideration of ISO 14002. (2.) A new standard needs to be initiated, decided upon and developed (between 18-36 months).

### 3.3.4 Option D: Drafting of a new climate management system standard

So far there has been no management system standard for climate management that is comparable with ISO 14001 (or ISO 50001 and the like). However, the relatively high number of management system standards with varying objectives already in existence is the subject of critical debate. Those in standardisation circles are talking about a proliferation of management standards that needs to be curtailed.

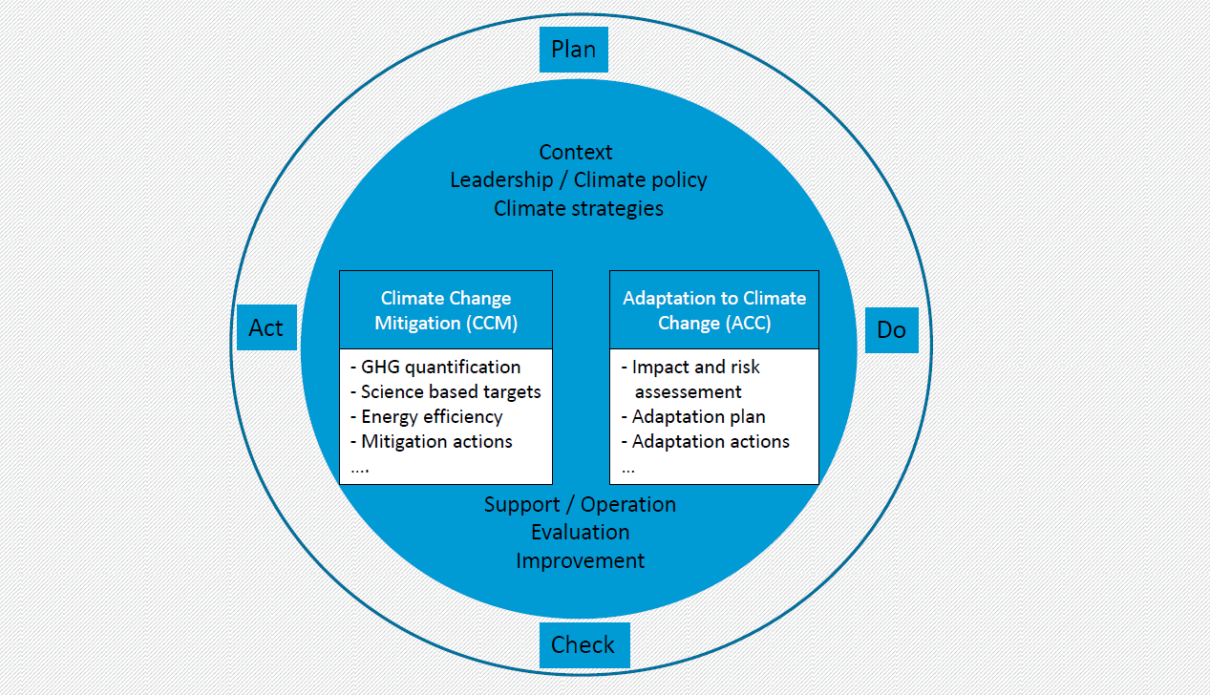
The development of a separate series of standards for energy management systems (ISO 50001 et seq.) is seen by some as a "sin" that should not be repeated, given that energy consumption and energy efficiency have traditionally been treated as aspects of environmental management. Otherwise there would be a risk of undermining the value of the ISO 14001 framework. However, the example of energy management under ISO 50001 illustrates that standards focused on a single topic are seen as attractive and useful because their narrower focus makes them more specific, even though they are no longer embedded in an overall context.[47]

According to existing management system standards, a separate climate management system standard could therefore be developed and introduced using the harmonised structure defined by ISO[48] to centralise the management of climate risks. It would then be possible to use that standard independently or in combination with ISO 14001 (environmental management system), ISO 50001 (energy management system) or other management systems, and also for verification or certification.

[47] However, the current discussion about the expansion of energy management in the direction of climate management represents an opposing trend.

[48] "Harmonized Structure" in accordance with the "Harmonised approach for management system standards" (previously: "High Level Structure – HLS". Cf. ISO/IEC Directives, Part 1 Procedures for the technical work – Consolidated ISO Supplement – Procedures specific to ISO, Annex SL (ISO, 2021b)

**Figure 21: Creating a new climate management system standard**




Source: by the authors (Ludwig Glatzner)

**Advantages:** (1.) Management system standards specific to topics or disciplines allow for a more materially and methodologically targeted focus on the aspect of interest. The specific need for only climate management or climate risk management can be covered. (2.) With a certifiable management system standard, the existence of systematic climate or climate risk management can be proven and made mandatory. (3.) Despite its independent nature, climate management can be an intermediate step on an axis of development, for example from energy management and climate management through to environmental and sustainability management. And vice versa: standards more focused on specific topics can serve as a more in-depth study and provide more detail, such as a climate management standard for a climate-specific deep-dive into environmental management. (4.) Consequently, management systems are a proven instrument for promoting and spreading the systematic handling of areas of responsibility within companies.

**Disadvantages:** (1.) The role and benefits of ISO 14001 as an overall framework for all aspects and topics concerning the environment would tend to become more diluted. (2.) A new additional management system standard brings with it the fear of additional burdens associated with possible additional certification. [49] (3.) A new standard such as this needs to be initiated, decided upon and developed (between 18-36 months).

[49] The determination of testing periods (by the International Accreditation Forum (IAF) at international level) is of crucial importance with reference to the workload associated with certification. The workload for certifying "several management systems", which can be applied only as subsystems of an overarching environmental management system as is the case with energy management, climate management, water management and the like, would not necessarily have to be duplicated.

## 3.4 Recommendations for the review of ISO 14001

Each of the options mentioned offers advantages and disadvantages, as shown. Option A would result in little progress. Option B could result in a material "unilateral" change in ISO 14001 that would constitute a break with the generic character of the standard. Option C could be a potentially helpful but non-binding offer for promoting climate management without significant intervention in ISO 14001, whereas Option D could potentially advance climate management to the detriment of environmental management under ISO 14001.

**Table 6: Overview of the options and their assessment**

| Options | Description | Assessment |
|---|---|---|
| A) Better combination and linking of existing standards and tools | Status quo optimised by more support from combined application of existing standards/tools, e.g. from White Papers. | No major changes/developments/improvements expected; seems to be the attitude of ISO at the moment |
| B) Climate-specific further development of ISO 14001 | Further development of ISO 14001 as the standard for environmental and climate management | Climate management would be prominently incorporated, ISO 14001 would "unilaterally" change, readiness for a major review in this direction is not apparent |
| C) Development of a supplementary climate management module (ISO 14002) | Compatibility-forming climate-specific supplement to ISO 14001 through a new climate-related part of the ISO 14002 guidance | Non-binding alternative to a separate climate management system standard, which contains the entire ISO 14001 |
| D) Drafting of a new, separate climate management system standard | Development of another, additional ISO standard for climate management alongside ISO 14001, ISO 50001 and others. | A management system standard can advance a topic in practice. A new ISO MS standardisation project has been known to meet with resistance, but also with interest |

Source: by the authors (Ludwig Glatzner)

Given the challenge of climate change and the wide range of situations that organisations face, it appears appropriate to use an overall strategy that takes advantage of the approaches available:

1. Better use of the existing environmental management standards
2. Development of a separate climate (risk) management system standard
3. Supplementary climate management guidance (ISO 14002) as a driving force

#### 1. Better use of the existing environmental management standards

The investigation demonstrates that the relevant environmental management standards set few specific requirements when it comes to managing climate risks and do not lead to the supplementary use of climate-specific standards for additional depth. At the very least, approaches and tools that enable the use of suitable climate-specific standards within the scope of environmental management must be outlined and offered through instruments such as White Papers, for example the White Paper on ISO 14090. The user-oriented linkage of environmental

management (ISO 14001) with climate-specific standards (such as ISO 14064 and ISO 14090) through systematic further guidance that provides a proper structure promises greater impact.

**2. Development of a separate climate (risk) management system standard**

Although talk of a "proliferation of management system standards" may be making the rounds in some circles, along with the consciously negative connotations to match, experience shows that a certifiable management system standard can support an organisation's systematic approach to a topic and encourage use through customer demands or political programmes, thereby fostering envisioned outcomes such as a systematic response to the challenges of climate change. The simpler and faster option of developing a climate (risk) management system at national level remains a possibility should the chances of a successful New Work Item Proposal (NWIP) be seen as too low – or the necessary development time as too long – at an international level.[50]

**3. Supplementary climate management guidance (ISO 14002) as a driving force**

ISO 14002 offers a way to strengthen climate policy and the use of climate-specific standards without also weakening ISO 14001 as an environmental management framework and suitable basis for the management of climate mitigation and climate consequences. It has the potential to serve organisations that intend to report on climate-related environmental aspects, environmental conditions and the associated risks and opportunities within an ISO 14001 environmental management system or are required to address such issues in greater depth. Furthermore, it can be used to examine the environmental issue of the climate from both perspectives – the management of greenhouse gas emissions (mitigation) and the associated (transition) risks, as well as the management of climate-related physical risks and opportunities, including adaptation measures – while providing support for the implementation process that is compatible with the plan-do-check-act approach under ISO 14001 and other management system standards. The result is a link between the ISO 14001 framework and further useful climate- and climate-risk-related standards already in existence.

**Summary and conclusion**

In combination with an interface requirement in ISO 14001, the development of a climate-related part of ISO 14002 would play a pivotal role in promoting the management of climate risks and opportunities with the help of environmental management system standards. The competent German standardisation bodies have already drawn up recommendations to this end.

The previous parts of ISO 14002, the general Part 1 and the first special part (on water) show that there is a relatively broad scope to uphold the appeal and user-friendliness through a narrow interpretation of the PDCA approach of ISO 14001. This could even lead to making this standard useful for users of other management system standards, such as ISO 50001. A climate-related part of ISO 14002 would also make it possible to leverage existing, proven tools from the

[50] The German Environment Agency is currently working on a certifiable climate management approach that is to be largely integrated into the EMAS system and is designed for use even by organisations with a full EMAS environmental management system upon initial expansion. The integration into the EMAS framework is intended to leverage the German environmental verifier system in order to ensure high audit quality and credibility at a fair price while avoiding a climate management system that competes with EMAS and ISO 14001.

ISO 14000 series while potentially taking advantage of approaches from the energy management series (such as ISO 50006) and beyond (TCFD recommendations, SBTi methodology, GHG protocol, et cetera) – without having to "reinvent the wheel".

It would have to be examined whether ISO 14002's character as guidance categorically rules out including the recommendations of a climate-related part of ISO 14002 that can be verifiably implemented.[51] Doing so would make management in accordance with ISO 14001 and ISO 14002 more appealing for those who believe that the ability to demonstrate that they have an ISO-compliant functional climate (risk) management system offers potential benefits and advantages.

[51] Despite being merely guidance, evidence that an organisation fulfils a certain level of ISO 50005 is envisaged within the scope of the carbon-leakage provisions of Germany's Act on a National Emissions Trading Scheme for Fuel Emissions (BEHG).

# Part 2: Analysis of reporting on climate-related risks in EMAS environmental statements

# 4 Analysis of reporting on climate-related risks in EMAS environmental statements

## 4.1 Background and objective

**Analysis of sustainability reports, non-financial statements and the CDP database**

Prior to the analysis of EMAS environmental statements described here, the status of climate-related reporting activities by the 100 largest German companies was assessed – also as part of the Economics of Climate Change research project – through an empirical investigation of sustainability reports, non-financial statements and the CDP[52] database (hereinafter referred to as "CDP Climate").

Physical risks and transition risks have been taken into account, because both are climate-related risks which receive significant attention in the political processes on sustainable finance. In addition, comparisons between physical and transition risks are helpful for understanding the state of affairs at the companies.

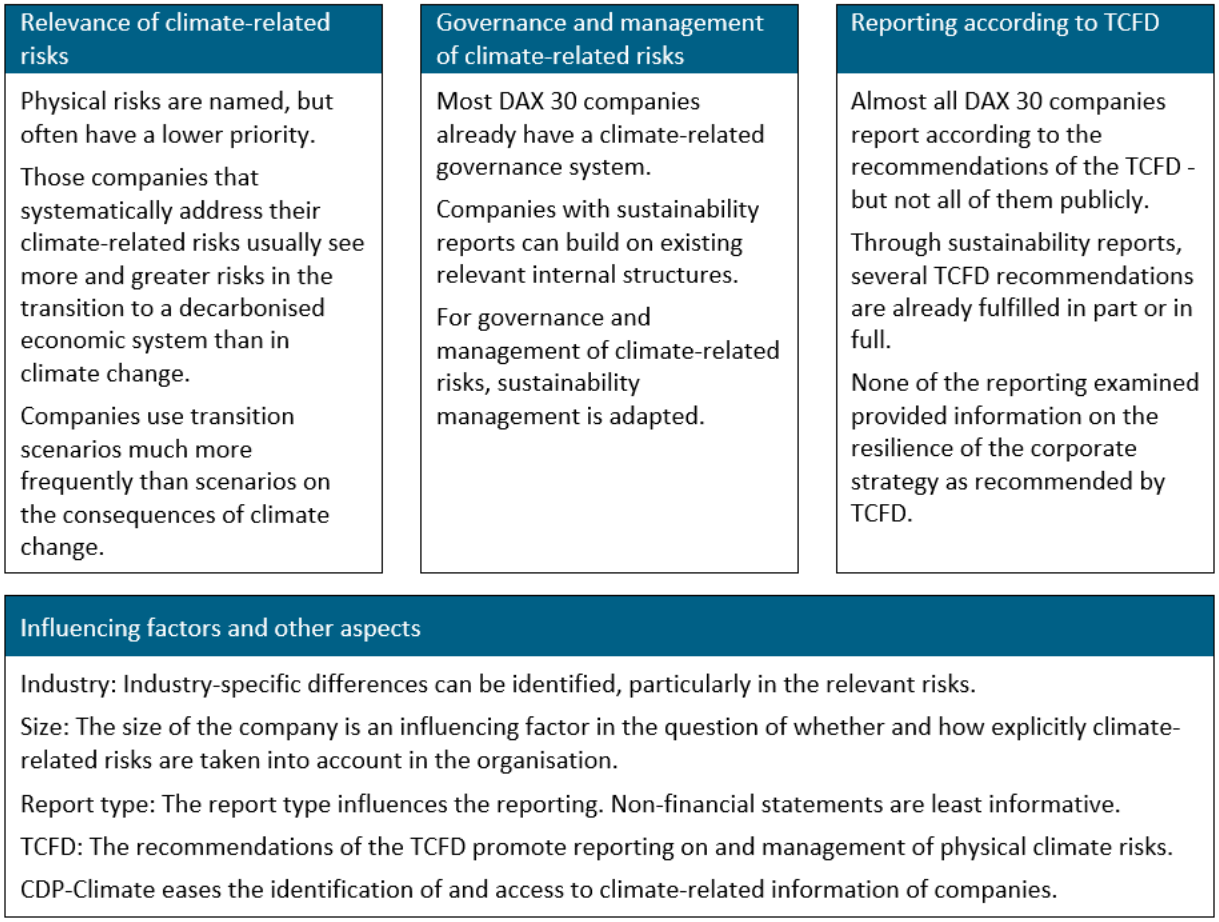
The analysis conducted in 2020 showed that most DAX 30 companies report largely in line with the recommendations of the Task Force for Climate-related Financial Disclosures (TCFD) and that climate-related reporting in the online platform CDP Climate is generally better than in sustainability reports or non-financial statements.

Other key findings are compiled in Figure 22. The detailed findings are published in the first report of the research project (Loew et al., 2021).[53]

[52] Over the past 20 years, the Carbon Disclosure Project (CDP) has developed a database with information on the climate impact of individual companies (WWF Deutschland, 2009). Originally set up only for climate-related information from companies, the CDP now also collects data relating to forestry and water through its platforms (CDP, o. J.). Due to this expansion in the topics covered, the globally active organisation has renamed itself "CDP". For the database related to climate – which we refer to as CDP Climate in this report – information on greenhouse gas emissions, climate mitigation measures and organisational precautions is requested annually from companies.

[53] Loew & Braun et al (2021) Management von Klimarisiken in Unternehmen: Politische Entwicklungen, Konzepte und Berichtspraxis. ["Management of Climate Risks in Companies: Policy Developments, Concepts and Reporting Practices"] Available to download at https://www.umweltbundesamt.de/publikationen/management-von-klimarisiken-in-unternehmen.

**Figure 22: Findings from the analysis of climate-related reporting**




Source: Loew et al. (2021)

### Objective of the analysis of EMAS environmental statements

The empirical basis of the previous investigation from the Economics of Climate Change project was expanded by analysing 40 EMAS environmental statements.

The aim was to gain insights into the situation of small and medium-sized enterprises and public authorities and to examine which of the findings obtained thus far can be applied to these organisations and the reporting in environmental statements.

## 4.2 Methodical data

### Sample of small and medium-sized enterprises

In the German EMAS register, 20 companies with 50 to 250 employees were selected for the investigation of the environmental statements of small and medium-sized enterprises.

It was intended to consider typical EMAS industries. In order to achieve the best possible comparability between these companies, the seven sectors from the manufacturing industry that have most frequently implemented EMAS environmental management systems were selected. This was done using a list of the top 15 industries in the 2018 annual report of the German EMAS registration authorities (DIHK 2019) (see Table 11 in the annex). Three companies were

randomly[54] selected from each of these seven sectors. As this results to 21 cases we randomly selected one sector in which only two companies were considered.

**Sample of public authorities**

Also, for determining the sample of public authorities the starting point was the decision to analyse 20 EMAS environmental statements from the this sector. In August 2020 the German EMAS register (DIHK o. J.) listed a total of 52 organisations in the "Public authorities, administration, defence, social insurance" category.[55]

The analysis of reports by companies (Loew et al 2021) had shown that large companies tend to prepare more thorough reports. Because of the assumption that this size-related effect can also be expected outside the private sector, the aim was to specifically draw on the reporting of large public administration organisations. The investigators therefore selected federal and state agencies, which are usually larger than municipal public administration organisations. As a result, the sample included six federal agencies and 14 state agencies.

It is certainly not surprising that every other authority in the sample obtained in this way is technically responsible for environmental issues (e.g. German Federal Environment Ministry, German state environment ministries, the German Environment Agency, German state environment agencies).

The public authorities in the sample employ between 115 (Landesamt für Verbraucherschutz, Saarland) and 22,199[56] (GIZ) people.

**Total sample of the EMAS environmental statements**

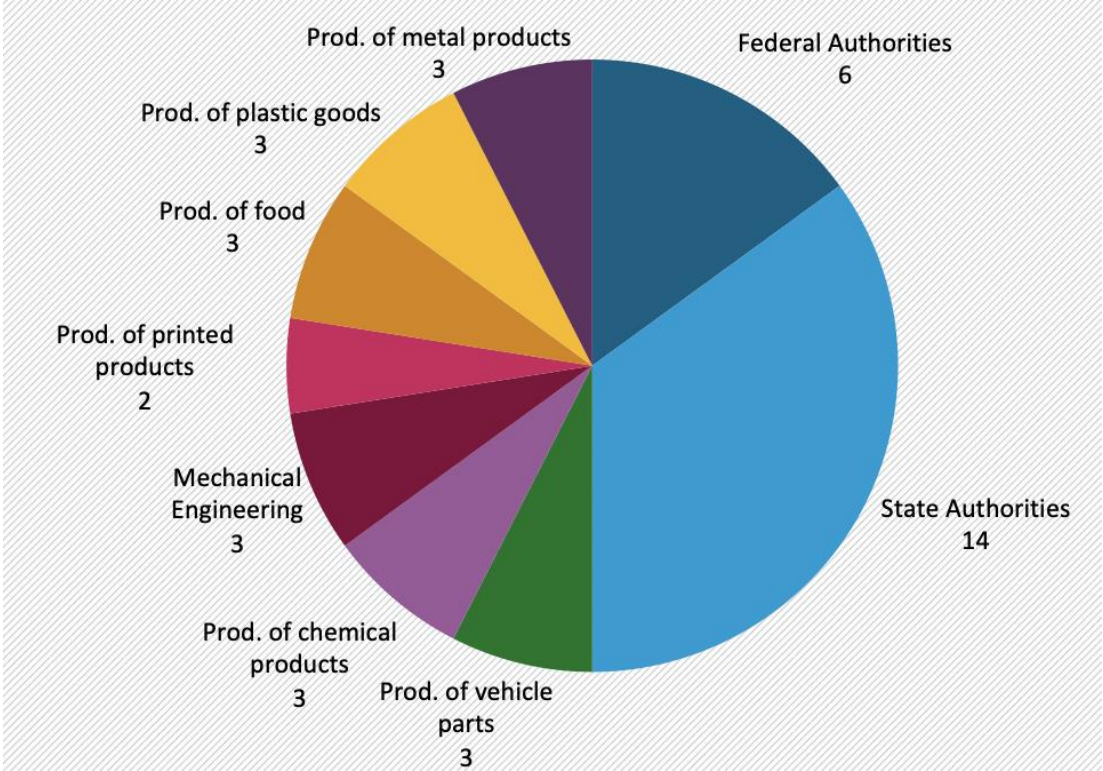
This resulted in the composition of the sample of EMAS environmental statements from small and medium-sized enterprises and public authorities as shown in Figure 23.

[54] The random selection was however compromised because several randomly selected companies only provide their environmental statement upon request. In these cases, the search continued until a company was found that had published its environmental statement in PDF format. In this respect, we identified a clear shortcoming: only providing environmental statements on request is no longer in keeping with the times and does not correspond to the EMAS objective of transparency and open dialogue.

[55] There were still 57 organisations in this category (DIHK 2019) in 2018, and 50 organisations in April 2021.

[56] Out of the 23,614 employees in around 120 countries, almost 70 percent are active locally as national employees (GIZ, 2021). Approximately 3,700 employees are entered in the EMAS register.

**Figure 23: Sample of environmental statements – composition by industry and public authority**




Source: by the authors (akzente)

The major organisations in the sample primarily consist of federal agencies. As a result of the selection process, all of the companies from the manufacturing industry employ between 50 and 250 people (Table 7).

**Table 7: Sample of environmental statements – composition by size**

| Size | Federal agencies | State agencies | Small and medium-sized enterprises |
|---|---|---|---|
| Over 5,000 employees | 1 | 0 | 0 |
| 501-5,000 employees | 4 | 7 | 0 |
| 251-500 employees | 1 | 3 | 0 |
| 50-250 employees | 0 | 4 | 20 |
| **Total** | **6** | **14** | **20** |

Source: by the authors (akzente)

### Significance of the results

When interpreting analyses of the reports submitted by organisations, it is important to note that such reports do not provide a complete representation of the circumstances within said organisations. In view of the analysis conducted, it is possible that more action is being taken to address climate-related risks than has been reported.

Since the aim of the investigation was to specifically draw on the reporting of large public administration organisations, the results were representative for large public administration organisations with EMAS environmental management systems. Nowhere near all public administration organisations have implemented environmental management systems in accordance with EMAS. Therefore, it can be assumed that the public administration organisations in the sample focus on their environmental issues to an above-average extent.

With regard to the sample of small and medium-sized enterprises in the manufacturing industry, it should first be noted that 275 companies with up to 250 employees are included in the EMAS register in this sector. Consequently, the sample in question comprises 7.3 percent of the population, and qualitative conclusions can be drawn about this population. Here, too, it should be remembered that the majority of small and medium-sized enterprises have not implemented environmental management systems and therefore, on average, focus less intensively on their environmental issues.

## 4.3 Results

### 4.3.1 Reporting on physical and transition risks

**Reporting by small and medium-sized enterprises**

Only three of the twenty investigated environmental statements by small and medium-sized enterprises explicitly address climate-related risks.

- Märkisches Landbrot, a bakery, explains that climate change poses a risk to the availability of regional cereals. The bakery also reports on the measures already taken to counteract this risk.
- Aicher Präzisionstechnik, a company that manufactures parts for car makers, addresses the protests for greater climate protection and the anticipated tightening of climate policy. It concludes that the company itself and its customers will be affected by stricter climate protection regulation, thereby necessitating a re-evaluation of its strategy.
- Trompetter Guss, a foundry, expects the prices for $CO_2$ emissions to rise and predicts that these emissions will therefore become an even more important issue.

The 20 environmental statements by small and medium-sized enterprises therefore contained two declarations on transition risks and one on physical risks. As previously discovered in the representative analysis of reports by major companies, businesses address transitional risks twice as often as physical risks (Loew et al., 2021).

**Presentation of climate-related risks in the environmental statement of Märkisches Landbrot**

"Climate change is increasingly transforming the Berlin/Brandenburg region into a landscape with less rainfall. Water availability is decreasing and extreme weather events are increasing. Conventional agriculture is driving species extinction (loss in pollination performance for the vegetables and honey we process) and the poisoning of groundwater – and therefore our drinking and production water, too. Above all, these dramatic changes affect regional farmers and therefore our regional availability of raw materials and our procurement of raw materials [...], resulting in the loss of regional crop yields and cereal qualities. For this reason, we have been supporting variety development for many years, producing varieties that also thrive on the sandy

soils of the Mark Brandenburg. In doing so, we provide continuous financial support for different growers (cf. the raw materials environmental programme), but we also ensure the cultivation of biodynamic and old varieties in the field through our purchasing policy [...]. Increasing economic insecurity of farmers will also mean that we will have to refine the social safety net within the framework of the Runder Tisch Getreide ("Cereal Round Table")."

Source: Updated environmental statement for 2019 of Märkisches Landbrot GmbH

**Presentation of climate-related risks in the environmental statement of Aicher Präzisionstechnik**

"We are part of the big picture and belong to a network of many different internal and external influencing factors. Political and economic developments, but also factors such as unusual weather conditions or climatic developments can have just as positive or negative an impact on our actions as legal, technological or sociocultural events and developments. […]

Climate protection protests and the emissions scandal in the automotive industry continued to intensify in 2019. The political activities relating to climate protection were stepped up. The fifth international energy transition conference took place on 9 and 10 April. One finding from this event was that a consistent focus on green electricity is a prerequisite for reducing global $CO_2$ emissions. Electricity from renewable energies must become the world's most important energy source. On 25 September 2019, the German federal cabinet resolved the benchmark paper for the Climate Action Programme 2030. The document contains an extensive catalogue of measures, including subsidy programmes in various sectors. Funding is available for energy-efficient renovation measures to buildings and heating systems, among other things, which will also affect industry as a whole.

Developments in the automotive industry and in climate policy affect our company very directly and with the expected consequences. Strategic considerations and realignment are inevitable here."

Source: Environmental statement for 2020 of Aicher Präzisionstechnik GmbH & Co.KG

**Presentation of climate-related risks in the environmental statement of Trompetter Guss**

"Energy consumption/emissions in the atmosphere

Energy consumption is of the utmost relevance when it comes to the impact on the environment. The production of cast iron is energy-intensive and leads to high greenhouse gas emissions, above all $CO_2$. This means that $CO_2$ costs and energy costs will rise in the next few years as a result of political will and thereby become an even more important issue for us."

Source: Environmental statement for 2020 of Trompetter Guss GmbH & Co. KG

The other 17 environmental statements of small and medium-sized enterprises examined did not contain any information on climate-related risks. As a consequence, the above examples are not typical, but should be viewed as positive exceptions. The same applies to the following examples of public authorities.

**Reporting by public authorities**

The analysis of environmental statements by public authorities reveals that only Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) reports on a fundamental review of the risks due to climate change. It should be noted that GIZ, with roughly 22,000 employees, is the largest public authority in the sample and sees itself as a "federal enterprise" rather than a government agency.

The second instance in which climate change is described as a risk comes from Abtei Brauweiler, a former abbey now run as a cultural centre by the North Rhine-Westphalian state agency Landschaftsverband Rheinland. The abbey's management noticed an increase in drinking water consumption during the summer 2018 drought and sees a risk that such events could occur more frequently in the future. However, higher water consumption is not material to service delivery or costs, and therefore this information is not comparable to the physical climate risks that companies report. These risks refer to damage to factories caused by hurricanes or disruption to production due to water shortage, for example.

In its environmental statement, the Federal Ministry for Economic Cooperation and Development (BMZ) reports that it is supporting the private sector in adapting to climate change. The report is one example of an environmental statement by a public authority that discusses not only the environmental aspects of its operations, but also the environmental aspects of its services (Loew et al., 2021).

**Presentation of climate-related risks in the environmental statement of GIZ**

"Environmental programme

[…] Measure: To review the introduction of an internal $CO_2$ price to cover climate risks and opportunities and for the transformation to a lower-emission business model.

Environmental risks and opportunities

[…] Extreme weather does not particularly affect us in Germany, at least not the kind of extreme weather that we could preventively counteract with our operational environmental management.

Determining the organisational context

[…] Extreme weather

- No relevance thus far for German locations (e.g. floods) (D)
- Periods of hot weather can occur, requiring an increasing consumption of resources for cooling purposes; scope for action in procurement is low, but broad for new buildings (D)
- Extreme weather and environmental conditions abroad are diverse and sometimes of extremely high relevance (A)

((A) = of extremely high relevance, (B) of medium to high relevance, (C) of low to medium relevance, (D) of very little to no relevance.)"

Source: Environmental statement for 2019 of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

**Presentation of climate-related risks in the environmental statement of Abtei Brauweiler**

"During the unusually warm summer of 2018, the park of the former abbey needed to be watered using drinking water as an exception for a longer period of time. Increased consumption of water like this could also happen more often in the future as a risk of climate change."

Source: Environmental statement for 2019 of Abtei Brauweiler des Landschaftsverband Rheinland (LVR)

**Information on climate change adaptation in the environmental statement of BMZ**

"In the area of private sector adaptation to climate change, department 110, via the WiPo sector project, supports the development and dissemination of a tool, the Climate Expert, which helps companies identify climate risks and develop economically viable adaptation measures. As part of a collaboration with the International Trade Centre (ITC), this approach has been developed further to strengthen the climate resilience of international value chains in particular."

Source: Environmental statement for 2019 of the Federal Ministry for Economic Cooperation and Development (BMZ) for site located in Bonn.

In many of the 20 environmental statements of public authorities examined in total, the terms "risk" and "climate change" do not appear, or appear only rarely. The cases where climate change is addressed as a risk are listed above. Therefore, the environmental statements almost always report "only" on climate mitigation and energy saving measures. In order to present this in figures, the study needed to determine the number of times terms related to climate, climate change, climate mitigation and risk appeared in ten environmental statements of environmental authorities (Table 8). This additional analysis of a random sample was not carried out for all environmental statements due to time and cost constraints.

**Table 8: Number of times climate change and climate mitigation appear in ten environmental statements of environmental authorities**

| Terms (or parts thereof) | Number of reports in which the term appears (N=10) | Average no. of occurrences per report | Maximum no. of occurrences in a report | Minimum no. of occurrences in a report |
|---|---|---|---|---|
| Climate | 10 | 30 | 74 | 3 |
| Climate mitigation | 9 | 9.9 | 43 | 0 |
| Climate change | 3 | 0.9 | 5 | 0 |
| Risk | 9 | 3.6 | 11 | 0 |

Source: by the authors (akzente)

**Preliminary conclusions**

In the 40 environmental statements examined, climate-related risks were only seldom mentioned.

Reading the environmental statements of both the 20 small and medium-sized enterprises and the federal and state agencies gives an impression of the different living environments of the organisations.

Like large companies, small and medium-sized enterprises deal with a wide range of tasks in their day-to-day business and in environmental management. In contrast to large companies, there are no departments dedicated only to sustainability to manage new issues as they emerge. There is also no formal risk management potentially identifying a pending tightening of climate policy as a reportable risk.

Furthermore, a pertinent part of the environmental statements of companies has more the character of a technical document and less that of a publication aimed at customers and the general public. It is therefore not surprising that climate-related risks (= physical and transition risks) are rarely addressed in the environmental statements of small and medium-sized enterprises, and that only one pioneering eco-company from the food and beverage sector in the sample reported on physical risks.

More than half of the environmental statements of public authorities examined come from organisations with more than 500 employees and only in four cases from small public authorities with fewer than 250 employees. Most of these environmental statements have the character of a report aimed at the general public. Yet, climate-related risks are also seldom addressed in them. This is probably largely due to the fact that most of the environmental statements examined only deal with the environmental aspects of operations and do not address the tasks of the authorities. At least the ten environmental authorities (ministries of the environment and environmental agencies) very likely to also deal with physical climate risks and adaptation to climate change as part of their "core business".

### 4.3.2 Degree of reporting with regard to the recommendations of the TCFD

#### 4.3.2.1 Method

**Application of TCFD criteria**

The recommendations of the Task Force on Climate-related Financial Disclosures (TCFD 2017) are shaping the further development of reporting requirements and the reporting practices of large companies. The extent to which the sustainability reports, non-financial statements and reports to CDP (Loew et al. 2021) fulfil the recommendations of the TCFD was therefore investigated during the analysis.

However, it is not possible to reliably measure all TCFD recommendations, necessitating the adjustments described in Table 9. Deviations from TCFD were necessary in the areas of risk management and metrics/objectives. The measured requirements are marked in bold in the table.

The same requirements now formed the basis of the analysis of the EMAS environmental statements.

Table 9: Requirements applied for the measurement of reporting in accordance with TCFD

| Topic | Measured requirement (bold) and comments on the deviations from TCFD, if applicable |
|---|---|
| Governance | **TCFD: Describe the board's oversight of climate-related risks and opportunities.** |
| | **TCFD: Describe management's role in assessing and managing climate-related risks and opportunities.** |

| Topic | Measured requirement (bold) and comments on the deviations from TCFD, if applicable |
|---|---|
| Strategy | **TCFD: Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.** |
| | **TCFD: Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.** |
| | **TCFD: Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.** |
| Risk management | **TCFD: Describe the organisation's processes for identifying and assessing climate-related risks.** |
| | TCFD: Describe the organisation's processes for managing climate-related risks.<br>**Not included in the assessment.**<br>Reason: No unique cases were identified in which processes were reported within the meaning of the TCFD recommendations. |
| | **TCFD: Describe how processes for identifying, assessing and managing climate-related risks are integrated into the organisation's overall risk management.** |
| Metrics and objectives | TCFD: Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks<br>**It was measured whether companies report their Scope 1, Scope 2 and, where applicable, Scope 3 GHG emissions.**<br>Reason: No information on "associated risks" was identified in the places in the text where these figures are published. With regard to the information on climate-related risks, there were also no presentations in which companies explicitly stated how risky their current emissions were. In addition, $CO_2$ pricing risks are not provided for all companies, meaning that a lack of such information should not be seen as a shortcoming in terms of transparency. |
| | TCFD: Disclose the metrics used by the organisation to assess climate-related risks and opportunities in line with its strategy and risk management process.<br>**It was measured whether companies report performance indicators on energy consumption or other facts that could be related to climate-related risks.**<br>Reason: It is conceivable that organisations explicitly state which figures are relevant to their strategic and risk management processes, but no such statements were found. It is therefore not possible to judge to what extent published figures are also relevant to the strategic and risk management processes. |
| | TCFD: Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.<br>**It was measured whether companies report on climate-related objectives and objective achievement.**<br>Reason: Many companies specified climate mitigation objectives. There is usually no way of ascertaining whether these objectives have been set to reduce transition risks or for other reasons (costs, reputation, voluntary contribution to climate mitigation). The study also looked into whether objectives to reduce the physical risks of climate change had been set, but this was not found to be the case. |

Source: Loew et al. (2021)

### Scale to show the degree of climate-related reporting

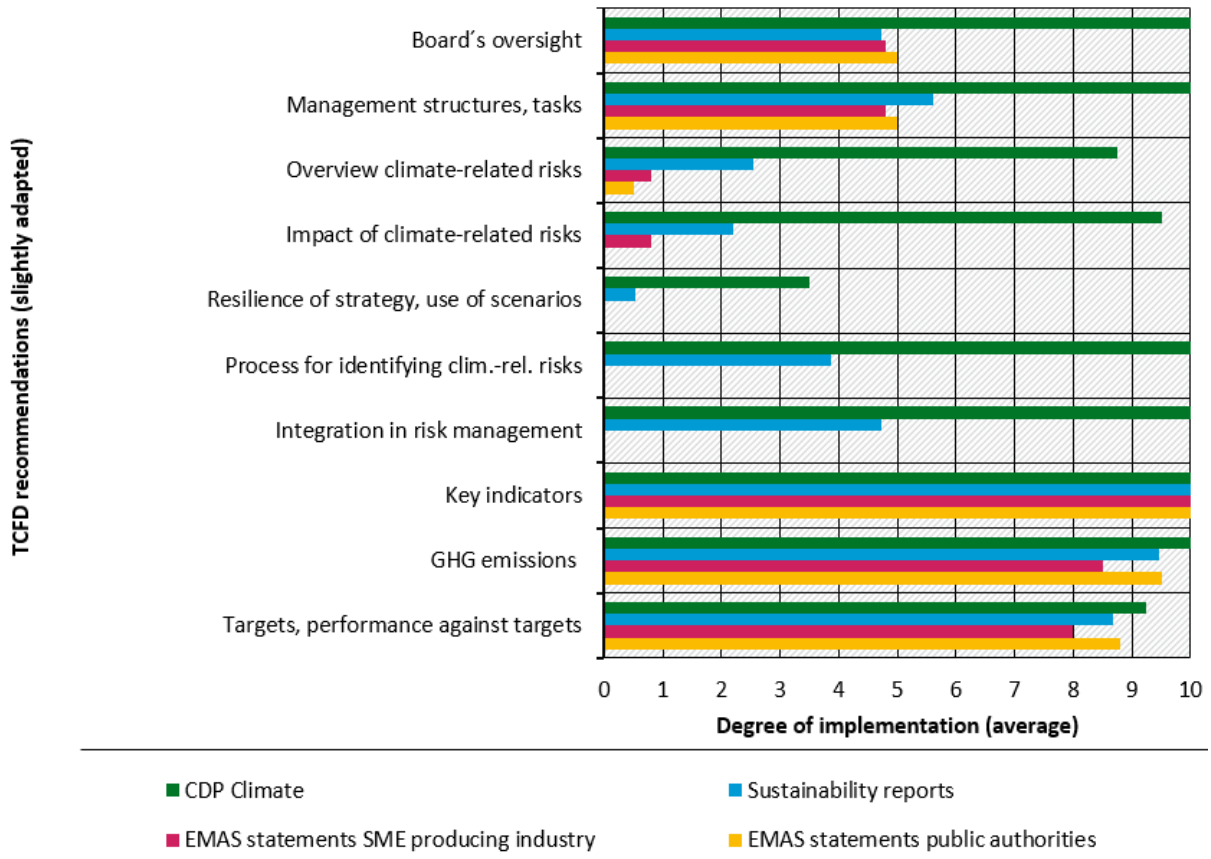
In order to show the degree of reporting with regard to the recommendations of the TCFD in a chart, a scale of 0 to 10 was used, where 10 points indicate that all recommendations have been

complied with, 5 points indicate partial compliance and 0 points indicate no or only minimal compliance with the recommendations.

#### 4.3.2.2 Result: Status of climate-related reporting in environmental statements

Figure 24 illustrates the average level of climate-related reporting as measured against the TCFD recommendations. In it, the reports in the investigated environmental statements are compared with the disclosures by large companies in sustainability reports and to CDP Climate.[57]

**Figure 24: Degree of reporting with regard to the recommendations of the TCFD**




Source: by the authors (akzente)

The large-scale analysis of the sustainability reports, non-financial statements and reporting to CDP Climate demonstrated that the size of the company, the type of report and the sector all have an influence on climate-related reporting (Loew et al. 2021 p. 121). These influential factors must therefore also be taken into account when interpreting the findings regarding the EMAS environmental statements. Particularly with regard to the type of report, the large-scale analysis itself illustrates that the underlying frameworks reflect TCFD-recommended reporting requirements to a varying extent. CDP Climate, for instance, takes into account most of the TCFD recommendations, whereas the requirements for non-financial statements do not contain any specific guidelines on this particular matter (and others). Likewise, the environmental statement requirements do not contain any explicit demands regarding climate-related reporting.

[57] For information on the sample of examined sustainability reports and reporting to CDP Climate, see annex A.2 on page 82.

First the areas with little differences between the report types are discussed below. Then the areas with significant deviations are addressed.

**Performance indicators**

Greenhouse gas emissions and other climate-related performance indicators (e.g. energy consumption) are reported almost universally in all reporting formats. In some cases, the environmental statements, and also the sustainability reports, do not report on Scope 2 greenhouse gas emissions.

**Objectives and objective achievement**

Climate-related objectives and the achievement of objectives are reported on similarly well in environmental statements, as well as in sustainability reports and in CDP Climate.

Most, but not all, of the environmental statements examined contain objectives that contribute to energy efficiency and the reduction of greenhouse gas emissions. On the other hand, no environmental statements were identified in which climate change adaptation objectives and measures are explicitly included in the environmental programme.

There are of course borderline cases. The Märkisches Landbrot bakery comments in an overview on the wide range of risks of climate change in Brandenburg leading to a decline in water availability and to more frequent extreme weather events. Consequently, a loss of regional crop yields and cereal qualities is expected. As a countermeasure, reference is made to the long-standing collaboration with growers and to the targeted procurement of old varieties and of cereal from biodynamic cultivation. However, in the sustainability programme, these activities are assigned to the protection of biodiversity.

The reporting on water consumption included in many environmental statements also presents a borderline case. Reports have been discussing objectives and measures on how to consume less water since the 1990s. In the 2019 Monitoring Report on the German Strategy for Adaptation to Climate Change (UBA 2019), the intensity of water consumption in the manufacturing sector is used as an indicator for monitoring the adaptation by businesses as a whole.[58] However, in the environmental statements, objectives and measures concerning water consumption are not (yet) provided in the context of climate change adaptation.

In other words: reporting on climate-related objectives and objective achievement therefore refers to the greatest possible extent to climate mitigation. The environmental statements of companies and public authorities examined do not contain any objectives explicitly referring to climate change adaptation.

**Governance and management structures**

For the criteria relating to climate-related governance and climate-related management structures, only partial compliance with the TCFD recommendations can be observed in environmental statements and in sustainability reports. The background to this is that although both report formats regularly describe the management structures for environmental protection or also for sustainability, they do not explicitly state whether climate-related risks are also taken into account with these structures. CDP Climate explicitly asks companies what management structures are in place to deal with climate-related risks.

[58] "Changed climatic conditions may result in such dry and hot phases occurring more frequently in future, becoming more intensive and lasting longer. [...] Industrial processes that are largely independent of water resources are better equipped for the impacts of climate change than processes which require a lot of water. [...] Between 2000 and 2016 water consumption declined in the manufacturing sector by approximately 27 % overall." (UBA, 2019, S. 196 f.)

The analysis of sustainability reports (Loew et al., 2021) revealed that there are clearly large companies that systematically manage climate-related risks with their sustainability management even if that is not explicitly stated. It further concludes that companies that first address their climate-related risks are more likely to apply their environmental or sustainability management system.

In our opinion, the same can be said about companies with environmental management systems in place. It is obvious that in companies with environmental management systems, the management involves the environmental management officer if physical and transition risks are to be identified and, if necessary, reduced.

However, the starting situation at public authorities is different. Their environmental management system is also the responsibility of the top management, but the management system is much more limited to administrative operations than in the case of companies. If public authorities address climate-related risks in their core activities (more intensively) within the scope of their responsibilities, this is evidently done outside the environmental management system. It may be expected that the environmental management system will only be used when it comes to managing climate-related risks to administrative operations.

**Climate-related risks**

As explained above, only a few companies and public authorities address climate-related risks in their environmental statements. What follows is a comparison with the sustainability reporting and the information in CDP Climate.

Climate-related risks are more often reported in the sustainability reports of large companies than in the environmental statements examined. In the case of companies, any deviations are primarily caused by the size of the company. In the case of public authorities, the difference is apparently explained by the fact that environmental management is limited to their administrative activities.

The main reason that reporting on climate-related risks is considerably better in CDP Climate is because CDP explicitly requests companies to describe these risks.

**Strategy and risk management**

The information recommended by TCFB concerning the resilience of the corporate strategy, the approach for identifying climate-related risks and, ultimately, the integration in risk management were not found in any of the environmental statements examined. The reasons are clear: management systems are usually focused heavily on operations and small and medium-sized enterprises and public authorities do not have risk management systems in the same way as large companies have and are in some cases required by law to possess.

### 4.3.3 Transferability of the state of affairs in large companies to small and medium-sized enterprises and public authorities

The analysis of reporting by large companies (Loew et al. 2021) revealed findings concerning the relevance of climate-related risks from the companies' perspective, the management of these risks and the reporting in line with TCFD.

The findings from the analysis of EMAS environmental statements in Table 10 supplement these results. In some cases, assessments are made that are not explicitly derived from the environmental statements, but only from plausibility considerations. For these plausibility considerations, the state of affairs at the small and medium-sized enterprises and the public

authorities is based on expert knowledge and on the lack of information in the environmental statements.

**Table 10: Exploratory comparison of the state of affairs at large companies with the situation at small and medium-sized enterprises and public authorities**

| Large companies (Top 100 and 16 other companies) | Small and medium-sized enterprises (50-250 employees) | Federal and state agencies |
|---|---|---|
| **A) Relevance of climate-related risks** | | |
| Physical risks are mentioned. | Physical climate risks are only mentioned on rare occasions. | |
| Most companies that address their climate-related risks systematically foresee more and greater risks in the transition to a decarbonised economic system than due to climate change. | None of the environmental statements of small and medium-sized enterprises revealed that these small and medium-sized enterprises address climate-related risks systematically. | None of the environmental statements of public authorities revealed that these public authorities address climate-related risks systematically. Assessment: However, it must be assumed that at least most environmental authorities do actually do this. |
| Considerably more often, companies use transition scenarios as scenarios for the consequences of climate changes. | None of the small and medium-sized enterprises reported on the use of scenarios. | None of the public authorities reported on the use of scenarios. Assessment: It must be assumed that at least most of the environmental authorities do actually do this, however not as part of their environmental management system but as part oft their duties. |
| **B) Governance and management of climate-related risks** | | |
| Most DAX 30 companies have a climate-related governance system. | It is not indicated that small and medium-sized enterprises have a climate-related governance system. | It is usually not indicated in the environmental statements that the public authorities have a climate-related governance system. Assessment: It must be assumed that at least most of the environmental authorities have defined the responsibilities for their climate policy and climate change adaptation within their organisation. |
| Companies with sustainability reports have relevant internal structures, which they can build on. | Companies with environmental management systems have relevant internal structures, which they can build on. | Assessment: Public authorities with an environmental management system will possibly rarely use it in order to consider climate-related risks as part of their provision of services. |

| Large companies (Top 100 and 16 other companies) | Small and medium-sized enterprises (50-250 employees) | Federal and state agencies |
|---|---|---|
| Sustainability management is adjusted for the governance and management of climate-related risks. | Environmental management is adjusted for the governance and management of climate-related risks. (The findings on this for large companies can be transferred onto small and medium-sized enterprises.) | Assessment: EMAS environmental management plays a minor role in the governance and management of climate-related tasks at public authorities. |
| **C) Reporting in line with TCFD** | | |
| Nearly all DAX 30 companies report in compliance with the TCFD recommendations – but not all of them publish their reports. | Reporting in line with TCFD is not apparent from the environmental statements. | |
| In sustainability reports, some of the TCFD recommendations are complied with in full or in part. | In environmental statements, some of the TCFD recommendations are complied with in full or in part. | |
| None of the examined reports included the information required by the TCFD on the resilience of the corporate strategy. | The environmental statements contained no information of this kind. | |

Source: by the authors (akzente)

# 5 Conclusion regarding reporting in EMAS environmental statements

The analysis of the environmental statements did not lead to any surprising findings. As expected, environmental statements contain indicators on greenhouse gas emissions and energy consumption, as well as disclosures related to climate objectives and the structure of the environmental management system. The assumption that the environmental statements would not report on the use of climate scenarios and the resilience of an organisation's strategy, as such aspects have yet to be included in the specific requirements for environmental management systems (see analysis in sections 2.2 and 2.3), was also confirmed.

It can be assumed that the level of reporting reflects the state of affairs at the companies. It stands to reason that small and medium-sized enterprises have so far devoted little time and effort to addressing their climate-related risks, particularly physical climate risks. The following approaches could help to change this at companies with environmental management systems according to EMAS:

- **Changing the requirements within ISO 14001 or in the context of ISO 14001.** The EMAS Regulation incorporates the requirements under ISO 14001 and goes beyond them. It can be assumed that future new requirements within ISO 14001 or in the context of ISO 14001 will also be reflected in the EMAS Regulation. The possibilities for contributing to a systematic consideration of physical climate risks within the framework of ISO standards are outlined in chapter 3 "Further development of international environmental management standards from the perspective of climate-related risks and opportunities" (page 77ff).

- **Introducing more demanding requirements within EMAS or adding a voluntary climate module.** The approach of developing a voluntary EMAS climate module is already being pursued. See section 2.3.5 "Summary and conclusion regarding EMAS" (page 65)

- **Mandating reporting on climate-related risks, especially physical climate risks, in EMAS environmental statements.** In order to demand such a reporting obligation, one could theoretically refer to the fact that disclosure on climate-related risks is also envisaged in the context of the European sustainability reporting directive and that, in addition, such reporting obligations are being worked on in most G20 countries (FSB, 2021). However, this approach would constitute a break with the current principle that an environmental statement describes the environmental management system and its outcomes. Therefore, the management of climate-related risks would have to be specified within the framework of the management system (see the approaches above).

**Consequently, the findings of the analysis of the environmental statements confirm the need to improve the requirements in place for environmental management systems.** At the same time, no additional approaches were ascertained.

Notwithstanding this, it is important to note that only a very small proportion of companies have implemented environmental management systems. Compared to the average company in the size range of between 50 and 250 employees, the companies with environmental management systems are pioneers. All the more so if they have opted for EMAS and report regularly. The same applies to public authorities; here, too, it must be assumed that the public authorities that

have implemented environmental management systems stand out from most other public authorities in terms of environmental protection.

In order to reach small and medium-sized enterprises or public authorities to a relevant extent, the path involving environmental management systems is therefore insufficient.

**Shortcomings not concerning the management of climate-related risks**

The analysis of the environmental statements also revealed two overarching shortcomings that are not specifically related to physical climate risks and should be addressed:

- **Availability as PDF:** Some companies still provide their environmental statements only when requested. Measures should be taken to ensure that environmental statements are always available as downloads without restrictions. In addition, the PDFs should be machine-readable, both as a contribution to accessibility and for evaluations in studies.
- **Clarity of environmental programmes together with the status of implementation:** Some organisations have presented their objectives and measures only in narrative text. In other cases, the reports do not provide a clear picture of how existing environmental objectives are being met. If possible, there should be a uniform basic structure for the tables presenting the objectives, the associated measures and the achievement of the objectives.

Ultimately, measures for the further improvement of environmental management systems and environmental statements should, as far as possible, aim to be compatible with the planned European sustainability reporting standards. In its draft for the new Directive on sustainability reporting, the European Commission stipulates that all corporations[59] with 250 employees or more must prepare their reports in line with these standards (European Commission, 2021b). This is scheduled to apply for the first time to reporting for financial year 2023 from 2024 onwards.

[59] Meaning joint stock companies (Aktiengesellschaften – AG) and limited liability companies (Gesellschaften mit beschränkter Haftung – GmbH).

# 6 References

**ISO Standards**

ISO 14001:2015 Environmental management systems – Requirements with guidance for use.

ISO 14002-1:2019 Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 1: General

ISO/CD 14002-2 Environmental management systems – Guidelines for using ISO 14001 to address environmental aspects and conditions within an environmental topic area – Part 2: Water

ISO 14004:2016 Environmental management systems – General guidelines on implementation

ISO 14064-1:2018 Greenhouse Gases – Part 1: Specification with Guidance at the Organizational Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals

ISO 14064-2:2019 Greenhouse Gases – Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reduction or Removal Enhancements

ISO 14064-3:2019 Greenhouse Gases – Part 3: Specification with Guidance for the Verification and Validation of Greenhouse Gas Statements

ISO 14067:2018 Greenhouse Gases – Carbon Footprint of Products – Requirements and Guidelines for Quantification

ISO 14090:2019 Adaptation to Climate Change – Principles, Requirements and Guidelines

ISO 14091:2021 Adaptation to climate change – Guidelines on vulnerability, impacts and risk assessment.

ISO/TS 14092:2020 Adaptation to climate change – Requirements and guidance on adaptation planning for local governments and communities.

ISO 26000:2010 Guidance on Social Responsibility

ISO 50001:2018 Energy management systems – Requirements with guidance for use

ISO 50006:2014 Energy Management Systems – Measuring Energy Performance Using Energy Baselines (ENB) and Energy Performance Indicators (ENPI) – General Principles and Guidance

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# A Annex

## A.1 Industries with the most organizations participating in EMAS

**Table 11: Overview of the sectors with the most organizations participating in EMAS**

Order by frequency, TOP 15, as of December 31, 2018.

| NACE | Branchen | Dec 02* | Dec 10 | Dec 14 | Dec 16 | Dec 17 | Dec 18 |
|---|---|---|---|---|---|---|---|
| **94** | Interest groups / religious associations | 13 | 215 | 180 | 173 | 154 | 152 |
| **85** | Education and teaching | 38 | 155 | 147 | 138 | 132 | 137 |
| **25** | Manufacturing of metal products | 278 | 108 | 102 | 95 | 98 | 99 |
| **55** | Lodging | 25 | 55 | 91 | 107 | 106 | 89 |
| **20** | Manufacturing of chemical products | 230 | 74 | 74 | 76 | 75 | 76 |
| **29** | Production of motor vehicle | 138 | 66 | 65 | 70 | 74 | 72 |
| **35** | Energy supply | 63 | 48 | 45 | 53 | 61 | 63 |
| **84** | Public administration | 75 | 64 | 60 | 63 | 63 | 57 |
| **38** | Waste disposal, recovery | 148 | 49 | 54 | 57 | 58 | 55 |
| **10** | Production of food and feed | 242 | 44 | 41 | 46 | 53 | 55 |
| **56** | Gastronomy | 25 | 25 | 57 | 63 | 59 | 51 |
| **22** | Production of rubber and plastic goods | 139 | 50 | 51 | 51 | 51 | 50 |
| **18** | Production of printed material | 88 | 42 | 45 | 41 | 41 | 37 |
| **46** | Wholesale | 57 | 31 | 33 | 31 | 40 | 37 |
| **28** | Mechanical Engineering | 151 | 35 | 33 | 39 | 38 | 36 |

* Double nominations possible; ** Converted according to new NACE code

Source: DIHK (2019)

## A.2 Sample sustainability reports and CDP climate

In Figure 24 on page 101, comparisons are made with the sustainability reports, non-financial statements and reporting to CDP examined in an earlier work step. The composition of this sample is shown in the following table 10.

**Table 12: Sample sustainability reports, non-financial statements and CDP-Climate**

| | Sustainability reports | Non-financial statements | CDP-Climate |
|---|---|---|---|
| DAX-30-Companies | 24 | 25 | 20 |
| Top-100-Companies without DAX-30 | 33 | 24 | |
| Medium-sized companies | 16 | | |
| **Sum** | **73** | **50** | **20** |

Source: Loew et al. (2021)