Handbook for Introducing TCFD in Sustainability Reporting, Case Study: Normet Group Oy

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Abstract

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This Bachelor's thesis explores the complex nature of Task Force on Climate-related Financial Disclosures (TCFD) framework. The primary purpose of this project was to deliver a tailored handbook for introducing TCFD to Normet Group Oy. Normet Group Oy is an international mining and tunnelling company headquartered in Espoo, Finland. The firm is proactively seeking to embrace new reporting initiatives, such as TCFD, within its recently adopted Environmental, Social, and Governance (ESG) reporting. The aim was thus to present the key components belonging to the framework and introduce a possible adoption process to Normet Group Oy with recommended steps for each stage.

The thesis consists of a theoretical and an empirical part. First, a review was conducted of the theory and literature regarding the context of sustainability, environmental accounting, TCFD and the mining industry. Second, diverse project methodologies were applied to bridge the gap between theory and practice. The desktop studies and company interviews contributed to creating a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis on Normet's readiness for adopting TCFD, while the benchmarking method studied the reporting practices employed by external companies. The interviews carried out with sustainability consultants aimed to obtain practical views of practicing TCFD reporting.

The results of the SWOT analysis highlighted Normet's practices aligning with TCFD recommendations and identified the areas needing further attention. Notably, the benchmarking demonstrated that if the TCFD framework is not standardized, each companies' disclosures may vary in quality and details. This was also addressed during the interviews, where the interviewees enhanced for instance the role of the new Corporate Social Responsibility Directive (CSRD) in improving and standardizing TCFD practices.

Collectively, the gathered information set the foundation for a roadmap, which outlined potential steps Normet could follow to initiate the TCFD process and complete its disclosures according to TCFD recommendations. Normet Group Oy is provided with insights into emerging trends and other recommendations for enriching their sustainability reports in the future. The results of the handbook serve as a visual guide introducing TCFD along with actionable steps for getting started.

Key words
Circular Economy, Corporate Social Responsibility Directive (CSRD), Environmental Management Accounting (EMA), Environmental Management Systems (EMS), ESG reporting, Scenario Analysis, Task Force on Climate-related Financial Disclosures (TCFD)

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1 Introduction

This thesis is a project type of a bachelor's thesis for the Degree Programme in International Business in the major specialization of accounting and finance in Haaga-Helia University of Applied Sciences. The project is conducted for the case company Normet Group Oy. The reader can expect to get a comprehensible overview of the Task Force on Climate-related Financial Disclosures (TCFD) and the key factors that newcomers ought to consider when beginning their adoption process. The main outcome of this thesis is an introductory handbook with the steps and recommendations for getting started with TCFD and integrating it into existing sustainability reports.

This chapter delves into the purpose of this thesis, outlining the background, objective, and scope of the project. It also presents the case company Normet and its unique business context. The author highlights the benefits connected with the thesis topic, as well as provides precise definitions of the key concepts for clarity.

The second chapter establishes theoretical foundations for sustainability reporting, environmental accounting, and most importantly, the essence and components of the TCFD framework. The theory is concluded by discussing sustainability within the mining industry, to which Normet belongs.

The third chapter outlines the project management methods, which explain the groundwork for the subsequent three chapters. These following chapters include the internal analysis of Normet, the external examination of disclosures by other companies, as well as the author's recommendations for Normet's own TCFD journey.

The project is finalized by concluding the outcome of this project. It involves discussing the results, further recommendations, and the author's personal learning points from this endeavour.

1.1 Background to the topic

At the beginning of the thesis process, the author had completed her internship at Normet Group Oy and desired to continue her collaboration through thesis work. The needs matched perfectly as the author found her passion for sustainability reporting, and Normet had recently initiated their ESG reporting process and wished to gain understanding of TCFD. Therefore, this thesis aims to provide a tailored handbook about Task Force on Climate-related Financial Disclosures (TCFD) for the case company Normet, supporting their efforts to proactively align with emerging sustainability initiatives.

Task Force on Climate-related Financial Disclosures (TCFD) is a framework that discloses the financial impacts that climate-related risks and opportunities may cause. The framework examines

the topic from the perspective of four key aspects: governance, strategy, risk management, and metrics and targets. Although it started as a voluntary initiative in 2015 by the Financial Stability Board (FSB), the recommendation of adopting the TCFD framework is continuously spreading across nations, especially with the emerge of new sustainability directives (Deloitte 2022b).

As the world is becoming more aware of climate change, as well as environmental and social responsibility, it's crucial for companies to report about the actions they are taking concerning these matters. Despite Normet being unlisted, new directives are pushing the company to include non-financial topics to their Annual Reports. Normet is a forward-looking business that acknowledges sustainability as one of their core values and recognizes the importance of acting against climate change and resource scarcity. Regardless of the company being at its early stage of sustainability reporting, it has proactively taken initiatives towards it and currently has decided to adopt TCFD reporting. For this reason, the author aims to provide a research on what TCFD reporting is, what is the content that should be disclosed, and how could Normet adopt it.

Incorporating TCFD into Normet's Annual Report will make the company increase their transparency, credibility, and responsibility, which eventually will attract more investors, talent, and customers. This is why the author ensures to provide a handbook, which could benefit the case company Normet, as well as other potential interested companies wanting to get themselves familiarized with TCFD and implement it in their reporting practices.

1.2 Project Objective

The objective of this thesis is to provide Normet a brief handbook with key information and recommendations on how to adopt the TCFD framework into its existing sustainability reports. It's important to note that the aim is not to create a ready-made disclosure solution for the case company to implement. Instead, the goal is to conduct in-depth research, present the key findings and assist with suggested initial steps to begin the adoption process. By utilizing this handbook, Normet could gain an understanding of the TCFD framework, as well as of the possible resources and activities needed to comply with the new reporting initiative. The handbook is specifically customized to suit Normet's context, which focuses on the mining and tunnelling industry. Nevertheless, the content could be easily applicable and modifiable to be adopted by other companies operating in similar sectors and with shared interested in this topic.

The degree programme requires the thesis to have an international aspect, which will be assured as Normet is an international company operating in over 30 countries. The handbook itself can be targeted towards any business or subsidiary despite their location.

To achieve the project objective, the thesis will be divided into five phases:

Project task 1: Understanding the evolution of sustainability practices within the business and mining context and gaining an understanding of TCFD

Project task 2: Analysing the current state of Normet's sustainability reporting

Project task 3: Researching external companies' TCFD practices

Project task 4: Creating the recommendations for Normet and the content of the handbook

Project task 5: Evaluating project management and project outcomes

Table 1. Overlay matrix

Project Task	**Theoretical Framework**	**Project Management Methods**	**Outcomes**
PT 1. Understanding the evolution of sustainability practices within the business and mining context and gaining an understanding of TCFD	Sustainability reporting, CSR, history of sustainability reporting, environmental accounting, sustainability within the mining sector, TCFD	Literature and online research	Theoretical framework (Ch. 2)
PT 2. Analysing the current state of Normet's sustainability reporting and position to implement TCFD	Shareholder theory	Desktop study (analysing Normet's existing reports) and interviews (interviewing company representatives for more information)	Internal analysis on the current situation of the case company (CH. 4.)
PT 3. Researching external companies' TCFD practices		Researching external companies, quantitative research (desktop study, benchmarking)	External analysis on companies already implementing TCFD (Ch. 5.)
PT 4. Creating the recommendations for Normet and the content for the handbook	Identifying and quantifying environmental risks and opportunities, IPCC scenarios, IEA scenarios, IAM, IIASA, ERM, SBT, IFRS S1 and S2, CSDDD, TNFD	Creating the handbook (reviewing data collected and building structured recommendations/guidelines)	The handbook (Ch. 6.)
PT 5. Evaluating project management and project outcomes		Project analysis on the outcome and process	Self reflection (Ch. 7.)

1.3 Project scope

The scope of this thesis is to help Normet get familiarized with the Task Force on Climate-related Financial Disclosures (TCFD) framework and the aspects which are needed to be understood and analysed in order to report on this matter. The handbook is aimed to provide an easily readable overview of the main topics related to TCFD, as well as recommend steps that can be followed for planning and initiating the adoption process. The handbook can be adopted on the Group level, but as the author is cooperating with her contacts in Finland, the recommendations are featuring examples pertinent to the Finnish context

The handbook is not supposed to be a set of guidelines that must be strictly complied with, but rather a supporting tool. It can be utilized for introducing the topic, getting familiarized with the framework, and serving as a checklist for revising the main aspects. Therefore, the thesis does not cover all the details regarding the core elements, nor all the possible methods for scenario analysis or evaluating risks and opportunities. Instead, the author highlights the practices that are commonly used by other recent TCFD adopters and recommends widely accepted tools and methodologies. By doing so, Normet could begin their TCFD project with reliable and comparable sources and techniques.

This thesis considers the basics of sustainability and ESG reporting, but it is limited to the environmental aspect and TCFD. Similarly, while the author introduces environmental accounting and mentions different environmental directives or accounting standards, the study does not delve into detailed accounting practices and rules.

The implementation of TCFD has certain recommendations that are different depending on the industry of the company. Therefore, this thesis focuses only non-financial companies, more specifically on the “materials and buildings” sector in which Normet belongs to according to TCFD.

1.4 Benefits

For the case company Normet, the handbook on how to implement TCFD could help the business take a step further in reporting about their climate-actions and be more transparent towards their stakeholders. Reporting on TCFD is not mandatory for Normet, however, doing so would increase their credibility and trustworthiness about taking serious action to fight against climate change. This could also increase their reputation, attractiveness as an employer, and draw more capital investments. Adopting TCFD in Normet’s reporting requires analysing the company’s actions and strategy. Being aware of these could eventually improve their ability to measure and improve their performance and have a better advantage over their competitors.

The same will apply for any other business who is interested in adopting TCFD in their reports. As the handbook provides a broad and introductory overview of the topic, it can be tailored to serve as a support tool for other companies as well, especially for other mining companies as the industry is still falling behind when it comes to sustainability and being “green”.

The thesis provides a valuable opportunity for the author to develop in the field of finance and accounting, primarily on the sub-field of sustainability reporting. The author wants to educate herself more on the relation between financial and non-financial reporting, the importance of environmental performance, as well as build a strong foundation of knowledge regarding sustainability strategies, initiatives, and directives. Therefore, this project offers multiple learning points that are beneficial for the author’s future career.

Additionally, this project could bring awareness to the faculty audience as the topic is not yet widely known among many individuals and there are only a few previous studies that grasp on the topic from graduates about the subject in Finnish. Therefore, the author aims to bring more light to the TCFD framework also for the English-speaking audience, and it could possibly inspire the faculty to consider it when discussing the field of ESG reporting.

1.5 Commissioning company

The commissioning company is Normet Group Oy, which is an innovative technology company operating globally and a key player in the mining, tunnelling, and civil infrastructure sectors. The company develops and delivers continuous improvements to key underground mining and tunnelling processes with a focus on maximising safety, sustainability, and productivity. (Normet 2023a)

Founded in 1962 in Iisalmi, Finland, Normet was first known as “Peltosalmen konepaja” (Normet 2022, 9), or “Peltosalmi Metal Works” in English. It was a company that designed and produced winches, woodchippers, and cranes for forest machinery. Once the ownership of the company changed in the beginning of 1970, the current name Normet was established, and the business shifted its focus to produce mining and tunnelling equipment. Since 2005, Cantell Oy has acted as majority shareholder of Normet, and consequent changes within the business have been made since. Normet no longer operated via distributors and intermediaries but started to sell its equipment and aftermarket services directly. (Construction & Civil Engineering magazine 2014.)

While in 2006 Normet had operational presence in solely three countries (Construction & Civil Engineering magazine 2014), today the company has expanded to 30 countries in 50 locations and employs around 1,700 employees globally. The headquarters is in Espoo, Finland (Normet 2023a); relocated from Iisalmi, Finland, where the company has its roots (Construction & Civil Engineering magazine 2014).

Normet offers a broad range of products and services. The company manufactures underground equipment and applications, provides aftermarket services and construction chemicals, as well as rock support equipment and expertise. Their equipment can be utilized for spraying and transporting concrete, explosive charging, lifting, installations, and in underground logistics. Moreover, Normet offers professional technical support, field-, and upkeeping services, repairing, and replacing spare parts, as well as instructional services for operating with Normet's machinery. (Normet 2023b.)

Despite short- and long-term market uncertainties, Normet has maintained approximately 20% year on year revenue growth over the recent years. In 2022, their revenue reached 439 million euros, which is 22% higher than in 2021. Their strong financial track record can also be seen in the company's EBITDA, amounting to 71 million euros in 2022 from 61 million euros in 2021. Normet aims for organic growth and growth through strategic acquisitions. (Normet 2022, 43.)

Normet's values include caring, commitment and courageous, and they are rooted in the company operations. Challenges are approached with these principles, and the aim is to develop solutions that benefit its customers, employees, and the environment, as well as to create a sustainable future with high performance. (Normet 2023c.)

Normet's goal is to solve global concerns of resource scarcity and climate change, while also enhancing the health and safety of employees and customers and maintain strong governance in its operations are deeply ingrained in Normet's values (Normet 2023d). This transcends to commitment to sustainability management, including compliance with internationally recognised sustainability reporting frameworks.

1.6 Key concepts

Circular Economy is a practice based on reusing, repairing and recycling current resources and products, thereby prolonging their life cycle (European Parliament 2023).

Corporate Sustainability Reporting Directive (CSRD) is an initiative by the European Union, in which the EU mandates all large and listed companies to provide reports informing their social and environmental risks, as well as about the actions that are taken to tackle them (European Commission 2023).

Environmental Management Systems (EMS) is a series of procedures and methods that help organizations to minimize their effects on the environment and enhance their operational effectiveness (EPA 2023a).

Environmental Management Accounting (EMA) is a holistic data integration system that handles information regarding environmental costs as well as other materials and energy flows (Tellus Institute s.a.).

ESG reporting is a disclosure on a company's sustainability, informing about the company's environmental, social and corporate governance operations (Peterdy 2023).

Scenario Analysis is a tool that companies can use to consider and evaluate effects of climate-related risks and opportunities in the future (TCFD 2017, 25).

Task Force on Climate-related Financial Disclosures (TCFD) is a reporting framework disclosing companies' climate-related risks and opportunities in the aspects of governance, strategy, risk management, as well as metrics and targets. (Deloitte 2022b).

2 The Fundamentals to TCFD Reporting

The era of sustainability awareness has brought light to a variety of new frameworks and initiatives that organizations are expected to integrate into their sustainability reports. Among these is the Task Force on Climate-related Financial Disclosures (TCFD), which focuses on disclosing the financial impacts arising from climate-related activities. To understand the significance of TCFD for the case company Normet and the mining industry, this chapter begins by exploring the underlying challenges and principles related to sustainability and climate change. With this bedrock in place, the thesis presents the TCFD framework by shedding light on aspects including climate-related risks and opportunities, the core elements of the framework, and scenario analysis. The chapter is concluded by tackling some existing challenges and discussing the importance on how these matters manifest for the mining sector and Normet. The theoretical framework remarks the completion of project task 1.

2.1 Exploring the Genesis of TCFD reporting

Given TCFD is a relatively new initiative, this section presents the evolution and importance of adopting these frameworks by diving into the roots of the topic. This involves discussing the role of Corporate Social Responsibility (CSR), sustainability reporting and environmental accounting.

2.1.1 CSR, Sustainability and ESG Reporting

Sustainability has become a relevant topic since the mid-1800s when the impacts of businesses daily activities started to show in the society. The burden on the society and the disputes over raw materials eventually developed a set of regulations in the 1950-60s, which is known as Corporate Social Responsibility (CSR). (Mosca et al. 2017, 18.) CSR refers to the responsibilities that organizations must take over their actions concerning the society and environment to satisfy the stakeholder's needs. It encompasses economic, legal, ethical, and strategic obligations. (Chandler 2017, 4-7.) Examples of these are human and animal rights, worker rights, anti-corruption measures, and environmental engagement (Blowfield et al. 2019, 24).

The concerns over the society and the environment culminated in 1980s when the United Nations made sustainability a global concept, describing it as addressing the current demands without sacrificing the possibility of future generations to address their own needs (UN 2023). The term considers three fundamental pillars: environmental, social, and economic sustainability. These pillars create the foundation for sustainability, which was later adopted by the UN as a basis for their 2030 Sustainable Development Agenda, which includes 17 sustainable development goals (SDG's).

SDG's aim to tackle societal issues, improve economic prosperity, and fight climate change. (Hansmann et al. 2012, 451; UN 2023.)

Turning to the environmental standpoint, Baldarelli et al. (2020) stated, "there will be no future for firms without a big commitment to respect for the environment". This quotation underscores the need for companies to assess and respond to new regulations, strategies, and risks, as well as adapt their accounting, and reporting practices to safeguard their reputation, investments, and future prospects. (Baldarelli et al. 2020, 1-6.)

According to Gokten (2020, 103-110) sustainability reporting was developed after the gradual recognition of the relation between the economy and nature emerging after incidents such as the Exxon Valdez oil spill in 1989. Several reports were published about climate events, justifying the need for improved disclosures as the impacts of environmental damage were not only affecting the environment itself, but also had financial backlashes for the stakeholders as they faced high and unanticipated costs. These reflections brought light to the emergence of ESG (Environmental, Social, and Governance) reports, which publicly discloses a company's performance regarding sustainability issues (Peterdy 2023).

The progress towards new environmental standards and reporting frameworks were initiated by multiple organizations, including the Global Reporting Initiative (GRI) (GRI 2023), the Sustainability Accounting Standards Board (SASB) and the International Integrated Reporting Council (IIRC). The SASB created industry-specific standards (SASB 2023), while the IIRC formulated principles for the Integrated Reporting Framework (IIRC 2020). These have since been integrated into the IFRS (International Financial Reporting Standards) Foundation's purview. This strategic move consolidated the IFRS Accounting Standards with Sustainability Disclosure Standards, promoting businesses to adopt the uniform reporting practices (IFRS Foundation 2022).

Environmental disclosures became even more crucial after the European Union introduced the Non-Financial Reporting Directive (NFRD) in 2014, requiring large public interest companies within EU to report their activities to comply with human rights, environmental laws, anti-corruption, diversity, and employee's treatment. (Boeykens et al. 2022.) Despite the challenge of still not having strict reporting rules, organizations such as the World Economic Forum, the International Business Council and the Big Four (Deloitte, PwC, KPMG and Ernst & Young) have facilitated the adoption of ESG reporting by actively developing measurements and standards to be used that align with the United Nation's 2030 Agenda and the sustainable development goals. (Deloitte 2022a, 1-2.)

2.1.2 The Importance of Environmental Accounting in Sustainability

For companies to enjoy the benefits of sustainability reporting and review their progress towards the desired objectives, companies cannot solely put their focus on improving their external reporting practices, but also on their internal managerial accounting systems (ACCA 2023). Therefore, embracing environmental accounting, environmental management accounting, and environmental accounting systems assumes a vital role in achieving sustainability reporting objectives.

Environmental accounting is a subfield of accounting (Hussain et al. 2016, 337) which originated due to stakeholder pressure for companies to disclose their environmental issues and rising costs from environmental factors (Schaltegger et al. 2000, 31). It concentrates on the organization's expenditure patterns, performance with regard to the environment, and the need to incorporate environmental impacts into regular accounting procedures. Therefore, it is a tool that helps the organization quantify the environmental consequences of their actions and company growth. (Baldarelli et al. 2020, 20.)

Environmental accounting is crucial for sustainability reporting as it serves various purposes, from internal managerial accounting to external voluntary reporting. (Hussain et al. 2016, 337-338.) The financial and non-financial viewpoint can also be applied in both of these contexts using either currency terms or physical values such as "tons of solid waste" (Baldarelli et al. 2020, 20). Essentially, environmental accounting helps organizations disclose their environmental goals and report quantified costs and impacts that occurred from their operations.

Environmental management accounting (EMA), is a holistic data integration system that handles information regarding environmental costs, material and energy flows (Tellus Institute s.a.). This is done by analyzing financial and non-financial data, and creating methods helping organizations determine their expenses associated with the environment. EMA integrates traditional accounting practices such as budgeting, evaluating investments, assessing costs, and establishing financial performance goals with considerations of environmental factors like costs of environmental lifecycles and savings from environmental programs. (ACCA 2023). Given its' ability to recognize the source of an environmental-related issue and find remedies that can result in financial gains, EMA benefits organizations by helping the management with improved decision-making (IFAC 2022).

To increase efficiency in performance and data processes, companies can also adopt environmental management systems (EMS) (NQA 2022). EMS is a framework that helps companies minimize their impacts on the environment while improving their performance. The improvement is achieved by engaging in practices that can evaluate and assess the organizations state for reaching their

environmental objectives and assist with their progress individually. EMS is not fixed to certain goals, but rather customizable for each company's own needs and goals. (EPA 2023a.)

EMS can help organizations comply with regulations by following a cycle, which initiates with the management adopting a regulation as a basis for the EMS. Subsequently, a plan is created for reaching policy-related goals, which is then implemented in the company's activities. The last steps of the cycle include evaluating and improving the action plan, and reviewing the EMS's usability with the management. (EPA 2023b.) ISO 14001, the world's most used EMS, serves as a prime example of a standard which can be set as a foundation for an EMS. It provides prerequisites to comply with environmental targets and policies. (NQA 2021.) Companies can get certified for using ISO 14001 by auditors, which further improves their trustworthiness and economic advantage over their competitors (ISO 2015, 4-6).

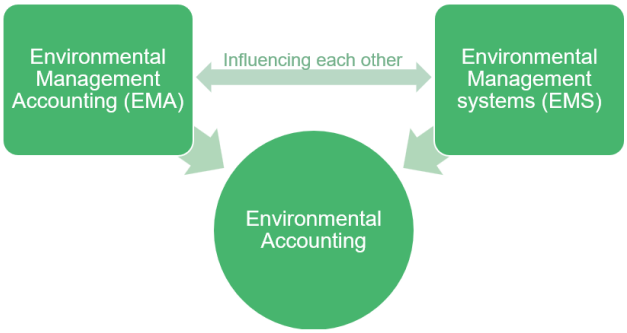

Figure 1. The relationship between environmental accounting, EMA and EMS

In conclusion, environmental accounting, EMA and EMS are interconnected as shown in Figure 1, and they can benefit companies in distinct ways. Environmental accounting serves as a foundation for identifying and quantifying environmental impacts, aiding both internal management and external reporting. EMA supports decision-making by supplying crucial environmental cost data, which in turn reinforces EMS. The EMS utilizes this data to assist the management adhere to policies, reach targets, and improve environmental practices. Consequently, EMA and EMS can mutually influence one another, and shape companies' overall environmental accounting practices, including external reporting. Adopting robust environmental accounting is vital for successfully implementing new sustainability frameworks and initiatives, such as TCFD.

2.2 The Development of Task Force on Climate-related Financial Disclosures (TCFD)

The world is experiencing an increasing number of weather-related instabilities due to GHG emissions and global warming. The unforeseen climate hazards are not only a safety concern for people but may also imply operational and economic risks to companies (Bloomberg Professional Services 2018). Because of this, investors may have a hard time making financial decisions without

having the risk of capital misallocation (FSB 2023b). This could occur more frequently if the companies are not prepared to fight against climate risks. Therefore, firms need to secure their trust with the investors by disclosing their strategy for tackling environmental challenges (Nisanci 2021, 3). Another risk for investors arise if companies have not disclosed information regarding their climate measures accurately, which may also lead to economic uncertainty (Ngo et al. 2022, 3707).

These risks were a call for clear reporting guidelines, which brought the Financial Stability Board (FSB) together by the G20 Finance Ministers and the Central Bank Governors to analyse climate-related challenges. This led for the FSB together with chairman Michael R. Bloomberg to announce in December 2015 the creation of Task Force on Climate-related Disclosures (TCFD 2017, 1-2.)

TCFD is a framework which brings awareness and provides information regarding possible climate-related risks and opportunities to companies and investors. The goal of the disclosure is to incorporate this information seamlessly into the companies' strategies and risk management, while offering transparent data for the investors regarding the financial impact of shifting towards an economy with minimized carbon emissions (Figure 2). Eventually, this will help both parties in their decision-making and financial management. (FSB 2023a.) The TCFD report was first published in 2017 and has ever since gotten the support and visibility from the central banks, governments, regulators, financial agencies, and businesses in different industries. (FSB 2020.)

Figure 2. The main factors of the TCFD framework

As the wish was to align the TCFD framework with domestic standards and global goals (US Department of the Treasury 2021), the IFRS Foundation came to agreement that the Climate Disclosure Standards Board (CDSB), the Value Reporting Foundation (VFR) and the newly established International Sustainability Standards Board (ISSB) will cooperate to develop an extensive, consolidated framework for disclosing necessary information for all affected parties (IFRS 2021). The ISSB released two exposure drafts in 2022, aiming to provide a comparable collection of requirements for climate-related risks and opportunities that facilitate businesses to evaluate their financial position, performance, strategy, business model and future cash flows (IFRS 2022, 5). However, the complete standardization of data has not yet been achieved, which still poses challenges to companies (TCFD 2023, 97, 103).

The latest significant update regarding standardization is from April 2022, when the EFRAG (European Financial Reporting Advisory Group) published the Exposure Draft for the European

Sustainable Reporting Standards. The draft's objective is to provide standards, requirements, and guidance on reporting sustainability matters that align with TCFD recommendations in order to comply with the Corporate Sustainability Reporting Directive (CSRD) (EFRAG 2022, 5). This directive is initiated by the European Union, in which the EU mandates publicly listed and large companies to provide reports informing about their social and environmental risks, as well as about the actions that are taken to tackle them (European Commission 2023). Today, TCFD is supported in over 100 countries by over 4000 organizations (FSB 2023c).

To respond to the increasing need for standardized climate-related data, the Task Force provided categorized risks and opportunities, as well as a set of recommendations for different business aspects to facilitate consistent and comparable reporting practices (TCFD 2017, 5). These are discussed in the following chapters.

2.3 The Risks and Opportunities Related to Climate Change

The Task Force developed a set of climate-related risks and opportunities that support both the companies' and the stakeholders' ability to detect possible challenges and improve financial stability. The risks belong into two groups: (1) the risks associated with the transition towards an economy with reduced carbon emissions and (2) the risks connected with the physical effects of climate change. (TCFD 2017, 5).

The transition risks include:

- **Policy and legal risk:** possible changes in climate regulations could either hinder the negative effects of climate change or encourage adaptation to it. Examples involve establishing carbon price systems to cut emissions or switching sources of energy. These imply certain level of monetary risk depending on the character and timeline of the change. Legal risk in contrast arises from climate-related lawsuits which may emerge if the effects of climate change haven't been managed and disclosed properly, and if the financial risks causes a person or entity to lose money.
- **Technology risk:** adopting new technologies that support the transition towards an economy with reduced carbon emissions may create financial losses. This is due to possible disruptions in demand, expenses of production and distribution, and overall competitiveness.
- **Market risk:** the raising awareness of the hazards caused by climate change are changing the supply and demand of products and services. Consumers' changing interests for more environmentally friendly products may lead to instability in the markets.
- **Reputation risk:** customers' and communities' attitudes are shifting regarding climate change. This may lead to changes in organizations reputation depending on their level of

involvement to reduce their carbon emissions. Negative perceptions increase when there is less commitment to new climate targets.
(TCFD 2017, 5-7.)

In contrast, the physical risks are divided into two sub-categories:

- **Acute physical risks:** caused by unexpected and harsh events. Climate change has aggravated the occurrence of severe weather conditions, such as floods and hurricanes, which are examples of acute, short-term physical risk.
- **Chronic risks:** resulted by long-term shifts in temperatures, overall weather, and environment. Example consequences are raised sea levels and continuous heat waves.
(TCFD 2017, 6; Colas 2019, 4.)

Regarding climate-related opportunities, The Task Force reveals five possible sources that could raise benefits if organizations adopt the TCFD recommendations:

- **Resource efficiency:** businesses could cut costs by enhancing operational productivity in areas including manufacturing, facility management, machinery, and transportation. Businesses can support their trajectory towards cutting emissions and using advanced technological developments such as new circular economy methodologies, effective heating systems and more.
- **Energy sources:** shifting to renewable and low-emission energy sources. This transition to generate for instance solar, hydro, and wind energy may lead to declined yearly energy costs and improved energy storage.
- **Products and services:** inventing and developing new, innovative goods that have a minimized carbon footprint may boost companies' competitiveness. The same benefit can be achieved also due to the shifted consumer preferences, which may be more environmentally aware and thus find more interest in products and services that have been marketed as environmentally friendlier.
- **Markets:** diversifying operations and cooperating with other organizations may create opportunities in new markets and assets that are meant for a low-carbon economy. Funding green bonds and facilities could also potentially seize new opportunities.
- **Resilience:** having the capability to handle transitional and physical risks and build resilience for climate change may open possibilities such as boosting efficiency and creating new products and manufacturing methods. Especially the firms relying on natural resources, infrastructure, long-lasting fixed assets and investments, as well as complex supply chains may find these particularly important.
(TCFD 2017, 6-7.)

Acknowledging these risks and opportunities and reporting them does not benefit only the company itself, but also other entities who consider making financial decisions regarding the company. In fact, being open about the risks and opportunities is crucial, as they also have the possibility of implying financial effects on the company. (TCFD 2017, 8.) These effects are presented in chapter 2.3.1.

According to Nelson (2019), there is no single method for identifying climate risks and opportunities for all organizations. Instead, companies must customize assessments for their own situation and value chain. Additionally, they could benefit from using facilitating questions to identify physical and transition vulnerabilities. These questions are illustrated below (Figure 3).

Figure 3. Facilitating questions for identifying physical and transition risks.

To conduct an in-depth analysis on the causes and effects of the risks, as well as on the management and monitoring strategies, companies must gauge the size and velocity of the risk, their time period, and the level of impact on the company. (PWC New Zealand 2022.) This multifaceted risk analysis can be done in a qualitative or quantitative manner, which creates room for flexibility (TCFD 2021, 63). However, it is fundamental to disclose the financial impacts arising from the risk and opportunities. While this may be challenging, The TCFD (2021, 65) discloses and suggests the following:

> "Due to the complexity of estimating financial impacts, preparers interviewed reported often using a combination of internal performance data, forecasts, organization-specific climate scenarios, and external data in their analysis. In addition, preparers can also depend on disclosures from organizations in their supply chains or portfolios as inputs to their financial impact analysis."

In essence, The Task Force does not offer a one-size-fits-all method for identifying climate-related risks and opportunities. Nevertheless, businesses may use their own internal data in conjunction with external resources and tools provided by third parties to create suitable approaches that are appropriate for their unique needs and conditions.

2.3.1 The Effects of Climate-Related Risks and Opportunities on Financial Statements

The degree of financial repercussions arising from climate-related risks and opportunities displays considerable variability between business units, industries, regions, and individual entities. The decision-making of both the company and the stakeholders have a significant focus on the estimates for future economic gains or losses of the firm. Therefore, it is pivotal to comprehend the effects of climate change, the company's approach on managing climate risks, and the results of the company's actions. These can alter companies' income statements, balance sheets and cash flows (Figure 4). (TCFD 2017, 8.)

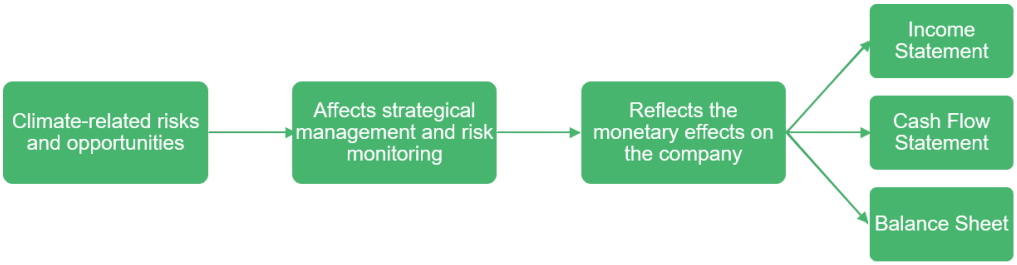

Figure 4. The reflection of climate-related risks and opportunities on financial statements

The state of companies' financial performance depends on how their revenues and expenditures are influenced by transition-, and physical risks, as well as possible climate-related opportunities. Revenues may raise or decrease due to physical and transition risks as they may alter the demand for products and services, thus firms must manage their offerings accordingly. Expenditures on the other hand are tied to firms' cost structure and ability to upkeep resilience in case of climate hazards and opportunities. Companies are more likely to get funding if they transparently report their expenditure plans and adaptability to climate change. (TCFD 2017, 8-9.)

Companies' financial position is also vulnerable to factors raising from climate change. In fact, assets, especially long-lasting assets and liabilities, may face alterations due to legal, technology and market risks that could shift the supply and demand. Companies may consequently decrease the residual value or write off assets which do not support the firms' environmental goals (PWC UK 2023). Firms must actively prepare for impairments and new funding. Climate risks and opportunities may also cause raises in debt due to climate-related losses or investments in R&D, which could shift the debt-to-equity ratio. Moreover, losses from operations or asset write-downs may result in modifications to capital and reserves. Both factors could potentially pose the risk of inability to request for more borrowings. (TCFD 2017, 9.)

The monetary effects on companies should be assessed by using past information and future trends. The assessment should be incorporated into companies' strategical management and risk

monitoring practices (TCFD 2017, 9). To facilitate the process, it is recommended to use scenario analysis, which will be covered in chapter 2.5 of the thesis.

2.4 The TCFD Recommendations and Core Elements

As the goal of TCFD is for companies to transparently share their exposure and resilience regarding climate change to their stakeholders, it's crucial to enhance the climate-related disclosures in terms of accuracy and clarity (Deloitte 2022b). Therefore, the TCFD built a set of structured guidelines that include recommendations for the implementation process, for general TCFD reporting across sectors, as well as for industry specific TCFD reporting (TCFD 2017, 13). These are illustrated in Figure 5.

Figure 5. The Structure of TCFD Recommendations

As for the recommendations for implementation, The Task Force suggests companies to disclose their determination and scope for adopting the framework, as well as locating the disclosures in the company's public filings, such as in Annual Reports. The adoption of TCFD should align with the national disclosure needs, and in case of a clash between the requirements, the TCFD reporting is only then recommended to be disclosed as a separate document. (TCFD 2017, 17.) However, the new CSRD directive states that all large companies and listed SMEs are accountable for documenting their actions to tackle sustainability issues in their public reports. Consequently, it will also become mandatory for TCFD to be disclosed in public Annual Reports from 2024 onwards. (European Commission 2023; European Union 2022, 18.)

The recommendations for all sectors are divided into categories of governance, strategy, risk management and metrics and targets. These are the four core elements that the framework builds upon. To further facilitate the consistent reporting of climate-related matters, the Task Force developed 11 recommendations for the four core elements, which can be found in Figure 6. The recommendations can be widely adopted by different types of organizations worldwide, both by financial and non-financial companies, and the clarity of what needs to be assessed regarding each topic benefits both the preparers of the report and the investors. Furthermore, apart from the general

recommendations for all sector, companies are also suggested to follow additional, industry-specific guidelines for a more tailored and detailed disclosure. (TCFD 2017, 13-14.) For instance, mining companies fall into the category of “materials and buildings” according to TCFD. Overall, these recommendations are planned to provide useful and forward-looking information for decision making on financial effects, and emphasize the potential opportunities and challenges associated with moving towards a sustainable economy (Baker & McKenzie 2017, 28).

Governance	Strategy	Risk Management	Metrics and Targets
a) Describe how the management oversees the climate-related risks and opportunities b) Describe the function of the management in evaluating and monitoring the climate-related risks and opportunities	a) Describe the firm’s assessment of rhe short-, medium-, and long-term climate risks and opportunities b) Describe how the organization’s operations, strategy and financial planning are affected by climate risks and opportunities c) Describe the firm’s strategy resilience while considering various climate-related scenarios, for instance 2°C or lower scenario	a) Describe the procedures the firm uses to detect and evaluate climate-related risks b) Describe the procedures the firm uses to manage the climate risks c) Describe how the firm recognizes, evaluates and manages climate risks and how it incorporates them into the firms entire risk management	a) Disclose the metrics that the firm uses to evaluate climate risks and opportunities in accordance with its strategy and risk management procedure b) Disclose Scope 1, Scope 2 and if relevant, Scope 3 GHG emissions, and the associated risks c) Describe the targets the firm uses to monitor climate risks and opportunities, and their performance against them

Figure 6. The 11 TCFD recommendations for the four core elements (adapted from Task Force)

The recommendations for all sectors starts with governance, which aims to provide information about how a company’s board of directors and management perform when they identify and address climate-related concerns, as well as how they monitor the progress towards the desired target. This information is followed by disclosures on how climate-related responsibilities have been shared among the management and overall organization, how the organization communicates about climate concerns to the management, and how the management keeps track of the climate issues. (TCFD 2022a, 12-14.)

The next topic companies get guidance for is strategy. Companies are recommended to report about their short-, medium-, and long-term objectives and climate concerns during each period of time and describe the process of identifying them. If possible, the climate-related risks and opportunities should also be determined for each sector or geographical area. Additionally, companies should take into account how these risks will affect their operations, strategy, financial planning and financial position over time. Recognizing the financial implications such as increased costs occurred from impairment of assets (physical risk) or higher revenues from increased sales for low-carbon equipment is vital in order to explain the changes in the company’s financial statements to the investors. Furthermore, to reflect credibility about the company’s sustainability targets, firms

are also encouraged to report their procedures for moving towards a reduced-carbon economy. The last point stakeholders could expect is describing the strategy's resilience in relation to the risks and opportunities arising from climate change, which could also be discussed through climate related scenarios (explained in chapter 2.5). Additional guidance for non-financial group also emphasizes disclosures related to materiality, for instance disclosing the impacts of risks and opportunities on R&D, assets, and capital planning. (TCFD 2022b, 12, 16, 23, 43.)

Recommendations for strategy are followed by guidance for risk management. The Task Force suggests companies to report about their process for recognizing and evaluating climate-related risks, the scope of them and whether they are following any related regulations, such as GHG Protocol emission limits. Similarly, as in the governance section, the report should disclose the responsibility areas and who oversees assessing the risks. Additionally, the risk management process should describe which risks are prioritized and how do they consider materiality. Companies are expected to recognize and manage challenges in transition risks, physical risks, resource efficiency, as well as opportunities regarding energy source, products and services, markets, and resilience. The last recommendation calls for description of how companies have seamlessly integrated the TCFD risk assessment into the firm's holistic risk management, as these two are not supposed to be handled separately. (TCFD 2022c, 12, 15, 17.)

The last main topic for TCFD recommendations is metrics and targets. Companies are advised to use climate-related metrics and targets to manage TCFD-related risks. The most important targets involve GHG Protocol calculations, including Scope 1, 2 and 3, as well as metrics related to energy, water, land use and waste management. Firms may also encourage performance and track development with remuneration policies if the climate concerns are material. Additional metrics that could be disclosed are internal carbon prices, energy, water, land, and other indicators that assist with scenario analysis, as well as with strategy-, and risk management development. To improve decision-making and openness, the data about targets should also display historical periods, estimated trends for the future, as well as the procedure for calculating these metrics. The data should also determine the time period of the objective, the starting year, the key performance indicators which help evaluating the performance of the metric, as well as whether it's intensity or absolute based. The results can be analysed and compared between different categories such as business segments. (TCFD 2022d, 12, 15, 17, 53.)

2.5 Scenario Analysis

As the effects of climate-related hazards are rather impacting companies on a medium to long term, it's important for organizations to prepare for the evolving and materializing risks and opportunities arising in the future. In response to this, the Task Force introduced scenario analysis, as it

is a valuable tool which helps companies to evaluate their performance in future consequences of climate change (TCFD 2017, 25), and make better, forward-looking decisions. By using this tool, companies can improve their strategy and resilience, which refers to maintaining operational and financial stability and recovering from any interruptions caused by climate events. (CDP 2023, 6-8; Huiskamp et al. 2022, 1764-1565.)

Adopting scenario analysis makes companies compelled to look beyond the box for unusual business circumstances, which also expands innovative thinking and new strategies. It may help firms identify key signs of changes in the external environment, enabling swift modifications to strategy and economic plans. Lastly, it facilitates the comparison investors can make of the risks and opportunities between different entities and understand how these firms address their vulnerabilities. (CDP 2023, 8; TCFD 2017, 26.)

Huiskamp (2022, 1764-1565) emphasizes that for building resilience, companies must consider stability and change. Companies seek stability by improving their operational resilience in different climate conditions, for example by reducing recovery time. Simultaneously, companies should plan for changes in their operations and value chain to reach their environmental targets, as well as avoid losses caused by climate risks. Eventually, maintaining resilience in stability and change will increase effectiveness, helping firms answer “what-if” and “how-to” questions in scenario analysis.

Among the potential scenarios that companies may adopt, the most recommended one is the 2°C scenario, which requires companies to build a strategy which keeps the rise of temperatures between 1,5 and 2 degrees aligning with the Paris Agreement target. The Task Force (2017) suggests adopting a mix of qualitative and quantitative methods for the analysis and cover two to three different scenarios for an extensive view. These can either be adopted from third party companies or created by the company itself. Notably, the analysis should determine the scope of the analysis, including the types of risks analysed, the business segments impacted (Huiskamp 2022, 1765), as well as the time frames considered. The outcome is expected to be transparent, comparable, and reliable, as well as validated and consistent over years with new insights and conversations (TCFD 2017, 28).

From the financial point of view, it is imperative for organizations to discuss whether the firm overall or the specific regions and marketplaces could face more noticeable consequences from climate change. For instance, scenario analysis could indicate the assets or geographical areas with the highest level of vulnerability to certain risks and opportunities resulting from natural disasters or decarbonization objectives (CDP 2023, 16; Delevingne 2020, 10-11).

Adopting climate-related scenario analysis has yet various challenges that organizations need to tackle. These include:

- Lack of transparency, data range and practical tools for individual businesses to apply as the scenarios were originally designed with global policy issues in mind
- Difficulty of obtaining sufficient and accurate data for evaluating energy, technological routes, and carbon limits
- Novelty of scenario analysis in business application as most companies are only at the early stages of studying and adopting scenario analyses
- Challenge of translating the scenarios into quantifiable, monetary terms
- Uncertainty in the process of how scenario analysis may affect the organizations' future performance.
  (Huiskamp et al 2022, 1771; Nelson 2019; MarshMcLennan 2018, 9; TCFD 2017, 30.)

To mitigate these issues, organizations should collaborate with each other to foster the development of new methods for executing the analysis (TCFD 2021, 64). To avoid disagreements with the investors or regulators, it is safer to use accepted and more commonly utilized scenarios (TCFD 2017, 32). Additional suggestions for a successful implementation include having the continuous support of the company's board and financial experts, cooperating during the adoption and evaluation process, and defining the purpose and future outcomes of conducting the scenario analysis (TCFD 2017, 30; MarshMcLennan 2018, 6). Moreover, organizations are encouraged to gather at least one external stakeholder party to be part of the assessment process to eliminate bias and widen the perspectives for scenario analysis (Huiskamp et al. 2022, 1770).

2.6 Overcoming the Challenges of Adopting the TCFD Framework

As the TCFD framework is relatively new, most companies are at the beginning stage of the adoption process for disclosing their approach on climate related risks and opportunities. The lack of expertise together with uncertainty regarding the reporting guidelines has led to inconsistent reporting practices. Due to the absence of the aforementioned factors and the voluntary nature of the framework, companies reported flexibly regards to the recommendations that they considered to be useful. This created varieties between disclosures, which made them incomparable. Therefore, to increase the relevancy, preciseness and comparability of companies' disclosures, regulators should make stricter and clearer guidelines while encouraging the usage of the framework even more widely, ideally making it mandatory. Furthermore, incomplete disclosures could be detected by investigating and comparing corporations actual investing activities with the activities revealed in their reports. (Ngo et al. 2022, 3713-3715.)

Another major challenge emerging from the absence of standardization is the lack of available and consistent data (FSB 2021,4; TCFD 2023, 32). Incomplete disclosures and standards make it difficult for both the firms and investors to accurately assess the financial implications of macroeconomic scenarios and the risk exposure to physical vulnerabilities. (Khan 2023; Pinchot et al. 2019; Marsh & McLennan 2018, 10.) What also adds to this challenge is that firms may underestimate risks or report unreliable data due to lack of expertise and flawed data systems. To tackle these issues, firms are encouraged to take part in educational courses and follow guidance reports provided by accounting organizations like IFRS or Climate Standards Board. (TCFD 2023, 56-59.)

The difficulty occurred from the dearth of data has emerged the obstacle for quantifying the climate-related risks and opportunities. The limited research and comparability of the financial impacts between different companies have hindered the ability to create clear methods for evaluating the economic side of the framework. However, a possible solution for calculating the monetary effects is to use asset data for the analysis. As the type and placement of an asset can determine the level of exposure it has to damage, it is essential to study how various assets react to the same climate risks. The annual losses, owner's expenditures, and revenue reduction can be determined by comparing the decrease in asset value caused by forthcoming significant climate-related hazards. This also aids the organizations to detect the assets that are the riskiest in case of environmental hazards. (McMahon 2022.)

Another method is to use the discounted cash flow model (DCF). With this model, transition-, and physical risk scenarios will be turned into financial effects by estimating the change in profits, expenditures, prices, and volumes. Subsequently, the estimates are turned into cash flows, which are eventually discounted into their current value. The future cash flows are calculated by adding the time period, and the weighted average cost of capital as the discount rate in the formula. The result is the following formula:

$$DCF = CF/(1-WACC)^t$$

Lastly, the discounted cash flows are summed up for the number of years that the DCF was made for, and the sum reflects the net present value of the calculation taking into account transition risks due to climate hazards. This can be calculated for each subsidiary and summing them together will give the result for the whole entity. The model is flexible enough for incorporating any additional risks, such as physical risks, in a “plug and play” fashion, where the arbiter does not need to do any significant changes to the model. (Kästner 2020, 23-25.)

Regarding governance, a vital challenge lies in the companies’ boards’ insufficient practices to turn their climate-related discussions and plans into actions. Researches have brought to light that

while companies may disclose their climate risks, the board members are still not incentivized to manage and tackle these risks. The lack of commitment from the top management reflects to the lower levels of the organization, leading to a gap of awareness between the risks and the mitigation methods, for instance for integrating climate-related metrics. These metrics are crucial in order to truly manage the issues. To tackle this challenge, companies need a strong and determined leadership team that monitors the company's progress regarding their climate risks for instance by linking incentives and bonuses to their objectives. (MarshMcLennan 2018, 6.)

The risk management section possesses a couple challenges that organizations have tackled with. The first difficulty arises due to the intricate nature of climate risks, as there are numerous types of hazards which could be constantly changing and long-lasting. The traditional methods of managing risks are different in nature as they tackle less-complex issues and focus on shorter time horizons, challenging the process of quantifying and assessing climate vulnerabilities in the regular risk management. (MarshMcLennan 2018, 7-8; Nelson 2019.) To overcome this challenge, organizations must adopt scenario analysis (Nelson 2019) and fully comprehend the magnitude of different risks and how are they interconnected. To connect the regular risks with the climate-related risks, the sustainability team should be included in cross-functional management and leadership for cooperation and broader understanding of both sectors. (MarshMcLennan 2018, 8.)

In contrast, the second risk management challenge lies in the overlapping of information for climate and regular risk management. The Task Force emphasizes that as long as the general risk management discussion evidently clarifies that the same process is also applied to their climate-related risks, companies do not need to create a separate climate risk-management disclosure. In fact, the reports should include a seamless discussion between the general and climate-related risk management, and how they are affecting one another. (TCFD 2022c, 18.)

Lastly, companies have raised questions about their data security. According to the Task Force (2022b, 30), companies implementing the TCFD framework reported that disclosing their scenario analysis made them face the challenge of revealing confidential information regarding their strategy and business. To address this, the Task force recommended companies to assess the sensitivity of disclosing certain information from two aspects: competitive advantage and financial loss. If the information can be beneficial to competitors and threaten the company's financial situation, the company can opt to a steplike reporting method. This means that companies may begin by sharing qualitative and general data before eventually mobbing to more precise and quantitative facts over time.

2.7 Sustainability within the Mining Industry

To understand Normet's entry into TCFD reporting, it is essential to study the mining industry, which is one of the most challenging sectors to comply with the expectations regarding environmental sustainability. This is not only because mining involves extracting non-renewable resources that may harm the environment (Han Onn et al. 2014, 4), but also because of the complex and risky nature of the business.

According to Nurmi (2017, 3), the worlds ore reserves have already been extensively explored, thus miners are required to investigate more remote areas and deeper mines, which could lead to economic and environmental complications. Ekolle-Essoh et al. (2022) argues this statement by highlighting that it is difficult to determine the geographical distribution of mineral resources. The concentration and quality of the minerals may be underestimated due to inaccurate estimation methods and sample sizes. However, what is undisputable, is that the demanding circumstances may force companies to invest in improved technologies, the investment may still carry a high risk if the desired outcomes are not achieved due to the lack of resources available (Nurmi 2017, 3).

A concurrent concern is competition, as miners are battling over the use of land which may already be challenging due to regulatory restrictions on mining activities. The usage of energy and water, which are particularly scarce in some areas, is also subject to competition. In fact, up to 50 percent of mining operation is situated in locations where water-stress and chances for drought are already high and rapidly increasing in the next decades. This is a problem for miners as extreme weather conditions can cause disruptions. (Nurmi 2017, 2-3; Delevingne et al. 2020, 2-3.)

The mining industry poses many risks that may result in the companies' poorer performance, and people's perceptions of mining businesses being a polluting and dangerous industry may lead to a negative reputation. However, mining is still a vital industry as it has created many jobs. It has been the main driver of infrastructural development, and it's additionally the only way to reach the minerals that uphold our desired standard of living. (Han Onn et al. 2014, 4; Nurmi 2017, 2-3.)

While green and sustainable mining are desired concepts (Nurmi 2017, 3), it is still a contradicting topic as the long-term negative impacts can surpass the short-term advantages of sustainable actions (Boerchers et al. 2018). However, instead of quitting the mining completely or disregarding the sustainable efforts, mining companies are encouraged to shift to renewable energy sources (Delevingne et al. 2020, 9), reduce their waste and focus into recycling and circular economy, which would eventually lead to improved resource efficiency (AFRY 2023b). Additionally, managing waste could have an unintended outcome, as mine waste can also be used as raw material (AFRY 2023a).

Miners should consider the type of machinery they are employing if they wish to minimize their carbon footprint. As the pollutants emitted by diesel equipment contributes to the raising temperatures, a more sustainable alternative would be for miners to invest in electric vehicles that release a reduced amount of heat, as well as toxic- and greenhouse gases. Additionally, electric vehicles may enable miners to cut expenses as these vehicles have an improved energy efficiency. Nonetheless, the sustainability of these vehicles depends on the way the electrical energy is produced; whether it comes from renewable sources or from coal-fired power plants, the level of GHG emissions emitted will differ dramatically. (Paraszczak et al. 2014, 81-86.)

In addition, in order for companies in the mining sector to pursue lower carbon emissions, the firm's whole value chain, especially the downstream industries, need to cooperate to minimize the CO2 emissions. Likewise, the other stakeholders such as investors, lawmakers and customers should insist on miner's environmental targets. Miners may also consider harsher strategies and targets to improve their reputation on a long term. (Delevingne et al. 2020, 8-11). However, stakeholders may not directly correlate carbon-intense companies' climate disclosures with improved performance. According to a research by Ding et al. (2022, 5, 23), the more companies voluntarily reported their climate-related data, the poorer their performance was to mitigate their emissions, which may reflect the attempt of greenwashing.

Using scenario analysis may be crucial for miners to respond to unforeseen events, as they possess physical assets which may get damaged due to different climate hazards, especially in the rural areas with possible uncertainties in the infrastructure (Delevingne et al. 2020, 2-5.) TCFD analysis may thus aid in avoiding for instance disruptions in operations or the supply chain, which could result in increased costs (Kanike 2023, 1-2).

To sum up, while the mining sector plays an important role in extracting resources and building the infrastructure that our society desires, it poses serious challenges regarding sustainability. In order to minimize the environmental harm, miners must put special attention to decarbonizing their equipment and operations in the whole value chain.

3 Project Management Methods

This chapter delves into the methods for collecting and analysing data for the project tasks 2, 3 and 4. The chosen approach and resources are vital to achieve the objective of gaining insights into the practical side of adopting the TCFD framework. This information further guides the author to create the handbook for the case company Normet.

3.1 Desktop Study

A fundamental aspect of the project revolves around gaining clear understanding of Normet's current operations and sustainability reporting practices, as this knowledge is essential for building potential future recommendations. This knowledge can be gained through qualitative study, as it would answer the question of "how" a firm can comply with TCFD for instance (Tenny et al. 2022). Therefore, the author embarks on a thorough desktop study, scrutinizing existing documents to assess Normet's readiness to embrace the TCFD framework. Furthermore, the similar desktop study extends its purview to encompass an external analysis, focusing on how other companies have engaged in disclosing TCFD-related information. This qualitative review will provide insights into the various interpretations and strategies used by these companies to execute the TCFD framework.

In essence, the desktop research has a dual purpose: first, it gathers information on how Normet could improve its present sustainability disclosures to align with the TCFD recommendations, and second, it acquires different strategies to report and present that information in practice. These two aspects complete the project tasks 2 and 3 serving as foundations for creating the handbook.

3.2 Benchmarking

In connection with the external analysis, the author conducted a benchmarking analysis involving three companies. Notably, the selected enterprises are not all directly Normet's competitors. The primary goal was to compare different types of companies, each with distinct approaches to TCFD reporting to learn about the various possibilities for adopting the framework and the effects each method may have on clarity. While the external analysis could have also been done with interviews, this method is beneficial as it highlights differences which may offer new perspectives for improvement (Nugroho B. 2021). Given this thesis focuses mainly on the Finnish context, most of the case companies are also Finnish, except for one foreign entity to provide an international perspective. These firms share a couple things in common: they are well-known players domestically or internationally, and they are acknowledged for their commitment and quality regarding sustainability reporting. This supports the validity of following and learning from praised disclosures. The outcomes are presented in chapter 5, completing the project task 3.

The first firm, Stora Enso, is a Finnish-Swedish enterprise specializing in biomaterials, wooden construction, and renewable packaging products. The company employs around 21 000 people worldwide, and had a turnover of 11,7 billion euros in 2022. The company has been awarded for having the best sustainability report in Finland in 2021, and therefore is an exemplary company to consider for TCFD reporting as well. (Stora Enso 2022, 4, 12, 54.)

The second one, Metso, previously known as Metso Outotec, is a Finnish technology company (Metso 2023b) with over 16 000 employees globally, and a turnover of 5,3 billion euros in 2022. Metso offers a variety of solutions and services to different industries, offering equipment, spare parts, and digitalization tools for improving operations and profitability. Given Metso's strong focus on sustainability and its presence in the mining sector, it serves as a persuasive case company for this analysis. Their goals include coming up with new sustainable innovations and to be carbon-free by 2030. (Metso 2023a.)

The last company, Mitsubishi Corporation, is a well-known global enterprise founded originally in Japan. The company has 1700 group entities operating within 10 diverse industries, including natural gas, materials, chemicals, mineral resources, automotive and mobility, and more. (Mitsubishi Corporation 2023.) Many of their business units have been awarded for their sustainability efforts, including for their innovative commitment to sustainability (Newsfile Corp. 2023) and for overall being environmentally sustainable company (Mitsubishi Materials Corporation 2023). In essence, the firm could be considered as an example due to their experience, diversity, and ESG commitment.

Comparing these firms offers a holistic view on TCFD reporting strategies, while it may also highlight common reporting patterns, focus areas, or uncertainties. The learning points gained through this analysis will support the author in creating recommendations for Normet in chapter 6.

3.3 Interviews

The final project management method involves interviewing both internal representatives from Normet, as well as external professionals specializing in the area of sustainability. This is because interviews can provide more in-depth data that may uncover unforeseen and personalized aspects, while in contrast, surveys could have posed more limitations to answers (Jain 2021).

The interview for Normet aimed to uncover insights into the company's current practices and ongoing projects which may be related to TCFD but have not been publicly disclosed. The author engaged with two key teams: the sustainability and finance teams. The interviewees are addressed in the following chapters as Company Representative X and Company Representative Y. The questions pertaining to sustainability reporting were formulated based on TCFD recommendations, and they were addressed via email during May by the Company Representative X from the

sustainability team. In contrast, the inquiries for the second portion of the interview focused on the finance department and their alignment with the sustainability efforts and TCFD. These were discussed through an online Teams meeting at the end of April with a representative from Normet's finance team, addressed as Company Representative Y.

Normet's interview questions are exhibited in Appendix 3. The interview outcomes provided a deep perspective of Normet's existing strategies and initiatives relevant to TCFD, as well as pointed out the pivotal areas that will become the focus areas in the near future. This interview is a significant component for Normet's internal analysis conducted in chapter 4, supporting the project task 2.

The second and third interview were directed to sustainability consultants. The goal of the discussions was to gain personal views of the TCFD framework, as well as gather advice on how a new adopter could approach TCFD assessment successfully. This information supports the creation of a TCFD adoption roadmap.

The first interview was conducted with Leonard Breukers. Breukers is a PhD researcher currently working as a sustainability consultant at Azets, which is an advisory, compliance and outsourcing company. Breukers is also a board member of Nordic Sustainability Reporting Standard, and chairman of the sustainability reporting expert group at the Finnish Accounting Association. The author had attended a career fair, in which she was forwarded the contact details to request an interview with Breukers. The interview was planned via email, and eventually conducted through an online Teams meeting in June.

The second interview was carried out with Laura Savikoski. Savikoski is a manager at AFRY, focusing especially on consulting TCFD, taxonomy and corporate sustainability related topics. AFRY is a global engineering, design, and advisory company that puts great emphasis on decarbonization, circularity, electrification, and digitalization. The company's sustainability services and efforts have been validated by various organizations, including CDP and Science Based Targets. (Savikoski 15 August 2023.) The author learned about the company during the process of researching external companies, and approached Savikoski via email. The interview was conducted in two parts due to a limitation in time, first part via online Teams meeting in August, as well as the second part via email in October. The interview was afterwards translated from Finnish to English.

The interview questions for Breukers and Savikoski are exhibited in Appendix 4. and 5. For the second interview, there was a slight change in the questions due to the limited time, which made the author modify certain questions, while keeping the interviews still comparable. The outcomes of the interviews are discussed in chapter 6, therefore supporting the completion of the project task 4.

4 Assessment of the Case Company's Disclosures

In this chapter, Normet's existing sustainability information disclosure framework is compared to that of TCFD by utilizing a Strengths, Weaknesses, Opportunities and Threats assessment method. In assistance, a detailed list of topics in alignment with the TCFD framework was created (Appendix 1). It considers all categories discussed in the TCFD framework, including governance, strategy, risk management, and metrics and targets. The outcome highlights Normet's advantages for their readiness to adopt TCFD, while identifying the areas for further assessment. This would ultimately broaden Normet's current disclosure framework towards TCFD if deemed applicable. This chapter concludes the internal analysis and project task 2.

4.1 Strengths

Starting the assessment with Normet's strengths, the company engages, and collaborates closely in mutually advantageous partnerships with its stakeholders. This approach resonates with Freeman's stakeholder theory (1984), advocating that a company should consider not only the expectations and requirements of its shareholders, but also any other stakeholders who are impacted by, contribute to, or derive value to the company (Stakeholder Theory 2018). Regarded as a group with direct and indirect relevance, stakeholders are a valuable resource with possible vital impact also on the organizations' climate-related performance (Ding et al. 2022). Normet has transparently disclosed its identified key stakeholders and their expectations in their Annual Report (2022, 19). Based on the stakeholder assessment, Normet shows commitment to fulfilling these expectations, nurturing mutual collaboration, and driving R&D efforts for access to new technologies while enhancing client services and leveraging industry knowledge.

The alignment with TCFD is further evidenced by Normet's governance. With clear sustainability management, Normet's Board of Directors and Leadership Team are evolving the sustainability agenda. The Board of Directors routinely assesses progress of sustainability practices, and the company's President and CEO are in charge of ensuring that sustainability is part of the firm's strategy and risk management. Business lines and sales areas are accountable for their respective goals ensuring integration of sustainability practices throughout Annual Report. Additionally, workshops and trainings ensure that climate-related information is monitored, communicated, and adhered across the business on the more grass-root level. (Normet 2022, 17, 19.)

In 2021, Normet carried out a materiality analysis which defined the most important subjects through evaluating stakeholder expectations, industry-wide targets, and compliance prerequisites. The Board and Leadership team verified the study, which enhanced credibility. (Normet 2022, 17.) With the continuous reviewing of new events, Normet assures openness and responsiveness in

line with TCFD principles. Materiality analysis is fundamental for TCFD as it is incorporated into all aspects of TCFD. It provides Normet with invaluable data about the climate effects on the firm.

Regarding metrics and targets, Normet's Scope 1 and 2 GHG emissions have been reported for the first time in its 2022 Annual Report. Additionally, relevant metrics such as energy efficiency, total waste, and recycling rate were included, which are relevant in TCFD. In addition to these, Normet is implementing GHG emissions accounting in order to be transparent of its value chain (Scope 3) emissions more accurately in the years to come. Some product lines, along with raw materials, logistics, production, and equipment utilization are also being assessed for their carbon footprint. To demonstrate its commitment to accurate reporting and to act upon new regulations and recommendations, Normet strives to set long-term emission reduction objectives also for their most important direct suppliers worldwide. (Normet 2022, 20-22.)

On the strategic front, Normet aligns with TCFD by aiming to improve their energy efficiency and develop sustainable solutions. Normet does this by aiding their clients achieve their sustainable development goals, such as lowering CO2 emissions, producing zero noise pollution, and protecting the environment. Moreover, Normet engages in community sustainability initiatives in the areas of training, innovations, health, and safety to guarantee a more secure, healthier, and cleaner environment for those communities where the company operates. (Normet 2022, 19-21.)

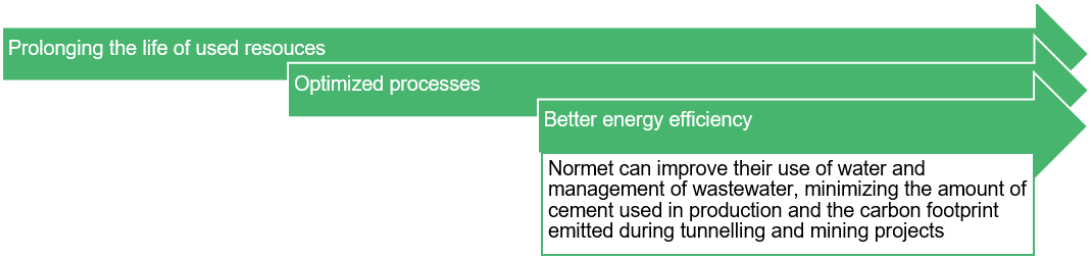

Figure 7. Normet's strategy to improve energy efficiency

As illustrated in Figure 7, Normet's strategy accentuates its dedication to reducing emissions from its own activities and through its value chain in line with the Paris Agreement. Investments in research and development, particularly in battery-electric vehicle technologies, reflects Normet's proactive approach to minimize CO2 emissions, noise pollution and environmental harm. Additionally, Normet sees significant potential in underground process optimization, particularly in minimizing the carbon footprint of cement in sprayed concrete procedures. In fact, over the past decades, Normet's expertise has resulted in reductions in the quantity of concrete lining needed in mines and tunnels. Digitalization has improved process optimization by providing access to information, analytical instruments, automation, and artificial intelligence. These factors culminate in augmented efficiency, reduced downtime, and safe, efficient working environment. (Normet 2022, 21.)

A strategy with precise goals and time horizons outlines companies' priorities and agenda for the current and upcoming endeavours. From a climate perspective, Normet's new SmartDrive (fully battery-powered vehicles) configurations are a concrete example of this commitment. The goal is to have the configurations applied to all their main equipment models by the end of 2024, as well as establish more rigorous recycling and waste management procedures in all the market areas globally. (Normet 2022, 23.)

Despite the absence of further risk analyses of climate-related risks, Normet understands that these types of risks need to be considered, especially as operational equipment must remain functional regardless of unprecedented changes in operational conditions. Therefore, these risks are reflected in the warranty of their machines, prompting the company to evaluate warranty processes and any associated additional costs. Furthermore, climate risks may lead to changes in warehouse valuation, highlighting the importance of considering such factors in the purchasing process of technical items that belong to the physical inventory. (Company Representative Y 28 April 2023.)

4.2 Weaknesses

Given Normet's status as a non-listed entity, and currently falling outside the scope for TCFD reporting, various areas could currently be considered as weaknesses but which will be subject to improvements in the near future if relevant. For instance, Normet exhibits transparency in disclosing the responsibilities and processes considered in their risk management framework. Nonetheless, the company does not clearly acknowledge any TCFD concerns or outlined risks in accordance with the TCFD guidelines, a circumstance possibly linked to its current scope designation (Company Representative X 2 May 2023). This may lead for a call to focus first and foremost on identifying the climate risks during the implementation process.

While Normet has shared some vital metrics resonating with TCFD, there is a gentle shortfall for a holistic and full account of GHG emission calculation, embodying the organizational carbon footprint. This encompasses the detailing of Scope 3 emissions, alongside disclosures of water use and wastewater treatment in water sensitive areas. However, Normet is currently developing its GHG calculations to include Scope 3 emissions, fostering to establish mid- and long-term emission reduction targets upon obtaining an overview of its total value chain emissions. An added weakness to the incompleteness of metrics is the lack of historical climate-related data as Normet has only recently adopted GHG standard in its Group-wide environmental reporting. Consequently, as of now, the targets for carbon neutrality to date, as well as Science Based Target emission reductions remain uncovered. (Company Representative X 2 May 2023.)

Given Normet's current position outside the scope for TCFD, no discernible impacts to financial accounting practices have been observed yet. This is an aspect that awaits further exploration and cooperation between the sustainability and finance teams as Normet navigates its pathway towards a richer sustainability reporting. (Company Representative Y 28 April 2023.)

Lastly, for the reason of not having to comply with TCFD yet, climate-related scenarios have not yet been built or formulated. However, with the recent assessment of Scope 3 emissions, culminating the entire organizational carbon footprint calculation, Normet has acquired a deeper understanding about its emission reduction potentials. With this new knowledge, Normet aspires to prepare for the climate roadmap including pathways, emission reduction actions and timelines. This work will be based on well-founded scenario analyses. (Company Representative X 2 May 2023.)

4.3 Opportunities

Upon recognizing Normet's strengths and areas of improvement, it's possible to unfold the potential opportunities emerging from following the TCFD recommendations. The first substantial opportunities lie in the green transition, its accent on decarbonising global heavy industries, and the market opportunities arising from it. To assist in decarbonizing diesel engines, battery-electric machines are being introduced into the market as Normet continuously building new technologies (Normet 2022). However, since these batteries are created to meet the increased demand for energy storage, renewable energy sources, electric vehicles, and green infrastructure, metals will play a pivotal role in the transition. Therefore, the pace of the transition is contingent on the ability to secure sustainable metal supply. (Company Representative X 2 May 2023.)

Moreover, to provide low-CO2 footprint products to the market, the technological progress must also apply to concrete spraying techniques. According to Normet's production research, a large portion of GHG emissions are generated by the usage of steel. Normet embraces circular economy as a part of their core business, which emphasizes the efficient use of materials. Their expertise extends to remanufacturing and maintenance services that contribute to a longer lifetime of equipment. (Normet 2022, 22.) Eventually, these efforts provide a compelling strategy allowing Normet and its stakeholders to benefit from opportunities arising from green transition.

The second significant opportunity that TCFD could bring to Normet is the increase in trust and credibility. Stakeholders, including potential partners and the financial community, are more faithful and attracted towards a business when they know the company follows ethical values and practices transparent reporting. Successes in this regard would positively affect perceptions of Normet.

Aligning with the increased trustworthiness, reliable sustainability reporting could also bring about new, responsible investing opportunities. While transitioning towards a carbon-free economy may

be costly for companies, a concurrent opportunity resides in attracting investors keen to support sustainable and innovative enterprises with a drive to expedite a carbon-free future. For Normet transition towards more climate-friendly business within its value chain creates opportunities, inclusive of expanding offerings with new equipment technologies and fostering synergies across the value chain through a progressively digital and service-oriented business model.

Another noteworthy opportunity arises from calculating all the GHG emission metrics that will unveil a holistic perspective of Normet's carbon footprint. Coupling this with providing historical, comprehensive, and comparable data or trend analyses could bolster Normet's transparency and ability to monitor their progress, as well as provide valuable insights for better decision-making and resource allocation. Furthermore, as Normet already employs adjustable bonus schemes to reward employee performance (Company Representative X 2 May 2023), extending these compensation structures to cover climate-related targets could serve as an effective method to amplify motivation and performance to pursuit these environmental goals.

Once Normet has analyzed and embraced climate scenarios, the company could have sharpened strategies to tackle unforeseen climate hazards and avoid any unsought financial burdens. Furthermore, the awareness of different directions that the company could take with the evolving situation of climate change, Normet could improve their resilience, flexibility, and decision-making for future climate-related threats.

4.4 Threats

While there is potential for Normet to adopt the TCFD framework and strive to turn their weaknesses into advantages, the company may still face diverse threats. For instance, incomplete environmental-related reporting practices could result in a negative reputation and lack of trust among the stakeholders if not reviewed and improved continuously. Besides, the absence of identified climate-related risks may lead to vulnerable situations and unanticipated disasters that could damage the company's financial performance and disrupt their operations.

It becomes crucial for Normet to investigate and identify their financial impacts associated to climate-related risks and opportunities, considering that the lack of financial planning could cause unforeseen expenses. Although the company acknowledges the merits of practicing circular economy reduce expenses, transitioning towards environmentally congruent equipment and operations may nevertheless result in unexpected losses.

The importance of calculating cross-industry climate metrics and possessing historical data becomes essential for the management and stakeholders to make decisions. In fact, if the

management struggles with inaccurate decision-making, Normet may delay its progress towards the desired targets, as well as misallocate their resources.

The concluding threat encompasses facing legal burdens which could occur due to inaccurate reporting or assimilation of new sustainability regulations. To avoid this, Normet should thoroughly delve into the subject matter and benefit from auditing services to ascertain the company is operating and disclosing correctly. By taking careful measures, Normet can work towards mitigating these outlined threats, laying a more secure foundation for its venture into responsible and sustainable business practices.

4.5 Conclusion of Normet's Readiness to Adopt TCFD

In conclusion of the SWOT analysis, it is evident that Normet is already embracing practices that serve as a good foundation for incorporating TCFD recommendations. Especially Normet's descriptions regarding its governance structure, as well as metrics and targets are initially aligned with TCFD's principles and framework. The main sections that will require special attention from Normet are strategy and risk management, as these areas require detailed exploration of the company's approach and management methods for addressing the risks and embracing the opportunities related to climate. The summary of the SWOT analysis can be found in Appendix 2. In addition, Figure 8 represents a snapshot of Normet's current situation regarding their reporting practices in comparison to TCFD recommendations. The dark green represents that the section is mostly disclosed according to the recommendations, the lighter green represents partial compliance, while yellow highlights the topics that are yet to be disclosed.

Governance	Strategy	Risk Management	Metrics & Targets
a) Normet describes how the management oversees the businesses risks, discusses the responsability areas and the sustainability plan, but does not yet discuss climate-related risks and opportunities	a) Normet discusses their strategy regarding new trends, challenges and targets that contribute to their sustainability ambitions, but has not addressed climate-related risks and opportunities yet	a) Normet has not yet detected climate-related risks and opportunities	a) Normet has calculatedsome metrics beneficial for TCFD, but has not yet incorporated other cross-industrial or forward-looking indicators
b) Normet explains the function of the management in evaluating and monitoring risks, but does not yet discuss the climate-related risks and opportunities	b) Normet has not yet considered climate-related risks and opportunities when planning their strategy or finances	b) Normet describes well their approach to mitigate other risks, however, they have not yet addressed climate-related risks and opportunities	b) Normet discloses Scope 1 and Scope 2, and is in the process to calculate Scope 3 and provide historical data
	c) Normet has not yet conducted a scenario analysis suitable for TCFD	c) Normet manages sustainability related matters together with the overall risk management	c) Normet calculates for example energy use, total waste, and recycling rate, but does not yet discuss the calculation methods or values per business line

Mostly disclosed
Partially disclosed
To be disclosed

Figure 8. Normet's readiness to adopt the TCFD framework

5 External Analysis on the Existing TCFD Practices

This chapter closes the project task 3 and aims to review external companies' reports and learn the different approaches and perspectives these companies have taken to adopt the TCFD framework. In order to reach this objective, the author creates a benchmarking matrix, in which the companies are evaluated from the aspect of TCFD's core elements: governance, strategy, risk management, and metrics and targets. The author starts the assessment by addressing how TCFD is presented by each company, and subsequently evaluates the clarity, focus areas, and weaknesses of each report. The analysis is concluded with a color-coded matrix highlighting the best practices of each company. This matrix may serve as a learning tool for giving recommendations for Normet.

5.1 Stora Enso Oyj

Stora Enso incorporates their TCFD disclosures within their 2022 Annual Report. The TCFD chapter encompasses their scenario analysis results, as well as their approach for TCFD disclosures through an index table, which contains all the TCFD recommendations by category. The table directs readers to relevant sections of the Annual Report by providing the key locations as chapter titles. This reporting method aligns with the TCFD recommendations, in which the recommendations are embedded into the Annual Report. They seamlessly discussed in multiple chapters, reflecting that climate-related risks and opportunities are considered in the four core aspects of governance, strategy, risk management, and metrics and targets.

Stora Enso (2022, 98-103, 136) discloses the roles and responsibilities regarding climate-related risks and opportunities of various teams over multiple business areas, offering detailed information about their governance. Notably, Stora Enso also reveals various methods that the management uses for monitoring their progress, for instance by using the Enterprise Risk Management (ERM) process, which is a tool that sets goals, evaluates risks, responds, controls and communicates the outcomes of either hazard, financial, strategic or operational risks (CFI 2023). By integrating suggestions by TCFD into ERM, Stora Enso enhances transparency and credibility over their activities.

Stora Enso's strategy complies with TCFD and it is shaped by identified global trends, risks, and opportunities on various time horizons. They respond to global warming by creating a Carbon Neutrality Roadmap, committing to the 1,5 degree target, assessing their resilience, and conducting Life Cycle Assessments to reveal product carbon footprints. The company diversifies their operations locations and enhance their R&D to tolerate the risks arising from changed weather patterns. Moreover, Stora Enso spotted opportunities, driving innovation, value chain improvements, environmental policies, and leadership-, and incentive programs to enhance their operations. (Stora Enso 2022, 57-59, 140.)

Regarding risk management, Stora Enso uses the Enterprise Risk Management process to assess their financial risks. Additional risks are identified and assessed by business entities and divisions, group service and support functions, who reveal the root and aftereffect of the risks. The company has identified physical impacts that may damage their assets, for which they conduct three scenario analyses to find out the material impacts and resilience. On the other hand, climate-related transitional risks are not discussed clearly in risk management, even though certain topics, including changes in policies, could be linked to close this information gap. (Stora Enso 2022, 136-140.)

Stora Enso discloses climate-related metrics in a comprehensible table. It explains their KPIs, reveals their yearly progress, sets the target timeline, and discusses additional comments about their progress. This table serves as a transparent visualization of Stora Enso strategic actions. Additionally, they presents their calculations for Scope 1 and 2 together with the historical and future trendlines, highlighting their target of being carbon neutral by 2030. For Scope 3 accounting, Stora Enso uses an activity-based technique, which calculates emissions by considering the quantities of supplied inputs and delivered outputs. (Stora Enso 2022, 52-57.)

To sum up, Stora Enso has extensive releases over their TCFD practices. Notable highlights include their activities regarding governance and strategy, as well as their table with the snapshot of the state and progression of their targets and KPIs. There is a slight inconsistency for disclosing transitional risks as they are not stated clearly together with the other climate risks, therefore bringing light to these topics may close the information gap and provide more clarity.

5.2 Metso Oyj

Metso adopts a distinctive approach to reporting TCFD compared to Stora Enso. While the TCFD disclosures are also embedded into the 2022 Annual Report, they are consolidated within a dedicated TCFD chapter at the end of the Annual Report. This chapter encompasses all four core TCFD elements, complemented by a table with all the identified transition-, and physical risks, alongside the climate-related opportunities. This method clearly segregates climate-related risk and opportunity disclosures from other sustainability discussions, ensuring stakeholders easy access to the relevant data. However, this approach creates overlapping and repetition to some information, which have already been addressed in other sections of the Annual Report.

Metso effectively communicates the Board of Director’s oversight and role regarding climate-related activities, as they clearly express their cooperation with other teams, their meeting frequency, and approach for their strategy alignment with sustainability goals. The governance section does not specify who is responsible for identifying climate-related risks, nonetheless, given the

responsibility for following the sustainability agenda is reported to be distributed across various teams, it may suggest that the risks are identified collectively. (Metso Outotec 2022, 40.)

Metso's strategy highlights their understanding of the changes that meeting their sustainability targets require, as well as of the possible regional variations in the risks and opportunities. Their main focus for strategy lays on evaluating their resilience in different climate-related scenarios, with the main goal of following the 1,5 degree scenario. While the lower than recommended 2-degree scenario reflects Metso's high ambitions, the disclosures lack detailed action plans taken towards the scenarios, which limits the level of transparency of the outcome. (Metso Outotec 2022, 40-43.)

The description of risk management is compressed and mainly expresses the roles and goals of the teams responsible for risk management. The climate-related risks and opportunities are only presented in a table, which covers the type of risk, what happens if they do not manage it, the economic impact they may cause, as well as the time period for how long the risks and opportunities may influence the company. The table is similar to what the TCFD recommends, however, Metso does not express the mitigation methods for these risks, which creates unclarity of their readiness and plans to tackle them, as well as uncertainty for the stakeholders. (Metso Outotec 2022, 43.)

Lastly, in the metrics and targets section, Metso emphasizes the efforts to minimize their CO2 emissions while engaging their suppliers towards the same goal. They use the Science Based Target initiative (SBT), which is a tool that aids calculating the scope and velocity for emission reduction goals to avoid climate hazards (Science Based Targets 2023). Metso calculates Scope 1,2 and 3 using the GHG protocol methodology, but does not yet consider internal carbon pricing. Notably, Metso's incorporates renumeration policies as a long-term strategy to incentivize positive environmental achievements, which may also boost their performance. (Metso Outotec 2022, 43.)

Overall, Metso complies with TCFD recommendations on a general level. They have clear targets for their sustainability goals which also play a crucial role in their strategy and scenario analysis, and they have a detailed table of the climate-related risks and opportunities, the financial impacts and time horizons. The main lessons from Metso's reporting practices include the need for clarity in risk assessment, and a deeper exploration about the measures taken to manage risks in order to prove their capability to endure them and promote openness towards stakeholders.

5.3 Mitsubishi Corporation

The TCFD for Mitsubishi Corporation can be found in their 2022 sustainability report. While separate reports are not recommended, Mitsubishi's extensive operations led each business within the Group to do their TCFD into their respective Annual Reports. Mitsubishi Corporation discusses all

core elements within the report, but also offers a table with the data locations within the sustainability webpage or report. Therefore, it's a blended approach in comparison to Stora Enso and Metso.

Mitsubishi's governance visualises transparently the responsibilities of different committees and their meeting frequencies in a table. Moreover, they reveal that they work closely with stakeholders, get suggestions from external professionals, and consider the sustainability team's opinions in investment decisions. (Mitsubishi Corporation 2022, 75-76.) However, the governance structure focuses mainly on complying with policies, which leads the description of monitoring and communicating climate risks and opportunities to be inconsistent. These aspects could require broader exploration to become fully transparent.

Mitsubishi's strategy centres on decarbonization by 2050, for which they have created a roadmap with objectives and action programs. They have also conducted 1,5-to-2-degree scenario analyses for the business areas with major climate impacts and assets, which serves as a resilience analysis for these vulnerable businesses. The assessment is transparent as it compares different scenarios and openly shares the outcomes. These results highlight areas with the most significant climate risks and opportunities and how the company addresses them. This showcases the benefits of scenario analysis and how openly it can be discussed. (Mitsubishi Corporation 2022, 79-91.)

The risk management section discusses mainly the company's physical risks, leaving the transition risks to be covered in the scenario analysis made previously. This together with focusing on specific business areas may create confusion and lack of transparency across the corporation. Regardless, the physical risk management process follows a clear structure, including screening exposure levels of the risks, historical data analysis, climate model predictions and observations. The outcome includes tables detailing the analysed assets, locations, and categories of the climate risks, as well as the actions and future plans for tackling these hazards. This provides a snapshot of the physical climate risks the company may experience. (Mitsubishi Corporation 2022, 92-94.)

Lastly, Mitsubishi's metrics and targets section has a clear visualization of their current plans, progress, and future estimations to minimize their GHG emissions. For this, the company has calculated Scope 1 and 2 to present and compare the data. Mitsubishi also embeds a detailed description of their Scope 3 emissions, attributing responsibilities by business category for the past years. Moreover, Mitsubishi calculates emissions they have succeeded to avoid compared to a baseline, which adds to the credibility and openness to commit to their targets. (Mitsubishi Corporation 2022, 95-102.) While the disclosures about the emissions are transparent and extensive, the company has limited description and consistency regarding their fossil-free and renewable energy targets.

To sum up, Mitsubishi's TCFD practices are consistent and detailed in aspects including scenario analysis and physical risk presentation. These discussions serve as valuable examples for other companies looking to improve their own reporting. However, for enhanced transparency, the company could benefit from assigning greater focus to explain the managements methods for monitoring risks and opportunities, as well as providing further details on additional metrics that they use.

5.4 Conclusion

To conclude this chapter, the author created a color-coded benchmarking matrix (Figure 9) based on her insights gained from the previous chapters. The matrix provides an overview of the external companies' TCFD practices. The dark green denotes exemplary reporting in openness and clarity, whereas yellow showcases possible information gaps. The light green represents a middle ground, in which the discussion is relatively thorough, but could potentially benefit from additional details.

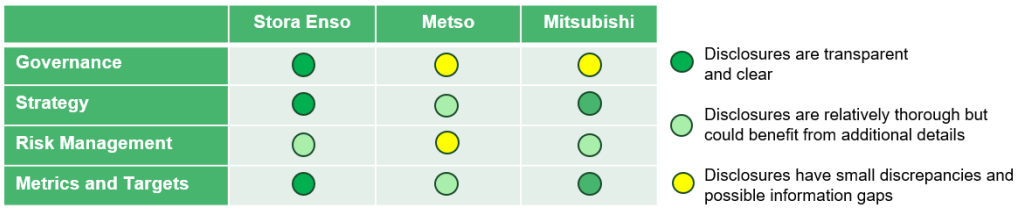

Figure 9. Benchmarking matrix of companies already adopting TCFD

As seen in the figure, there is no direct correlation between the strengths and weaknesses of each company. This observation could attribute to a couple scenarios: either the reporting guidelines lack straightforward recommendations for companies to share the same consistency, or each firm may allocate their resources and focus on the areas that align with their interests and priorities.

Despite the distinct strengths and weaknesses exhibited by each company, even the most experienced firms may struggle in the same sections. For instance, while Stora Enso generally follows TCFD recommendations meticulously, they also display a degree of inconsistency in their risk management chapter, just like Metso and Mitsubishi. Therefore, companies new to TCFD, such as Normet, may gain new visions by screening through different companies' practices and selecting the best approaches for their own adoption.

Example key takeaways that the author would highlight and recommend from these external case companies' reports include leveraging Enterprise Risk Management processes, conducting life cycle assessments, developing roadmaps for significant targets, using science based targets, creating tables for presenting climate-related risks and opportunities, describing the results of scenario analysis and the action plans, as well as disclosing the responsibilities regarding Scope 3 emissions.

6 Recommendations for Facilitating the Adoption Process

This chapter covers the project task 4 and discusses practical recommendations for Normet to approach the adoption process of the TCFD framework. This section combines the data gathered from the desktop study, benchmarking, and interviews, culminating in a unified set of guidance and critical factors to consider. The author's approach is to conclude both primary and secondary research by creating a structured roadmap (Figure 10) that could assist Normet's journey towards its' first steps to disclose climate-related risks and opportunities. The same roadmap is used for the handbook's framework.

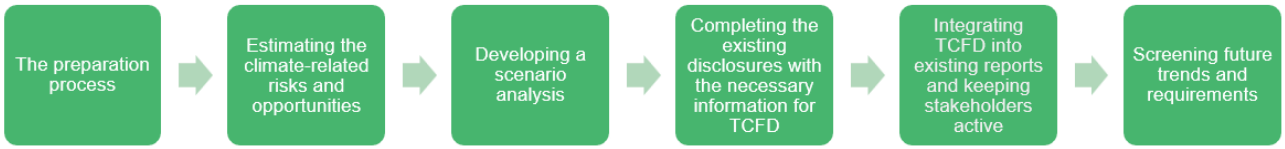

Figure 10. Roadmap for the adoption process

6.1 The Preparation Process

Adopting new frameworks and initiatives, such as the TCFD, requires time, resources, and commitment in order to be executed correctly. The process could be considered as a project that needs planning and cooperation from multiple teams and stakeholders of the company. This chapter provides potential steps that Normet could consider during their initiation process.

To begin the adoption process, it is important to engage the relevant internal stakeholders into a dialogue regarding TCFD and how it would benefit Normet, their operations and decision-making. Collaboration is vital as it brings together multiple perspectives adding more value to the collected data. Therefore, Normet's management and sustainability representatives should create workshops or other interactive events to discuss TCFD together with the key internal stakeholders and gain a clear direction and approach for the process. (Savikoski 15 October 2023.)

However, it's important to note the challenge of stakeholders' interests misaligning. It is recommended to set the strategy for the adoption with the key stakeholders at first, and include more relevant parties during the subsequent steps to understand the risks and opportunities within their own vicinity. (Breukers 21 June 2023.) Therefore, after discussing with the management and key stakeholders about TCFD on a surface level, Normet's next step could then be to agree on a project management team and assign the main responsibilities over the project. The team could consist of representatives from the top management, sustainability, finance, and other vital internal or

external persons. Depending on the needs and resources available, Normet may also consider hiring new professionals dedicated to the topic.

An essential point to note though, is that the TCFD is a complex project in nature as it is about disclosing climate-related information and the financial impacts arising from them. Therefore, having the CEO and CFO involved at all stages is crucial to plan and execute the adoption process and get help with the project management and cost estimation. (Breukers 21 June 2023.)

The following step is to get a deep familiarization of the TCFD prerequisites and recommendations, alongside a general exploration of the possible risks and opportunities posed by climate change to the company. This knowledge serves as the foundation for aligning TCFD's principles with the company's unique context. The key to success lies in the project leaders' profound comprehension of the business, its product portfolio, and the company's impact on the environment. The TCFD framework places significant emphasis on climate-related risks and opportunities, therefore making it imperative to understand how these factors apply to the company's context to be able to construct a meaningful scenario analysis. (Breukers 21 June 2023.)

The acquired knowledge on the TCFD recommendations and their application to the business context create a base understanding of what is expected to be disclosed. Therefore, conducting a thorough assessment of the organization's current operations and sustainability reporting practices is the next step. This evaluation seeks to pinpoint gaps between the existing disclosures and the TCFD criteria. These identified disparities serve as a pivotal role in determining the goals of the adoption process, guiding the organization's focus towards the targeted improvement areas.

Companies may lack expertise and resources to identify climate risks and scenarios (Breukers 21 June 2023). Therefore, once Normet has outlined the TCFD requirements, the company may identify and include more stakeholders relevant and beneficial to the project. This will create a cross-functional team specialized for evaluating climate risks and opportunities in detail. The team may include internal specialists by location or business unit, and external professionals such as consultants to gain mentoring and advice. The project leaders should onboard the team through workshops to share awareness and ideas regarding TCFD in Normet's context, as well as develop a common ground for moving towards the same goal of assessing climate risks and opportunities.

Having appropriate stakeholders and professionals identifying the climate issues in their own sectors brings light to more detailed information valuable for the overall strategy and risk management. It would also respond to TCFD's recommendation of not only informing the company-wide climate matters, but also the specific ones based on location or business unit for instance which the project leaders may have not thought of initially. As the findings must be acknowledged by the top

management, it is important to create clear communication methods and channels to facilitate the information flow between different teams.

Lastly, the company must identify the essential tools and methodologies for data collection for managing and implementing both the quantitative metrics and qualitative information into the new reports. As the data accuracy and availability is one of the main challenges of the process, investing in effective systems and collaborating closely with partners that understand the extent of emissions growth across the supply chain, value chain, manufacturing process, and product lifecycle is critical. This also involves researching different climate-related measuring tools provided by third parties. (Breukers 21 June 2023.) Additionally, the CSRD directive requires companies to verify their responsibility information by using a certifier for it, which will also support the validity and reliability of the reported data (Savikoski 15 August 2023).

In essence, the preparation process relies heavily on communication and collaboration both with internal and external professionals throughout the steps. While it may be overwhelming to meet the raising expectations for first-time TCFD reporters, Savikoski (15 August 2023) highlights that everything doesn't need to be done at once, but rather detail the disclosures as the years go on.

6.2 Estimating the Climate-related Risks and Opportunities

Determining climate-related risks and opportunities represents a pivotal but intricate step for the project. It forms the bedrock for TCFD reporting and directly influences many business areas, especially strategy and risk management. Consequently, this chapter is envisioned to furnish the steps (Figure 11) and practical tips to facilitate a smoother navigation through this endeavor.

Figure 11. The steps for assessing the climate-related risks and opportunities

In the initial step, the cross-functional team specializing in identifying climate-related risks and opportunities may gather to discuss possible environmental initiatives and market changes. Other aspects to consider are any emission and climate trends, regional factors, and possible long-term effects on Normet. These evaluations need to be customized for Normet's business context as different industries and business locations are exposed to a variety of physical risks and other events related to climate change (Savikoski 15 October 2023).

Considering Normet's presence in the mining sector, a significant focus must be placed on identifying risks and opportunities arising from their decarbonization project, its implementation

requirements, and its financial implications. For instance, the Carbon Border Adjustment Mechanism (CBAM) is a pricing policy for imported goods with high emissions. Once it becomes applicable in Europe, it will raise the price of imported steel. It may become a strategic question for Normet, as acquiring Finnish steel that is carbon neutral may result in higher initial prices, but it also lowers their carbon emissions. Therefore, the cross-functional team must evaluate the short- and long-term advantages between the environmental and financial impacts and perhaps run a cost-benefit analysis. (Breukers 21 June 2023.) A cost-benefit analysis is a practice in which a comparison is made between the anticipated costs and opportunities related to a project (Stobierski 2019).

Once a possible risk or opportunity is identified, the next step is to conduct an in-depth analysis. This includes diving deeper into the causes, effects, size, velocity, time period and impact level they may pose as discussed in chapter 2.3. Determining these details will facilitate Normet in choosing their management and monitoring strategies. To aid the evaluation, Normet can utilize new analytical tools by third parties. For instance, The World Bank provides assistance in screening risk processes and guidance for classifying the impact levels (The World Bank Group 2023).

The next stage would be quantifying the risks and opportunities. As discussed in chapter 2.6, this step may be challenging, but vital for informed decision-making. This task can be carried out by using the DCF model which forecasts the present value of future cash flows, and assessing the financial impact caused by a decreased asset value due to a climate hazard. Normet may also do a cost-benefit analysis to justify for instance opportunities, such as in the case of using carbon-free steel even if it may initially cause more expenses.

Lastly, to guarantee consistent disclosures, Normet should also include forecasting for new risks arising from the present and emerging trends. Analyzing these patterns using historical data and external tools such as scenario analysis is recommended for this stage in order to foresee and react upon possible external or internal changes. Scenario analysis is explored in the next chapter.

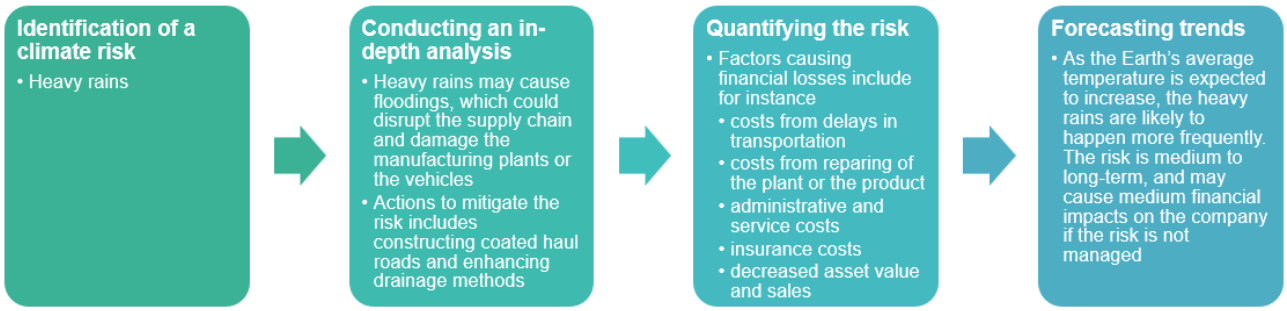

Figure 12. Example of a process for screening a potential future climate risk

The author concludes this section with an example of a risk assessment process illustrated in Figure 12. As Normet operates worldwide, the local managers must research and prepare for diverse hazards in each area. For instance, the accountable teams at Normet Oy in Finland can proactively evaluate potential climate hazards unique to their location. Once a risk, such as heavy rains, is recognized, a thorough analysis of the potential effects and management solutions can be conducted. To completely align the evaluation with TCFD, Normet should also allocate its' time to develop scenario analyses which are discussed below.

6.3 The Steps for Developing a Scenario Analysis

Scenario analysis is an essential tool for uncovering climate-related risks and opportunities within businesses, sharing insights into the potential material and financial implications, as well as forecasting prospective future circumstances. This chapter outlines actionable steps for adopting scenario analysis, drawing upon the author's knowledge and insights. Furthermore, the chapter presents a couple scenarios and tools from third parties, which Normet could consider in their own evaluation to further enhance and support their comprehension of climate risks and opportunities. Based on the research made in chapter 2.5, the author built eight recommended steps for developing and incorporating scenario analysis. The initial four steps are visualized in Figure 13.

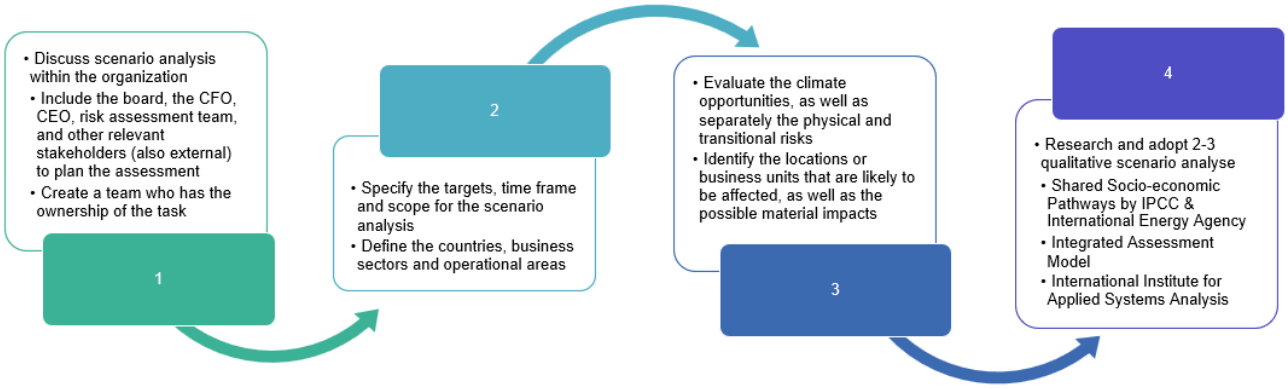

Figure 13. Steps 1-4 for Scenario Analysis

The first step is to discuss scenario analysis within the organization and involve relevant stakeholders such as the board, the CFO, and CEO. An external stakeholder is also encouraged to participate as they could possibly widen the perspective and decrease bias. Followingly, the team designated to scenario analysis may specify the targets time frame, and scope to assure the alignment with the Normet's needs and goals. By directing the analysis to a precise location or operations area, the perspective becomes more articulated and accurate, which facilitates reaching the purpose and objectives for the scenario analysis.

Once the baseline is set, the team can evaluate the climate risks and opportunities, using the previously established methods, including following trends related to climate, regulations, and markets. Identifying vulnerable locations, business units and possible material impacts is essential. The material impacts caused by climate hazards can be assessed using external tools and ranging the risk exposure from low to high for instance.

The fourth stage involves choosing two to three scenarios that resonate with Normet's strategic vision and resources. This can be initiated with a qualitative exercise that may be completed with further details in the following year (Savikoski 15 August 2023). It is advised for Normet to start by adopting widely used and accepted scenarios by third parties, such as the Intergovernmental Panel on Climate Change (IPCC). It has crafted five Shared Socio-economic Pathways (SSP1-SSP5), each with different degrees of ambition for decreasing GHG emissions. For a diverse evaluation, Normet could use SSP1, which aims for maximum 2-degree temperature increase and economic growth driven by sustainability, and SSP4 or 5 for a risk analysis in the event of non-compliance with climate change targets. (ClimateData.ca. 2023; Januta 2021; Hausfather 2018.)

The International Energy Agency (IEA) is another ally offering scenarios that may fit Normet's context as it guides firms with high carbon footprints (UNEP FI 2020) to transition into a lower-carbon economy. It also offers markets forecasting, which could predict the demand for Normet's vehicles. IEA's "Net zero emissions by 2050" scenario informs the actions and time frame that companies must consider to reach carbon neutrality by 2050 (IEA 2022).

In order to benefit from the full potential of these scenarios, Normet may also consider tools such as The Integrated Assessment Model (IAM), which collects environmental and economic data to support well-informed decision-making (WBCSD 2022). Additionally, The International Institute for Applied Systems Analysis (IIASA) is a third party providing extensive research, databases, and methodological advice (IIASA 2021; IIASA 2023a; IIASA 2023b). With the assistance of these external sources, Normet may traverse the complicated decision-making processes more easily.

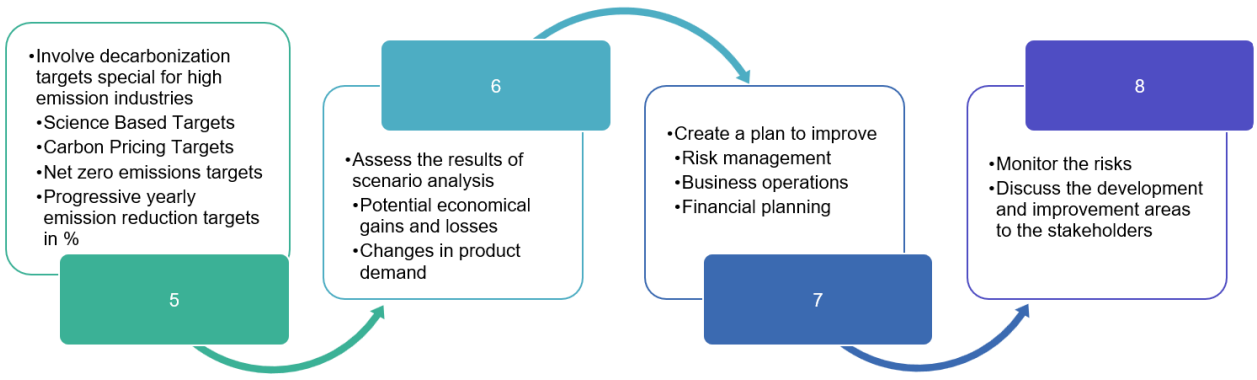

Figure 14. Steps 5-8 for Scenario Analysis

The last steps (5 to 8) are exhibited in Figure 14. The fifth step outlines that the analysis should be completed with decarbonization targets such as net zero emissions, progressive yearly emission reductions like Science Based Targets, and carbon pricing. This supports the commitment expected and generally desired from companies dealing in high-emission sectors.

After this, the sixth step focuses on analyzing the results, building resilience against possible economic impacts and changes in product demand for instance. This leads to step 7, which highlights making better financial and operational decisions with a forward-looking vision. Successful progress includes continuous monitoring and keeping the stakeholder aware of the action plans by holding informative meetings, workshops, and creating transparent reports that provide investors with reliable data, therefore these are the action plans for the last step.

Mastering scenario analysis is crucial for TCFD reporting, as it supports all aspects of the framework: a clear governance facilitates the analysis process, the strategy will be improved based on the climate risks and opportunities identified, recognizing climate risks expands the horizons of risk management, and monitoring new targets supports concrete action plans. However, the same core aspects of TCFD require further guidance and attention to details to become complete.

6.4 Guidance for Completing Disclosures Regards to the Four Core Elements

After discussing how to start with identifying climate risks and opportunities, as well as developing a scenario analysis, this chapter offers guidance on how to complete the rest of the recommendations of TCFD regarding governance, strategy, risk management, and metrics and targets. The suggestions are tailored to harmonize Normet's current reporting practices with the Task Force's requirements, taking into account the ideas gained in the external analysis in chapter 5.

Starting with the governance section, Normet must complete their disclosures with specified information regarding their organizational arrangements, roles, and responsibilities regarding TCFD. To demonstrate precise administering of climate concerns, it involves clear expression of the decision-making hierarchy and oversight. The functions and duties may be simple to comprehend by using visual representations like tables or hierarchical maps, which outlines the organizational structure.

Normet could additionally consider revealing their management's plans to monitor the climate targets, particularly the procedures, tools, and tracking mechanisms they employ to ensure their progress towards reduced emission and other goals. If certain data is deemed too sensitive to be disclosed, particularly to competitors, Normet may opt to publish this information later and provide more general level data in the interim. While it is important to show transparency, it is equally important to share accurate data and not risk falling into eco-deception.

In the strategy section, Normet has already incorporated sustainability ambitions and global industry trends. These can further be supported with climate risks, opportunities, and scenario analysis. Following a scenario significantly shapes the strategic direction, depending on the ambition levels and desired velocity of carbon footprint reduction. Additionally, Normet should communicate the results of the analysis, as it may uncover latent risks which may cause strategic adjustments, for instance diversification plans. The report should therefore elaborate on the strategy for various time periods, considering the associated climate-related goals, risks, and opportunities, as well as the possible effects on financial decision-making and resilience. Given Normet's presence in a high-emission industry, they could create a decarbonization roadmap and share their life-cycle assessments to enhance their credibility and indicate their concrete actions.

Regarding risk management, Normet should align their existing risk reporting methods with its identified physical and transition risks, along with the measures for reducing these factors. TCFD requires risks to be precisely localized to certain areas or business units, which may lead Normet to focus primarily on the core risks and where they are located. Alternatively, Normet can assign the assessment to be conducted by each subsidiary due to the relatively large size of the firm.

According to TCFD, Normet should elaborate on how they identify, evaluate, and monitor their risks. Normet could share their use of systems such as Enterprise Risk Management, any environmental management systems, or scenario analysis. They could additionally indicate the consequences of unmanaged risks. An effective visualization of the risks, their roots and consequences would be a table that also outlines the time horizon and level of financial exposure these risks possess.

Lastly, Normet could take a few steps to complete their metrics and targets in line with TCFD objectives. First, Normet may calculate any absent metrics which are relevant to their strategy and risk management. These include completing cross-industry metrics such as Scope 3 emissions, as well as land and water consumption. A transparent reporting method for Scope 3 could include sharing the sources and responsibilities for Scope 3 emissions. However, this may be challenging for new adopters, thus it could be a consideration for the upcoming years.

Second, to increase their trustworthiness, Normet should use widely adopted initiatives such as Science Based Target initiatives for decarbonization objectives, as well as report about their monitoring methods, possibly through an environmental management system along with other calculation tools. It is essential that Normet also provides historical data for evaluating the process and future trends for all these targets.

To boost clarity, all the metrics, targets and KPIs could be consolidated into a comprehensive table which outlines the actions taken and the progress achieved thus far. This visual presentation could potentially improve the accessibility of the data for stakeholders.

6.5 Navigating TCFD Integration, Stakeholder Engagement and Future Trends

The final part of the author's recommendations cover data presentation, stakeholder participation, and long-term TCFD coordination. These elements ensure effective reporting for external stakeholders, as well as efficient internal interaction for further development regarding TCFD.

When exploring different approaches companies have for presenting data regarding TCFD, it becomes clear that there is no standardized strategy to do it. Although the Task Force requires it to be adopted in the Annual Report, it does not impose strict rules to follow. While this may create confusion, it also offers the freedom to choose the best course of action that fits the company's existing reporting procedures. However, there are two common approaches emerging.

The first method is to incorporate the TCFD-related disclosures into several sections smoothly throughout the report. This practice has been embraced by companies like Stora Enso, UPM and Outokumpu. A vital component of this approach is to create an index table to list the locations of TCFD data together with the relevant page numbers. It safeguards that consumers can navigate easily throughout the document and identify the links between TCFD recommendations and the company's activities.

An alternative method includes discussing TCFD as a separate chapter in the Annual Report which centralizes the focus area on presenting the company's disclosures related to climate change. Example companies using this method are Metso and Mitsubishi. A comparison between the advantages and disadvantages of the two methods are illustrated in Figure 15, which is built upon the author's insights gained during the external study in chapter 5.

Index Table	Separate chapter dedicated to TCFD
•Avantages: •Seamless integration of TCFD to the wider context •Demonstrates that forecasted climate risks and opportunities are taken into account in business practices	**•Avantages:** •Division gives a noticeable and transparent statement about the dedication to tackle TCFD •Easy path for stakeholders to study TCFD data in one place
•Disadvantages: •Complex documentation affects readibility and comprehensiveness •Challenging to identify the TCFD data	**•Disadvantages:** •Possibility of disconnection between the climate aspects and the wider context •Misinterpretation for climate risks to be the most significant element of the risk evaluation

Figure 15. Comparison table between different reporting methods

Both of these methods may also pose the challenge of data overlapping. This mainly occurs due to the generalist reporting practices which could repeat sustainability data that is integrated both into TCFD and the company's strategy for instance. A solution for this may be the upcoming CSRD directive which will requests more detailed documentation. However, until then Normet could eliminate duplications by ensuring that TCFD is part of the firm's strategy (Breukers 21 June 2023), as well as part of the whole ESG reporting narrative, which emphasizes the importance of planning (Savikoski 15 October 2023).

Once the TCFD analyses and reporting has been completed, Normet needs to ensure that the action plans are implemented and the progress is being monitored. An essential element is promoting stakeholders' engagement, collaboration, and communication. In order to keep all involved parties active in the reporting process, Normet could consider implementing a mandatory dual materiality analysis and use this as a method for climate-related data gathering (Savikoski 15 October 2023), as well as participating in sustainability courses provided by the Finnish Accounting Association (Suomen Tilintarkastajat ry) for instance (Breukers 21 June 2023).

Anticipating the evolving landscape, Normet may screen future trends shaping the TCFD reports. As climate-related regulations and standardization are becoming more precise, Normet must further detail their disclosures for improved comparability. Technological assessment tools are also advancing, which may offer counterbalance to the growing need for quantitative documentation (Savikoski 15 October 2023). Furthermore, Normet may prepare themselves for the upcoming directives, including the CSRD, as well as Corporate Sustainability Due Diligence Directive (CSDDD), which demands companies to share their actions to protect the environment and human rights. New accounting standards, such as IFRS S1 and S2 will also set new general requirements for disclosing sustainability-related financial information (S1), as well as for climate-related disclosures (S2) (IFRS 2023). Once Normet has conducted TCFD assessments, it may direct its concentration on the Task Force on Nature-related Financial Disclosures (TNFD), which explores the risks and opportunities arising from the nature's perspective (Breukers 21 June 2023).

6.6 The handbook

The following subchapters lay out the handbook tailored for Normet Group Oy. It unfolds various considerations taken into account during the process to reach the target audience and overall needs of the company.

6.6.1 Target Audience

The handbook is targeted primarily to the sustainability, and finance teams of Normet in Finland, as the author is cooperating with the Finnish sustainability team and incorporated Finnish contexts to

provide examples. Nonetheless, it can be used by the subsidiary companies of Normet, as the content can be adapted towards any non-financial company regardless of the location. Moreover, to enhance the usability of the handbook, the author has written the content in the universal language of English, avoiding the use of complicated vocabulary. This supports the readers journey to comprehend the topics without having prior knowledge of TCFD.

6.6.2 The Development Process and Style of the Handbook

The handbook has been created by using Microsoft Power Point, as it offers numerous visual options for data presentation. The style of the handbook does not follow the case company's design because the author is not working internally for the company, but it is rather inspired by the theme of the topic. Figures are essential for compressing data into easily readable illustrations which may be more easily remembered and internalized. Similarly, the text is brief and clear, making it easy to identify the key topics and follow different steps of the adoption process. The outcome serves as a snapshot of TCFD with customized recommendations, making it an accessible checklist to review for any details or steps.

6.6.3 The Content of the Handbook

In order to orient the readers for the topics covered in the handbook, the key concepts are presented at the beginning of the handbook. These serve as a first synopsis, providing an insight into the context, which emphasizes the most relevant components of the subject. This is followed by a brief executive summary about current discussions in sustainability, and an introduction about TCFD and all its core components, which are based on the theoretical framework of the thesis.

The informative section is followed by an assessment table of Normet's current situation regarding their sustainability practices in comparison to TCFD recommendations. This gives the company a brief insight into their readiness to adopt the framework as well as to the information gaps that are required to be filled in order to comply with the new initiative.

The rest of the content follows the proposed roadmap for initiating the TCFD reporting process. This involves presenting the recommended steps for each stage, offering guidance for completing the missing disclosures highlighted in the previous assessment table, as well as presenting the options for data presentation.

The handbook is concluded by discussing the future trends and their relation to TCFD disclosures, which may support the reporting process in the upcoming years. This is followed by a brief summary, closing remarks regarding the project, and a list of sources.

7 Conclusion

This chapter is dedicated for discussing the results of the product and revealing the background work for reaching the project objectives. The subchapters provide further recommendations for Normet Group Oy, as well as addresses the reliability, validity, and relevance of the project. Finally, the chapter is concluded with reflections on project evaluation and the author's own learning, which also completes the project task 5.

7.1 Discussion of Results

The first project task, which laid out the foundation for this project, was to build a theoretical framework. It is apparent that the theory has given a thorough overview of the essential components relevant to the topic. However, it is important to note that due to the complexity of the TCFD framework, the outcome of the theory may be challenging to internalize, especially for the readers encountering the subject for the first time. Understanding the content may require effort and patience, but in contrast, the handbook discusses the topic more broadly and simplistically, mitigating the possible hurdle for seeking to study the framework.

Furthermore, due to the broad scope of TCFD, this thesis posed limits to the exploration of the extensive and detailed data across all the elements regarding the framework. Nevertheless, the discussion and conversation between sources in the theoretical framework provides an appropriate level of information, which may serve as a valuable source for Normet's representatives approaching the topic without prior familiarity.

The interviews and desktop study conducted for assessing Normet's readiness to adopt TCFD highlighted the company's novelty for embracing climate-related aspects in their sustainability reporting. While the results from the interview did not reflect awareness of any climate-related risks, opportunities, or accounting practices, the evaluation was concluded by considering Normet's ongoing actions towards environmental efforts. Notably, these current approaches were found to have potential to parallel the strategies supported by TCFD. Therefore, the assessment recognized that Normet could create a solid base for implementing TCFD with an enhanced focus on strategic alignment and climate-related risk management.

The benchmarking of well-known companies under the scope for disclosing TCFD provided insightful data on how the guidelines can be applied in practice. Even though the analysis was limited to three companies due to the time limitation, the author had researched multiple companies before selecting the three different, but most common approaches. Additionally, the level of clarity and quality found in other reports affected the decision not to analyze only direct competitors. The

outcome of project task 3 reflected that all three companies showed different strengths and weaknesses, supporting the statement that no report can be identical before the framework becomes standardized. This assured the leeway for making tailored recommendations for Normet that suit their goals.

Lastly, the recommendations chapter, which completed the project task 4, were built based on the previous project outcomes, as well as on the interviews directed to the consultants. Both interviews raised the importance of collaboration, which aligns with the challenges stated in the theory that cooperation and sharing expertise will overcome the challenge of novelty of TCFD. This is why the same aspect is emphasized in each stage of the adoption process in the recommendations and handbook. Another common discussion that was highlighted during the interviews was the connection of CSRD to the topic of TCFD. The CSRD is a new directive not discussed in the TCFD guidelines, but the interview results reflected its' growing relevance to support adopters to align with TCFD. This resulted for CSRD to be a crucial factor and trend to be considered in the handbook.

7.2 Recommendations

Regards to Normet, as The Task Force requires companies to conduct analyses for particular geographical areas, business lines or value chains, it is recommended that other subsidiaries or particular teams within Normet may also conduct a comparable TCFD analysis with a more specific scope. For this, Normet can modify the handbook, including its language or content, and pass it to other teams for introducing the new reporting strategy and recommended steps.

Moreover, as TCFD disclosures are becoming more common, the expectations are rising for the content and quality of the reports. Therefore, Normet may screen their competitors and conduct peer benchmarking in order to acquire a perspective of the standard, as well as seek external consulting. This could support Normet in the most challenging tasks, such as the quantification of risks, and correctly complying with updated TCFD-related regulations and policies, such as the CSRD or IFRS S1 and S2 standards.

In contrast for further research, the author encourages more in-depth studies to be made especially about the strategic and risk management aspects of TCFD. There is a need for broader exploration of scenario analysis, along with managing and quantifying climate risks and opportunities due to their relatively uncertain domains. Research could be conducted to discover connections between various approaches or methodologies and their effects on performance, usefulness, and clarity. The end goal of these studies would be to find out the best and easiest practices that could facilitate complying with TCFD.

7.3 Reliability, Validity and Relevance

The reliability of the outcome relies heavily on the diverse data gathered in the theoretical framework, desktop studies, benchmarking, and interviews. The theoretical framework is based on multiple sources, most importantly on Task Force's original TCFD recommendations from 2017. Certain sections, such as the listed risks and opportunities, as well as the recommendations for each core element were not cross-referenced because they all originate on the primary report by the Task Force. However, the components for completing the documentation for governance, strategy, risk management, and metrics and targets were researched from newer sources, as the 2017 version indicated outdated data.

The absence of strict rules may result in challenging to gather completely reliable data concerning external companies' reporting approaches. To increase reliability, renowned companies with good reputations and rewarded practices were selected for the analysis. Interviews with these firms could have added to the reliability, however, the author was unable to reach them. Instead, fresh perspectives were included from experienced consultants, one of whom specializes in TCFD, bridging the gap between theory and practice and reinforcing credibility.

The validity of the project is supported by strict adherence to the TCFD principles, as well as by using updated sources in the theory. Comparing the most recent Annual Reports for the external analysis ensures that the learnings are rooted in the latest practices. Moreover, the interviews conducted with the consultants focused on the current practices and future trends, which adds to the validity of the previous findings. Notably, the outcomes and the handbook remain valid until new regulations or standardization comes into effect, potentially affecting the validity on the long term.

The results of this project show high relevancy in today's evolving concern and unawareness of the potential consequences of climate change. While seeking interview candidates, it became apparent that the topic is still new even to professionals, which also reflected the varying availability and quality of TCFD reporting by external companies. By analyzing Normet's current practices, the thesis could offer practical relevance to the company with tailored recommendations of what they could focus on, avoiding repetition of suggestions that they already comply with. The inclusion of future trends and upcoming directives underscore the relevance of the project for future ESG reporting developments.

7.4 Project Evaluation

The objective of the thesis was to create a tailored handbook for Normet Group Oy to get familiarized with TCFD and gain practical steps for initiating their adoption process. The project tasks of the thesis provided insightful perspectives that together built a visual handbook that aims to

support Normet through the initial challenges of unfamiliarity to the topic, and to approach this new project through practical steps. The handbook serves as an introductory foundation and supplemental tool for Normet's TCFD integration process, nevertheless it is essential that the company follows the Task Force's report for full compliance regarding TCFD. The handbook is targeted for Normet and is not widely "ready-to-use" across different companies. However, as the content covers the fundamental pillars regarding TCFD adoption, faculties, researchers and other possible interested parties can apply the structure of this thesis to develop their own handbooks tailored for their own unique contexts and needs.

According to the comments of the author's contact person from Normet, the outcome of the project holds a good and logical structure. It has an appropriate scope and the approaching method is effective. Especially the transition from the theoretical perspective to practical findings and learning points were found to be useful. It was understandable that some stages of the project were not as clearly presented, given the topic is entirely new to everyone. Therefore, the author made diligent efforts to deliver a more concrete and coherent documentation. The outcome was later validated by the contact person from Normet, who confirmed that the product will be used as a supporting tool for their process. Additionally, it will be shared as an introductory and training material for other departments.

The process encountered a couple of setbacks due to the inability to reach different companies' representatives, abrupt resignations of the interview candidates or cancellations due to lack of expertise in the topic. However, these factors were taken into account in the author's project risk management. Therefore, the plans were changed from interviewing candidates about their experience on the TCFD reporting processes to developing broader questions for sustainability consultants about their own perspectives of the framework. The same factors also prolonged the process for data comparison and analyzing the conclusions, but the project tasks were still finished on time.

Despite the handbook's limitations of not covering all the required details regarding TCFD or offering direct experiences about the reporting processes, the project tasks were achieved successfully and provided Normet a diverse set of data for getting started. The outcome highlights beneficial action plans and considerations for tackling common difficulties, as well as offers a forward-looking aspect for future validity.

7.5 Reflection on Learning

This project resulted in a true learning experience for the author. The only background that had been acquired regarding this topic was the basic principles and nature of non-financial reporting and environmental accounting. The TCFD framework was a completely new concept at the

beginning of the project, which at first took a generous amount of time to fully comprehend as the reports are relatively long, complex, and extensively detailed. The broad scope also meant that the author had to first internalize the whole concept, after which she picked the most important points to discuss and make guided steps for. This developed the author's ability to understand large concepts and build simplified processes for educational purposes.

The author also learned to appreciate a previous course in which she studied companies' financial reports and accounting practices. This experience assisted in screening and picking the key information from Normet's and the external case companies' reports relatively smoothly. In fact, the stage of analyzing the practical implementation of TCFD recommendations played a critical cornerstone to the project. It not only offered insightful advice on how to carry out different duties, such as scenario analysis, but it also emphasized how crucial real-world experience is to completely understanding theory. This resulted in an important lesson that real-world examples may greatly help one understand and internalize complex scientific ideas when there is uncertainty.

The challenges encountered during the interview process enhanced the importance of having contingency plans. In future research, the author will not rely solely for the needed pool of candidates but will further identify potential candidates in case of possible cancellations. Moreover, to improve time efficiency and communication, the author will even more actively reach out to her contact persons for follow-ups in case they have not responded in time. This applies to interviewees, external companies' representatives, as well as the commissioning company. It's worth to note that maintaining seamless communication might become more challenging if the author is no longer present or part of the internal staff.

The author had a significant interest in ESG reporting prior to this project, which made the thesis writing a pleasant process. The author was actively reading different sustainability-related articles, as well as attended events in which she had the chance to meet people to talk about sustainability and get contacts for interview purposes. The project provided an extensive amount of new information about the diverse sector of sustainability. Diving deep into the theory of TCFD and discussing it with ESG professionals greatly inspired the author to learn more about the upcoming ESG trends and career possibilities within this field. The author is seeking to incorporate her professional knowledge gained through this thesis into her future Master's and working opportunities.

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Appendices

Appendix 1. Steps for assessing a Company's Readiness to Adopt the TCFD Framework

1. **Review the existing reports:** Evaluate the current state of climate-related disclosures in sustainability, annual and financial reports. Understanding the current reporting practices assist in getting an overview on how present sustainability matters are currently and what are the next steps for improved and more transparent reporting.
2. **Evaluate the company's governance:** Examine the governance practices for processing and monitoring climate-related concerns. Look for the managements roles and responsibility areas, as well as how the climate-related information is communicated to the management. Evaluate the clarity of this information.
3. **Revise the company's strategy:** List out the environmental factors affecting the strategy. Identify whether the company has considered climate-related risks and opportunities for short-, medium-, and long-term, and what could be their material impact on the company. Additionally, see whether the process of determining this information is reported and whether the risks and opportunities have been disclosed for each geographical area or sector of the business. Additionally, evaluate how climate-related concerns have been taken into account in the company's financial planning, performance, and position. If GHG emissions have been calculated, review whether the company has disclosed their method for transitioning to low-carbon economy. Lastly, look for climate-related scenarios that could be discussed in the reports and assess how their strategy's resilience has been evaluated.
4. **Assess the company's risk management:** Evaluate the firm's climate-related risks and any climate-related regulations taken into consideration. Look for the process to identify the risks, the scope of the risks and whether the applied frameworks are defined and explained. Review the process of managing the risks and whether the firm has made materiality determinations to prioritize the risks. Check if transition risks, physical risks, resource efficiency, energy source, products and services, or markets and resilience has been discussed. Lastly, review how risks have been integrated to overall risk management. The company should mention how climate risks are applied across risk management and overall report.
5. **Examine the current metrics and targets:** Review what climate-related metrics, targets and KPIs the company is currently measuring, what are the methods used to calculate these, do they provide historical data for comparison and is there is a connection between the metrics' performances and renumeration policies. Check whether the company is aware of their internal carbon prices or revenues gained from operating in a low-carbon economy and whether they have forward-looking metrics. Look for Scope 1-3 calculations and whether they align with the GHG Protocol methodology.

Appendix 2. SWOT analysis

Strengths: - Close engagement with stakeholders and understanding their expectations nurture mutual collaboration, R&D efforts, new technologies and knowledge - Normet's Board of Directors and Leadership Team are evolving the sustainability agenda - Business lines and sales areas are accountable for their respective goals ensuring integration of sustainability practices - Workshops and trainings ensure that climate-related information is monitored, communicated, and adhered across the business - Materiality analysis provides data about the climate effects on the firm - Scope 1 and 2, as well as energy efficiency, total waste, and recycling rate have been calculated - Dedication to reducing emissions from its own activities and value chain in line with the Paris Agreement - Optimized processes lead to better energy efficiency - Goal of having battery-powered configurations applied to all their main equipment models by the end of 2024, as well as establish more rigorous recycling and waste management procedures in the market areas globally	**Weaknesses:** - Normet does not clearly acknowledge any TCFD concerns or outlined risks in accordance with the TCFD guidelines yet - Missing scope 3 emissions, alongside disclosures of water use and wastewater treatment in water sensitive areas and historical data - No discernible impacts to financial accounting practices have been observed yet - Climate-related scenarios have not yet been built or formulated
Opportunities: - Green transition and decarbonizing global heavy industries raise new market opportunities - Circular economy emphasizes efficient use of materials and longer lifetime of equipment - TCFD increases Normet's trust and credibility among stakeholders - Reliable sustainability reporting could bring about new investment opportunities - Calculating all the GHG emission metrics that will unveil a holistic perspective of Normet's carbon footprint provides	**Threats:** - Incomplete environmental-related reporting practices could result in a negative reputation and lack of trust among the stakeholders if not reviewed and improved continuously - The absence of identified climate-related risks may lead to vulnerable situations and unanticipated disasters that could damage the company's financial performance and disrupt their operations - The lack of financial planning could cause unforeseen expenses - Inaccurate decision-making due to the absence of climate metrics may lead to

valuable insights for better decision-making and resource allocation - Bonus schemes amplify motivation and performance to pursuit these environmental goals	delays in progress toward desired targets or resource misallocation

Appendix 3. Interview with Normet’s Company Representatives X and Y

1. Could you tell about Normet’s current targets and goals related to the environment?
2. What are the key risks that could have a significant financial impact on Normet, and how do you identify and assess them? What about the opportunities?
3. How do climate-related risks impact Normet's financial performance and position?
4. Has Normet already taken into account scenario analysis?
5. Has Normet considered utilizing any industry-specific metrics to measure its climate-related performance?
6. In what ways does Normet consider climate-related information in its accounting process?
7. What software or reporting tools does Normet utilize for calculating sustainability metrics?
8. Are the climate-related metrics integrated into Normet's financial performance or budgeting process in any way?
9. Has Normet considered implementing compensation policies based on achieving climate-related targets?

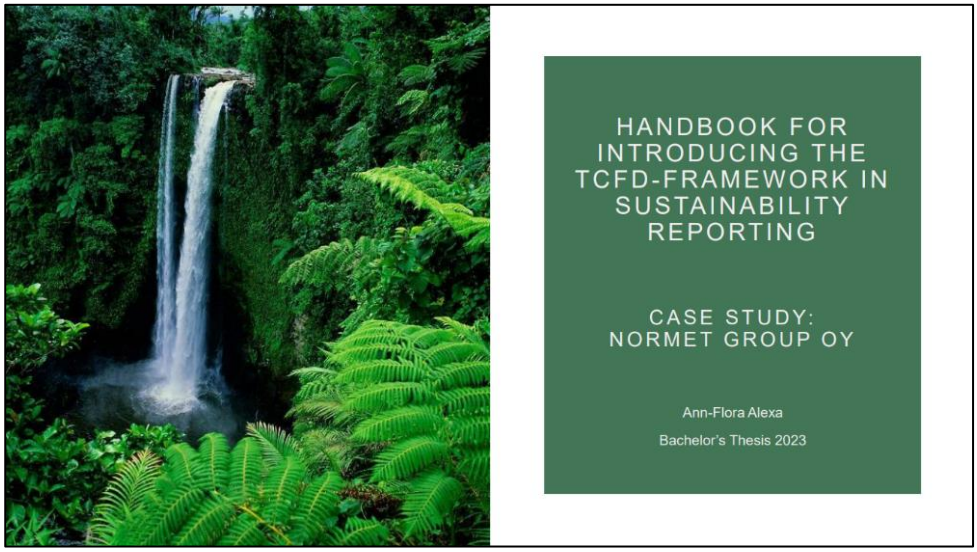
Appendix 4. Interview with Leonard Breukers

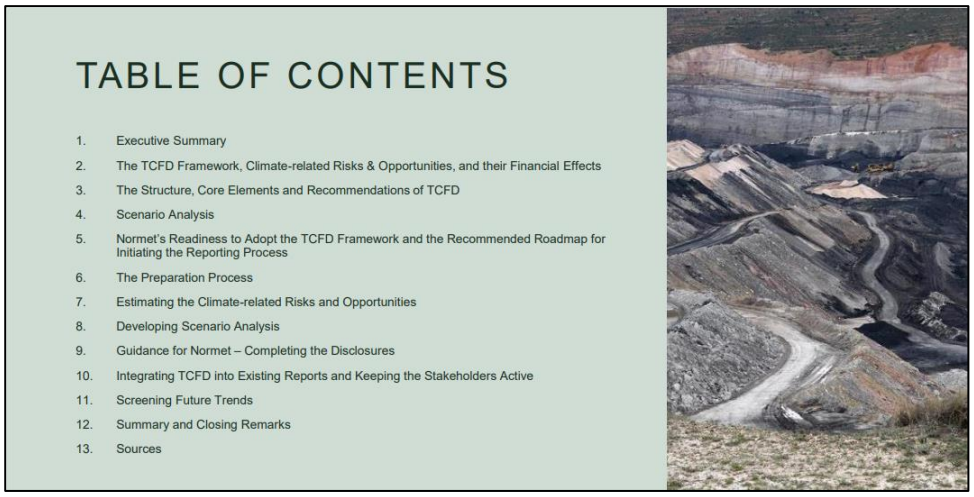
1. Could you provide an overview of the TCFD framework and how it supports climate-related financial disclosures?
2. From your perspective, what are the benefits and opportunities that a company can experience by adopting TCFD reporting?
3. What challenges and obstacles do you anticipate a company could face when they want to integrate this report? Do you have any recommendations on how to mitigate or overcome them?
4. How can you assure that the data is available and accurate for a company to start implementing the framework?
5. In your opinion, how can a company assess its readiness to adopt TCFD reporting? Are there any assessments available to identify strengths and areas for improvement?
6. What recommendations do you have for the first steps for a company when they want to start reporting about TCFD?
7. How can the report be tailored to align with the company's specific context? Are there any industry-specific or regional considerations that should be taken into account when implementing TCFD reporting?
8. How can TCFD reporting be integrated into a sustainability report without overlapping with the existing sustainability or financial reporting practices?
9. How can a company ensure to keep their stakeholders active in participating and collaborating in the reporting process? What are your recommendations for transparent and effective communication of TCFD findings to the stakeholders?
10. Are there any specific training or educational programs you recommend for to raise awareness and understanding of TCFD reporting?
11. Are you aware of any emerging trends or future developments related to TCFD reporting?

Appendix 5. Interview with Laura Savikoski

1. What is your own view of TCFD and what opportunities does its implementation bring to the company?
2. What are the main challenges during the adoption process and how could these be addressed?
3. How can companies ensure that the data related to reporting is reliable enough?
4. What do you think are the first steps companies should take when they want to adopt TDCFD reporting, and do you have any recommendations for starting the reporting process?
5. How can the report be tailored to match the company's own context? Are there industry-specific or regional considerations that should be considered when implementing TCFD reporting?
6. How can TCFD reporting be integrated into the sustainability report without duplicating existing reports? Would a separate TCFD share be a more appropriate approach?
7. How can a company ensure that its stakeholders remain actively involved in the reporting process? Are there specific trainings you would recommend for employees to increase awareness and understanding of TCFD reporting?
8. Are you aware of any emerging trends or future developments related to TCFD reporting?

Appendix 6. The Handbook





EXECUTIVE SUMMARY

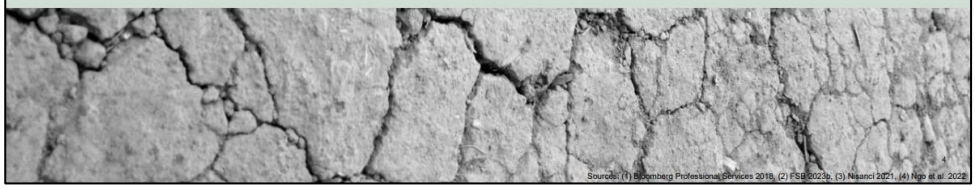
The climate change introduces new environmental hazards disrupting operations and financial performance

Environmental volatility and evolving policies expose companies to serious risks, but also to emerging opportunities

Researching about corporate stability against possible future climate events may lead to strategic innovations and mitigating potential losses

These insights are valuable for both firms and investors reliant on transparent disclosures for informed decision-making

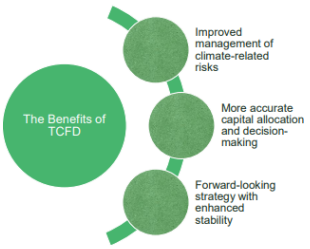
The absence of comprehensive reporting may lead to capital misallocation



Sources: (1) Bloomberg Professional Services 2018, (2) FSB 2023b, (3) Nisanci 2021, (4) Ngo et al. 2022

WHAT IS TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD)?

- A reporting framework published by Financial Stability Board and Michael R. Bloomberg in 2017
- Responds to the need for more transparent and accurate reporting
- Raises awareness on climate-related risks and opportunities both for companies and investors
- Uncovers the financial impacts occurring from transitioning towards a carbon-free economy
- Consists of 11 recommendations in the areas of governance, strategy, risk management, and metrics and targets
- Specific guidance is also offered for financial and non-financial organizations



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Sources: (1) TCFD 2017, (2) FSB 2023a, (3) FSB 2020.

CLIMATE-RELATED RISKS

Policy and legal risk	Changes in climate regulations either hinder the negative effects of climate change or encourage adaptation. The monetary risk depends on the character and timeline of the change. Legal risks arise from climate-related lawsuits emerging if the effects of climate change have not been managed and disclosed properly, and if the financial risks cause a person or entity to lose money.
Technology risk	Arises from adopting new technologies that assure a smoother transition towards an effective economy with reduced carbon emissions. It may pose financial losses due to the disruptions caused by the changes in demand, expenses of production and distribution, and overall competitiveness.
Market risk	Raising awareness on the risks and opportunities of the climate change are changing the supply and demand of products and services. The changes in interests for more environmentally friendly products for instance may increase the risk of uncertainty in the markets.
Reputation risk	Customers' and communities' attitudes are shifting regarding climate change. Organizations reputation depending on their level of involvement to reduce their carbon emissions. Negative perceptions increase when there is less commitment to new climate targets.
Acute physical risks	Caused by unexpected and harsh events. Climate change has aggravated the occurrence of severe weather conditions, such as floods and hurricanes, which are examples of acute, short-term physical risk.
Chronic risks	Resulted by long-term shifts in temperatures, overall weather, and environ-ment. Example consequences are raised sea levels and continuous heat waves.

6

Source: TCFD 2017.

CLIMATE-RELATED OPPORTUNITIES

Resource efficiency:	Helps businesses cut costs by enhancing operational productivity in areas including manufacturing, facility management, machinery, and transportation. Together with upgraded energy use, companies can support their trajectory towards cutting emissions and technological developments such as circular economy strategies, effective heating systems and more.
Energy sources:	Shifting to renewable and low-emission energy sources. This transition to generate for instance solar, hydro, and wind energy may lead to declined yearly energy costs and improved energy storage.
Products and services:	Inventing and developing new, innovative goods that have a minimized carbon footprint may boost companies' competitiveness. The same benefit can be achieved also due to the shifted consumer preferences, which may be more environmentally aware and thus find more interest in products and services that have been marketed as environmentally friendlier.
Markets:	Diversifying their operations and cooperating with other organizations may create opportunities in new markets and assets that are meant for a low-carbon economy. Funding green bonds and facilities could also potentially seize new opportunities.
Resilience:	Having the capability to handle transitional and physical risks and build resilience for climate change may open possibilities such as boosting efficiency and creating new products and manufacturing methods. Especially the firms relying on natural resources, infrastructure, long-lasting fixed assets and investments, as well as complex supply chains may find these particularly important.

7

Source: TCFD 2017.

THE FINANCIAL EFFECTS OF CLIMATE-RELATED RISKS AND OPPORTUNITIES

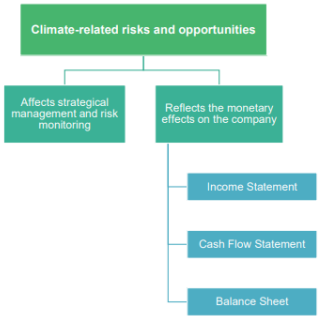
Revenues may raise or decrease due to physical and transition risks as they may alter the demand for products and services

Expenditures are tied to firms' cost structure and ability to upkeep resilience in case of climate hazards and opportunities. Companies are more likely to get funding if they transparently report their expenditure plans and adaptability to climate change.

Assets, especially long-lasting assets, and **liabilities** may face alterations due to legal, technology and market risks that could shift the supply and demand. Consequently, companies may decrease the residual value or write off assets which do not support the firms' environmental goals

Debt may raise due to climate-related losses or investments in R&D, which could shift the debt-to-equity ratio. Firms must therefore actively prepare for impairments and new funding.

Capital and reserves may fluctuate due to operational losses or asset write-downs. Both factors could potentially pose the risk of inability to request for more borrowings



8

Sources: (1) TCFD 2017, (2) PWC UK 2023.

THE STRUCTURE OF TCFD RECOMMENDATIONS

Recommendations For Implementation

Suggestions for
- The scope
- The assigned location for the disclosure
- Effective reporting

Recommendations For All Sectors

Suggestions for implementing the four core elements for all types of organizations
- Governance
- Strategy
- Risk Management
- Metrics and Targets

Industry-Specific Recommendations

Explicit suggestions for financial and non financial (below) organizations
- Energy
- Transportation
- **Materials and Buildings***
- Agriculture, Food, and Forest Products

*Normet belongs to "Materials and Buildings" according to TCFD

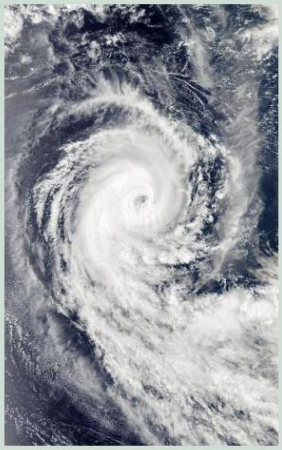
9

Source: TCFD 2017.

THE FOUR TCFD CORE-ELEMENTS AND THEIR RECOMMENDATIONS

Governance	Strategy	Risk Management	Metrics and Targets
a) Describe how the management oversees the climate-related risks and opportunities b) Describe the function of the management in evaluating and monitoring the climate-related risks and opportunities	a) Describe the firm's assessment of the short-, medium-, and long-term climate risks and opportunities b) Describe how the organization's operations, strategy and financial planning are affected by climate risks and opportunities c) Describe the firm's strategy resilience while considering various climate-related scenarios, for instance 2°C or lower scenario	a) Describe the procedures the firm uses to detect and evaluate climate-related risks b) Describe the procedures the firm uses to manage the climate risks c) Describe how the firm recognizes, evaluates and manages climate risks and how it incorporates them into the firm's entire risk management	a) Disclose the metrics that the firm uses to evaluate climate risks and opportunities in accordance with its strategy and risk management procedure b) Disclose Scope 1, Scope 2 and if relevant, Scope 3 GHG emissions, and the associated risks c) Describe the targets the firm uses to monitor climate risks and opportunities, and their performance against them

Source: TCFD 2017.



WHAT IS SCENARIO ANALYSIS?

- A tool helping companies to evaluate their performance in potential future circumstances of climate change
- Improves companies' strategy, financial and operational stability to recover from climate-related disruptions, and enhances forward-looking decision-making and innovative thinking
- It could bring awareness to changes in investment decisions, underwritings, funding allocation and financial inflows and outflows in certain areas
- Helps investors compare entities and their approaches for managing their risks and opportunities
- The most recommended one is the 2°C scenario, which requires companies to build a strategy which keeps the rise of temperatures between 1,5 and 2 degrees aligning with the Paris Agreement
- Challenges of adoption include lack of accurate data, tools and expertise, as well as uncertain methods for quantifying the analysis in monetary terms and evaluating future performance
- Companies should collaborate to foster development for analysis methods, use commonly utilized and accepted scenarios, and have the support of the Board and financial experts during the whole process
- An external stakeholder is encouraged to join to eliminate bias and widen the perspective

Sources: (1) TCFD 2017, (2) CDP 2023, (3) Huiskamp et al. 2022, (4) Delevingne et al. 2020, (5) TCFD 2021, (6) MarshMcLennan 2018.

CHALLENGES AND SOLUTIONS REGARDING TCFD ADOPTION

Incosistent and incomparable reports due to uncertainty of reporting guidelines and lack of expertise	•Stricter and clearer guidelines are needed •Follow new directives and standards such as CSRD and IFRS S1 and S2
Difficulty assessing financial and macroeconomic scenarios due to lack of available and consistent data	•Take part in educational courses •Follow guidance reports and tools provided by well-known organizations
Challenge of evaluating the financial impacts of climate risks and opportunities	•Calculate the decreased asset value caused by a climate hazard •Use the discounted cash flow model (DCF) and cost-benefit analysis
The management is not incentivized to manage and tackle climate risks	•Build a determined leadership to monitor the company's progress and link incentives and bonuses to climate objectives
Difficulty managing hazards which constantly change and are long-lasting	•Use scenario analysis, analyze the magnitude of the risk, and collaborate with a cross-functional management
Overlapping information	•Discuss general and climate risks seamlessly within the same report
Revealing confidential data beneficial to competitors	•Assess the sensitivity of the information and share qualitative, general level data, which can be detailed over time

Sources: (1) Ngo et al. 2022, (2) FSB 2021, (3) FSB 2023, (4) Khan 2023, (5) Pinchot et al. 2019, (6) MarshMcLennan 2018, (7) McMahon 2022, (8) Käsner 2020, (9) Nelson 2019, (10) TCFD 2022.

NORMET'S READINESS TO ADOPT THE TCFD FRAMEWORK

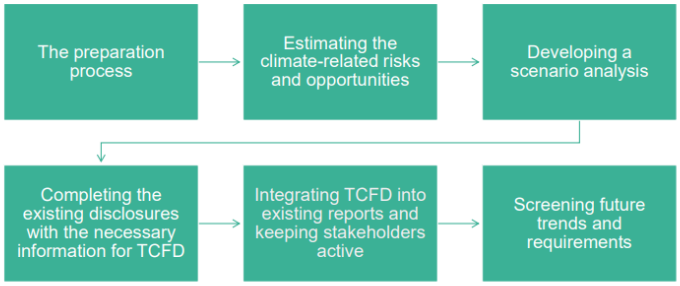
Governance	Strategy	Risk Management	Metrics & Targets
a) Normet describes how the management oversees the businesses risks, discusses the responsability areas and the sustainability plan, but does not yet discuss climate-related risks and opportunities	a) Normet discusses their strategy regarding new trends, challenges and targets that contribute to their sustainability ambitions, but has not addressed climate-related risks and opportunities yet	a) Normet has not yet detected climate-related risks and opportunities	a) Normet has calculatedsome metrics beneficial for TCFD, but has not yet incorporated other cross-industrial or forward-looking indicators
b) Normet explains the function of the management in evaluating and monitoring risks, but does not yet discuss the climate-related risks and opportunities	b) Normet has not yet considered climate-related risks and opportunities when planning their strategy or finances	b) Normet describes well their approach to mitigate other risks, however, they have not yet addressed climate-related risks and opportunities	b) Normet discloses Scope 1 and Scope 2, and is in the process to calculate Scope 3 and provide historical data
	c) Normet has not yet conducted a scenario analysis suitable for TCFD	c) Normet manages sustainability related matters together with the overall risk management	c) Normet calculates for example energy use, total waste, and recycling rate, but does not yet discuss the calculation methods or values per business line

Mostly disclosed
Partially disclosed
To be disclosed

I 3

Sources: (1) Normet 2022, (2) TCFD 2017.

ROADMAP FOR ADOPTING THE TCFD FRAMEWORK



I 4

1. THE PREPARATION PROCESS

- Engage the key stakeholders to the topic through discussion and workshops
- Build a project management team
- Familiaze each other about the TCFD framework and requirements
- Assess the current state of the sustainability reports and idenitfy the data gaps
- Set the project objectives and focus areas
- Include additional relevant stakeholders and provide training
- Discuss possible climate risks and opportunities and communicate the findings to the top management
- Identify the necessary tools and methods for data gathering

I 5

Sources: (1) Breukers 21 June 2023, (2) Savikoski 15 August 2023.

2. ESTIMATING THE CLIMATE-RELATED RISKS AND OPPORTUNITIES

Identify the climate risks and opportunities that could impact Normet on a long-term	Screen possible physical and transition risks, as well as possible opportunities
Conduct an in-depth analysis	Consider the cause, effects, size, velocity, time period, and the impact level of the risks, as well as the management and monitoring strategies
Quantify the risks (and opportunities)	Calculate the financial impact that a decreased asset value could cause due to damage, build a DCF model or use cost-benefit analysis
Forecast trends	Use historical data and scenario analysis

*Scenario analysis can be applied in all phases

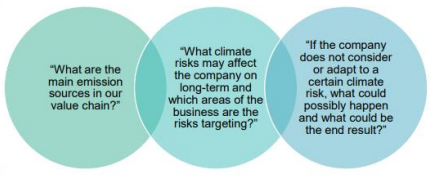
I 6

Sources: (1) Breukers 21 June 2023, (2) Savikoski 15 August 2023.

TIPS FOR IDENTIFYING RISKS AND OPPORTUNITIES

- There is no single method for identifying climate risks and opportunities for all organizations, but companies must customize assessments for their own situation and value chain
- To analyze the causes and effects of the risks, as well as on the management and monitoring strategies, companies must gauge the size and velocity of the risk, their time period, and the level of impact on the company
- Evaluation can be done in a qualitative or quantitative manner (or both), but must disclose the financial impacts either on a range from low to high or in quantified values
- The analysis can be built based on a combination of internal performance data, forecasts, organization-specific climate scenarios, and external data

Facilitating questions for identifying risks and opprotunities



Sources: (1) Nelson 2019, (2) PWC New Zealand 2022. (3) TCFD 2021.

EXAMPLE OF RISK IDENTIFICATION AND EXAMINATION CASE: INCREASED HEAVY RAINS IN FINLAND

Identification of a climate risk
- Heavy rains

Conducting an in-depth analysis
- Heavy rains may cause floodings, which could disrupt the supply chain and damage the manufacturing plants or the vehicles
- Actions to mitigate the risk includes constructing coated haul roads and enhancing drainage methods

Quantifying the risk
- Factors causing financial losses include for instance
  - costs from delays in transportation
  - costs from repairing of the plant or the product
  - administrative and service costs
  - insurance costs
  - decreased asset value and sales

Forecasting trends
- As the Earth's average temperature is expected to increase, the heavy rains are likely to happen more frequently. The risk is medium to long-term, and may cause medium financial impacts on the company if the risk is not managed

I 8

EXAMPLE OF HOW CLIMATE-RELATED RISKS CAN BE PRESENTED

Transition Risks			
Category	**Description**	**Financial Impact**	**Time Horizon**
Policy and Legal Risks	Describe the risk, its cause and its effect on the company	Range from Low-High	Range from Short - Long
Technology Risks	Example: The demand for carbon neutral vehicles requires shifting our R&D and production on electric-battery solutions. Neglecting this could potentially endanger our business's competitiveness and continuity.	High	Medium - Long
Market Risks	Example: The customer requirements have shifted and the demand for carbon-free products has increased. The mismatch between the customer needs and our offerings may pose risks to our comptetitiveness and sales.	High	Short - Medium
Reputation Risks	Example: The perception of the mining industry is tied to unsustainable and high emission activities, threatening the positive attitudes towards our business and customers	Intermediate	Medium

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Source: Adapted from Metso Outotec 2022

3. DEVELOPING SCENARIO ANALYSIS-RECOMMENDATIONS FOR THE STEPS

1. Discuss scenario analysis within the organization. Include the board, the CFO, CEO, and other relevant stakeholders (also external) to plan the assessment, and create a team who has the ownership of the task
2. Specify the targets, time frame and scope for the scenario analysis, including defining the countries, business sectors and operational areas
3. Evaluate the climate opportunities, as well as separately the physical and transitional risks the company may be exposed to. Identify the locations/business units that are likely to be affected, as well as the possible material impacts
4. Research and adopt 2-3 qualitative scenario analyses. 2-degree or lower scenarios are the most recommended. Examples: Shared Socio-economic Pathways by IPCC or scenarios by International Energy Agency.
5. Involve decarbonization targets and scenarios special for the company's own context. Examples: Science Based Targets, carbon pricing targets, net zero emissions targets or progressive yearly emission reduction targets in percentages.
6. Assess the results of scenario analysis, including potential economical gains and losses, as well as how the demand for products could change
7. Consider possible strategies and changes in the business operations or financial planning to tackle the climate-related challenges, as well as to benefit from the possible positive climate-related opportunities
8. Monitor and discuss the development and improvement areas to the stakeholders

20

Sources: (1) Breukers 21 June 2023, (2) Savikoski 15 August 2023.

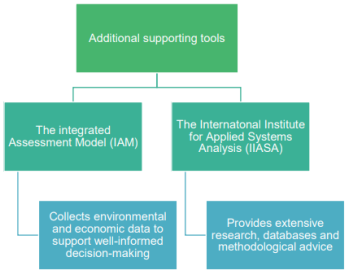
EXEMPLE SCENARIOS AND TOOLS FROM THIRD PARTIES

Intergovernmental Panel on Climate Change (IPCC)

- **The most optimistic scenario (SSP1-1.9)**
  - The maximum temperature increase being up to 1,5 degrees by 2050 → aligns with TCFD recommendations of using below 2-degree scenarios
- **The second most optimistic scenario (SSP1-2.6)**
  - Temperature increase of 1,8 degrees by 2100 → aligns with TCFD recommendations
- **The "middle of the road scenario" (SSP2-4.5)**
  - Temperature rise of 2,7 degrees before year 3000
- **The "dangerous scenario" (SSP3-7.0)**
  - A gradual temperature raise and doubled CO2 emissions by 2100 → may be useful for analysing possible negative consequences
- **The "avoid at all costs" (SSP5-8.5)**
  - CO2 levels doubled by 2050, temperature increased 4,4 degrees by 2100

International Energy Agency (IEA)

- Concentrates on energy modelling and the economic effect on companies, as well as on the energy markets and CO2 reductions
- **Net zero emissions by 2050**
  - Outlines the actions and time frames companies need to consider
  - Considers a maximum temperature rise of 1,5 degrees by 2050



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Sources: (1) ClimateData.ca. 2023, (2) Januta 2021, (3) Hausfather 2018, (4) UNEP FI 2020, (5) IEA 2022, (6) WBCSD 2022, (7) IIASA 2023.

4. GUIDANCE FOR NORMET, COMPLETING THE DISCLOSURES

Governance

- Demonstrate precise administering of climate concerns, involve clear expression of the decision-making hierarchy and oversight
- Consider revealing the management's plans to monitor the climate targets (the procedures, tools, and tracking mechanisms)
- Use visual representations like tables or hierarchical maps that outline the organizational structure.

Strategy

- Describe the climate-related risks, opportunities and objectives, and their time periods
- Discuss the company's resilience and goals using scenario analysis
- Disclose the impacts on R&D, assets, and capital planning
- Communicate the results of the scenario analysis and the action plans
- Create a decarbonization roadmap and share their life-cycle assessments to enhance their credibility and indicate their concrete actions.

Risk Management

- Align existing risk reporting methods with identified physical and transition risks, along with the measures for reducing these factors
- Focus primarily on the core risks and where they are located, or assign the climate risk assessment to be conducted by each subsidiary
- Uncover the risk identifying, evaluating, and monitoring methods
- Use systems such as Enterprise Risk Management, any environmental management systems, or scenario analysis
- Indicate the consequences of unmanaged risks
- disclose the responsibility areas and for assessing the risks

Metrics and Targets

- Calculate the missing TCFD and cross-industry related metrics, such as Scope 3 emissions, land and water consumption
- Consider sharing the sources and responsabilities for Scope 3 in the coming years
- Use widely adopted initiatives such as Science Based Target initiatives for decarbonization objectives
- Report about monitoring methods (possibly through an environmental management system or other calculation tools)
- Provide historical data for evaluating the process and future trends for all targets
- Create a consolidated table for actions taken and progress achieved thus far

22

Sources: (1) Normet 2022, (2) Stora Enso 2022, (3) Metso Outotec 2022, (4) Mitsubishi Corporation 2022, (5) TCFD 2022a, (6) TCFD 2022b, (7) TCFD 2022c, (8) TCFD 2022d.

5. INTEGRATING TCFD INTO EXISTING REPORTS AND KEEPING STAKEHOLDERS ACTIVE

Index Table

- Incorporate the TCFD-related disclosures into several sections smoothly throughout the Annual Report. Create an index table to list the locations of the data with the relevant page numbers

- **Avantages:**
  - Seamless integration of TCFD to the wider context
  - Demonstrates that forecasted climate risks and opportunities are taken into account in business practices
- **Disadvantages:**
  - Complex documentation affects readibility and comprehensiveness
  - Challenging to identify the TCFD data

Separate chapter dedicated to TCFD

- Discuss TCFD as a separate chapter in the Annual Report that centralizes the focus area on presenting the company's disclosures related to climate change

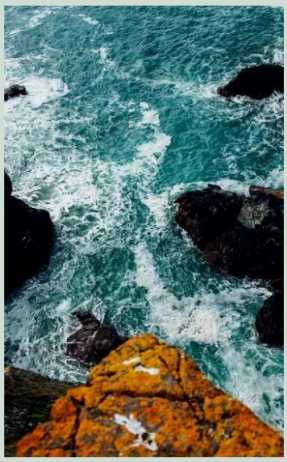
- **Avantages:**
  - Division gives a noticeable and transparent statement about the dedication to tackle TCFD
  - Easy path for stakeholders to study TCFD data in one place
- **Disadvantages:**
  - Possibility of disconnection between the climate aspects and the wider context
  - Misinterpretation for climate risks to be the most significant element of the risk evaluation

Keep the stakeholders active throughout and after the reporting process:

- Promote stakeholders' engagement, collaboration, and communication
- Hold inclusive meetings, including quarterly closings, and workshops
- Create bonus systems that are tied to sustainability and TCFD performance
- Join courses provided by well-known organizations, such as the Finnish Accounting Association or IFRS

23

Sources: (1) Breukers 21 June 2023, (2) Savikoski 15 October 2023.



6. FUTURE TRENDS

- Climate-related **regulations and standardization** are becoming more precise, improving comparability and data accuracy
- **Technological assessment tools** are advancing, and artificial intelligence will support accuracy and automation of TCFD reporting
- **Quantitative reporting** will increase
- **Corporate Social Responsibility Directive (CSRD)** supports TCFD
  - Expectations of the ambition level and quality of reporting are raising
  - Dual materiality analysis and stakeholder engagement becomes mandatory
  - Responsibility information will need to be verified by certifiers
- **New IFRS standards: S1 and S2**
  - IFRS 1 standard sets general requirements for Disclosure of Sustainability-related Financial Information
  - IFRS S2 standard sets standards for Climate-related Disclosures
- **Corporate Sustainability Due Diligence Directive (CSDDD)**
  - Requires companies to recognize, prevent and decrease the current and possible effects of their operations on the environment and infringements of human rights
- **Task Force on Nature-related Financial Disclosures (TNFD)**
  - Explores the risks and opportunities arising from the nature's perspective

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Sources: (1) Breukers 21 June 2023, (2) Savikoski 15 October 2023, (3) IFRS 2023, (4) KPMG 2023, (5) TNFD 2023.

SUMMARY AND CLOSING REMARKS

- TCFD is a reporting framework which helps companies identify and disclose their resilience against climate-related risks and opportunities
- Using tools such as scenario analysis may create a forward-looking strategy, which facilitates decision-making and accurate resource allocation
- This handbook provides a recommended roadmap and steps for getting familiarized with TCFD and initiating the reporting process, as well as special guidance for completing disclosures in alignment with TCFD
- As the Task Force requires companies to conduct analyses for particular geographical areas, business lines or value chains, it is recommended that other subsidiaries or particular teams within Normet may also conduct a comparable TCFD analysis with a more specific scope (therefore, the content of the handbook can be tailored according to Normet's needs and goals)
- It is worth to note, that even though the expectations for TCFD adopters are getting higher, the disclosures do not have to cover everything since the first reporting year, but can be detailed over time
- Additional support from the Task Force can be found on TCFD Knowledge Hub, which provides TCFD related tips and guidelines, as well as offers additional tools, sources and case sudies aiming to facilitate comparability and accessibility of data.

25

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