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Master's thesis in Strategy and Management & Business Analysis and Performance Management

Measuring What Matters in a Dynamic Business World

An Exploratory Case Study of Company and Stakeholder Perceptions of Materiality in the Renewable Energy Sector

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Abstract

An important step towards reaching the United Nations' 2030 Agenda and the associated Sustainable Development Goals, is to illuminate what impact companies and industries have on environmental, social and economic aspects. In this context, it is also crucial to understand what key stakeholders consider important, because they have the power to influence where the efforts of companies are directed. However, stakeholder perceptions of sustainability materiality in particular has proven to be a major research gap in the literature. This study takes an exploratory and qualitative approach to investigating how companies in the Norwegian renewable energy sector and some of their key stakeholders perceive sustainability through a materiality lens, including how they prioritize and operationalize sustainability issues. In total 14 representatives distributed among electricity production companies, electric grid companies, electricity retail companies, investors, NGOs, and regulatory bodies were interviewed to get a broad perspective on sustainability and materiality perceptions in the sector.

Based on a thematic analysis of the interview data, it is, broadly speaking, found that: (1) the stakeholders exert different kinds of pressure on the companies; (2) there are several conflicts of interest between companies and stakeholders and among stakeholders; (3) there is a general consensus on the materiality of environmental aspects, but more divergent perceptions of the materiality of social and economic aspects; (4) there is high uncertainty about which indicators should be used to measure impacts on sustainability; (5) there seem to be several systematic challenges to identifying and selecting sustainability indicators; (6) there seem to be several systematic factors for materiality, that together determine how issues evolve from being immaterial to being material; (7) the most protruding factor for materiality in general seems to be stakeholder pressure, especially from regulatory bodies. These findings are elaborated in detail and discussed in the context of literature from the fields of sustainability measurement and reporting, materiality, and stakeholder theory. Theoretical and practical implications are drawn from the study, and several avenues for future research are suggested based on the study's findings and limitations.

Preface

This thesis is written as part of our MSc in Economics and Business Administration at the Norwegian School of Economics, in collaboration with TERRAVERA Foundation. It constitutes 30 ECTS for each of the authors, and is the result of a fairly comprehensive and challenging study; as such we hope the thesis is able to provide some interesting and valuable insights, so that this major undertaking was worth its efforts.

We would like to start by thanking our supervisor, Associate Professor Lars Jacob Tynes Pedersen. When we started this project, we did so without knowing exactly which direction it would be headed. In this situation, it was reassuring to have Lars Jacob there to guide us through the uncertain process. He contributed with great knowledge and enthusiasm, and assisted us whenever needed. We also highly appreciate all the good discussions we've had, including the critical feedback and encouragement he has given us.

Another party that has contributed greatly to this project is the TERRAVERA Foundation, to which this thesis is the first academic contribution in the Renewable Energy Pilot Program. We are humbled to have had the opportunity to participate in this program, which we find extremely interesting and relevant, not to mention ambitious. In particular, we would like to thank Gyda Bjercke for our monthly meetings where she has contributed with great advice, fruitful discussions, and moral support; it has been a joyful cooperation with a touch of light-hearted humor amid all the seriousness. From the TERRAVERA Foundation we also would like to thank Erik Fossum Færevaag for presenting us with this opportunity and showing great interest in our work from day one.

We would also like to thank all of our interviewees who have taken time out of their busy schedule to share their knowledge and thoughts with us. This study would not have been possible without their willingness to contribute with their insights. Lastly, we would like to thank our family and friends, for supporting us throughout these months and contributing with good advice and feedback.

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Introduction

1.1 Background

The notion of a new geologic epoch coined as the "Anthropocene" is a hot topic in the current public and academic discourses. Although the Anthropocene is not yet formally recognized as a distinct epoch, extensive global evidence suggests that we have indeed entered a new geological unit of time, characterized by profound human influence on the Earth and its ecosystems (IPCC, 2018; WMO, UNEP, IPCC, & GFCS, 2019). The evidence ranges from chemical signals, to landscape changes, to biological changes, and indicates that the trajectory of the Earth System is being altered. This entails long-lasting changes, some of which with permanent effect (Subcommission on Quaternary Stratigraphy, 2019; Zalasiewicz, Waters, Williams, & Summerhayes, 2019). As a response to these anthropogenic pressures, an academic group in 2009 led by former director of the Stockholm Resilience Centre, Johan Rockström, identified the nine processes that regulate the stability and resilience of the Earth System (Stockholm Resilience Centre, n.d.). The nine proposed processes coined as the *planetary boundaries* define the thresholds for unsustainable development within the areas of "climate change", "ocean acidification", "stratospheric ozone depletion", "global phosphorus and nitrogen cycles", "biodiversity loss", "global freshwater use", "land-system change", "atmospheric aerosol loading" and "chemical pollution". Infringing one or more of the boundaries may induce irreversible environmental changes that could have catastrophic repercussions for human well-being (Rockström et al., 2009). In 2015, further research was conducted to provide a status on the planetary boundaries and update and strengthen the framework. The resulting report from Steffen et al. (2015) shows that four of the planetary boundaries (climate change, biosphere integrity, biogeochemical flows, and land-system change) have been exceeded as

a result of human activity. This includes the two identified "core" boundaries – climate change and biosphere integrity – which on their own could drive the Earth System into a new state if significantly infringed.

In the year of 2015, the United Nations (UN) launched the *2030 Agenda for Sustainable Development*, building on the Millennium Development Goals put forth in 2000. According to UN (2015), this Agenda is a "plan of action for people, planet and prosperity", which also "seeks to strengthen universal peace in larger freedom" (p. 1). The ultimate goal is to end poverty and create sustained economic growth within the planetary boundaries of the Earth, making it sustainable and resilient. The UN pleads that this is a collective journey with all nations, and pledges that no one will be left behind. As part of the Agenda, 17 global goals – also known as the Sustainable Development Goals (SDGs) – were developed alongside 169 targets to be reached within 2030 to ensure a sustainable development of the world. Despite considerable efforts and advancements being made in many areas the preceding five years, the UN reports that we are not on track to reach the SDGs by 2030 (Independent Group of Scientists appointed by the United Nations Secretary-General, 2019). A failure to act swiftly and purposefully to breach out of business-as-usual and adopt sustainable practices will put the world as we know it at great risk. The answer to solve the present challenges is by no means simple. The SDGs represent a complex and intertwined system, where action towards one goal inevitably has effects on other goals. Thus, it is simply not possible to achieve them with isolated efforts; rather, a systemic approach is needed, where new and innovative partnerships and shared knowledge is at the core (Independent Group of Scientists appointed by the United Nations Secretary-General, 2019). Joint effort between academia, business and the public is quintessential to achieve consensus and drive sustainable development forward. As we are entering what the United Nations Secretary-General refers to as the Decade of Action (UN, n.d.), mobilization and acceleration of sustainable solutions is called for.

One cannot imagine the 2030 Agenda being achieved without the private sector also taking part, with the mobilization of businesses and collaboration with multiple stakeholders. The Independent Group of Scientists appointed by the United Nations Secretary-General (2019) claims that the private sector has started the sustainable transition, for instance by adopting and reporting on sustainability standards. To be able to accurately measure local as well as global progress, there is a need for accessible tools that facilitate such measurement and reporting practices. There already exist numerous different reporting standards with a range of indicators to measure on, both general ones, topic-specific ones and sector-specific ones. Some of the most prominent standards are the ones from the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board

(SASB) and the International Integrated Reporting Council (IIRC) (Goldschein & Marks, 2019). In a study by Ceres (2018), it was uncovered that as much as 70 % of major global corporations use the GRI Standards in their disclosure, making GRI the leading global standard. While the purpose and focus of the various standards differ somewhat, they all provide frameworks and guidelines to facilitate corporate sustainability reporting. However, utilizing such standards for disclosure is voluntary, and companies adopting them stand free to tailor the reporting to their specific needs, for example by cherry-picking which indicators to report on. Furthermore, there is a divergence in how various issues are classified and evaluated, disagreement about which stakeholders to engage, and varying ways to measure sustainability performance (Delai & Takahashi, 2011).

The lack of a generally accepted framework for assessing and measuring sustainability performance is a problem, as it undermines the ability to accurately assess the *real* impacts of firms and compare the sustainability performance across firms (Boiral & Henri, 2017; Delai & Takahashi, 2011; Nikolaou, Tsalis, & Evangelinos, 2019). For instance, voluntary and highly tailorable reporting paves the way for heavily biased disclosure, as there is an incentive for firms to only disclose favorable information and contrarily hide adverse information. A number of studies provide evidence that such non-transparent disclosure is highly present in a multitude of sectors (e.g. Boiral & Heras-Saizarbitoria, 2020; Talbot & Boiral, 2018). Boiral & Heras-Saizarbitoria (2020) find that sustainability reports generally do not reflect critical sustainability issues or credible verification processes, nor do they tend to stakeholder concerns. Font, Guix, & Bonilla-Priego (2016) argue that "sustainability reporting is currently a legitimation tool to discharge responsibility and protect corporate image". Moreover, the complex and diverse nature of sustainability performance and its related indicators virtually makes verification of such information an insurmountable task for stakeholders themselves (Boiral & Henri, 2017). For sustainability reports to be of greater value, targeted stakeholder engagement in the reporting process is needed (Amran & Ooi, 2014). Unfortunately, a common pitfall is applying a stakeholder *management* approach rather than a stakeholder *engagement* approach, and thus not adequately engaging key stakeholders in the reporting process (Manetti, 2011). Neglecting the role of stakeholders is detrimental to both the quality and credibility of the resulting reports (Junior, Best, & Cotter, 2014).

An integral part of sustainability measurement and reporting is the concept of sustainability materiality (hereafter simply referred to as *materiality*), which is an extension of financial materiality in its traditional form (Eccles, Krzus, Rogers, & Serafeim, 2012; Edgley, Jones, & Atkins, 2015; Whitehead, 2017). GRI defines material topics as those significantly impacting economic, environmental and social dimensions and/or substantially affecting

stakeholder decision-making (GSSB, 2016a). Materiality assessments are thus crucial to identify and prioritize sustainability issues, while also accounting for stakeholder interests, according to GRI. As such, a good materiality assessment is grounded in stakeholder opinions, that are weighted according to the stakeholders' relative importance to the firm. Consequently, assessing materiality is an important step to ensure credible and informative sustainability disclosure, that has real value to stakeholders and are comparable across organizations (Calabrese, Costa, Levialdi Ghiron, & Menichini, 2019; Font et al., 2016; Rogers & Serafeim, 2019). However, materiality assessment practices suffer many of the same problems as sustainability measurement and reporting in general. One of the problems is that there is no uniform way to assess material issues (Calabrese et al., 2019), as this is a highly qualitative and subjective process (Cohen, 2016; Koehler & Hespenheide, 2014; Whitehead, 2017; Zhou, 2011). Furthermore, multiple scholars argue that the common lack of documentation on the assessment process and prioritization of issues, combined with divergent assessment practices, render materiality assessments non-transparent and incomparable across organizations (Boiral & Henri, 2017; Cohen, 2016). Materiality assessments also commonly include stakeholders as one "composite unit", representing only the most salient interests and concerns. The fact that stakeholders are diverse and can have vastly different perceptions and interests is often ignored, although it should be expected and taken into account (Calabrese et al., 2019; Lamberton & Zhou, 2011; Puroila & Mäkelä, 2018).

Although the importance of understanding stakeholder perceptions of materiality becomes evident when seen in the larger context, the research on this field is severely limited. Several studies have been conducted on stakeholder perceptions of social, economic and environmental impacts, although in various and highly specific contexts (e.g. AlWaer, Sibley, & Lewis, 2008; Byrd, Bosley, & Dronberger, 2009; Karanja, Mburu, & Gasparatos, 2020; Ladd, 2013; Peters et al., 2015; Petit & van der Werf, 2003; Ramos, Santos, Whitmarsh, & Monteiro, 2007). However, none of which, to our knowledge, look at stakeholder perceptions of sustainability issues through a materiality lens. There are a few studies that have investigated stakeholder perceptions of materiality (e.g. Font et al., 2016; Nishant, Goh, & Kitchen, 2016; Whitehead, 2017), but most of these are also highly context-specific and based on quantitative methods. Consequently, they do not provide deep insight into how various stakeholders perceive materiality or the rationale behind their prioritization of sustainability issues. Furthermore, while a lot of research has been done on sustainability indicators in various industries, very few studies, to our knowledge, have looked at stakeholder perceptions of such indicators. Thus, there seems to be a research gap on the topic of stakeholder perceptions of materiality and related indicators. Some studies have also pointed out this topic as an avenue for future research (Beske,

Haustein, & Lorson, 2020; Calabrese et al., 2019; Lamberton & Zhou, 2011; Nishant et al., 2016).

The lack of research on the field may be largely due to the fact that materiality in a sustainability context is a relatively new concept, that first now is getting adopted broadly in business. Consequently, materiality has only started to gain real momentum in academia the last few years. The most recent research on the topic suggests that materiality is not static; rather, materiality is seen as a dynamic concept that evolves over time (Eccles, 2020; Kuh, Shepley, Bala, & Flowers, 2020; Rogers & Serafeim, 2019; WEF & BCG, 2020). All research on this field has – to our knowledge – been initiated in the course of the last three years, and therefore marks the beginning of a new body of literature within the realm of sustainability materiality. A key characteristic of this new conception of materiality is that the perceptions and influence of various stakeholder groups are what define which issues are material in an industry, and how materiality develops over time. This study aims to contribute to the growing academic field of materiality, by qualitatively investigating stakeholder perceptions of sustainability materiality and indicators within the boundaries of one industry, and connecting it to the emerging concept of dynamic materiality. Specifically, the renewable energy sector in Norway is chosen as the case industry in which this phenomenon will be studied, and is presented in Chapter 3.

1.2 Motivation and research aim

This thesis is written as a link in the Academic Programs of TERRAVERA Foundation, and serves as a contribution to the Renewable Energy Pilot Program directed by them. In this context, the purpose of the thesis is to gain empirical evidence and insights into sustainability in the renewable energy sector, preferably relating to how this should be measured. The academic freedom is still safeguarded, so that the choice of approach and methods used to examine this topic falls on us as researchers. By contributing to this pilot project, the thesis may serve as a small contribution towards the broader mission of TERRAVERA Foundation, which is to create an open, collaborative platform for fact-based and transparent information on sustainability assessment in various industries.

On a more general level, the thesis may provide practical insights into what is deemed material with respect to sustainability in the renewable energy sector, which we hope can be of value to various stakeholders and decision-makers. Furthermore, an enhanced understanding of which issues are material, why they are material, and how they should be prioritized and operationalized, may prove to be valuable for the industry itself and its future work on sustainability, in addition to its stakeholders. Seeing as the renewable

energy sector plays a crucial role in fulfilling the SDGs and driving sustainable development forward, it appears to be a highly topical industry to study with respect to sustainability measurement and materiality perceptions. In this context, we hope the thesis can help shed light on some important aspects of sustainability measurement and materiality in the renewable energy sector and possibly beyond, and that way serve as a tiny contribution towards achieving the 2030 Agenda.

On another note, the thesis also aims to contribute to the academic field of sustainability materiality, which is relatively new and still developing. As previously mentioned, there still seems to be a lack of research on stakeholder perceptions of materiality specifically, let alone the rationale underpinning such materiality and its development over time. A range of scholars in this academic field highlight the need for more research on this particular topic. Beske et al. (2020) conclude in their article that "future research can add companies with different characteristics to gather more information on materiality analysis", and that "[...] another question arises, how companies deal with different/divergent interests and how they are aggregated during the materiality process". Although the authors in this case look at the disclosure processes and the methods for stakeholder and sustainability aspect identification, we posit that the statements still underline the general need for more research on stakeholder perceptions of materiality. Furthermore, Puroila & Mäkelä (2018) argue that "only by accepting plurality and acknowledgement of divergent stakeholder voices can the complex corporate sustainability impacts be fully understood". As we see it, the authors behind this statement clearly argue that understanding stakeholder perceptions is imperative to understanding corporate sustainability impacts. Consequently, studying stakeholder perceptions of materiality becomes highly important in the question of sustainability assessment. Kuh et al. (2020) supports this argument by stating that "We assert that the stakeholder perspective provides a critical input in determining materiality, as it provides the best proxy for experienced externalities".

The statements above are just examples illustrating the demand for more research on the stakeholder role in materiality. With root in the identified research gap, this study aims to gain insights into the theoretical landscape of materiality, specifically relating to stakeholder perceptions. The study may be valuable to enhance our understanding of the interplay of stakeholder perceptions and materiality, and how such dynamics can translate to the notion of dynamic materiality – or how an issue's degree of materiality develops over time within an industry. Furthermore, we investigate how actors in the renewable energy sector and their key stakeholders operationalize material aspects into measurable indicators, which is another question in its own right. No previous studies have – to our knowledge – investigated any of the mentioned topics within the renewable energy sector;

hence, this thesis explores the materiality concept in a previously unexplored setting. However, as the thesis is rather constrained with respect to time and scope, it may serve as a point of departure in the further investigation of materiality in the renewable energy sector, rather than providing any form of certain answer. Lastly, by writing a thesis in such a nascent academic field, within the setting of a turbulent and highly debated industry, we hope we can help stimulate productive and solution-oriented discussions that foster necessary actions to be taken towards sustainability in the renewable energy sector and beyond.

1.3 Research questions

On the basis of the preceding considerations, the aim of this thesis will be to shed light on the two following, main research questions:

* *RQ1:*
  How do companies in the Norwegian renewable energy sector and their key stakeholders prioritize and operationalize sustainability issues and assess their materiality?

* *RQ2:*
  How do sustainability issues evolve to become material in the renewable energy sector in Norway?

These two research questions together give direction for a qualitative study of materiality in the Norwegian renewable energy sector. Collectively, these research questions are fairly comprehensive, as they both are connected and comprise multiple implicit sub-questions.

The first research question is mainly concerned with assessing the materiality perceptions of the industry players and their key stakeholders, but also implicitly asks about the rationale behind labeling something as material. Additionally, RQ1 asks about how the companies and stakeholders prioritize and operationalize sustainability issues, which is part of the overall sustainability reporting process. Operationalization in this context is to be understood as the process of breaking down broad sustainability topics into concrete and measurable issues with relevance to the organization. An important part of this process is to identify, select, and measure the indicators most appropriate for determining the organization's sustainability. Prioritization is to be understood as the process of weighting various sustainability issues according to their materiality, or importance to the organization.

The second research question captures the connection to the concept of dynamic materiality,

and is concerned with investigating the reason why some issues become material while others do not, and the process through which materiality evolves in the industry. We acknowledge that these are somewhat broad research questions that potentially can head in many directions, although we do not necessarily view this as a weakness due to the fairly exploratory nature of the study.

1.4 Structure of the thesis

This thesis is structured in nine chapters, including the introduction. In Chapter 2 we provide an overview of relevant literature on the field, through a critical literature review. In Chapter 3 we present the research case being the renewable energy sector, before we describe the study and our methodological choices in Chapter 4. In Chapter 5 we present the results of the study, which are subsequently discussed in Chapter 6. In Chapter 7 we provide a conclusion that aims to answer the proposed research questions; additionally, we elaborate on the theoretical and practical implications of the study as well as its limitations, before suggesting avenues for future research. Lastly, the bibliography and appendices are provided in Chapter 8 and 9, respectively.

2

Literature review

This chapter gives an overview of the literature relating to the main topics of sustainability measurement and materiality, and seeks to present the theory development leading up to the research questions. Since this is first and foremost an exploratory study, the literature review has three main functions. First, it shall establish the "universe" in which we operate, i.e. the universe of sustainability, sustainability measurement and reporting, materiality, and stakeholder theory. An integral part of this is explaining the relevant terms and perspectives required for understanding the setting in which the research questions take place. Furthermore, research on sustainability and materiality inevitably touches upon an array of different fields of research; thus, an explanation of the most important concepts and the connections between them is called for. This leads to the second function of the literature review, which is laying out the research landscape. The point of this is to present what has been researched on the topic before, and identify research gaps in the academic literature. Thirdly, the literature review serves as a reference point against which the results of the study can be discussed, and is thus integral to determining which findings are new or surprising, and subsequently develop new theories and hypotheses.

The literature review is divided in four main sections, representing the most important facets of the overall topic of the thesis and its research questions. First, we give an introduction to the concept of sustainability and what it entails, in addition to establishing some important terms that will be used throughout the whole thesis. Then, we introduce the concept of sustainability measurement and reporting, which builds on the general concept of sustainability, and is at the core of RQ1. Here we also define some important terms for the subsequent chapters. Following this, we elaborate on the concept of materiality, which is a cornerstone in sustainability reporting and the core of this whole study. Both research questions rely on perceptions of materiality with respect to sustainability, and

so theory about materiality and development thereof becomes imperative to this study. However, materiality is only understood when seen in the context of its very foundation: stakeholders. That is why we finish off the literature review by presenting multiple facets of the stakeholder theory and describing the connection between stakeholder theory and materiality. It should be noted that the literature review is meant to present a general overview of what we consider to be the most relevant literature; it is not meant to provide an exhaustive description of all literature in the field nor go in depth on any specific topic. Below is a conceptual hierarchical model that illustrates the connections between the various facets of the literature pertinent to this study. Note that the model presents a linear relationship, which is a highly simplified reality only intended for structuring the theoretical landscape in simple and comprehensible terms; in reality, there is a web of connections and dependencies between the topics.

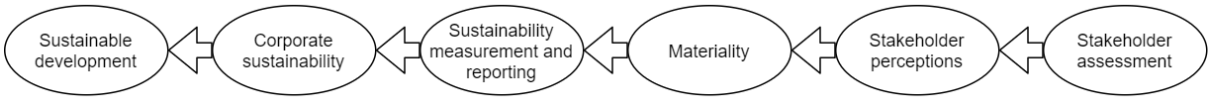

Figure 2.1: Conceptual hierarchical theory model

2.1 Sustainability

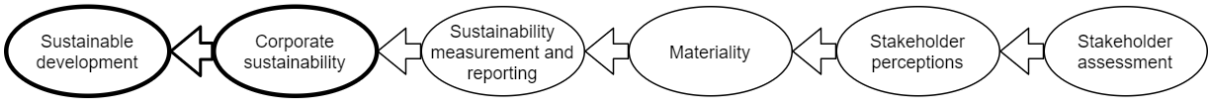

Figure 2.2: Section 2.1 in relation to the theoretical landscape

2.1.1 What is sustainability?

One of the most widely used and acknowledged definitions of sustainable development stems from the 1987 report *Our Common Future*, also known as the *Brundtland Report* by the World Commission on Environment and Development (WCED). WCED, also known as the *Brundtland Commission*, was chaired by the former prime minister of Norway – Gro Harlem Brundtland – which now is crowned the "mother of sustainable development" due to her impactful work. The Brundtland Report defines sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). While this is a historically groundbreaking definition that helped put sustainability on the agenda, it fails to capture the complex nature of the sustainability concept. It is also a definition on sustainable

development, and as such does not define the "end state" that is sustainability. We therefore need a more tangible definition that captures the most important aspects of the sustainability concept in a more concrete way.

Sustainability is, however, a concept that has proven difficult to define. Even though the concept is ubiquitous today, there is no general agreement about what constitutes sustainability, and definitions differ across context of application (Vos, 2007). However, nearly all definitions of sustainability share common elements, according to Vos. The first commonality is relating environmental problems to the economy and society, and emphasizing that the interconnections between them must not be taken for granted. In this setting, there is usually a focus on the impacts caused by humans on the environment and ecosystems (Salomone, 2014), but also on factors such as economic growth, social equity, protection of the environment, and the role of institutions (Bell & Morse, 2008; Wong, 2014). These interconnections are usually described as a "triangle", consisting of the three elements *economy*, *environment* and *society*, or similar terms. The "triangle" is often illustrated with overlapping circles in a Venn diagram, as shown in Figure 2.3, and is often referred to as *the three pillars of sustainability* (Purvis, Mao, & Robinson, 2019). However, a theoretically rigorous description of the three pillars does not seem to exist, according to Purvis et al. Another distinguishing characteristic of the sustainability concept is its focus on the long term, even through multiple generations. A final shared element, Vos argues, is the emphasis on working beyond mere compliance with existing laws and regulations.

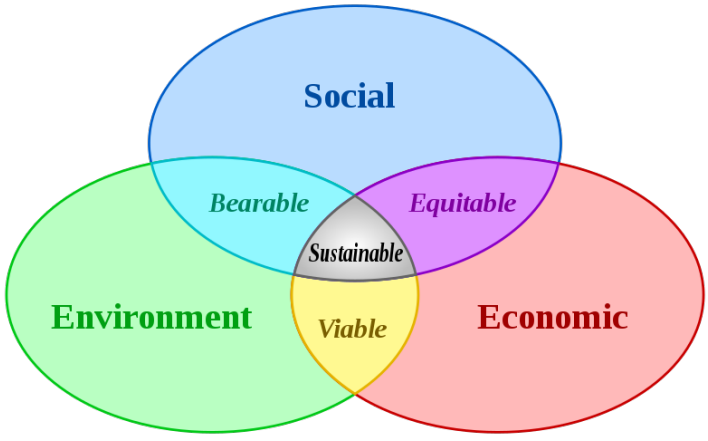

Figure 2.3: The three dimensions of sustainability (Dréo, 2006)

Even though a theoretical description of the three pillars of sustainability is not present, it is quite intuitive what they encompass. The environmental pillar concerns issues relating to effects on the environment; central issues are emissions, waste management, material

use, air quality, water quality and ecosystem services, including biodiversity (U.S. EPA, 2015). Most attention is generally directed towards the environmental pillar, possibly because of the large negative externalities that are associated with it, which are not yet fully costed (Beattie, 2019). The social pillar is mostly concerned with *social license* (Beattie, 2019), which refers to "the ongoing acceptance or approval of an operation by those local community stakeholders who are affected by it and those stakeholders who can affect its profitability" (Moffat, Lacey, Zhang, & Leipold, 2016, p. 480). Human health, participation, resource security, education and community empowerment are fundamental facets of the social pillar (U.S. EPA, 2015). It also encompasses more specific issues like employment, human rights, equality and working conditions throughout the supply chain.

The economic pillar is the one resembling traditional business practices, with concerns like profitability, compliance, governance and risk management (Beattie, 2019). Profitability is a prerequisite to sustainability, and therefore the economic pillar is just as important as the other two. However, sustainability can per definition *not* be achieved where profitability trumps the social and environmental pillars; all three pillars must be seen in conjunction to account for their interconnections. This notion of sustainability was in many ways popularized by the business author and consultant *John Elkington*, who in 1994 coined the term *triple bottom line* as a way of measuring corporate performance based on sustainability principles (Elkington, 1994; Kenton & Berry-Johnson, 2020), and further elaborated on in (Elkington, 1998). The triple bottom line (TBL) consists of the three elements *profit*, *people*, and *planet*, which coincide with the three pillars of sustainability. According to Kenton & Berry-Johnson (2020), "TBL theory holds that if a firm looks at profits only, ignoring people and the planet, it cannot account for the full cost of doing business".

When talking about sustainability or sustainable development in a corporate context – as with the TBL – it is often referred to as *corporate sustainability* (Dyllick & Hockerts, 2002; Steurer, Langer, Konrad, & Martinuzzi, 2005), which is defined as "adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining and enhancing the human and natural resources that will be needed in the future" (IISD, Deloitte Touche, & WBCSD, 1992, p. 1). This definition is more business oriented, but still captures the essence of the original definition of sustainable development proposed by the WCED. In the financial sector, the reigning definition of sustainability revolves around the environmental, social and governance (ESG) criteria, which enable investors to better assess risks and opportunities in order to make more informed investment decisions (Bassen & Kovács, 2008). ESG is in many ways congruent with the three pillars of sustainability, although with a different framing. The biggest

difference is the *governance* criteria in contrast to the *economic* pillar, where the latter embraces a wider scope of issues. Due to the similarities, the governance criterion can be considered a part of the economic pillar of sustainability.

In this thesis, we will use the ubiquitous definition of sustainability based on the three pillars *economy*, *society* and *environment*. In the academic discourse, this definition is predominantly used synonymously or interchangeably with the concept of sustainable development derived from the Brundtland Report, which takes away any distinction between them (Purvis et al., 2019). Purvis et al. argue that "the recent articulation of the SDGs has further entrenched the notion of 'sustainable development'". The term "CSR" is also commonly used when referring to a company's sustainability efforts, and the lines between CSR, sustainable development and corporate sustainability have become strongly blurred (Steurer et al., 2005). In this thesis, we will use the terms "sustainability" and "corporate sustainability" interchangeably with the same meaning, unless explicitly stated otherwise. The term "sustainable development" will be used in a similar fashion, but refer more to the *process* rather than the *state* of sustainability. We will refrain from using the CSR term, except for in instances we find such usage particularly suitable.

2.1.2 Drivers of sustainability

There is a growing consumer expectation of sustainable business operations and products (Whelan & Kronthal-Sacco, 2019), and even an increased willingness to pay for sustainable products (CGS, 2019). At the same time, businesses are increasingly adopting sustainable practices to meet the expectations of various stakeholders. Whitehead (2017) points out that drivers of sustainability have been considered from different angles by a range of studies. Whitehead further emphasizes that the importance of drivers differ between studies, but that four primary drivers are common. The four drivers identified are *market demands*, *societal desires*, *regulatory requirements* and *business sustainability*; these largely concur with the drivers identified by Lozano (2015).

There is commonly drawn a distinction between *internal* and *external* drivers of sustainability (Lozano, 2015; Whitehead, 2017). Some authors also make a distinction between "push" and "pull" factors that can act as drivers for sustainability efforts (e.g. Jørgensen & Pedersen, 2018), which to some extent resemble the internal/external driver dichotomy, although from a different angle. Internal drivers arise from within the organization (Whitehead, 2017), and include, inter alia, ethical leadership, risk management, protection of business reputation, improvements in economic values and enhancements in corporate image (Lozano, 2015). Consequently, external drivers arise from outside of the organization, and include, inter alia, national policies, NGOs (non-governmental organizations) and

stakeholder pressure (Lozano, 2015). Lozano emphasizes that internal drivers deal with processes inside the organization, while external drivers are concerned with the relations with external stakeholders. In his study, Lozano found the most important internal drivers to be *leadership* and *the business case*, while the most important external drivers were *customer demands and expectations*, *regulation and legislation*, and *society's raising awareness*. It should be noted, however, that external drivers may influence internal drivers (Harris, 2007, as cited in Whitehead, 2017), and that the interactions between internal and external stakeholders are seldom considered (Lozano, 2015). Lozano makes a new group of drivers termed "connecting drivers", in which *reputation* and *sustainability reports* are found to be the most important ones. Figure 2.4 illustrates the corporate sustainability driver model developed by Lozano, which includes internal and external drivers as well as the drivers that connect them.

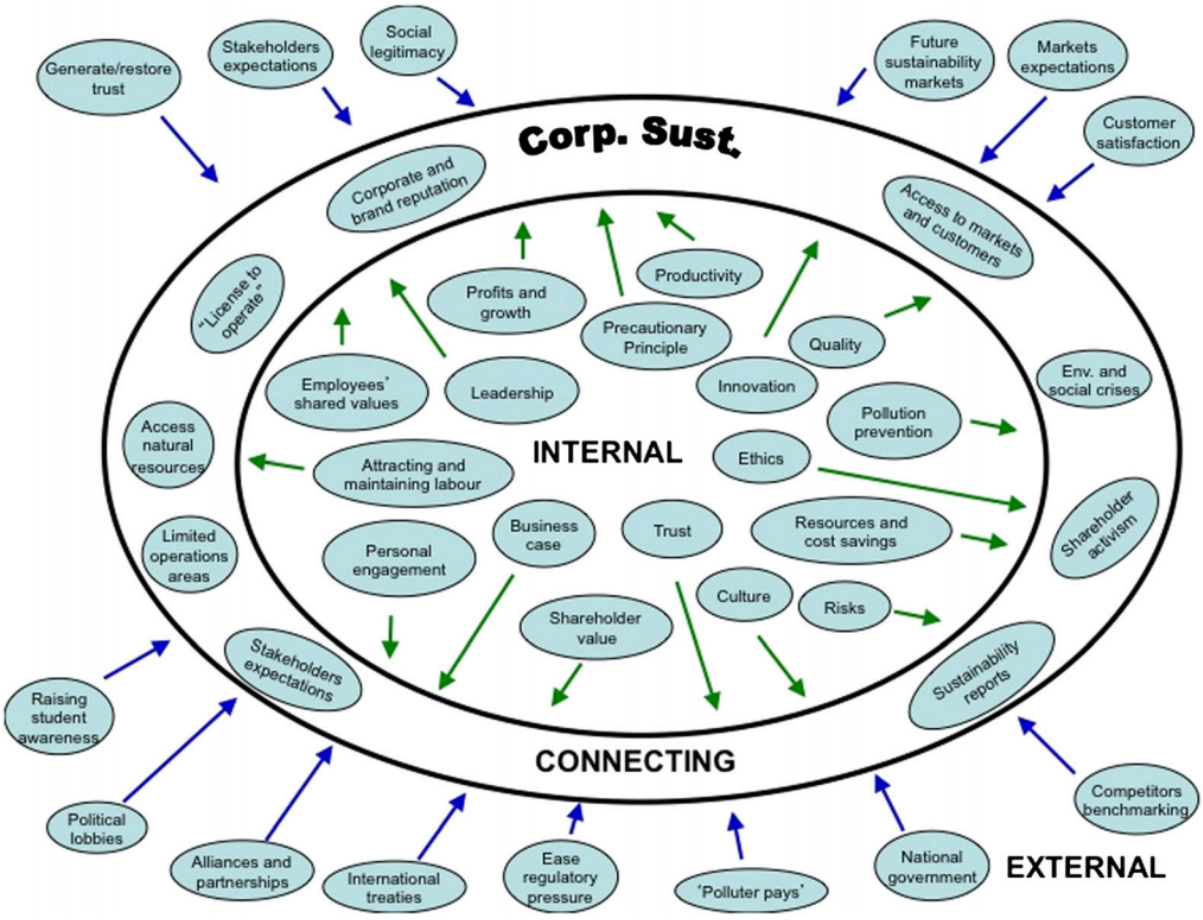

Figure 2.4: Corporate sustainability driver model (Lozano, 2015)

2.1.3 Sustainability in the renewable energy sector

The renewable energy sector is generally seen as a "green" industry. This is largely due to the massive upsides with renewable energy production and distribution, like long-term

security of electricity supply, enhancement of the diversity in energy supply markets, reduction of local and global atmospheric emissions, and economic growth and human development (UNDP, 2019). Other upsides include new employment opportunities and local manufacturing of equipment (UNDP, 2019), and reduction of environmental and health impacts (Owusu & Asumadu-Sarkodie, 2016). Although there is still limited knowledge regarding the interrelations between sustainable development and renewable energy (Owusu & Asumadu-Sarkodie, 2016), research suggests that the renewable energy sector has a major role in driving sustainable development forward (Dincer, 2000; Güney, 2019), by providing a secure supply of "clean" energy that substitutes the energy derived from unsustainable sources such as oil, coal and natural gas. Firms partaking in this transformation are contributing to several of the SDGs (Güney, 2019) – either directly or indirectly – due to their interconnected nature, mainly goal 7 - affordable and clean energy, and goal 13 - climate action (UN DESA, n.d.).

However, UNDP (2019) emphasizes that this transition largely relies on technological and organizational development that makes renewable energy technologies affordable, and on "the political will to internalise environmental costs and other externalities that permanently increase fossil fuel prices" (p. 267). A report from IEA, IRENA, UNSD, WB, & WHO (2019) shows that the world is making progress towards SDG 7, but that the current rate of ambition is insufficient to meet the targets by 2030. The report further shows that the use of renewables (i.e. sources of renewable energy) to generate electricity increased rapidly the last years, but that progress in heat and transport still lags behind. Furthermore, IEA et al. (2019) emphasize that "despite remarkable progress over the past decade, renewables still face persistent financial, regulatory, and sometimes technological barriers" (p. 8), and that harmonious policy making is crucial to foster a transition to renewable energy.

Despite the many positive impacts of renewable energy deployment on society and the environment as well as its gigantic potential, there appears to be some inevitable trade-offs associated with it, particularly with respect to the social impacts (Santoyo-Castelazo & Azapagic, 2014), where public acceptance is at the heart (Evans, Strezov, & Evans, 2009). Other important aspects include greenhouse gas emissions through the life cycle, land use, water consumption, capital costs, resource scarcity, technological limitations and energy efficiency, although the magnitude of these vary depending on the renewable energy technology (Evans et al., 2009). In general, both Evans et al. (2009) and Onat & Bayar (2010) find wind power to have the lowest total negative impacts on sustainability, followed by hydropower, photovoltaic, and geothermal. However, wind power is found to require larger land areas and more capital than the other technologies.

2.2 Sustainability measurement and reporting

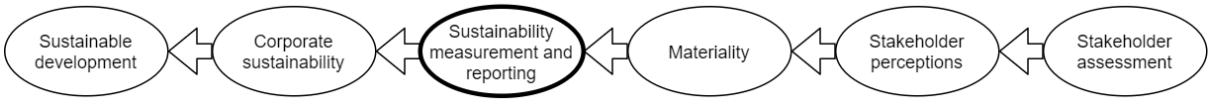

Figure 2.5: Section 2.2 in relation to the theoretical landscape

2.2.1 What is sustainability reporting?

As the focus on sustainability has been increasing worldwide (ICC Commission on Environment and Energy, 2015; Roca & Searcy, 2012), companies are increasingly disclosing information about sustainability aspects of their business (Amran & Ooi, 2014; Ceres, 2018). Consequently, companies are to a greater extent starting to communicate their sustainability efforts to the public, through *sustainability reporting* (Roca & Searcy, 2012). GSSB (2016a) defines sustainability reporting as "an organization's practice of reporting publicly on its economic, environmental, and/or social impacts, and hence its contributions – positive or negative – towards the goal of sustainable development" (p. 3), while WBCSD (2002) defines it as "public reports by companies to provide internal and external stakeholders with a picture of the corporate position and activities on economic, environmental and social dimensions" (p. 7). As these two definitions illustrate, sustainability reports present information about economic, environmental and/or social aspects of the business publicly to a variety of stakeholders. It is in principle the way companies communicate their performance on the three pillars of sustainability or the triple bottom line (see Section 2.1.1), which can be beneficial for both internal and external stakeholders (Chekwa, Ogunbgure, Hunter, & Garten, 2018). Additionally, sustainability reporting may be regarded as a process of *sustainability assessment*, which can be defined as "any process that aims to direct decision-making towards sustainability" (Bond & Morrison-Saunders, 2011, derived from Hacking & Guthrie, 2008, as cited in Pope, Bond, Hugé, & Morrison-Saunders, 2017). Sustainability reporting is strongly related to, and often used synonymously with the terms "nonfinancial reporting" (Amran & Ooi, 2014), "triple bottom line reporting" and "CSR reporting" (see e.g. Milne & Gray, 2013), besides being a central part of *integrated reporting* (GRI, n.d.-b; Milne & Gray, 2013).

The reasons for companies to report on sustainability performance are many, some of which relate to stakeholder expectations and pressure (e.g. Cuadrado-Ballesteros, Martínez-Ferrero, & García-Sánchez, 2017; GSSB, 2016a; Silva, Nuzum, & Schaltegger, 2019), effects on reputation and brand name (Amran & Ooi, 2014; EY & BCCCC, 2016), financial risk and competitive position (EY & BCCCC, 2016), compliance with disclosure regulations

(GRI, 2013b; Vormedal & Ruud, 2009), performance benchmarking (Atkinson, 2000), and information asymmetry (Cuadrado-Ballesteros et al., 2017). In order to produce sustainability reports, firms may have to analyze processes and collect data about things they previously did not measure (EY & BCCCC, 2016). The information disclosed in sustainability reports may be of both qualitative and quantitative nature (Daub, 2007; GSSB, 2016a), and thus reflect different kinds of data. Consequently, the accuracy of qualitative and quantitative information is determined in separate ways (GSSB, 2016a).

2.2.2 Measuring sustainability through indicators

A central element of sustainability reporting is the disclosure of company performance on a set of indicators; such indicators are seen by many as the core element in operationalizing sustainability (Bell & Morse, 2008), and are thus crucial for measuring and evaluating sustainability. An *indicator* can be defined as "something that provides useful information about a physical, social, or economic system, usually in numerical terms" (Gallopín, 1997, as cited in Farrell & Hart, 1998). More concretely, Gallopín (1997) describes indicators as *variables*, where a variable is defined as "an operational representation of an attribute (quality, characteristic, property) of a system". Furthermore, Gallopín argues that "desirable indicators are variables that summarize or otherwise simplify relevant information, make visible or perceptible phenomena of interest, and quantify, measure, and communicate relevant information", and in some cases are used to "*evaluate* a condition or phenomenon". In the setting of sustainability and sustainable development, indicators are, according to Wong (2014), "statistics that are used to measure social equity, economic growth, institutional capacity, and environmental protection to ascertain the different dimensions and levels of sustainable development".

There is drawn a distinction between *qualitative* and *quantitative* indicators, and Gallopín (1997) argues that an indicator in principle could be either a qualitative (nominal) variable, a rank (ordinal) variable, or a quantitative variable. Although one of the essential functions of indicators is to quantify, qualitative indicators may be preferred in cases "when quantitative information is not available; when the attribute of interest is inherently non-quantifiable; and when cost considerations become determinant" (Gallopín, 1997). Sometimes the term *Key Performance Indicator (KPI)* is used interchangeably with the term *indicator* when speaking of sustainability measurement (see e.g. Adams & Frost, 2008; Lydenberg, Rogers, & Wood, 2010), although KPIs in theory are more directed towards measuring a company's success against a set of goals or targets (Twin & James, 2020). Furthermore, Lydenberg et al. (2010) argue that sustainability KPIs can play a crucial role in sustainable development, and should be included as a part of companies' financial reporting. Note that throughout this thesis, we distinguish between *indicators*

and *aspects*, where indicators represent specific and measurable variables in line with the definitions above, and aspects represent sustainability subjects of varying granularity. An aspect can comprise many indicators and sub-aspects, and is often used interchangeably with the terms *issue* and *topic*, although these may be used somewhat more generically.

2.2.3 Reporting standards

After the introduction of the 2030 Agenda and the SDGs, many businesses have adopted the SDGs and integrated them into their sustainability work and reporting. Each SDG has multiple targets and indicators to measure its progress, with 169 targets in total. However, implementing the SDGs in the business strategy has its major limitations, as the SDGs and their related targets and indicators provide systemic guidelines to reach sustainability in society at large, and hence do not provide detailed guidelines for attaining sustainability in a company. Nevertheless, recommendations for companies on how to manage corporate sustainability and best work towards the SDGs have been created, such as the Ten Principles of the UN Global Compact and the SDG Compass (GRI, UNGC, & WBCSD, 2015). Furthermore, numerous standards and frameworks have been initiated to bridge this gap, by providing guidelines on sustainability measurement and reporting, and by facilitating the operationalization of sustainability into concrete topics and indicators, enabling organizations to measure their impact on a range on sustainability issues (GRI, n.d.-b).

Today, the three most widely known frameworks for sustainability reporting are the GRI Standards from the Global Reporting Initiative (GRI), the Integrated Reporting Framework from the International Integrated Reporting Council (IIRC), and the SASB Standards from the Sustainability Accounting Standards Board (SASB) (Calace, 2016; Goldschein & Marks, 2019). Apart from these, there exist a few more specialized reporting standards, a range of reporting guidelines and helping tools, certification standards, and even dedicated ESG reporting guides. This wide dispersion of different reporting standards, frameworks and tools has created confusion about sustainability disclosure and led to problems with the integrity, reliability, and comparability of reports (Boiral & Henri, 2017; Delai & Takahashi, 2011; Nikolaou et al., 2019). It should in this context be mentioned that the Carbon Disclosure Project (CDP), the Climate Disclosure Standards Board (CDSB), GRI, IIRC and SASB very recently have initiated a large cooperative commitment to develop a comprehensive and unified reporting system (CDP, CDSB, GRI, IIRC, & SASB, 2020), which is a huge step in the right direction. However, the frameworks from GRI, SASB and IIRC are still the ones generally used for direct reporting purposes, and therefore we give a brief introduction to these three reporting frameworks in the following.

The GRI Standards

The Global Reporting Initiative (GRI) is an international and independent organization working towards helping governments and businesses to understand sustainability issues, and enabling them to communicate these (CRD, 2019; GRI, n.d.-a). Since GRI launched their first guidelines on sustainability reporting in 2000, they have introduced several updates of this framework (G2, G3, G4 and the GRI Standards), the latest being the GRI Standards in 2016 (GRI, n.d.-c). For the sake of clarity, when referring to the GRI Standards, we refer to the latest update of the framework – and when referring to the GRI framework, we talk about the framework in general, comprising all of its updates.

As of today, GRI is the most widely known and adopted framework for sustainability reporting worldwide (Ceres, 2018; CRD, 2019); in 2017, 75 % of the world's 250 largest companies (G250) were reporting according to the GRI framework (KPMG International, 2017). The GRI Standards are the first global standards for sustainability reporting, which enable organizations to report to the public on their economic, environmental and social impacts (GRI, n.d.-c), both positive and negative (GSSB, 2016a). Furthermore, the GRI Standards are standardized and designed to facilitate comparability of sustainability performance between organizations, and to make the reporting understandable for stakeholders. Two key elements of the reporting process in the GRI framework is *stakeholder inclusiveness* (see Section 2.4.5) and *materiality* (see Section 2.3), which place emphasis on identifying and acting on stakeholder interests (GSSB, 2016a).

Although the GRI framework itself is relatively renowned, its usage has been criticized by several scholars. One of the criticisms is that companies may be reporting in line with GRI mainly to increase their own CSR reputation (Hedberg & von Malmborg, 2003). There are also studies indicating that even companies within the same sector, supposedly reporting according to the same GRI principles, do not produce comparable sustainability reports (e.g. Boiral & Henri, 2017; Talbot & Boiral, 2018), which undermines one of GRI's own core principles for determining report quality (GSSB, 2016a). Reasons include lack of compliance with the GRI requirements, opaque reporting and concealing of information on the measurement and methodology used, indicator contingency, ambiguous or incomplete information, data heterogeneity, and qualitative aspects of sustainability (Boiral & Henri, 2017; Talbot & Boiral, 2018).

The Integrated Reporting Framework

The Integrated Reporting Framework developed by IIRC, abbreviated to IRF (Goldschein & Marks, 2019) or <IR> (IIRC, 2013b), is not a framework for *sustainability reporting* per se, but is well suited for reporting on sustainability related issues nonetheless (CRD,

2019). The primary purpose of an integrated report is to "explain to providers of financial capital how an organization creates value over time" (IIRC, 2013b, p. 4), which entails communicating the organization's strategy, governance and performance (CRD, 2019). Thus, integrated reporting not only aims at gathering various financial and nonfinancial information in one report, but also at connecting all sorts of information that can explain an organization's value creation (IIRC, 2013b). Goldschein & Marks (2019) argue that this form of reporting is mainly targeting international investors, lenders of capital and insurers, and that companies reporting in this manner are more likely to view information about sustainability issues as financially material (see Section 2.3 for an explanation of materiality). The main criticism of the IRF is the prevailing confusion around the framework's fundamental concepts of value creation and capital, as well as their guiding principles (Oll & Rommerskirchen, 2018).

The SASB Standards

The Sustainability Accounting Standards Board (SASB) is an independent, non-profit organization, aimed at enabling businesses to "identify, manage and communicate financially material sustainability information to their investors" (SASB, n.d.-a). This mission is carried out by providing the SASB standards, consisting of 77 industry-specific standards (SASB, n.d.-a) across 11 sectors (Ceres, 2018). As opposed to the GRI Standards and the IRF, the SASB standards are primarily focused on how sustainability issues influence the financial performance of the company (Goldschein & Marks, 2019). This is why the SASB standards mainly are concerned with identifying the financially material sustainability topics and their associated metrics in each industry (SASB, n.d.-a). Consequently, the SASB standards are more of a helping tool for sustainability reporting rather than a full-fledged reporting framework as offered by GRI and IIRC.

2.2.4 Sustainability measurement in the renewable energy sector

The renewable energy sector being the research setting of this study, it is only in its place to address how sustainability can be measured and disclosed in this sector. In this context it should be mentioned that the renewable energy sector as we have defined it in this thesis (see Chapter 3) to a great extent concurs with what is often referred to as the *electric utilities sector* (see GRI, 2013a; SASB, 2018a), although energy produced from fossil sources is also included in the latter. Both GRI and SASB have developed frameworks tailored to the electric utilities sector, namely the *GRI G4 Electric Utilities Sector Disclosures* (GRI, 2013a) and the *SASB Electric Utilities & Power Generators* (SASB, 2018a), respectively. In addition, SASB has developed the frameworks *SASB Wind Technology & Project Developers* and *SASB Solar Technology & Project Developers*

(SASB, 2018b) specifically for wind power and solar power.

The GRI G4 Electric Utilities Sector Disclosures framework provides organizations with a set of disclosures targeted on key aspects of sustainability performance in the electric utilities sector, which comprises organizations engaged in the production/generation, transmission, distribution and/or retail of electricity (GRI, 2013a). The framework presents three overarching issues for the sector: *regulatory and market structure*, *stakeholder engagement*, and *contracting and supply chain practices*. These issues are, according to GRI, "key topics that require special attention by the electric utilities for sustainability reporting" (GRI, 2013a, p. 10). Furthermore, GRI proposes a set of economic, environmental and social factors that are of particular importance for the electric utilities sector. The aspects highlighted as most important for disclosure are presented in Table 2.1, where the sector-specific aspects are marked with (++), and aspects that have been modified from the G4 General Standard Disclosures and G4 Aspects are marked with (+).

Economic	**Environmental**	**Social**
Availability and Reliability (++)	Materials (+)	Employment (+)
Demand-Side Management (++)	Water (+)	Occupational Health and Safety (+)
Research and Development (++)	Biodiversity (+)	Freedom of Association and Collective Bargaining (+)
Plant Decommissioning (++)	Emissions (+)	Local Communities (+)
System Efficiency (++)	Effluents and Waste (+)	Disaster/Emergency Planning and Response (++)
		Customer Health and Safety (+)
		Access (++)
		Provision of Information (++)

Table 2.1: A selection of aspects from GRI G4 Electric Utilities Sector Disclosures (GRI, 2013a)

The SASB Electric Utilities & Power Generators framework applies to the same organizations as the GRI G4 Electric Utilities Sector Disclosures. In a similar style to GRI, SASB lists a range of topics of particular importance to the electric utilities sector, with associated accounting metrics. The main difference is that SASB exclusively presents aspects that are financially material to investors, while GRI provides a more holistic framework for sustainability reporting. Still, many of the aspects are the same. Regarding the SASB Wind Technology & Project Developers framework, it presents the material sustainability disclosure topics and accounting metrics for companies that manufacture wind turbines and other components of wind power systems, as well companies that develop, build, and manage wind energy projects (SASB, 2018b). An overview of the sustainability disclosure topics suggested in the SASB Electric Utilities & Power Generators framework and the SASB Wind Technology & Project Developers framework is presented in Table 2.2.

Electric Utilities & Power Generators	Wind Technology & Project Developers
Greenhouse Gas Emissions & Energy Resource Planning	Workforce Health & Safety
Air Quality	Ecological Impacts of Project Development
Water Management	Materials Sourcing
Coal Ash Management	Materials Efficiency
Energy Affordability	
Workforce Health & Safety	
End-Use Efficiency & Demand	
Nuclear Safety & Emergency Management	
Grid Resiliency	

Table 2.2: Financially material topics from SASB Electric Utilities & Power Generators and SASB Wind Technology & Project Developers (SASB, 2018a; SASB, 2018b)

Independently of the frameworks developed by GRI and SASB, some researchers have carried out academic studies on the topic of sustainability measurement in the renewable energy sector specifically, although this body of literature is fairly small. In a study by Roca & Searcy (2012) it was found that among the sustainability reports of energy companies in Canada, 43 % of the indicators disclosed related to the economic dimension of sustainability, while only 23 % related to the social dimension. Furthermore, Roca & Searcy found that "financial and operations categories were the two preeminent classifications of indicators in the electricity sector" (p. 111), followed by "emissions and effluents", "employees", and "health and safety". The three most used indicators were "environmental spills and releases", "total revenues", and "all injury frequency". However, since these indicators are derived from sector-specific company reports, they may not reflect what actually *should* be measured in the sector.

Other studies have been set out specifically to identify the best indicators for measuring sustainability in the renewable energy sector, sometimes using the indicators for a particular purpose. Drawing from some of the most thorough studies in this regard, the most important environmental indicators seem to be the following: greenhouse gas (GHG) emissions, including CO2 emissions and CO2 equivalent emissions (Evans et al., 2009; La Rovere, Soares, Oliveira, & Lauria, 2010; Liu, 2014; Mainali, 2012; Onat & Bayar, 2010; Santoyo-Castelazo & Azapagic, 2014); NOx and SO2 emissions (La Rovere et al., 2010; Liu, 2014); energy efficiency (Evans et al., 2009; Liu, 2014; Mainali, 2012; Onat & Bayar, 2010); water consumption (Evans et al., 2009; La Rovere et al., 2010; Onat & Bayar, 2010); and land use (Evans et al., 2009; La Rovere et al., 2010; Onat & Bayar, 2010; Santoyo-Castelazo & Azapagic, 2014). Social indicators that have been particularly emphasized include: job creation (La Rovere et al., 2010; Liu, 2014; Mainali, 2012);

benefited residents (Liu, 2014); public acceptance and disturbance factors (Evans et al., 2009; Santoyo-Castelazo & Azapagic, 2014); availability and security of electricity supply (Evans et al., 2009; La Rovere et al., 2010; Santoyo-Castelazo & Azapagic, 2014); health and safety (Santoyo-Castelazo & Azapagic, 2014); and displacement (Evans et al., 2009). When it comes to economic impact, the most important indicators seem to be: various costs, such as capital costs, operating costs and investment costs (Evans et al., 2009; La Rovere et al., 2010; Liu, 2014; Mainali, 2012; Santoyo-Castelazo & Azapagic, 2014); return on investment (ROI) and payback time (Liu, 2014); and the levelized cost of energy (LCOE) (Santoyo-Castelazo & Azapagic, 2014). Besides, some authors emphasize the importance of measuring the indicators in a life cycle context, especially those relating to the environmental dimension (e.g. Evans et al., 2009; Liu, 2014; Santoyo-Castelazo & Azapagic, 2014). Some of the aforementioned indicators may be regarded as more general *aspects* by our definitions, but most of them are expressed in terms of specific, measurable variables. However, we will not present the unit of measurement for each indicator in this text. It should also be noted that some of the indicators, especially along the social dimension, are more based on qualitative assessments.

2.2.5 Challenges of measuring sustainability

With the emergence and diffusion of sustainability measurement and reporting, a range of related problems and challenges have been emphasized in the literature. Many of these problems directly relate to the very nature of sustainability indicators. Firstly, multiple authors point to an aggregation problem, where the aggregation of indicators seem to be a double-edged sword: On the one side, aggregation is necessary in order to reduce the scope of indicators and raise awareness of the problems. On the other side, disaggregated values are essential for determining the necessary courses of action (Wall, Ostertag & Block, 1995, as cited in Gallopín, 1997). Bell & Morse (2008) argue that "one of the major criticisms regarding SIs is that they attempt to encapsulate complex and diverse processes in a relatively few simple measures" (p. 41) (SIs = sustainability indicators). Furthermore, Farrell & Hart (1998) emphasize that two issues in particular arise in the question of indicator aggregation: "how to represent the concept of sustainability meaningfully and accurately in a compact form, and how to connect different sustainability indicator sets to each other". This leads us to another evident challenge of measuring sustainability through indicators which has still not been overcome: interconnections between sustainability issues/indicators (see e.g. Independent Group of Scientists appointed by the United Nations Secretary-General, 2019; Needles, Frigo, Powers, & Shigaev, 2016; Zhou, 2011). Gallopín (1997) and Farrell & Hart (1998) shed light on the issue with the following statements:

> *Complex interlinked problems such as those associated with sustainable development require integrated approaches and solutions. There is a need to move beyond the usual, more or less exhaustive, lists of individual indicators to integrated or interlinked sets of indicators. This is particularly important regarding the uses of indicators for early warning and for forecasting.* (Gallopín, 1997)

> *Unconnected indicators encourage the same fragmented view of the world that has historically led to some of our most serious problems. Decision makers need indicators that show the links between social, environmental, and economic goals to better understand how to achieve economic growth that is in harmony with – rather than at the expense of – the natural systems within which we live.* (Farrell & Hart, 1998)

The interlinkages between sustainability aspects/indicators also inherently entail trade-offs. Needles et al. (2016) argue that reporting on the three sustainability dimensions (economic, environmental and social) simultaneously can create contradiction between the different dimensions, and that management of such tensions becomes crucial for avoiding favoring of one dimension. According to Santoyo-Castelazo & Azapagic (2014), this problem is also present in the energy sector, where there often are no "best" solutions to the sustainability criteria, and "trade-offs are necessary to identify the 'most sustainable' option" (p. 137). Furthermore, Roca & Searcy (2012) found that a high diversity of indicators were present in heavy industries such as the oil and gas, mining, and the electricity sectors, which according to the authors "underscores the difficulty of developing standard sets of indicators that are broadly applicable" (p. 116).

2.3 Materiality

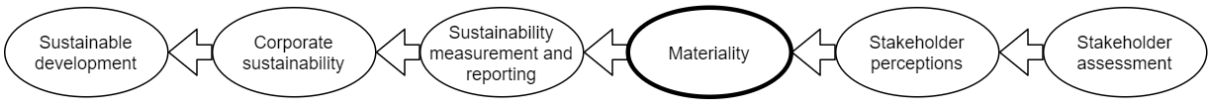

Figure 2.6: Section 2.3 in relation to the theoretical landscape

2.3.1 What is materiality?

In line with the emergence of sustainability measuring and reporting standards, the concept of *materiality* has become essential (Jones, Comfort, & Hillier, 2016b; Whitehead, 2017). Merriam-Webster (n.d.) defines the term "material" as "having real importance or

great consequences"; thus, the materiality term concerns the extent to which something is important or has great consequences to someone or something, linguistically speaking. The concept of materiality has long been applied in the field of accounting, and while the preceding definition still holds, the term has been reframed to fit the financial context (Eccles et al., 2012; Whitehead, 2017) As of 2018, the International Accounting Standards Board (IASB) defines materiality as follows:

> *Information is material if omitting, misstating or obscuring it could reasonably be expected to influence the decisions that the primary users of general purpose financial statements make on the basis of those financial statements, which provide financial information about a specific reporting entity.* (IFRS, 2018, p. 2)

A handful of other important definitions exist, including the one from the Financial Accounting Standards Board (FASB), the Securities and Exchange Commission (SEC) and the Public Company Accounting Oversight Board (PCAOB). These definitions share a common point that information is material if omitting or misstating it would influence decisions made by general users of the information, like shareholders (Eccles et al., 2012). Another definition of materiality provided by Securities law reads: "that which would cause a reasonable investor to think differently about whether to buy or sell the stock" – a definition that has stood the test of time (Rogers & Serafeim, 2019, p. 4).

The concept of materiality in nonfinancial reporting (also referred to as *sustainability reporting*) builds on the definitions delineated for financial reporting (Edgley et al., 2015; Zadek & Merme, 2003, as cited in Zhou, 2017), although the two forms of reporting use materiality differently (Jebe, 2019). Eccles et al. (2012) highlight that there is placed greater emphasis on defining the user of the information in nonfinancial reporting. Instead of focusing narrowly on shareholders, the term "stakeholders" is typically used as an umbrella term to include other important user groups, such as non-governmental organizations (NGOs), regulatory bodies, businesses and customers (Eccles et al., 2012; Edgley et al., 2015). According to Eccles & Youmans (2016), a firm must, for its own good, take into account the perspectives of stakeholders beyond providers of financial capital when deciding what is material. GRI includes materiality as one of the core principles in their reporting standards, and defines material topics as those which "reflect the reporting organization's significant economic, environmental, and social impacts, and/or substantively influence the assessments and decisions of stakeholders" (GSSB, 2016a, p. 10). This definition of materiality from GRI (GSSB) is the one we operate with throughout the thesis.

2.3.2 Materiality assessment

Conducting a materiality assessment is a crucial step in the sustainability reporting process (AccountAbility, 2006; GSSB, 2016a). However, assessing both financial and nonfinancial materiality primarily relies on qualitative judgments, because of the uncertainty of what could affect stakeholder decision-making in a particular situation (Whitehead, 2017). Thus, there exists no generally accepted, uniform quantitative threshold or formula for materiality, and one must therefore resort to applying best practice principles in materiality assessments, according to Whitehead. GRI is the leading organization offering guidance on sustainability reporting (KPMG International, 2017), including the issue of materiality (Calace, 2016; Overall, 2017). In the guidelines, GRI acknowledges that not all material topics are of equal importance, and that they hence should be prioritized. In assessing and prioritizing materiality, GRI advocates engaging both internal and external stakeholders; evaluating influence on upstream and downstream entities in the supply chain; taking into account expected compliance with international standards and agreements; and utilizing materiality matrices to guide the process. The materiality matrix itself is an effective tool for visualizing the prioritization of material topics in an intelligible way. It is simply a 2x2 matrix with "significance of economic, environmental and social impacts" on the x-axis, and "influence on stakeholder assessments and decisions" on the y-axis (GSSB, 2016a, p. 11). A generic materiality matrix is depicted in Figure 2.7.

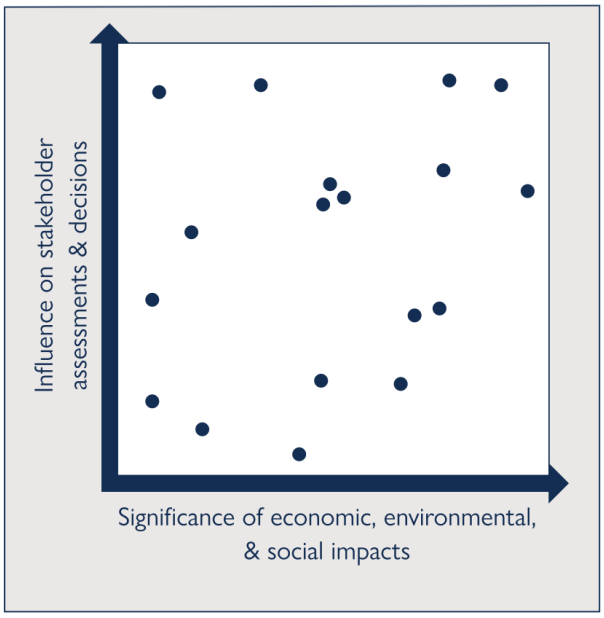

Figure 2.7: Materiality matrix (GSSB, 2016a)

While materiality assessment and prioritization is an integral part of sustainability reporting, GRI does not offer detailed guidance or procedures to its execution, beyond the

general guidelines (Calabrese et al., 2019). AccountAbility (2006) does offer a framework for assessing materiality, consisting of the three steps *identify issues*, *prioritize*, and *review*, although the procedure is somewhat vague. The lack of more detailed and pragmatic guidelines for conducting materiality assessments might partly be the reason why many have "misinterpreted" the concept of materiality. A common misconception is reporting the impacts of sustainability *on* the business instead of the impacts *of* the business (Cohen, 2016; GRI, n.d.-d), and even completely replacing the x-axis with impacts on the business and its goals (McElroy, 2011). Such practices undermine the whole point of the sustainability assessment, and is more in line with IIRC's definition of materiality for integrated reporting, which focuses more on the issue's effect on the organization's ability to create value (IIRC, 2013a). That is not to say the company's own interests should be neglected using GRI, but the company should instead be included as a stakeholder. However, the company or its representatives must be regarded as *internal stakeholders*, as opposed to *external stakeholders* (GRI, n.d.-d; KPMG International, 2014; RobecoSAM & GRI, 2015). It should also be mentioned that the European Commission recently introduced the notion of *double materiality* or *dual materiality*, positing that materiality has two faces: financial materiality affecting the value of the company, and social and environmental materiality representing the impact of the company's activities (European Commission, 2019). This view thus acknowledges the importance of both IIRC's and GRI's perspectives on materiality.

Cohen (2016) states that there is no uniform method or weighing factor that is being applied in the prioritization of topics, and that the details of the prioritization process rarely are disclosed by companies, rendering materiality assessments non-transparent. This process discrepancy entails materiality assessments that are not comparable across entities (Boiral & Henri, 2017; Cohen, 2016). The lack of process standards for the determination of material impacts is, then, a barrier to creating consensus on materiality on industry level. The development of the SASB standards was, however, a response to this issue, facilitating comparisons of firm performance on industry-specific financially material issues (Rogers & Serafeim, 2019). Furthermore, it is documented that regulations imposing mandatory sustainability disclosure have improved the comparability and credibility of reported information, and increased the levels of disclosure in general (Ioannou & Serafeim, 2019).

2.3.3 Materiality in sustainability reporting

Despite being a relatively new concept, the prevalence of materiality in sustainability reporting has increased considerably the past years (Jones et al., 2016b; Whitehead, 2017), to the extent materiality assessments and disclosure is now common practice for thousands

of companies (Ioannou & Serafeim, 2019), many of which with a strategic anchoring in the C-suite (Rogers & Serafeim, 2019). Furthermore, Rogers & Serafeim (2019) posit that empirical evidence of financial materiality of certain sustainability issues and the release of the SASB standards in 2018 has accelerated mainstream acceptance of the importance of a materiality focus in sustainability-related work. Many scholars argue that investors play a major role in driving material sustainability reporting forward by demanding such reporting from companies (e.g. Amel-Zadeh & Serafeim, 2018; Eccles & Youmans, 2016), as illustrated by the following quote: "Recent research provides persuasive evidence of a latent investor appetite for the reporting of material ESG information that goes beyond conventional financial statements" (Eccles & Youmans, 2016, p. 44). Eccles & Youmans further point out that also social expectations about responsible business behavior continue to rise, and that companies need to be clear on their prioritization of issues in order to meet the requirements of investors, society and other stakeholders.

However, exploration of the early adoption of the GRI G4 guidelines for material sustainability disclosure indicated that companies took different approaches to materiality assessment, and prioritized issues centered around business continuity rather than the environment (Jones, Comfort, & Hillier, 2016a). A more recent study by Beske et al. (2020) confirms this, and finds that companies disclose only a small amount of related information and fail to explain the methods used to identify stakeholders and topics/aspects. Such non-inclusive and non-transparent disclosure greatly reduces its quality (Junior et al., 2014) and comparability (Boiral & Henri, 2017; Cohen, 2016). The importance of including considerations of materiality when analyzing absence of social or environmental disclosures in sustainability reporting is highlighted by Unerman & Zappettini (2014).

Done right, the integration of materiality principles in the corporate governance and reporting practices can have vast benefits. Font et al. (2016) claim that "material reporting favours targeted and focused reports, and avoids over-reporting and greenwashing", and that "adequate use of material reporting facilitates the comparability of reports and stakeholder decisions [...] and benefits an organisation by maximising its competitive advantage" (p. 184). Furthermore, Calabrese et al. (2019) posit that metrics produced from materiality analysis can enhance the awareness of a company's sustainability performance and improve the quality of reporting. Additionally, the metrics facilitate benchmarking and stakeholder engagement (Forstater et al., 2006, as cited in Calabrese et al., 2019). There is also evidence that firms with strong ratings on material sustainability topics outperform firms with poor ratings on these topics, in addition to exhibiting relatively higher growth in accounting profitability (Khan, Serafeim, & Yoon, 2016), and that firms disclosing more material information in line with the SASB standards have higher

stock price informativeness (Grewal, Hauptmann, & Serafeim, 2020). Rogers & Serafeim (2019) capture the essence of what labeling an issue as material implies with the following statement:

> *Characterizing an issue as "material" focuses the attention of corporations, triggering the need for performance data, internal controls, disclosure to shareholders, acknowledgement by the CEO and CFO, and allocation of resources to manage the issue. But perhaps most importantly, it elevates the issue to one for consideration, diligence and integration into the governance processes and systems of the corporation by its ultimate governing body: its board of directors.* (Rogers & Serafeim, 2019, pp. 3–4)

Although some studies have identified material issues that are common across industries, like supply chain management (including labor practices), climate risk (including greenhouse gas emissions) and business ethics (Kuh et al., 2020), materiality is still highly context-specific and vary between industries and companies (Eccles et al., 2012; Kuh et al., 2020; Nishant et al., 2016; Zhou, 2017). The introduction of the SASB standards in 2018 was a means to address this context-specificity, by providing industry-specific financially material topics for firms to measure and report on (Herz & Rogers, 2016; SASB, n.d.-b). However, a multitude of challenges still exist in the realm of material sustainability reporting. Identifying which aspects and indicators to monitor among the ocean of interrelated topics to choose from, can be a particularly difficult task (Ribera, 2017; Zhou, 2011) that requires good stakeholder engagement (e.g. AccountAbility, 2006; Calabrese et al., 2019; Font et al., 2016; GSSB, 2016a; Zhou, 2017).

A crucial part of the materiality disclosure process is the prioritization of issues, which also has shown to be a major challenge for many firms, particularly due to the lack of detailed guidelines (Calabrese et al., 2019), the need for qualitative and subjective judgments (Koehler & Hespenheide, 2014; Whitehead, 2017; Zhou, 2011), and the variability in stakeholder concerns (Font et al., 2016; Lamberton & Zhou, 2011). Such prioritization requires firms to "place issues on a spectrum from less to more important" (Whitehead, 2017, p. 402), and thus engage in a process of deciding what to include and what to exclude from the sustainability report (Unerman & Zappettini, 2014). Lydenberg et al. (2010) also highlight the challenge of balancing comprehensiveness and relevance in the sustainability reporting, and emphasize the importance of integrating material key performance indicators in the disclosure. In fact, many companies approach these challenges by "short-cutting" or "simplifying" the materiality assessment and disclosure, e.g. by disconnecting the process from their stakeholders (Jebe, 2017), not accounting for divergent or conflicting stakeholder views (Lamberton & Zhou, 2011), and presenting

the results in a simplistic manner using matrices (Puroila & Mäkelä, 2018). To solve some of the complexity involved in sustainability materiality, Ribera (2017) calls for more quantitative decision science methods.

As a response to the prevailing challenges pertinent to materiality assessment and disclosure, including the prioritization of issues, some researchers have developed novel, quantitative models for this purpose (see e.g. Bellantuono, Pontrandolfo, & Scozzi, 2016; Calabrese, Costa, Levialdi Ghiron, & Menichini, 2016; Calabrese et al., 2019; Hsu, Lee, & Chao, 2013). However, the proposed models are still fairly nascent, and their recognition and adoption by companies still seem to be quite limited. Besides, the models do not offer a simple solution to the materiality problem; what they do provide is a tool that can assist sustainability practitioners in the materiality assessment process. There is still a need for strategic alignment and proper stakeholder engagement, where stakeholder perceptions are effectively represented (Calabrese, Costa, Levialdi Ghiron, & Menichini, 2017; Calabrese et al., 2019; Guix, Bonilla-Priego, & Font, 2018). Stakeholder engagement in the reporting process has shown to be important for both the success of the implementation of the materiality principle, and the report quality itself (Torelli, Balluchi, & Furlotti, 2020). Ngu & Amran (2018) even argue that – in addition to being significant in materiality disclosure – stakeholder engagement is vital for maintaining sustainable business and advancing sustainable development in the corporate sector. However, Calabrese et al. (2019) accentuate that difficulties with diverse and conflicting stakeholder views of materiality may arise, which is something that must be expected and accounted for (Lamberton & Zhou, 2011; Puroila & Mäkelä, 2018).

Since the stakeholders play such a central role in materiality analysis and sustainability reporting, it is important to understand how stakeholders conceive and think about materiality. This is a topic that – to date – has been explored to a limited extent. Several studies have looked at stakeholder perceptions of social, economic and environmental impacts, although in various contexts, and not necessarily relating to the concept of materiality (e.g. AlWaer et al., 2008; Byrd et al., 2009; Karanja et al., 2020; Ladd, 2013; Peters et al., 2015; Petit & van der Werf, 2003; Ramos et al., 2007). A few studies, however, have been conducted on stakeholder perceptions of materiality (see e.g. Font et al., 2016; Nishant et al., 2016; Whitehead, 2017). In their study, Font et al. (2016) perform a materiality analysis of the cruise industry, comparing stakeholder concerns and demands with the industry definition of its social responsibility. The authors find a lack of stakeholder engagement, incomplete reporting, and divergent stakeholder views of material sustainability indicators. A study by Elias, Jackson, & Cavana (2004) even provide empirical evidence of changing stakeholder positions and interests in environmental

conflicts. However, our current understanding of stakeholder perceptions related to materiality is still quite limited, and multiple researchers highlight the need to garner further insights into this matter (e.g. Calabrese et al., 2019; Kuh et al., 2020; Lamberton & Zhou, 2011; Nishant et al., 2016; Whitehead, 2017).

2.3.4 The process of materiality development

In an article from 2014, Koehler & Hespenheide argue that "for many companies, the problem is not a lack of ESG issues that are important to stakeholders, but when and why these issues might become financially material". In fact, a new field of research within the realm of materiality which is currently in its infant stage, is the development process of materiality, i.e. how sustainability issues become material. The first major contribution to this field is the work done by Rogers & Serafeim (2019) presented in the working paper *Pathways to Materiality: How Sustainability Issues Become Financially Material to Corporations and Their Investors.* In this paper, the authors propose a "framework of how sustainability issues become financially material arguing that materiality is not a 'state of being' but a 'process of becoming'" (Rogers & Serafeim, 2019, p. 1). The framework suggests how the dynamics between companies, investors, NGOs, and policy makers and regulators can indicate the stage of materiality for an issue, and by that generate predictions about future materiality (just for the sake of mentioning it, this framework relies on many of the same principles as the "Heterogeneous Stakeholder Materiality Model and Process" developed by Zhou (2017, p. 141)). Rogers & Serafeim segment the framework in five stages: *the status quo*, *catalyst events*, *stakeholder reaction*, *company reaction*, and *regulatory reaction and innovation.* The framework can be found in Section 9.4 in the appendix.

In the first stage – the status quo – the industry is essentially in equilibrium, and the issue at hand is still financially immaterial. Misalignment between business and societal interests is minimal and tolerated, and no industry players increase negative externalities to increase profits. In stage two, a catalyst will cause a deviation from the status quo. The catalyst can be companies that change behavior to capture more rents, which increases the misalignment between business and society; it can also be changes in societal expectations due to information about companies' behavior and negative externalities. The issue is still financially immaterial in stage two. Following the catalyst is stage three, where the stakeholders start reacting to the misalignment between societal interests and the way the offending companies are being managed. The issue is starting to become financially material for some companies, but political action towards the industry is unlikely. In stage four, the companies change their behavior as a result of pressure from stakeholders, aiming to minimize the cost of reaction and deter stakeholder pressure and regulation.

Politicians and regulators threaten to impose corrective mechanisms or new legislation, and the norms and beliefs for industry behavior are updated. The first sign the issue at hand could become financially material for the entire industry now appears. In the fifth and final stage, new regulations are implemented, which forces companies to decrease misalignment. Either this – or a disruptive innovation – creates a new equilibrium and renders the issue at hand financially material for the entire industry, as it is integrated into the industry's competitive landscape.

The view that materiality in the modern world must be seen as a dynamic concept rather than a static one, is shared by Kuh et al. (2020), among others. Kuh et al. (2020) argue that what is material for an industry will change over time due to changes in the business landscape or stakeholder concerns. Thus, "what is financially immaterial to a company or industry today can become material tomorrow" (WEF & BCG, 2020, p. 5). This concept that what is material is becoming more "fluid", is by (Kuh et al., 2020) coined *dynamic materiality*. The authors highlight that factors such as emerging technologies, new knowledge and new regulations drive companies to adapt their products and services, which causes entire industries to evolve. Furthermore, social expectations are changing, which together with these factors will change what is material for an industry. These factors for dynamic materiality greatly resemble the five criteria against which to determine industry-level materiality proposed by Lydenberg et al. (2010), comprising *financial impacts/risks*, *legal/regulatory/policy drivers*, *industry norms and competitive issues*, *stakeholder concerns and social trends*, and *opportunity for innovation*. Kuh et al. also document differences in the materiality of issues between companies within the same industry, and suggest that every company has its own unique "materiality signature", which might be overlooked in the shadow of industry classification systems and taxonomies. In conjunction with evolving company signatures, the authors even assert that "the stakeholder perspective provides a critical input in determining materiality, as it provides the best proxy for experienced externalities" (Kuh et al., 2020, p. 3).

Eccles (2020) point out that factors like growing awareness of system-level effects, changing social expectations of employees and customers, global norms that companies voluntarily adopt, and laws and regulations, are important factors that determine materiality from the investor perspective. Furthermore, Eccles (2020) and Kuh et al. (2020) argue that the transparency of social media helps magnify and dramatically speed up the impact of these factors. WEF & BCG (2020) posit that stakeholders, such as NGOs, activists and civil society groups, are now better equipped to influence businesses through presence on the internet and social media specifically, which is a view shared by Kuh et al. (2020). As a result, social media can be seen as a moderator to financial materiality. These points all

illustrate the crucial role of stakeholders in the materiality question, and how technology may facilitate stakeholder influence on what companies must consider to be material issues. WEF & BCG (2020) thus argue that the ability to foresee which issues might become material relies on the ability to anticipate how stakeholders will react to emerging sustainability issues; this ability therefore becomes crucial for businesses. Kuh et al. (2020) also claim that grasping the dynamism of materiality is essential for corporate leaders in the ever-changing business world, and that understanding the perspective of stakeholders is the gateway to assessing the relative importance of ESG issues and externalities. This view is supported by Rogers & Serafeim (2019), who claim that the pathway by which an issue becomes material is important to understand by both companies and their key stakeholders, because pressure from stakeholders, regulation, or industry disruption can cause an internalization of externalities.

As a contribution to the field of dynamic materiality, WEF & BCG (2020) propose a new framework on how ESG issues become financially material over time. The framework "builds on the depth of existing research in this field, and comprises four key drivers – each of which is gaining momentum – of the growing dynamism in the materiality of ESG issues" (WEF & BCG, 2020, p. 8). The four drivers are *the growth in evidence and transparency*, *escalating stakeholder activism*, *the growing responsiveness of key decision-makers*, and *greater emphasis on ESG from investors*. The framework is presented in Figure 2.8.

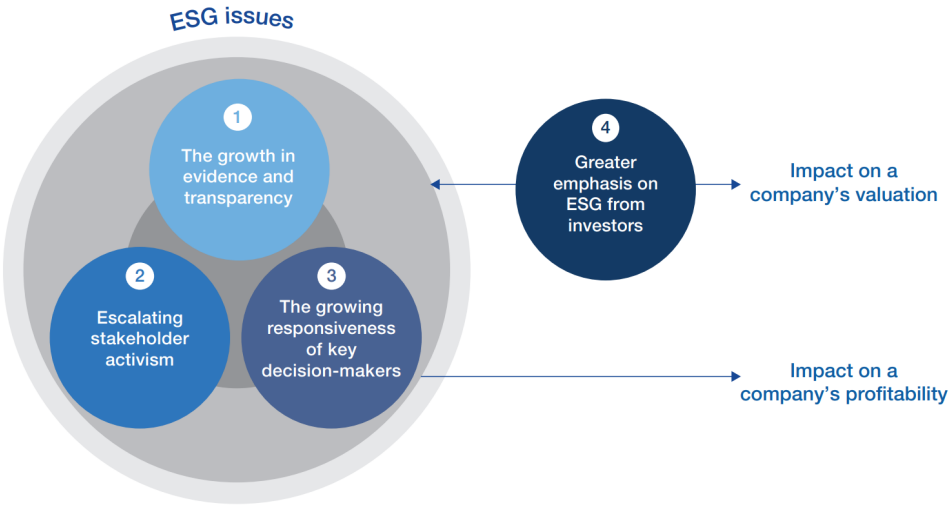

Figure 2.8: Framework on how ESG issues become financially material over time (WEF & BCG, 2020)

2.4 Stakeholder theory

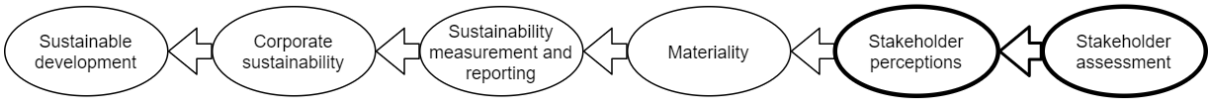

Figure 2.9: Section 2.4 in relation to the theoretical landscape

By now it should be clear that stakeholders play a crucial role in materiality assessment and development, and thus are imperative to the process of evaluating and reporting on sustainability. Based on a synthetization of a body of academic work, Silva et al. (2019) even argue that "applying a stakeholder perspective responds to the call of several authors that sustainability performance is not an absolute concept but should rather be seen in the context of stakeholders and their expectations" (p. 206). With this backdrop, it becomes of utmost importance to understand what a stakeholder is and what the term entails. Therefore, we dedicate this last section of the literature review to giving an introduction to stakeholder theory and its many alterations and applications. We start by providing some historical context, before transitioning to the stakeholder term and subsequently some of the most prominent bodies of the stakeholder literature.

2.4.1 What is stakeholder theory?

During the 1980s it was recognized that both local, national and global issues as well as non-corporate groups had started altering the environment in which businesses operated, and impacted organizations to a larger extent than in previous years (Freeman, 1984). In this context, Freeman argued that the classical approach to doing business was too static, and called for a framework more fit to this changing environment. As a result, he introduced the *Stakeholder View of Firm*, which has developed into what is now commonly known as the *stakeholder theory*. A generic and oversimplified illustration of the Stakeholder View from Freeman (1984) is shown in Figure 2.10. In the stakeholder theory, Freeman emphasizes the importance for companies to take into account "all of those groups and individuals that can affect, or are affected by, the accomplishment of organizational purpose" (Freeman, 1984, p. 25). In broad terms, the stakeholder theory represents a redefinition of the conceptualization of an organization, in which stakeholders play a central part (A. L. Friedman & Miles, 2006). According to Phillips (1997), the stakeholder theory was developed as a response to the shareholder theory proposed by M. Friedman (1970), which proclaimed that the organization's main obligations were towards its shareholders. Whereas the stakeholder theory revolves around attending to the needs of a variety of stakeholders, it also differentiates itself from the shareholder theory by

addressing "morals and values explicitly as a central feature of managing organizations", rather than narrowly focusing on profit maximization (Phillips, Freeman, & Wicks, 2003, p. 481). However, Wilson (2003) argues that stakeholder theory suggests that it is in the company's own best economic interest to work towards sustainable development, because "doing so will strengthen its relationship with stakeholders, which in turn will help the company meet its business objectives".

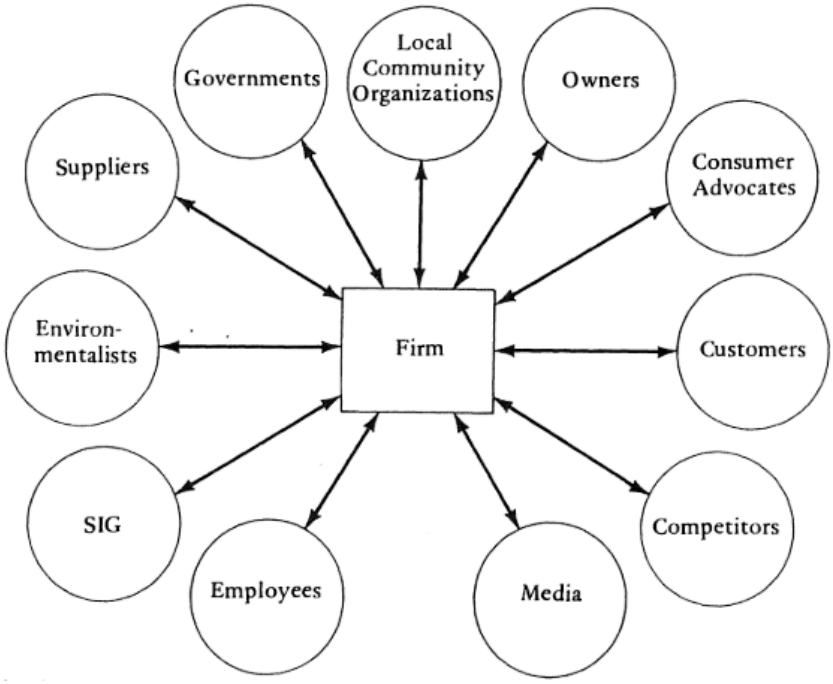

Figure 2.10: A stakeholder view of the firm (Freeman, 1984, p. 25)

The fact that the arrows in Figure 2.10 are pointing in both directions indicates that the firm both can influence, and be influenced by, its stakeholders. Furthermore, Freeman (1984) argues that pressure on an organization to change either can come from stakeholders *within* the organization, or from changes in the environment in which the organization operates. This creates the basis for dividing stakeholders into two groups: *internal stakeholders* and *external stakeholders* (Reed, 1999), in which the former can exert internal pressure for change, while the latter can exert external pressure for change.

2.4.2 Definition of a stakeholder

The definition of a stakeholder in the context of organizations has its origins from the Stanford Research Institute back in 1963, referring to "those groups without whose support the organization would seize to exist" (Freeman & Reed, 1983, p. 89). Building on this, Freeman & Reed (1983) argue that the stakeholder term can be defined in two ways: either

widely or narrowly. In the wide sense the stakeholder term comprises "any identifiable group or individual who can affect the achievement of an organization's objectives or who is affected by the achievement of an organization's objectives". In the narrow sense, a stakeholder is defined as "any identifiable group or individual on which the organization is dependent for its continued survival" (Freeman & Reed, 1983, p. 91). Of the two, the wide definition of a stakeholder appears to be the most frequently used, and is perceived as the classic definition of a stakeholder (A. L. Friedman & Miles, 2006; Harrison & St. John, 1996; Mitchell, Agle, & Wood, 1997), even though many have attempted to further develop the definition after it was introduced.

Based on the narrow and wide stakeholder definitions, stakeholders can be classified as being either *primary* or *secondary*; those embraced by the narrow definition are classified as primary stakeholders, while stakeholders falling into the wide definition are classified as secondary stakeholders (Clarkson, 1995; Freeman, 1984; Harrison & St. John, 1996; Mitchell et al., 1997). By definition, a primary stakeholder is, according to Clarkson (1995), "one without whose continuing participation the corporation cannot survive as a going concern" (p. 106). This group may include stakeholders such as customers and employees (Clarkson, 1995; A. L. Friedman & Miles, 2006), shareholders, investors and suppliers, together with the "public stakeholder group" consisting of governments and critical communities (Clarkson, 1995). On the other hand, secondary stakeholders are defined as "those who influence or affect, or are influenced or affected by, the corporation, but they are not engaged in transactions with the corporation and are not essential for its survival" (Clarkson, 1995, p. 106). Based on this definition, the media and special interest groups fall into the category of secondary stakeholders (Clarkson, 1995), including activist groups, trade organizations and the general public (Lamberton & Zhou, 2011). However, it has been argued that the primary stakeholders really are the ones the firm should contemplate (Clarkson, 1995; Harrison & St. John, 1996; Savage, Nix, Whitehead, & Blair, 1991; Zhou, 2017).

2.4.3 Stakeholder salience and influence

One challenge with the stakeholder theory is the lack of a framework for stakeholder identification, i.e. determining who is a stakeholder and who is not (Phillips, 1997). Furthermore, the stakeholder literature is criticized for not providing "much guidance on how firm decision-makers should balance between the competing demands of stakeholders" (Eesley & Lenox, 2006, p. 779). Mitchell et al. (1997) suggest that there are three features that can be used to identify groups of stakeholders: "(1) the stakeholder's power to influence the firm, (2) the legitimacy of the stakeholder's relationship with the firm, and (3) the urgency of the stakeholder's claim on the firm" (p. 854). Based on this, the

authors introduce the theory of *stakeholder salience*, which is defined as "the degree to which managers give priority to competing stakeholder claims" (Mitchell et al., 1997, p. 854). The three attributes can determine how firms perceive stakeholders, and thus act as important drivers of salience (Eesley & Lenox, 2006), although Neville, Bell, & Whitwell (2011) argue that urgency is not relevant for identifying stakeholders. Generally, firms will respond to claims from salient stakeholders (Zhou, 2017), and the likelihood of the firm addressing these claims increases with the degree of salience (Mitchell et al., 1997; Neville et al., 2011; Zhou, 2017).

However, the concept of stakeholder salience has received critique for not necessarily considering that secondary (and less salient) stakeholders might want to – and have the power to – influence firms (Eesley & Lenox, 2006). Eesley & Lenox distinguish between evaluations of the stakeholders' claims and evaluations of the stakeholders themselves, which, according to Neville et al. (2011), "suggests that stakeholder salience is affected by the power of the stakeholder and the legitimacy and urgency of the claim" (p. 369). Based on this, Neville et al. propose a new definition of stakeholder salience: "Stakeholder salience is the prioritization of stakeholder claims by managers based on their perception of the degree of power of the stakeholder and the degree of moral legitimacy and urgency of the claim" (p. 369). This view of stakeholder salience thus opens up for the idea that secondary stakeholders also can influence firms, as long as their *claims* are sufficiently legitimate and urgent. However, there is still the criticism that prioritizing stakeholders based on these assumptions does not capture the complete picture of stakeholders' influence on firms (Maak, 2007; Neville & Menguc, 2006; Rowley, 1997; Zhou, 2017). Wood, Mitchell, Agle, & Bryan (2018) even recognize that stakeholder assessment and identification is at the mercy of the *perceptions* of corporate managers, which may not accurately reflect the factual importance and salience of the firm's stakeholders.

2.4.4 Stakeholder diversity

Following the definitions of stakeholders described earlier, it becomes evident that each organization has a vast range of different stakeholders with varying salience and influential power, and with each of their own interests. The notion that stakeholders may have widely different characteristics and interests is recognized in academia, where it commonly is termed *stakeholder heterogeneity* (Zhou, 2017) or *stakeholder diversity* (Lamberton & Zhou, 2011). Based on a literature review, Zhou posits that "stakeholders are different in their values, interests and social identities", and "take different actions and exert different extents of influence on the organization" (Zhou, 2017, p. 24), which makes up the definition of stakeholder heterogeneity. Regarding stakeholder diversity, Lamberton & Zhou argue that it entails stakeholders having "different or even conflicting interests,

actions and views", and that it is one of the basic assumptions of stakeholder theory (Lamberton & Zhou, 2011, p. 2). Thus, for all practical purposes, these definitions seem to be used synonymously to describe the same concept, and they will for this reason be used interchangeably throughout this thesis. Despite being diverse, most stakeholder groups seem to agree that "the goals of economic stability, environmental protection, and social justice" are important in the corporate world, although they "may debate the level of priority or urgency" of the goals (Wilson, 2003).

Since stakeholders should be at the core when assessing materiality, it becomes clear that stakeholder diversity is something that will affect what is deemed material. However, Lamberton & Zhou argue that the prevailing conception of materiality "ignores or oversights the diversity in stakeholders, a basic assumption in stakeholder theory", as stakeholders are usually seen as a whole rather than as different entities with different interests and views (Lamberton & Zhou, 2011, p. 2), a claim that is backed up by Puroila & Mäkelä (2018). Furthermore, previous and classical models for assessing materiality divide topics into being either material or immaterial. By incorporating the significance of stakeholder diversity into the materiality assessment, Lamberton & Zhou (2011) developed the *Hierarchic Materially Complexity Model*, which the authors argue enables a deeper analysis of the degree of materiality complexity of a sustainability issue. In short, the model allows for analyzing issues with respect to stakeholder concern and the degree of consensus across stakeholder groups. There are five grades of complexity in total, where a *higher* complexity grade is associated with a *lower* degree of consensus among stakeholders on the materiality of the issue. There is a lot more to this model, but we will not go further into detail on it in this thesis.

2.4.5 Stakeholder engagement and inclusivity

Many scholars have argued that having a good relationship with one's stakeholders is beneficial for business success (see e.g. Donaldson & Preston, 1995; Freeman, 1984; Maak, 2007), and for firms' overall performance (AccountAbility, 2015). Furthermore, having a good stakeholder dialogue can promote legitimacy and reduce the possibility of negative responses from stakeholders (Amran & Ooi, 2014), and also help to evaluate stakeholder claims (Maak, 2007). However, as discussed, there are challenges related to stakeholder identification and salience that must be overcome before *stakeholder inclusivity* can be attained. Stakeholder inclusivity is defined as "the participation of stakeholders in developing and achieving an accountable and strategic response to sustainability" (AccountAbility, 2015, p. 4), which can be realized by implementing *stakeholder engagement*, according to AccountAbility.

To explain stakeholder engagement, Jeffery (2009) builds on the definition of a stakeholder by Freeman (1984), and describes the concept as "those groups who can affect or are affected by the achievements of an organisation's purpose should be given the opportunity to comment and input into the development of decisions that affect them" (Jeffery, 2009, p. 8), while AccountAbility (2015) defines stakeholder engagement as "the process used by an organisation to engage relevant stakeholders for a purpose to achieve agreed outcomes" (p. 34). In a similar fashion, Greenwood (2007) posits that "stakeholder engagement has been defined as practices that the organisation undertakes to involve stakeholders in a positive manner in organisational activities" (pp. 317-318). There are numerous ways in which stakeholder engagement can be facilitated, including, but not limited to, surveys, in-person meetings, complaints channels, online forums (Zhou, 2017), the use of media and social media platforms, telephone and mail (AccountAbility, 2015). Greenwood (2007) argues that "stakeholder engagement is traditionally seen as corporate responsibility in action" (p. 315), although this may be a false assumption, according to Greenwood. In fact, the author argues that stakeholder engagement may actually be driven by financial objectives rather than a moral objective. Nevertheless, stakeholder engagement is seen as a cornerstone in the materiality assessment process in relation to sustainability reporting (see e.g. AccountAbility, 2006; AccountAbility, 2015; Ferrero-Ferrero, Fernández-Izquierdo, Muñoz-Torres, & Bellés-Colomer, 2018; Font et al., 2016; GSSB, 2016a; IIRC, 2013b; Manetti, 2011; Zhou, 2017), and stakeholders are increasingly demanding more information on how sustainability is incorporated in business management (Amran & Ooi, 2014).

In the GRI Standards, it is claimed that stakeholder engagement can "serve as a tool for understanding the reasonable expectations and interests of stakeholders, as well as their information needs" (GSSB, 2016a, p. 8). Furthermore, actively engaging with stakeholders makes identifying and understanding issues easier, and may work as a mechanism that creates accountability towards the firm (AccountAbility, 2015). Moreover, a systematic literature review by Silva et al. (2019) revealed four types of reasons for why stakeholders are relevant in corporate sustainability performance measurements and assessments: *normative* (societal benefits), *instrumental* (improved performance), *descriptive*, and *social and political* (consensus and improved performance). Despite the potential benefits of understanding stakeholder expectations (Silva et al., 2019), several studies have found that companies are not implementing stakeholder engagement to a satisfactory extent (Hayward et al., 2013; Lacy, Haines, & Hayward, 2012; Manetti, 2011; Searcy, 2012). This is partly resulting in stakeholder dissatisfaction with companies' current work with sustainability, and raises questions about the integrity of the sustainability assessments (Silva et al., 2019).

3

Case presentation: the renewable energy sector

In this chapter, we present the renewable energy sector, which is the case of this study. We start by giving a short introduction to renewable energy, before describing the structure of the energy system and the renewable energy sector in Norway more in detail. Part of this consists of painting a picture of the dynamics between various actors in the sector, how the system works, and its relevance in the modern society.

3.1 What is renewable energy?

Energy can exist in a wide variety of forms, and is termed *primary energy* when in its original state in nature, before any energy conversion has been undergone (Rosvold & Hofstad, 2019). Sources of primary energy include e.g. crude oil and potential water energy. Through the process of energy conversion, primary energy is converted into new energy forms in order to better exploit its potential. For instance can crude oil be transformed into gasoline, and gravitational potential energy from water can be transformed into electric energy (Hofstad, 2017). These two types of energy conversion represent two different types of energy: non-renewable and renewable energy, respectively. Renewable energy comprises "energy from sources that has a continuous flow of new energy, and it cannot be depleted" (Bøeng, 2011), and such sources include, inter alia, solar, wind, hydro, biomass, wave, and geothermal energy (Bøeng, 2011; Espelien et al., 2017; OED, 2019e). Today, renewable energy plays a crucial role in decarbonizing the energy system while providing clean and affordable energy for all, which is one of the six prominent transformations necessary to achieve the UN SDGs (Independent Group of Scientists

appointed by the United Nations Secretary-General, 2019; TWI2050, 2018). Specifically, such decarbonization necessitates an improvement in energy efficiency, an increase in the share of renewable energy, comprehensive electrification, and improved carbon capture and storage. In this context, *decarbonization* refers to "the reduction of carbon inputs to socioeconomic metabolism or of greenhouse gas (GHG) emissions such as CO2 or CH4" (Haberl, 2015).

One of the world's leading countries with regards to electricity production from renewable energy sources, is Norway. As of 2016, approximately 98 % of total electricity production in the country originated from renewable energy sources (OED, 2016; NVE, 2020a), mainly hydro and wind, constituting 94.3 % and 3.4 % of total production capacity, respectively. This makes Norway the country with the highest share of electricity produced from renewable sources in Europe (OED, 2019b). Hydropower is the backbone of the Norwegian power system, where the ten largest companies account for about 70 % of total production capacity (OED, 2019a).

3.2 Division of responsibility in the sector

Regarding the management of the renewable energy sector in Norway, there is a division of responsibility between different institutions and ministries. While The Norwegian Parliament is responsible for the overall policy making for the energy sector, the execution of these policies are conducted by the Government through the following ministries: the Ministry of Petroleum and Energy (OED), the Ministry of Climate and Environment (KLD), the Ministry of Local Government and Modernization (KMD), the Ministry of Finance (FIN) and the Ministry of Trade, Industry and Fisheries (NFD) (OED, 2017). Among these ministries, OED has the administrative responsibility for the Norwegian power supply and the management of energy resources in Norway (OED, 2014). However, OED is not responsible for the production of electrical power; this is divided between private companies and the state, where approximately 90 % of Norway's production capacity is being controlled by either the state, a county, or municipal authorities (OED, 2019a). Emissions and climate politics are not the responsibilities of OED either, as this is governed by KLD and the Norwegian Environment Agency.

The management of the energy resources is conducted though the Norwegian Water Resources and Energy Directorate (NVE), which is a subordinate institution reporting to the OED (OED, 2017). NVE also has the operational responsibility of the power supply (OED, 2014), and is responsible for processing and granting licenses for renewable energy development projects such as the construction of new wind farms, hydropower plants,

and grid infrastructure (NVE, 2020d). Furthermore, NVE issues *guarantees of origin (GOs)*, which are documents guaranteeing that a certain amount of electricity is produced from renewable energy sources, at specific power plants (NVE, 2019a; Statnett, 2018b). However, GOs are only instruments used for creating a financial guarantee, meaning that customers buying GOs cannot be certain that the actual, physical electricity they consume comes from renewable sources (Energi Norge, n.d.).

3.3 Structure of the energy system

The energy system, also called the *power supply system*, can be divided into three overarching, interdependent parts: *production of electricity*, *transmission & distribution of electricity*, and *retail of electricity* (Multiconsult, 2019; OED, 2019f). Furthermore, each part of the power supply system has its own distinct supply chain, which means that e.g. the supply chain of a retail company would differ significantly from the supply chain of a production company. There are also differences in the supply chains of companies within the same part of the power supply system, especially between production companies that utilize different renewable energy technologies, such as wind turbines and water turbines. When we refer to the *supply chain* in the rest of this thesis then, it is to be understood as the specific supply chains of companies in the renewable energy sector.

Nonetheless, for the sake of simplicity and in the context of this thesis, the power supply system and all its constituent parts are generally looked upon as one entity. We hereby refer to this entity as the renewable energy *value chain*, consisting of production, transmission, distribution, and retail of electricity, which we distinguish from the specific supply chains. This is congruent with Espelien et al. (2017), who emphasize that the renewable energy sector in reality does not have a common value chain, but is tied together through the production and deliverance of the same product being renewable electricity, through the same infrastructure and to the same customers. It is also in accordance with the simplification made by Multiconsult (2019, p. 13), stating that production, transmission, distribution and retail can be seen as parts of a longer value chain in the renewable energy sector. A simple illustration of the renewable energy value chain is presented below.

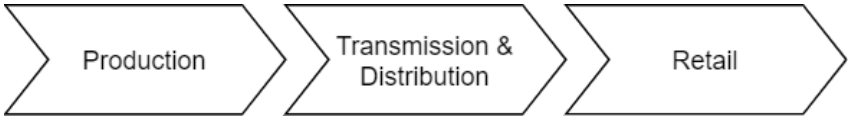

Figure 3.1: The renewable energy value chain

Although Figure 3.1 illustrates the overarching structure of the energy system, reality is

much more complex. In order to get a fuller understanding of how the energy system works in practice, it is necessary to dig a bit deeper into the details and technicalities. Therefore, we present a more complete illustration of the power supply system in Figure 3.2, which will be subject to further explanation below.

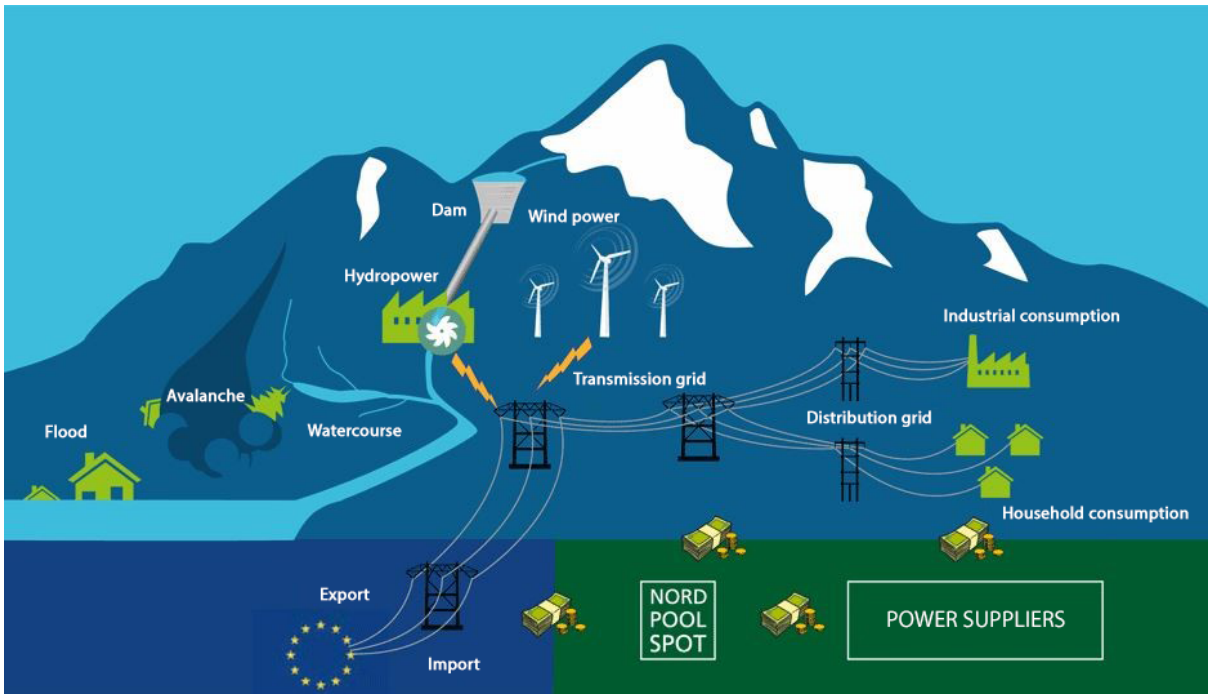

Figure 3.2: Overview of the Norwegian power supply system (NVE, 2020c) [the figure has been translated to English by the authors]

3.3.1 Grid operations

As electricity is produced, it runs through the transmission and distribution grids, which together make up the electricity grid. Even though the two can be seen as one entity, they are in reality two different types of grid with distinct features and different operators. The transmission grid is a high voltage grid connecting producers and consumers of electricity in a nationwide system, both inland and cross-border. Unlike the transmission grid, the more local distribution grid ensures the distribution of power to smaller end consumers, and carries less voltage than the transmission grid (OED, 2019e). The electricity grid is a natural monopoly and therefore subject to strict regulation (OED, 2019h), with the transmission grid being operated solely by Statnett SF, a company wholly owned by the Norwegian state through the OED. Being the only operator of the transmission grid, Statnett is responsible for regulating the frequency in the grid and maintaining the balance of power supply (OED, 2019f), and for making future plans for the transmission grid (Statnett, 2018a). They are also required by law to connect producers of electricity to the grid (Energilovforskriften, 1990, § 3-4; NVE, 2019b). In addition, they are responsible

for safeguarding the security of electricity supply (OED, 2014), which is the "ability of the power system to provide end users with an uninterrupted supply of electricity and a specified quality of supply" (OED, 2019d). Maintaining this is one of the critical functions of the power system (NOU 2012: 9, 2015; OED, 2019d). On the other hand, the distribution grid can be operated by private companies (OED, 2019f), and quite a few of these are part of vertically integrated companies who conduct business within production, distribution and/or retail of electricity simultaneously (OED, 2019f).

3.3.2 Licensing and infrastructure development

The construction of power plants and grid are regulated by the licensing authorities, which in addition to NVE consist of OED, the Norwegian Parliament (the Storting), and the King-in-Council (the Norwegian Government) (OED, 2019c). In the licensing procedure, which is governed by the Watercourse Regulation Act, the Water Resources Act, and the Energy Act (OED, 2019c), applications are directed to NVE. Among other things, NVE has to conduct impact assessments with standardized terms and conditions, and administer dialogue with stakeholders. Based on the result of this process, NVE has decision authority to either grant or reject applications in most cases, while in some cases they must write a recommendation to OED, who then gives its recommendation to the King-in-Council, possessing the ultimate decision authority (NVE, 2020b). This process and the surrounding legal framework is intended to "ensure that all the different interests are heard and considered, and that projects are subject to government control and conditions that safeguard different interests", and to "ensure effective management of our resources" (OED, 2019g).

3.3.3 Production capacity and power trading

Contrary to the strictly regulated grid operations and infrastructure development, electricity production and trading are market-based, which is the core principle on which the Norwegian Energy Act is based (OED, 2019h). Electricity is an energy source that is difficult to store on a large scale, which means that there has to be a balance between the supply and demand (or production and consumption) of/for electricity (Espelien et al., 2017; OED, 2019e), a so-called "power balance" (OED, 2019b). In this context, Norway stands out from other countries, with as much as 75 % of the production capacity being flexible. This means that energy production can be regulated (increased or decreased) to fit the changing electricity demand, which is possible thanks to the high prevalence of storage reservoirs and hydropower plants (Espelien et al., 2017; OED, 2019b). The opposite of flexible capacity is intermittent capacity, with which electricity only can be produced when the energy happens to be available, as is the case with e.g. wind and

solar power (OED, 2019b). In Norway, the amount of intermittent capacity is increasing, especially stemming from wind power development, which creates a need for increased flexibility in the remainders of the Norwegian energy system (Espelien et al., 2017; OED, 2019b). As a means to facilitate the balancing between electricity supply and demand, power is traded on the Nord Pool power exchange (OED, 2019h). Through Nord Pool it is possible for the Nordic and Baltic countries to trade physical power with each other, as they are all part of an interconnected European power market. In this way the Norwegian power market is linked with the European power market both financially and physically (OED, 2019h). Due to the interdependence with the European market, the price of electricity in Norway is dependent on, inter alia, the degree of cross-border interconnection to Europe and transmission opportunities, as well as the amount of rainfall and the prices of CO2 and fossil fuel (Espelien et al., 2017), the market for electricity certificates, and the prices of carbon credits in Europe (Multiconsult, 2019).

3.4 The relevance of the renewable energy sector

The renewable energy sector in Norway creates values of around NOK 70 billion annually and accounts for about 40 % of the wealth creation of inland Norway (the total Norwegian wealth creation excluding the offshore oil and gas industry) (Energi Norge, 2017). It is also a critical infrastructure sector, responsible for providing the country with a secure and stable supply of electricity (OED, 2019d). Being such a large and crucial part of the national economy and society, there are numerous important stakeholders that hold interest in the renewable energy sector. Apart from the companies operating within production, transmission, distribution and retail, key stakeholders include environmental non-governmental organizations (NGOs) and energy-intensive industries (Gullberg, Ohlhorst, & Schreurs, 2014), land owners, local and regional authorities (Díaz, Adler, & Patt, 2017), investors, the general public and policy makers (Talbot & Boiral, 2018). For the purpose of this thesis and due to its scope and limitations, we focus on stakeholders on an organizational level, limited to environmental NGOs, investors, and regulatory bodies (the authorities), in addition to companies operating within the industry itself. This is explained more thoroughly in Chapter 4. The role of each stakeholder and the way they interact with the industry players and with each other is described in Section 5.1.

As mentioned in Section 2.1.3, the renewable energy sector plays a crucial role in achieving the 2030 Agenda and ensuring a sustainable development going forth. Population growth and economic growth globally are expected to continue driving the demand for energy upward (Espelien et al., 2017). Being able to transform today's energy systems is essential for reaching local and global targets for climate and the environment (Energi Norge, 2017;

TWI2050, 2018). Thus, it is clear that the renewable energy sector will remain highly relevant in all foreseeable future, and even increase in relevance as renewable energy technologies gradually take over for fossil fuels. According to Multiconsult (2019), the demand for renewable power is expected to increase due to several goals set by the EU towards 2030. These include upward-adjusted targets for reduction in CO2 emissions (40 % compared to 1990 levels), increased target share of total power from renewable resources (from 27 % to 32 %), increased target for energy efficiency (from 27 % to 32.5 %), as well as a 40 % reduction of CO2 emissions from lightweight vehicles. Furthermore, Espelien et al. (2017) argue that international environmental politics will be important in setting the terms for how the Norwegian renewable energy sector will evolve.

4

Methodology

In this chapter, we describe the methodology used in our study. We start by explaining our choice of research design, illuminated by the characteristics of the study and the context in which it has been conducted. Following this, we explain the methods for collecting and analyzing data, before we evaluate the quality of the research design, addressing its validity and reliability. Finally, we make some ethical considerations of the study.

4.1 Research design

The aim of this study is to gain insights into firms' and stakeholders' perceptions of sustainability materiality within the renewable energy sector, including how they prioritize and operationalize sustainability issues, and how they interact with other actors in the industry with respect to these issues. Sustainability materiality is in itself a relatively new concept that has gained traction the last years, and is becoming an increasingly prominent part of sustainability assessment (Whitehead, 2017). While there are some studies on materiality and materiality assessment, stakeholder perceptions of materiality remains a highly unexplored area of research, let alone in the renewable energy sector. Consequently, there is little doubt that this study has a large exploratory element, and thus we treat it as an exploratory study. According to Saunders, Lewis, & Thornhill (2016), an exploratory study is fitting to make new discoveries and gain insights into an issue, problem or phenomenon that is currently not well understood. For this reason, exploratory studies are often carried out as a means to acquire initial insights into new territory, which can lead to generation of hypotheses and subsequent follow-up studies. This coincides with the purpose of this study, which is to explore a relatively untouched field in academia to generate new insights and identify areas where there is a lack of

knowledge. Saunders et al. emphasize that exploratory research is flexible and adaptable to change, allowing the researcher to alter the direction when new insights are drawn from newly collected data. Furthermore, Saunders et al. claim that exploratory research may commence with a broad focus that is narrowed down throughout the research process.

There is also a descriptive element to this study, as we seek to describe materiality in the renewable energy sector based on a range of different perspectives. However, this is just an extension of the exploratory findings, and constitute a smaller part of the study. As our focus lies on obtaining deeper knowledge about the topic, the description will simply reflect what "seems to be the case", and not necessarily what is *actually* the case in a statistical sense, as that would require another study well beyond the scope of ours. By the same token it could be argued that the study also has an explanatory element, as the findings are used to develop theories and hypotheses about possible patterns and relationships. However, we will remind that the study first and foremost was designed as an exploratory study, and treated as such throughout the whole research process.

Embarking on an exploratory study, it would only be natural to adopt an inductive approach to theory development, as that allows for exploration of a topic without relying on a preconceived theoretical position (Saunders et al., 2016; Yin, 2018). Rather than testing a theory through collection of data, Saunders et al. assert that an inductive approach entails exploring a topic and developing a theoretical explanation from the collected data, making the study data driven. This does not mean the research questions are not rooted in the literature; it simply implies that meanings are allowed to emerge from the data, to facilitate the identification of patterns and relationships for theory building, according to Saunders et al.

Saunders et al. (2016) claim that an inductive approach often is associated with qualitative research methods, as qualitative data are naturally rich and diverse. Thus, it allows a richer theoretical perspective to be developed compared to quantitative research methods. Furthermore, Saunders et al. argue that data collection is non-standardized and susceptible to alteration with respect to questions and procedures, although Yin (2018) argues that such alteration must only be done if its precise nature is understood. As this study is largely exploratory and inductive, a qualitative research method is well suited to find possible answers to our research questions. Specifically, we employ semi-structured interviews to collect primary data, as well as some documentary research on secondary data to compare and triangulate with the primary data. This is known as a *multi-method qualitative study*, according to (Saunders et al., 2016). Moreover, we classify this study as a *case study*, which Yin (2018) defines as "an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context,

especially when the boundaries between phenomenon and context may not be clearly evident". As follows, Yin claims that the rationale for doing a case study is to understand a real-world case, when such an understanding seems to involve important contextual conditions relevant to the case.

In this study, the case in question is the Norwegian renewable energy sector, which is not a simple entity per se, but rather a very complex system comprising a vast range of different firms and stakeholders and the relations between them. By applying a case study methodology, we seek to enhance our understanding of this elaborate case and the context surrounding it. Although we consider this study a case study, it possesses some characteristics that may be regarded as unusual for traditional case studies. These characteristics include the fact that the case is a whole, complex industry, as well as the fact that we do not interrogate a homogeneous group of individuals with the goal of finding converging patterns. Instead, we interrogate individuals representing vastly different stakeholders, to then compare and synthesize the insights from each of them. As such, this study can partly be considered a comparative study. However, we intend to go further, by compiling the findings and analyzing them on industry level. That is why we consider this study what Yin (2018) refers to as a single-case, embedded case study. "Single-case" simply means that we only study one case, being the renewable energy sector. "Embedded" means that the study includes multiple units of analysis, being the individuals representing their respective stakeholders and companies, hereby referred to as "interviewees" or "participants" interchangeably.

Regarding the time horizon of the study, the research will be conducted in a limited space of time. As we only have a few months to carry out the study and finalize the results, this is a cross-sectional study, meaning it seeks to give a "snapshot" of a particular phenomenon at the present time (Saunders et al., 2016), being materiality in the Norwegian renewable energy sector in 2020. The time constraint is the main reason for conducting a cross-sectional study, which compel us to conduct our interviews over a short time span.

4.2 Data collection

4.2.1 Sample

As this study aims to generate in-depth insights into a single case, being the Norwegian renewable energy sector, the entire sample of the study is by definition this one case. The case was not chosen randomly; it was partly chosen because our collaborating organization TERRAVERA Foundation facilitated access to it through their pilot project, and partly because it is an interesting and future-oriented case, subject to endless discussions and

continuous change. Even though the case inherits some characteristics distinctive to Norway, some of the insights may prove to be valuable and applicable also to other renewable energy value chains with similar structure and stakeholders, as well as on a more general level.

Despite the Norwegian renewable energy sector being our single-case sample in a broader context, we applied other non-probability sampling techniques to determine who to interview. For practical reasons, we hereby refer to our collection of interviewees as our *sample*. This sample is drawn from a larger target population, which again is a subset of the population. Within the context of the case, we define the population in this study as every company operating within the Norwegian renewable energy sector and all of their stakeholders. To make the population more manageable, we had to narrow it down with respect to both the stakeholders and the company types. The resulting target population comprises companies that produce, transmit, distribute and/or retail electricity from renewable energy sources (mainly hydro and wind), as well as stakeholders categorized as investors, NGOs and regulatory bodies. We acknowledge that this is still a very broad and heterogeneous group, but as the purpose of the study is to get a broad perspective by synthesizing and comparing company/stakeholder perceptions within the case, we argue that such heterogeneity is necessary. The target population can also be divided in two sub-groups; on the one hand we have the companies in the industry, and on the other hand we have the stakeholder groups.

Companies	**Stakeholders**
Production	Investors
Grid	NGOs
Retail	Regulatory bodies

Table 4.1: Target population of the study

To ensure we interviewed people within the target population most pertinent to our study, we mainly applied a *purposive sampling* technique, in line with Saunders et al. (2016). According to Neuman (as cited in Saunders et al., 2016), purposive sampling is often used in case study research with small samples, where you wish to select interviewees that are particularly informative. Generally, considering the population, we arguably applied a *heterogeneous* or *maximum variation sampling* to ensure sufficient diversity in the data collected, by interrogating numerous different companies and stakeholders. However, for each distinct company group and stakeholder group, we applied a combination of *critical case sampling* and the volunteer sampling method *snowball sampling*. The former

method involves selecting participants on the basis that they are important or can provide a dramatic example (Saunders et al., 2016), or otherwise have strategic importance in relation to the general problem (Flyvbjerg, 2006). One of the main reasons for choosing critical entities was the time constraint of the study, imposing a heavy restriction on the number of interviews that was feasible to conduct in each sub-group. By interviewing critical entities, the ambition was to uncover the most important patterns in the industry with respect to our research questions, without needing a large sample. In instances where we did not know who would be the best person to interview, we made use of snowball sampling, which involves identifying suitable interviewees through consultation with other people in the population (Saunders et al., 2016). The purpose of combining these two sampling techniques was to ensure that the chosen interviewees were highly competent on the research topic, and that they represented a company or stakeholder that was critical to its respective group.

On a side note, using non-probability sampling techniques means that the sample cannot be considered statistically representative of the population, implying that statistical generalizations cannot be made. However, we would like to remind that the selected sample of interviewees in our study must be seen in accordance with the study's exploratory and qualitative nature, where the purpose is to gather rich data about a complex phenomenon rather than making statistical inferences. In such studies, the sampling should be based on appropriateness and not on representativeness (Johannessen, Christoffersen, & Tufte, 2011), which is the case for this study.

Participants

The final sample consists of 14 interviewees in total, representing the four different company types in the Norwegian renewable energy sector and three different stakeholder groups. Since transmission and distribution companies are similar, we categorize both of these as "grid companies". One of the interviewees represented two different company types, and two of the interviewees took part in the same interview, meaning we conducted 13 interviews in total. Specifically, we had two interviewees from Production, two interviewees from Grid, two interviewees from Retail, two interviewees from Investors, two interviewees from Regulatory bodies, and three interviewees from NGOs. In addition, we interviewed one representative of the financial sector, and one representative of the renewable energy sector in large. The interviewees are generally people with long experience and expertise in the field of renewable energy and sustainability within the context of their organization's function; although their key areas of interest are diverse, this is their common denominator. It should be noted that both men and women are well represented in the sample. Table 4.2 shows an overview of the interviewees in the study, including the identification number

of the interviewee as referred to in the results chapter, and the type of company or stakeholder the interviewee represents.

	Company/stakeholder
Interviewee 1	Retail
Interviewee 2	Production + Grid
Interviewee 3-1	NGO
Interviewee 3-2	NGO
Interviewee 4	Investor
Interviewee 5	Regulatory body
Interviewee 6	Financial sector representative
Interviewee 7	Grid
Interviewee 8	Renewable energy sector representative
Interviewee 9	NGO
Interviewee 10	Production
Interviewee 11	Regulatory body
Interviewee 12	Retail
Interviewee 13	Investor

Table 4.2: Overview of interviewees

4.2.2 Interviews

In this study we utilized *semi-structured interviews* as our method for collecting primary data. According to Saunders et al. (2016), a semi-structured interview is a form of qualitative, non-standardized interview, whose purpose is to promote open discussion about a list of themes and key questions. Through relatively free conversation and open questions, the researcher is able to explore individuals' opinions, beliefs and experiences about a topic (Tjora, 2017). Thus, semi-structured interviews are highly appropriate for exploring the themes outlined in this study, and accompanies our exploratory and inductive approach well (Saunders et al., 2016). By allowing the interviewees to steer the conversation to some extent, and ask follow-up or *probing* questions, the idea has been to let the interviewees elaborate on the sustainability aspects and indicators they view as most material. To facilitate such an interview, it is important to allocate sufficient time, so that the interviews will not be rushed or incomplete (Saunders et al., 2016; Tjora, 2017). The interviews in this study lasted approximately 60 minutes with some exceptions (including one at 30 minutes and one at 90 minutes), and were never ended before the interviewees felt that they had shared what they wanted. In some cases, however, the

time constraint compelled us to be brief about some of the topics, and sometimes even leave some out.

The interviews were conducted in two different ways. Some of the interviewees were interviewed in physical presence, while some were interviewed through internet-mediated video calls. In total, five of the interviews were conducted face to face, of which four were conducted in Oslo and one was conducted in Bergen. We had planned three more physical interviews in Oslo, but due to the outbreak of the novel coronavirus COVID-19, these were unfortunately canceled, and were instead conducted through video calls. The remaining six interviews were also carried out through video calls, amounting to 13 interviews in total. The video interviews were primarily held in Skype for Business, but some were held in Google Hangouts and Microsoft Teams, depending on the interviewees' preferences. All of the interviews were audio-recorded to ensure a correct representation of the data and facilitate subsequent analysis. For the physical interviews, we employed recording software on our mobile phones, while we employed the software OBS (Open Broadcaster Software) for recording the video interviews. The video interviews were also recorded with our mobile phones, to serve as a backup should OBS fail. Generally, the interviews were conducted within normal working hours, mainly early in the day, with a few exceptions. All of the interviews were agreed upon through e-mail in advance, and no pressure were put on the interviewees to participate.

Gaining access to data

A crucial aspect of conducting interviews is to establish personal contact with the interviewees (Saunders et al., 2016). Building rapport is fundamental to establishing our credibility as researchers and to gain trust, which in turn is necessary to gain access to the desired data. To ensure good personal contact was established prior to the interviews, we took an incremental approach to developing access. Johnson (as cited in Saunders et al.) provides an example of a three-stage strategy to achieve the desired depth of access: send a request to conduct interviews, negotiate access to undertake observation, and gain permission to audio-record the interactions. We do not apply this exact strategy, but we use the same principle for developing access in this study. Generally, we have taken the following steps for building rapport with the interviewees and gaining access:

1. Gather background information about potential interviewee
2. Establish initial contact with potential interviewee
3. Have a short telephone conversation (alternatively e-mail correspondence)
4. Determine whether the person is pertinent to our study
5. Decide time and location for interview

6. E-mail information about the study and interview topics prior to the interview
7. Conduct interview
8. If necessary, have follow-up conversation

Interview guide

In the planning phase, careful thought was put into how the interviews be conducted, and our role as researchers. The comprehensive preparation for the interviews were partly to ensure we got the right type of data, and partly to ensure data quality, which we elaborate on in Section 4.4. The first step of our interview preparation was developing an interview guide fitting to our research questions and objectives, that would navigate us through the interview process. Before we started the development process, we reviewed relevant literature to identify research gaps and key areas of interest, to decide what we wanted to uncover with the interviews. We then made the first version of the interview guide, which was subject to a lot of subsequent alterations and revisions. Developing the interview guide was a very iterative process, and a lot of thought, discussion, feedback and tweaking went into crafting its final version. Note that we had a separate interview guide for the companies and the stakeholders, to account for the differences between them. The themes and main questions were the same; the main difference was the formulation of some questions and how they were framed. After "testing" the interview guide in our first two interviews, we acquired some valuable experiences, and did some minor, refining tweaks to it to improve the following interviews. The final interview guides can be found in Section 9.2 in the appendix.

The interview guide was structured in three main phases: *warm-up*, *reflection*, and *wrap-up* – in line with the suggestion of Tjora (2017). Figure 4.1 illustrates this trisection and how the specific parts of our interview guide fit into the structure. Part 1 marks the initial communication with the interviewee, and together with part 2 constitutes the warm-up phase. Part 3 marks the start of the reflection phase, and opens with fairly straightforward questions to create a smooth transition. Part 4 is structured quite similarly to part 3, and these parts are naturally linked. Therefore, and as expected, part 3 and part 4 were sometimes discussed interchangeably, depending on the interviewee. Part 5 is the last part of the reflection phase, and touches upon topics that may be perceived as more sensitive. That is partly the reason why they come last in the interview. The interview guide ends with part 6, which represents the wrap-up phase. Structuring the interviews this way allows us to build rapport early and gradually ease into more challenging questions that require a greater degree of reflection, before moving into some potentially sensitive questions, and wrapping up with the feet grounded. Furthermore, it makes it easier for both the interviewer and the interviewee to keep track of the many questions, and

gives the interviewee a frame for the thematic structure, even though free conversation is promoted (Tjora, 2017). Note that the job of the interview guide was to provide a structure with good logical flow to guide the interviews in the right direction. Accordingly, it was not used slavishly, but rather adapted to the situation and interview context while still involving all key questions.

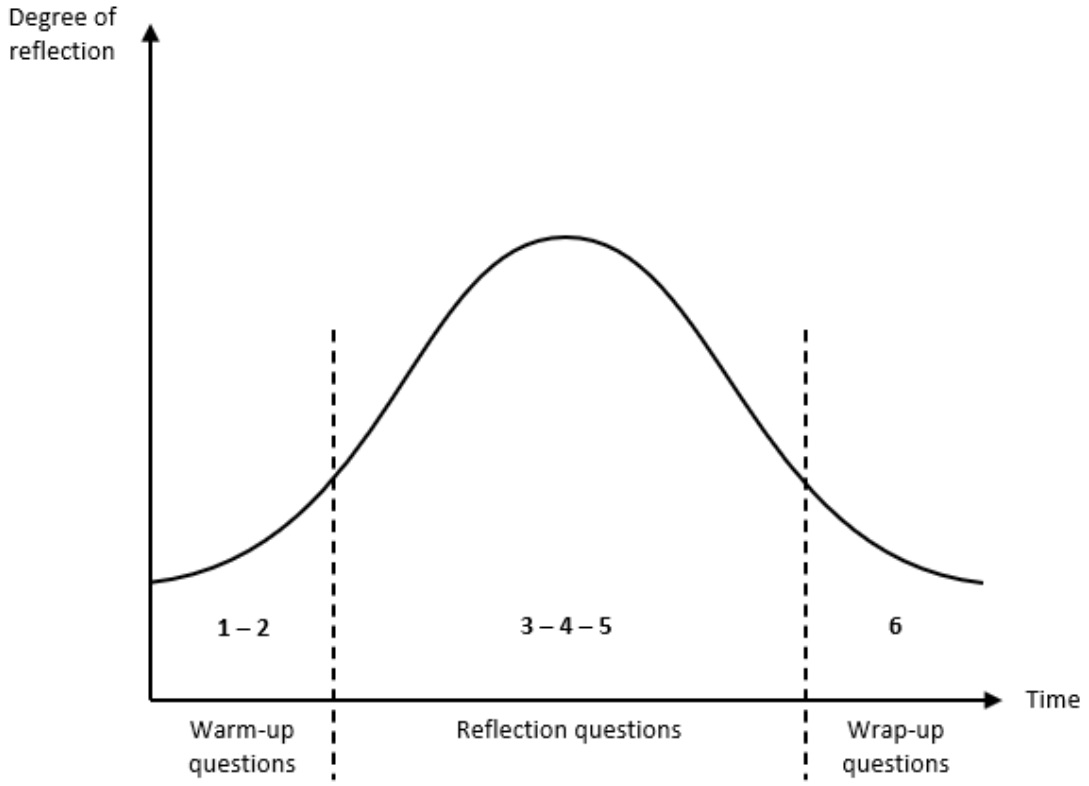

Figure 4.1: Illustration of the in-depth interview's structure (Tjora, 2017)

Interview preparation

To prepare for the interviews in general, we increased our level of knowledge about the renewable energy sector beforehand. To prepare for each interview, we firstly read up on the interviewee's company or organization and the general mechanisms in their market/industry. Additionally, we did some background research on the interviewee in advance. The main reasons for doing this was to be able to demonstrate credibility during the interview, and to better understand the answers and ask appropriate probing questions (Saunders et al., 2016). In instances where specific terms or jargon unknown to us appeared in an interview, we made sure to research this before the next interview. The preparations also entailed investigating different cultures and professional environments, like investment banking, social activism and regulatory practices. However, preparing for the interviews did not only entail us preparing ourselves, it also entailed preparing

the interviewees. To promote validity and reliability, Saunders et al. (2016) recommend providing the participants with relevant information before the interview. When we had established a time and a place for an interview, we quickly sent the participant an e-mail with some practical information about the interview, as well as three attached documents: a consent form with detailed information about the study and what participation entailed; an information sheet including a list of interview themes and key definitions; and an empty materiality matrix. These documents can be found in the appendix, in Section 9.3 and Section 9.1 respectively, whereas the materiality matrix is shown in Figure 2.7.

Interview conduction

All of the physical interviews were conducted in the offices of the interviewee's company or organization, in a quiet room with no distractions. This was important to ensure both validity and reliability, which we expand on in Section 4.4. To maximize the validity and reliability of the collected data, we took several precautions during each interview, as suggested by Saunders et al. (2016). Firstly, we adjusted our appearance to each situation, with respect to style, clothing and demeanor. Secondly, we opened the interview with remarks about the study and their role as a participant, and obtained informed consent before continuing. This is what constitutes part 1 in the interview guide. Following this, we talked loosely about the context and the interviewee's role and areas of competence, to build rapport and start establishing trust and credibility early (Saunders et al., 2016). This makes up part 2 in the interview guide. Part 3, 4 and 5 constitute the main section of the interview, and include questions about material sustainability aspects, indicators, and perception of conflict of interests. In this part of the interview, we carefully considered our approach to questioning to avoid forms of bias that could affect the data quality.

Firstly, we ensured we phrased our questions clearly, with a neutral tone of voice and without any suggestive expression. We mainly used open ended questions to stimulate free talking and reasoning, accompanied with relevant probing questions to get deeper insights (Saunders et al., 2016; Tjora, 2017). Often, we asked a question in multiple ways to facilitate a more fruitful answer. However, we never pressured the interviewee to answer something they did not wish to answer. To test our understanding, we occasionally "reflected" answers to seek confirmation or further explanation, and summarized responses. When appropriate, we applied the *critical incident technique* to get a richer description of a relevant incident (Saunders et al., 2016). We took specific care over the exploration of sensitive questions, and tried leaving the most sensitive questions until near the end. To avoid bias, we provided neutral, but interested responses to answers. Throughout the interviews we did our best to demonstrate open and attentive body language, as well as a neutral but enthusiastic tone of voice. We also demonstrated attentive listening skills

and refrained from projecting our own views to the extent possible. The audio recording allowed us to be more attentive and "present" in the interview, as we only took basic notes to assist us during the interview itself. Lastly, we ended the interviews on a good note (part 6 in the interview guide), ensuring the interviewee felt satisfied with the data they had shared.

Shortly after each interview, we compiled a full record of the interview including contextual data, as suggested by Saunders et al. (2016) in order to control bias and produce reliable data. The contextual data were written in a separate document, and consisted of the interview location, the date and time, the setting of the interview (e.g. noise level, degree of exposure, interruptions, etc.), background information about the interviewee, and our immediate impression of how the interview went, including a judgment of participant behavior, reticence, and the quality of answers. All of the contextual data were stored separately from the transcripts to ensure anonymity, and did not include the name of the interviewee. The only way to link transcripts and context documents was with a "key", which was stored in a separate document on another PC that did not have the context documents stored. Furthermore, we deleted all audio recordings upon completion of the project, in line with our consent form and requirements from the Norwegian Centre for Research Data (NSD), which is elaborated in Section 4.5.

Interview challenges

Generally when conducting interviews, a number of logistical and resource issues may arise, especially related to constraints in time and budget (Saunders et al., 2016). In this study, one such issue could be the time needed to conduct each interview, which easily could get out of hand considering our exploratory approach. To combat this, we set the "default" interview duration to 60 minutes, and left some room for extra time if appropriate. One hour for an interview is a fairly long time, and the interview length was clearly communicated to each participant before an interview was agreed upon. We experienced that it was often difficult to complete the whole interview within this time frame, and consequently we had to adapt a fair amount to the interviewee, while still ensuring we touched upon all the central interview topics. Thus, we tried to manage the interviews and steer the conversation without being overly intrusive, which is a challenging task. Furthermore, we tried to "collect" our interviews in time-constrained chunks, especially the ones in Oslo, to avoid unnecessary traveling and logistics. In cases where it would be impractical to have a physical interview, we conducted internet-mediated video interviews instead. Either way, we audio-recorded all of the 13 interviews, and transcribed them manually afterwards. The transcription process was extremely time-consuming and tedious, and we made sure to allocate sufficient time to transcribe all interviews fully and

in a very detailed manner.

4.3 Data analysis

4.3.1 Initial analysis

To comply with our exploratory, inductive approach in this study, we did some preliminary analyses on the data gathered from each interview shortly upon interview completion. Undertaking such initial analyses concurrently with the data collection process is advocated by Saunders et al. (2016), in order to develop theories and explanations that are "grounded" in the social reality of the research context. Our initial analyses were quite rudimentary, and consisted of going through the notes from the interviews and discussing the most apparent findings from them with each other shortly after the interviews took place. This was mainly done in order to "debrief" each interview while it was still fresh in memory, and better prepare ourselves for upcoming interviews by increasing our own understanding of the topic and our ability to draw parallels. These debriefs were also important for discovering or own knowledge gaps and improvement areas, so that we could improve our interview conduct and increase our credibility as researchers for the next interview. It must be noted, however, that our initial analyses were not thorough, as they were only based on basic notes and our initial thoughts on the interviews. As we did not formally develop a conceptual framework to guide our subsequent work throughout the data collection process, our final results cannot be said to be fully "grounded".

4.3.2 Transcription

In this study, all interviews were audio-recorded and transcribed manually afterwards. The transcriptions make up over 250 A4 pages with text in total. All of the interviews were held in Norwegian, and were transcribed verbatim with no translation. We did, however, normalize the transcriptions with respect to Norwegian dialects, to keep everything in Norwegian Bokmål. According to Tjora (2017), the main reason for normalizing is that it helps in anonymizing the data, which is important in our study. We made sure to transcribe the interviews in a very detailed manner and as precisely as possible, by including repetitions, pauses, mumbling, stuttering, hesitation, incomplete sentences and laughter, as well as our own comments about specific incidents during the interview. This level of detail was maintained throughout every transcription to ensure a correct and realistic reproduction of the interviews, and not risk overlooking potentially valuable data. The transcriptions also include the interviewer's questions and comments (i.e. ours) in addition to the interviewee's answers and comments, to give a comprehensive account for

the interview and facilitate the coding and subsequent analysis (Saunders et al., 2016).

4.3.3 Thematic Analysis

To systematize the data analysis process, we adopted *Thematic Analysis*. Saunders et al. (2016) describe Thematic Analysis as a "generic approach" to analyzing qualitative data, with the purpose of identifying themes or patterns occurring in a data set, e.g. a collection of interview transcripts. One of the strengths of Thematic Analysis is its systematic yet still flexible approach to data analysis (Braun & Clarke, 2006; Saunders et al., 2016). Its flexibility and ease of use fosters methodological rigor, as the focus is not on following a strict set of rules. Using Thematic Analysis also allows for modification of the research questions if the themes derived from the data deem this appropriate, which is fitting for our exploratory and inductive approach. To conduct a Thematic Analysis, there are four main procedures to be undertaken, which provide guidelines to the analysis process. These procedures are in practice often concurrent and recursive, and do not follow a linear progression, according to Saunders et al. The four procedures are described more in detail below, and involve becoming familiar with the data, coding the data, searching for themes and relationships, as well as refining themes and testing propositions.

Data familiarization

The first step in the data analysis process is becoming familiar with the data (Saunders et al., 2016). Data familiarization is fundamental to be able to interpret the data and extract meanings from them. To familiarize ourselves with our data material, we firstly discussed our impression after each interview and wrote up context documents. Secondly, we transcribed all interviews manually and in great detail, which was a big step to immerse ourselves in the data. Thirdly, we wrote summaries, self-memos and entries in a diary continuously during the analytical process, and read and re-read our data multiple times.

Coding

As part of the data analysis process, we coded the data in our transcripts. Coding is the process of categorizing data with similar meanings, with the purpose of making each relevant piece of data accessible for further analysis (Saunders et al., 2016). According to Tjora (2017), however, coding has three purposes: to extract the essence of the data material, to reduce the volume of the data material, and to facilitate idea generation based on empiricism. Saunders et al. (2016) define a *code* as "a single word or a short phrase, which may also be abbreviated in use", which is applied to an extract of data to create a *unit of data* (p. 580). We frequently coded the same unit of data with more than one code, as many data units were part of multiple themes and overlapped with each

other to some extent. Throughout the coding process we kept a list of used codes and their definitions, which was constantly updated to ensure consistency, as suggested by Saunders et al. (2016).

In line with the advice of Braun & Clarke (2006), we coded almost everything in our data material initially to not miss anything of potential interest, and kept the context of the code extracts. The coding process was very recursive, as we went back and re-coded all of our transcripts in accordance with our most updated list of codes. This process is termed *constant comparison*, and ensures a consistent process for coding and analyzing data (Saunders et al., 2016). Apart from implementing new codes recursively, we mainly coded in 2 big rounds for all transcripts, where the codes in the first round were more general, and the codes in the second round were more detailed and represented an updated and significantly improved coding scheme. Creswell (2007) calls this way of coding *lean coding*, i.e. when you start by coding bigger "chunks" with a short list of codes and then subsequently expand on these and develop themes. Most of the codes we used were labels we ourselves developed to best describe the data, although some of the codes were "in vivo" codes based on the actual terms used by the interviewees. To facilitate the coding process we made use of ATLAS.ti Cloud, which is a qualitative data analysis software, also known as CAQDAS. ATLAS.ti is highly reputable, and ensures privacy and security by encrypting the data with the latest TLS authentication, by using highly secure server infrastructure, by complying with GDPR, and by keeping all data confidential (ATLAS.ti, n.d.).

Theme searching

Throughout the whole coding process we searched for themes, patterns and relationships in the data, and produced summaries, memos and reflective diary entries. After the first round of coding the entire data set, we discussed our tentative findings and wrote a large summary document structured after the main code groups. Considering we had a long list of codes touching upon many different areas, this document provided a rough overview of the content of our data, which helped us narrow the scope of the subsequent analysis. From this we also started developing *themes*, which Saunders et al. (2016) define as "broad categories incorporating several codes that appear to be related to one another and which indicates an idea that is important to your research question" (p. 584). Saunders et al. point out that searching for themes is a vital step in the process towards condensing the data, by grouping coded data into analytic categories.

It should be noted that in this study, we did not search for predetermined themes. Rather, we derived themes directly from the data which were related to our research questions,

without imposing a framework of themes based on existing theory. However, the interview guide was structured around some overarching areas of interest, which to some extent guided us in the analytic process of coding and theme searching. It should also be mentioned that after we had explored the whole data set to look for reoccurring themes, we partly modified our research questions as appropriate to more accurately reflect the content of the actual data and findings, as suggested by Saunders et al. (2016, p. 579).

Theme refinement and proposition testing

To form a coherent and structured analytical framework and evaluate the meaningfulness of the codes and themes, Saunders et al. (2016) recommend reorganizing the coded data extracts under the relevant theme and make appropriate changes. This is something we did multiple times during the analytic process, e.g. by combining and redefining codes and themes, using the tools provided by ATLAS.ti. Furthermore, we tested our propositions emerging from the data by seeking alternative explanations and identifying negative examples, which according to Saunders et al. contributes to the development of valid and reliable conclusions that are well-grounded.

4.4 Evaluation of the research design

4.4.1 Dependability

Dependability is in qualitative studies the parallel to *reliability* in quantitative studies (Lincoln & Guba, 1985, as cited in Saunders et al., 2016), which tells something about the replicability and consistency of the study (Saunders et al., 2016). However, qualitative research methods like semi-structured interviews are not necessarily intended to be repeatable, as they provide a "snapshot" of reality in a complex and dynamic setting. An attempt to ensure replicability in such a study would thereby undermine its greatest strength: flexibility in exploring the complexity of a topic (Saunders et al., 2016). That is why dependability, in many forms of qualitative research, is more concerned with the transparency of the research method. It is generally considered high if another researcher would be able to conduct a similar study in another setting, based on the description of the methods used in the study. To ensure high dependability, it is thus necessary to write down all changes made during the study, think carefully through the choices that have been made, and be explicit about how the study has been conducted (Saunders et al., 2016). Johannessen et al. (2011) also point out that the dependability can be enhanced by providing an in-depth description of the context in the form of a case presentation. In an effort to comply with the dependability criterion in this study, we have been diligent about documenting our thoughts, reflections and changes continuously by making diary entries;

thought carefully about all our choices by planning and discussing these thoroughly; and provided a transparent and accessible presentation of the research context, strategy and methods used as well as the reasons underpinning the methodological choices.

When ascertaining the dependability of the data material collected through semi-structured interviews in particular, it is especially important to take potential interviewer bias, interviewee or response bias, and participation bias into account (Saunders et al., 2016). Interviewer bias appears, according to Saunders et al., when the interviewer's comments or behavior affect how the interviewee responds to the questions. In order to avoid this to the greatest extent possible, we kept a neutral tone throughout all interviews, attempted to build trust and credibility as researchers, and frequently checked if we had the correct understanding of the response. Response bias can arise as a result of the participant's perception of the interviewer or perceived interviewer bias, or if the participant avoids telling about a specific subject out of fear of sharing sensitive information or the like (Saunders et al., 2016). We tried to minimize response bias by building trust, exhibiting open body language and enthusiasm, and being cautious when exploring questions of sensitive nature. Bias can also occur from the sample of participants that accept to be interviewed, as these may possess specific characteristics (Saunders et al., 2016). We tried avoiding this by employing a purposive sampling technique, with which the participants were carefully selected based on the characteristics we regarded as most appropriate for the study. Furthermore, Saunders et al. argue that "audio-recording your data where permission is given, making notes, compiling a full record of the interview immediately or soon after it has occurred and producing a set of contextual data and related memos are all means to control bias and produce reliable data" (p. 412).

4.4.2 Credibility

Credibility is in qualitative studies the parallel to *internal validity* in quantitative studies (Lincoln & Guba, 1985, as cited in Saunders et al., 2016), which tells something about whether the measurement variables and instruments used in the study are fitting for the purpose, and whether the results reflect what they are intended to (Saunders et al., 2016). According to Saunders et al., the credibility in qualitative studies mostly concerns whether the researcher has managed to gain access to the knowledge and experiences of the participants, and is able to infer meanings the participants intend based on their language. Furthermore, Saunders et al. argue that semi-structured interviews can attain a high level of validity/credibility where conducted with adequate use of clarifying questions and probing questions to test understanding and explore responses from multiple angles.

To strengthen the credibility of our study, we took a range of measures, as proposed by

Saunders et al. (2016). Firstly, we always worked to build trust and rapport with our participants and potential participants, and strived to maintain a friendly tone and a good relationship. This was important in all stages of the study, but special emphasis was put on gaining trust prior to and during the interview. Details on how this was done can be found in Section 4.2.2. Secondly, by conducting 13 lengthy interviews, we presumably collected sufficient data for the purpose, and data saturation was apparent in some of the key areas of interest. On the contrary, the number of interviews in each company group and stakeholder group were highly limited, so the separate findings for these may not reflect saturated data and thus prove to be less credible. If this was the main purpose of the study, we would need a considerably larger sample to be able to reach data saturation (Saunders et al., 2016). Considering our restrictions with respect to time and resources, as well as our holistic lens, 13 interviews are nevertheless within the range of 12-30 interviews proposed by Saunders et al.

To ensure credible answers in the interviews, we sent a list with the interview themes (see Section 9.1) to the participants a good time ahead of the interview, in line with the suggestions of Saunders et al. (2016). This way, they were allowed to prepare for the interview and think through the main questions beforehand. In the analytic phase of the study, we developed a thorough analysis that accounted for negative cases and were subject to continuous refinement. Furthermore, we triangulated the results with other data sources, chiefly annual sustainability reports. We also made sure to check the data and our following interpretations by sending the relevant quotations back to the participants for confirmation. Not surprisingly, many of the interviewees gave clarifying feedback, which allowed us to correct the misrepresented quotations. Such triangulation and participant validation are helpful techniques to verify the research findings (Creswell & Miller, 2000; Saunders et al., 2016). It should be noted, however, that we translated the quotations from Norwegian to English, and therefore had to reformulate many sentences for them to make sense in another language. This poses specific challenges to the representation of the original meaning behind the quotations (van Nes, Abma, Jonsson, & Deeg, 2010). As a natural consequence of the translation, the quotations included in Chapter 5 are not verbatim, but still reflect the true meaning in an accurate way. We ensured this by sending our interviewees the quotations *after* they had been translated to English, and making sure the interviewees were happy with the quotations before they were included in the thesis. It should be noted that we took particular care for ensuring that all of the quotations used were translated in a good and correct way by also reviewing all of them together, getting three opinions in total on all translations (us + the interviewee).

Throughout the course of the study we have been careful to use reflection as a means to

enhance its credibility. Discussions of ideas, plans and findings among ourselves and with different people have been valuable to our reflection upon the study and its context. All reflections made were formulated in text and entered into a designated reflective diary with name and date stamps. Additionally, we had a separate reflective diary specific to the coding process in addition to a change log and other memos, to keep track of our notions about the emerging findings, and to subsequently be able to challenge these to avoid them overshadowing the social constructions of the participants (Saunders et al., 2016). These considerations are all means to achieve *researcher reflexivity*, which is significant to the credibility of the study (Creswell & Miller, 2000; Noble & Smith, 2015; Saunders et al., 2016).

4.4.3 Transferability

Transferability is in qualitative studies the parallel to *external validity*, or *generalizability* (Lincoln & Guba, 1985, as cited in Saunders et al., 2016), which represents the extent to which the findings from the research can be generalized to other relevant situations or groups (Saunders et al., 2016). Because we have a relatively confined sample that is not randomized, the study does not allow for generalizing the results in the traditional sense. It should, however, be reminded that the purpose of qualitative studies is generally not to make statistical generalizations, but rather explore, explain and gain insights that can be used to develop theory, according to Saunders et al. (2016). Even though we study a single case, the fact that we interviewed a wide cross-section of participants in different settings may still have brought forth valuable findings.

Saunders et al. (2016) argue that the best way to enhance the transferability in a qualitative study is to provide a full description of the research questions, the design and context of the study, the findings, and the resulting interpretations in the final report. Lincoln & Guba (1985), as cited in Saunders et al. support this claim, and refer to it as "providing thick descriptions". This is something we have placed great emphasis on, by logically explaining our research questions and thoroughly presenting the case context in Chapter 1 and Chapter 3; exhaustively describing our research design and methodology in this chapter; systematically presenting our results in Chapter 5; and discussing our resulting interpretations in Chapter 6. Furthermore, Saunders et al. (2016) claim that relating the findings to existing theory can help demonstrate their broader significance, and in that way strengthen the transferability. To meet this premise, we connected our findings to existing literature and discussed these connections in Chapter 6. Ultimately, however, the level of transferability rests upon the extent to which other researchers believe the study can be transferred to different, although suitable research settings.

A few words should also be devoted to the timing and situation of the study. Johannessen et al. (2011) point out that the timing and situation in which the study is conducted can negatively affect its transferability. The authors emphasize that this can happen in times characterized by extraordinary circumstances or where the context/location significantly differ from the ones intended to transfer the results. Regarding the timing of the study, it should be noted that the majority of the interviews were conducted during the COVID-19 (coronavirus) outbreak. This was an extraordinary situation that significantly altered the way in which business was done, and consequently caused stress and uncertainty for many. It could be the case that the COVID-19 situation took away some of the participants' focus on business-as-usual, which could have affected their reflections and answers. However, we generally did not have the impression that this was the case. Regarding the context, much emphasis was placed on wind power at the time of conducting the study. The focus on wind power construction in Norway was clearly evident for the stakeholder groups (NGOs, investors and regulatory bodies), although to a lesser extent for the industry itself, except for in production. Wind power was clearly on the rise, yet still in an early stage in Norway at this time, and was subject to endless debates and conflicts. We acknowledge that this influenced the interview answers to some extent, which may reduce the transferability of the findings. Apart from this, the Norwegian renewable energy sector may also have some distinct features that do not transfer to other contexts, e.g. the high degree of regulation.

4.5 Ethical considerations

Every research project touches upon ethical issues, and ours is no exception. Research ethics is defined as "the standards of behavior that guide your conduct in relation to the rights of those who become the subject of your work, or are affected by it" (Saunders et al., 2016, p. 239). Ethical issues will arise in all parts of the research project, including the design and planning phase, when you seek access to organizations and individuals, the data collection and analysis phases, the writing process, as well as the time following project completion. There have been developed a number of ethical principles that are recognized in codes of ethics. Saunders et al. (2016) have synthesized key points from many different approaches to ethical principles, and identified the following, widely used ethical principles: *integrity and objectivity of the researcher*, *respect for others*, *avoidance of harm (non-maleficence)*, *privacy of those taking part*, *voluntary nature of participation and right to withdraw*, *informed consent of those taking part*, *ensuring confidentiality of data and maintenance of anonymity of those taking part*, *responsibility in the analysis of data and reporting on the findings*, *compliance in the management of data*, and *ensuring the safety of the researcher*. These ethical principles to a great extent correspond to the general ethical principles and guidelines proposed by The Norwegian National Research Ethics

Committees (FEK, 2014), as well as the more specific ethical guidelines The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) have defined in the *Guidelines for Research Ethics in the Social Sciences, Humanities, Law and Theology* (NESH, 2016).

Nerdrum, as cited in Johannessen et al. (2011), claims that these guidelines can be condensed into three types (or groups) of ethical principles: *the informant's right to self-determination and autonomy*, *the researcher's duty to respect the informant's privacy* and *the researcher's responsibility to avoid harm.* The first group of principles concerns the participant's right to voluntarily take part in the study, by providing a voluntary and informed consent with the right to withdraw at any given time without justification, and without any discomfort or negative consequences. The second group of principles concerns the participant's right to decide over the information they share, including the right to refuse researchers access to personal information. Moreover, the researcher's responsibility to ensure that confidentiality and anonymity is maintained, is central. The third group of principles concerns the risk of causing harm on the participant through data collection or utilization of the results. As part of this, Johannessen et al. (2011) emphasize that the participants shall be subjected to the least possible burden throughout the study. We have to our best efforts tried to comply with these principles in this study, and careful planning, critical discussions, external consultations and the use of a carefully crafted, informative consent form (see Section 9.3 in the appendix) have been important measures to attain such compliance. Besides, we diligently informed our participants about the scope and purpose of the study, their role and rights as participants, our approach to storage and management/processing of data, as well as our intentions with the research.

Since we collected personal data like names, e-mail addresses and signatures, and audio-recorded the interviews, our research became subject to privacy and data protection legislation. In Norway it is mainly The Personal Data Act (*Personopplysningsloven*) that regulates these issues, which has integrated the General Data Protection Regulation (GDPR) from the EU (KMD, 2019). In accordance with present requirements and to accommodate the relevant legislation, we notified the project to the Norwegian Centre for Research Data (NSD), which subsequently approved the request and granted us permission to carry out the research project. It should be noted that all of the personal data and audio recordings in this project were collected after explicit consent, and that no personal data beyond the necessary was intentionally collected. All documents containing personal information have been stored securely and separately to other documents like transcripts, memos and contextual information, locally on our private, password-protected computers. All of the physical and digital data material was permanently deleted or destructed after

project completion.

As we have conducted this study on a mission from the non-profit foundation TERRAVERA, some other ethical concerns may be raised. TERRAVERA has been interested in our study and its findings from start to finish, and potentially wants to use the results as part of developing a common platform for sharing of transparent and factual knowledge about sustainability measuring, eventually leading to a coherent measuring system to be used in the business world. Our relationship with TERRAVERA thus incur a difficult balancing act between the wishes and expectations of TERRAVERA and the potential harm inflicted on the participants of the study, especially seeing as the results may contribute to something that could possibly affect their organization. We have been very aware of potential ethical difficulties related to these circumstances in all phases of the study, especially in the early phases with planning and design of the study. We also discussed the concerns with our project tutor and NSD to get clarity in how they should be handled. It has been of utmost importance that the confidentiality and anonymity be preserved throughout and after the study. This was partly ensured by not sharing any of our raw data with anyone, nor sharing the companies or names of the participants unless explicitly consented upon, which was completely optional. Furthermore, we were clear about our relationship with TERRAVERA to all participants, and kept a constant dialogue with them to make sure we were on the same level regarding sharing of data and personal information.

Finally, it should be mentioned that we as researchers represent our educational institution, NHH, and consequently have been conscious about our behavior and appearance outward. We have strived to project a professional and compassionate attitude in contact with everyone associated with this project, including TERRAVERA, our project tutor, our participants, every prospective interviewee, and the people referring us to others. We have also tried to act agreeably and humbly, and to communicate our reason of contact and the purpose of the study in a clear and comprehensible way, without being overly intrusive.

4.6 About the presentation of results

Before proceeding to the results chapter, a few words on the presentation of results need to be spoken. The results chapter is structured in separate sections representing the main categories of the findings, in line with the suggestion of Burnard, Gill, Stewart, Treasure, & Chadwick (2008). Each category and the respective main findings are presented consecutively. The findings are illustrated and supported using quotations from the interviewees, often from multiple angles to highlight different views, which

is also recommended by Burnard et al. (2008). All quotations are written in *italics* and encapsulated in quotation marks " " to make them distinguishable from the other text, while the interviewee behind the quote is denoted by I1 for interviewee 1, I2 for interviewee 2, and so on. Some quotations are placed within a normal paragraph, while other quotations are placed on a separate line. The latter quotations are usually lengthier, provide prototypical examples related to a finding, or are otherwise important or interesting enough to be highlighted separately. Where appropriate, quotations within a quotation are marked with single quotation marks ' '. In cases where a fragment of a larger quotation has been left out, the notation [...] is used. Explanations and descriptions of context or setting as well as other clarifying comments by us are written within square brackets [ ] when appropriate. Lastly, horizontal ellipses ... are used to mark longer verbal pauses in the quotation. We would like to remind that all quotations are translated from Norwegian to English, and thus not reproduced verbatim.

5

Results

In this chapter, we present the findings of our study, arising from a thorough analysis of the collected and transcribed interview data. As described in Section 4.6, quotations from the interviewees are used to back up and illustrate specific findings throughout the chapter, and sometimes to highlight a particularly interesting remark. The results presented relate to the two research questions, but are not directly structured thereafter. Instead, we structure the chapter after the five main topics or categories of findings, starting with a more general overview of the stakeholder landscape in the renewable energy sector, including the areas of interest and respective roles of the various stakeholders and companies (Section 5.1). Following this, we present the current industry dynamics, including the public debate and conflicts of interest between actors (Section 5.2). The two first sections may serve as a deeper introduction to the renewable energy sector, as seen from the perspectives of the industry players themselves and their key stakeholders. These insights give an understanding of the case context that is valuable for setting the other results in perspective, but are not directly linked to the research questions on their own.

After setting the stage, we proceed to present our findings regarding the perceptions of which sustainability aspects are material, within the environmental, social and economic dimensions of sustainability (Section 5.3). Here, we take a deeper dive into how the interviewees perceive materiality and prioritize sustainability issues, in addition to examining their thoughts on future materiality. In the subsequent section, we present our findings relating to how the interviewees operationalize sustainability, specifically how they decide which indicators are the most important for measuring the material aspects (Section 5.4). Within the same section, we present some findings about challenges related to sustainability indicators and operationalization. Lastly, we go into a topic

we term "factors for materiality", which is connected to the reasons underpinning the interviewees' materiality perceptions (Section 5.5). This last section is a bit more analytic than the others, as the findings to a larger extent draw upon our interpretations of the data material. The three aforementioned sections constitute the main findings of the study.

5.1 Stakeholder landscape and roles

This section gives a brief description of what the stakeholder landscape looks like in the renewable energy sector. It is not part of the main findings of the study, but is intended to set the stage for the subsequent findings and analysis. Firstly, it entails which stakeholders are the most important seen from the industry's (i.e. the companies') point of view. Secondly, it entails the parts of the value chain in which the stakeholders have the largest stakes. By "stakes" in this context we mean the degree of investment or interest in a particular value chain link. Thirdly, an overview of the roles of the companies and stakeholders in the industry is presented. It should be noted that during the interviews, despite our efforts to distinguish between transmission and distribution, these parts of the value chain often seem to be regarded as one entity. Thus, when the interviewees talk about distribution, we assume that they generally talk about the combination of the transmission grid and the distribution grid, unless otherwise is stated. In the following, we treat these two accordingly, under the common term "Grid".

5.1.1 Prioritization of stakeholders from companies' viewpoint

There is a range of different stakeholders that are of importance to companies in the industry. In general, some stakeholders are mentioned more often than others, including owners, authorities, customers and the general public/society. *"The customers are the far most important [stakeholder]. It is after all where the money and resources come from. But it does not help to have customers if you do not have satisfied owners, employees and the society in general" (I12). "It is natural to start with our owners as an important stakeholder. [...] The financial community is also obvious in my opinion. [...] Customers are also important, naturally, as well as media and employees" (I2). "We have three categories [of stakeholders]: customers, suppliers and business partners" (I1).*

When asked to prioritize stakeholders, the interviewees were prompted to do so based on the stakeholders' influence on the company. Most of the interviewees found it difficult to make a prioritized list of stakeholders with this criterion. Interviewee I2 and I12 illustrate some of the challenges: *"I believe that prioritizing the stakeholders is dependent*

on the situational context" (I2). "The main challenge is actually to balance the four [stakeholders]" (I12). However, some had a rough idea of how stakeholders could be ranked: *"If we make a two-part separation, we have customers and authorities first, and then we have the rest on level two" (I7).* On level two, I7 mentions the business world, electricity producers, employees and local communities. Table 5.1 summarizes the most prominent stakeholders of the companies in no particular order, with the highest prioritized stakeholders in **bold**.

Production	**Grid**	**Retail**
Owners	**Owners**	**Customers**
Local communities	**Customers**	Owners
Authorities	**Authorities**	Employees
Civil society[1]	Civil society[1]	Electricity producers
Customers	Local communities	Business partners
Employees	Employees	The public
Media	Electricity producers	Suppliers
Investors	Media	
Business partners	The public	
The public	Suppliers	
Suppliers		

1. Including NGOs, voluntary organizations, activists, etc.

Table 5.1: Prioritization of stakeholders from companies' viewpoint

5.1.2 Prioritization of stakes from stakeholders' viewpoint

In general, the stakeholders in this study seem to have the largest stakes in the production part of the renewable energy value chain, followed by transmission and distribution. There seems to be less interest in retail overall among the stakeholders interviewed. Among NGOs, production seems to be the part of the value chain in which they have the highest stakes. As one interviewee puts it: *"It is production that is our main interest in the renewable sector" (I9).* I3-1 assigns the same degree of interest to production, but also emphasizes the importance of the grid: *"It is the production side that is the most significant when we talk about electricity in this context. In addition, we have worked quite a lot towards the power grid and distribution side of things (I3-1)".* When it comes to investors, they mainly have stakes in production and distribution. Interviewee I13 states that *"production and distribution are the most interesting to us. That means the last link [retail] still is interesting, but is of significantly less importance" (I13).*

Regarding the regulatory bodies, they are in a different position than both NGOs and investors. In general, they have the overarching responsibility of regulating the industry in some way or another. However, all of the regulatory bodies have different functions and areas of responsibility, as described in Chapter 3. For instance, some have the responsibility of granting licenses to construct grid or power plants; some have the responsibility of ensuring that environmental aspects are safeguarded through impact assessments; and some have the responsibility of ensuring that the projects meet certain socioeconomic conditions. Consequently, the parts of the value chain in which they have the largest stakes vary. I11 argues that they *"follow the value chain from production to transmission, and [to] the retail market" (I11)*, while I5 argues that they *"do not regulate the retail market and therefore have less contact with end users of energy" (I5)*. Figure 5.1 illustrates which parts of the renewable energy value chain the stakeholders have the largest stakes in.

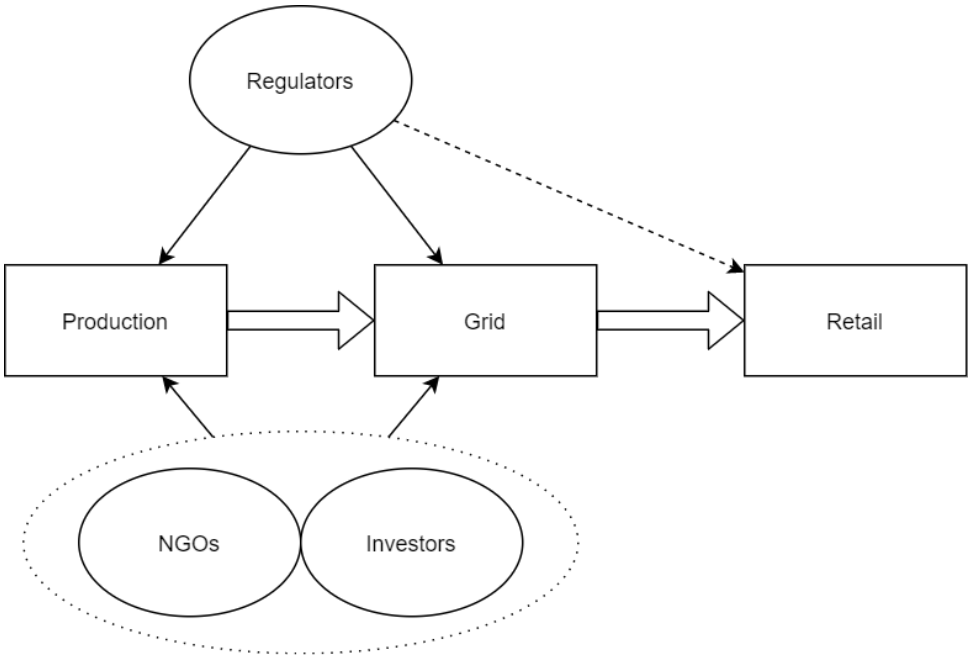

Figure 5.1: Prioritization of stakes from stakeholders' viewpoint

5.1.3 The roles of companies and stakeholders

In the following, we give an overview of the function of the companies in the renewable energy sector, as well as the function of the key stakeholders interviewed in this study, in the context of the renewable energy sector.

Companies

The main role of production companies in the renewable energy sector is to produce electricity from renewable energy sources. As interviewee I8 puts it: *"We are obliged to*

produce renewable energy, but we shall do so with the smallest environmental footprint possible" (I8). Thus, renewable energy production should not be at the expense of severe environmental impacts. The renewable energy sector as a whole also has a responsibility of contributing towards a low-carbon transition: *"The role of the energy sector in the low-carbon society might've been the most important one in many years now, I would say – that the producers and the grid companies facilitate a climate friendly society" (I7).* In practical terms, the role of the transmission companies is to transport electricity from the producers via the transmission grid, while the distribution companies transport electricity from the transmission grid to the customers (end users) via their distribution grid. Besides, interviewee I8 asserts that the sector's *"main social mission is to ensure 100 % security of electricity supply" (I8).* The last step in providing electricity to the end users, is for retail companies to sell electricity and enable for electricity to be distributed to the homes or facilities of the customers.

Investors

In this thesis, we use "investors" as a collective term comprising various actors within the financial sector, primarily in the form of institutional investors and investment banks. Institutional investors usually invest directly in companies or projects in the renewable energy sector, sometimes through large funds. This could entail them having shares and ownership in companies, which gives them the opportunity to work with mandates and influence decision-making related to the operations or the development of new projects. When it comes to the investment banks, they usually have an advisory role, acting as the intermediary between the companies in the industry and potential investors (i.e. between capital seekers and capital providers). This may include services such as raising financial capital or facilitating mergers and acquisitions (M&As), among other things. In general, it seems like the investors see the need to take an active role in making a shift towards a low-carbon society, as illustrated by I13: *"Greenhouse gases and the green shift [...] has become very important for the investors, and they increasingly demand more green companies. Coal is no-go and oil is not popular either, but everything that contributes to restructuring, electrification and decarbonization, is very 'in' at the time" (I13).*

NGOs

The general role of an NGO (non-governmental organization) is to serve a specific social or political purpose, often driven by voluntary participation. NGOs are inherently non-profit, and sometimes rely on funding through donations or membership fees. The missions of NGOs even with similar focal areas may vary, or even be conflicting, as their philosophies may be contradictory. This is especially true for the environmental NGOs with interest in

the renewable energy sector in Norway, even though they commonly *"pay attention to nature, environmental and biodiversity aspects, and take social aspects into consideration" (I9).* Besides, their way of influencing business and society appears to be similar. They generally try to promote their agenda through being present in social media, confronting politicians, engaging people and partaking in regulatory processes, as illustrated by interviewee I3-1: *"Our way of influencing is very political, and is centered around having publicity in media, confronting politicians, writing factual proposals and participating in official hearings, etc. But there is also a significant element of engaging people – in order to spread the message, change their attitude, and engage even more people" (I3-1).*

Regulators

The role of the regulatory bodies concerned with the renewable energy sector is, on an overarching level, to *"safeguard the security of electricity supply and ensure efficient usage of the energy resources" (I11).* Their primary way of achieving the overall mission is to propose legislation that regulates the industry, and enforce the existing laws and regulations. Part of their role is also to facilitate company operations, grant/reject licenses for infrastructure development and continued operations, work with energy politics, conduct impact assessments, and take preventative measures towards natural disasters. These are just examples of specific responsibilities, and each regulatory body has their own responsibilities and areas of expertise. They all work together to reach their overall mission and carry out the political agenda put forth in Norway.

5.2 Industry dynamics and conflicts of interest

To get a better understanding of the industry dynamics in the renewable energy sector, we asked the interviewees about potential conflicts of interest with other stakeholders and industry players. From these findings, we present today's picture of the industry with respect to the ongoing debate, disagreements, and conflicts of interest between actors. Just as with Section 5.1, this section is not part of the main findings of the study, but is intended to set the stage for the subsequent findings and analysis.

5.2.1 Public debate

In general, there seems to be an ongoing, heated debate about renewable energy development, mainly pertaining to the development of new wind farms. *"There definitely are large protests against new wind power projects" (I2).* Apart from wind power, there also seems to be some resistance to the construction of new grid infrastructure, and transmission lines in particular. *"There is a bit of resistance to the construction of new transmission*

lines, for various reasons. It is a lot due to social aspects, and because no one wants to have it close to themselves, naturally" (I8). It seems as if the debate about hydropower has been toned down in the shadow of the wind power debate. *"Some projects are highly disputed nowadays, for instance when it comes to wind power. Hydropower has had its share of extremely contentious periods as well" (I11).* This debate partly revolves around who shall get the benefits from the expanded electricity production:

"There is an ongoing discussion that Norway does not need wind power as we have plenty of hydro resources, and that we are destroying Norwegian nature to feed the Europeans with cheap green electricity. Should we develop [wind power in] the Norwegian nature, in order to export [electricity] abroad, or for foreign investors to profit from it? That is the ongoing debate." (I5)

An investor nuances this picture, and argues that *"there are a lot of foreign capital interests, and that is because Norwegian investors have found the profitability to be too low. [...] So the local resistance might be significant because it's not Norwegian local interests that get the benefits from these investments – it's French, German, and Swiss pension funds that are often behind this" (I13).*

However, the debate is far more nuanced than this; it is not only a discussion about who gets the benefits and where the capital flows. Usually, the debate revolves around the negative externalities associated with renewable energy development, and the locations in which new infrastructure should be built. Sometimes, the arguments are naturally based on personal and subjective views rather than objective assessments, as renewable energy development to a large extent interferes with Norwegian culture and beliefs. For instance, the impact on untouched, Norwegian nature seems to be emphasized by many opponents, as illustrated by I5: *"For instance, the Geirangerfjord shall look untouched, there isn't supposed to be a modern transmission tower standing there" (I5).* Furthermore, the direct impact on local communities and individuals is a major driver of conflict, as also highlighted by interviewee I5: *"When you build grid infrastructure in a populated area there will be a lot of opponents, as no one wants overhead lines in their backyard, which is understandable" (I5).* Interviewee I8 provides a similar perspective on the matter: *"The resistance mainly arises among impacted local communities, i.e. people who get it [new infrastructure] in their local area without wanting it, and without getting paid for it" (I8).*

Generally, the debate is characterized by highly opposing views among various stakeholders. *"We have some obvious collisions when it comes to wind [power]. There are many different stakeholders with many different views, wishes and needs" (I10).* This often manifests in public actions such as demonstrations, campaigns, malevolent and biased agitation in

social media, and sometimes even civil disobedience. *"There have been demonstrations everywhere, both locally and nationally, to stop wind power development" (I13).* A regulatory body emphasizes that conflicts can arise even when the industry tries to meet the stakeholders' demands: *"But of course, conflicts arise, which we can see in the media. Not all landowners and municipalities want this project, so even though the industry tries its best, they can face opposition." (I11).* When it comes to hydropower, interviewee I13 conveys that it is generally more accepted than wind power because it leaves larger amounts of money to the local communities and is mostly publicly owned and anchored in Norwegian interests:

"Hydropower is much less controversial than wind power, because [...] it has left a lot of money to local communities through a range of different programs that have been present for many, many years. [...] In addition, there are Norwegian ownership interests in the back, and the industry is mostly publicly owned, which also contributes to the higher acceptance of hydropower." (I13)

5.2.2 Conflicts of interest

There seem to be many conflicts of interest between the stakeholders and the industry itself. For instance, there could be frictions between companies and the regulatory bodies in cases where project applications have been rejected. Interviewee I11 elaborates: *"We do give refusals; nearly 50 % of all the wind power applications have been rejected. We are sometimes sued by energy companies if we don't grant a license. It is mainly in individual projects and on individual topics there are conflicts" (I11).* It is not uncommon that companies are in conflict with NGOs either, as emphasized by I8: *"On the NGO side there is [conflict], or at least colliding [interests] – especially with environmental NGOs that want less occupation of land area. However, we do have coinciding interests with other NGOs on climate" (I8).* Furthermore, companies are often subject to protests and public disagreements, stemming from a vast range of stakeholders within the public sphere. Interviewee I2 sheds some light on this issue:

"In our primary business, there is conflict of interest continuously. [...] Land owners, fishermen, partly environmental NGOs, etc. are probably both in disagreement with us and critical towards our business. [...] When it comes to infrastructure development, we have earlier seen vigorous protests, both with respect to hydropower and grid." (I2)

Among the most commonly mentioned stakeholders within the category of the "public" or the "civil society", we also find environmentalists, nature users, cabin owners, general recreational users, and recently more informal groupings, as emphasized by I4: *"I think*

those new informal groupings have become more prominent; there has in a way become an organization into many 'teams', which could start as small groups that rapidly gain increased support and begin pulling each other up. (I4)".

Between the industry players themselves, there seems to be a low level of conflict and high degree of cooperation. *"I would claim that the renewable energy sector is characterized by cooperation, and knowledge sharing in the core areas [...] as well as good dialogue" (I2).* The disagreements that exist appear to mainly relate to how costs and responsibilities should be shared between them. Apart from this, the actors seem to have the same overarching interests, as emphasized by I12: *"I believe everyone has the same overarching interest in terms of sustainability. The conflicts first arise in the question of whom should take the bill [for ensuring a sustainable development in the industry]" (I12).* In the continuation of this topic, interviewee I7 proposes the following: *"There might be some disagreements regarding who shall pay what [...] and who shall assess what, etc. It's always like that in a power system where things are interconnected: a division of tasks and a division of costs" (I7).*

Even though the conflicts of interest between the industry players themselves do not seem to be exceedingly prevalent, the conflicts of interest between the various stakeholder groups appear to be more protruding. However, while the relations between certain stakeholders may be particularly strained, the degree of disagreement depends on the specific characteristics of each stakeholder. The relationship between the regulatory bodies and the various NGOs is one that generally seems to be characterized by some degree of conflict, although elements of cooperation are existent. A regulatory body and an NGO provide their view on this relationship, respectively:

"There are both those who want more renewable and less renewable among them [NGOs], so whether we say yes or no to them, there will be someone who is dissatisfied with us. That's why there will be conflict in individual cases. But generally speaking, I think they have faith in our role, and we are respectful of their knowledge and that they have a lot to bring to the table." (I11)

"We do think that the requirements from the authorities are still not good enough, so in that sense we do not agree. However, we are in many cases on the same page – for instance, many hydropower projects have been stopped the past years. They have understood the reasons for our objections, which we take as a sign that we have a partly common understanding." (I3-1)

Similarly to to relationship between NGOs and regulatory bodies, the relationship between

investors and NGOs appears to be somewhat turbulent, as it depends on the views of the specific NGO, especially regarding wind power. For instance, one NGO asserts that: *"We have also targeted some investors. [...] Some private investors may invest to appear 'green' [...] without fully realizing which conflicts that are present" (I3-1).* However, another NGO seems to have a more positive relationship with investors, that is characterized by good dialogue and similar interests: *"We have some dialogue with them [investors] as well, and I would say that we have consistently quite similar interests" (I9).* When it comes to the relationship between regulatory bodies and investors, there seems to be some degree of conflict arising from the denial of applications and discontinuation of licenses previously granted: *"The investors are very eager to develop wind power on land in Norway as cost has come down significantly the last years, and Norway has one of Europe's best wind resources. However, we have denied several applications to build wind power and do not automatically renew licenses." (I5).*

There also seems to be some "inner turmoil" within some of the stakeholder groups, i.e. specific stakeholders within the same stakeholder group may have conflicting views on some topics. A stakeholder group that stands out in this regard, is the NGOs. It seems to be common knowledge that the NGOs with interest in the renewable energy sector are split in their views on renewable energy development, particularly in the question of wind power. As interviewee I5 puts it: *"They [the NGOs] are not always on equal foot, and cannot be viewed as one interest group. Some are positive to wind power and some are against wind power" (I5).* An NGO confirms this claim: *"For instance, we have had some conflicts with [NGO], although we do work together on a lot of things." (I3-1).* An investor proclaims that these split views are advantageous for them: *"To say it a bit cynically, it is an advantage that the environmental movement disagrees a lot with itself" (I4).* Interviewee I3-1 from an NGO also emphasizes that there even are conflicting views among different regulatory bodies: *"There is some internal conflict among the authorities too, where you have different weighting of economy. [...] Maybe it [business economics] is a bit more important for the Ministry of Petroleum and Energy than for the Ministry of Climate and Environment, for instance" (I3-1).* Table 5.2 summarizes the general conflicts of interest between the different stakeholders and companies in the renewable energy sector.

	Production	Grid	Retail	Investors	NGOs	Regulators
Production	X	Division of costs, tasks and responsibilities	Division of costs, tasks and responsibilities	ESG disclosure[1]	Environmental aspects	Licensing[4]
Grid	X	X	Division of costs, tasks and responsibilities	ESG disclosure[1]	Environmental aspects	Licensing[4]
Retail	X	X	X		Environmental aspects	
Investors	X	X	X	X	Project financing[2]	Licensing[4]
NGOs	X	X	X	X	Wind power development[3]	Licensing and legislation[5]
Regulators	X	X	X	X	X	Weighting of issues[6]

1. The investors demand more and better ESG disclosure than the companies currently provide.
2. Could either be a positive or negative relationship, depending on the NGO.
3. They have divergent opinions (some are positive and some are negative) towards wind power development.
4. Outcome of licensing procedures. Regulators prioritize socioeconomic profitability over business profitability.
5. Disagreements regarding licensing procedures and legislative requirements.
6. Not a conflict of interest per se, but they have different areas of responsibility and priorities, e.g. w.r.t. economics.

Table 5.2: Areas of conflicting interest

5.3 Sustainability aspects

One of the main purposes of this study is to map the material sustainability aspects in the renewable energy sector as seen from the perspective of the industry itself and its key stakeholders, as well as the prioritization between said aspects. The findings are mainly categorized in environmental, social and economic aspects, and a summary of the most important findings are located at the bottom of each subsection. For each of the categories, we present the perceived material aspects of the industry players and the stakeholders, continuously synthesizing and comparing the different views of the companies, the investors, the NGOs and the regulatory bodies. It should be noted that our findings reflect the fact that we interviewed firms from four different parts of the renewable energy value chain, which entails differing views within the industry itself. Naturally, the views of the different stakeholders also vary.

5.3.1 Environmental aspects

When asked about which aspects are considered material, the interviewees generally start talking about aspects in the environmental category. This might indicate that environmental issues are what first comes to mind when talking about sustainability. The NGOs are also mainly concerned with the environmental impacts. Therefore, our

results are to some extent skewed towards the environmental category. The perceptions of which environmental aspects are material coincide to a large extent both for players in the industry and their stakeholders. In general, there seems to be consensus on the materiality of two broad environmental aspects, namely *climate* and *biodiversity*, where especially the latter is conceived to become even more important in the time to come. *Land use* is also a highly material aspect mentioned by all of the interviewees, but this aspect is largely connected to biodiversity, climate, and other aspects of social character. For simplicity, we will however treat it as a separate environmental aspect. A summary of the most important findings can be found in Table 5.3 and Table 5.4.

Climate

Climate is one of the most frequently mentioned aspects across all categories, and all interviewees see this as an important aspect in one way or another. The importance of the climate aspect is highlighted in the following statements: *"Our main focus lately has been om climate, naturally" (I10). "The most important aspects are undoubtedly renewability and climate, and being part of the solution in these areas is crucial. That is where we believe we have the largest social mission in addition to ensuring security of electricity supply" (I8).*

It seems like climate has been put on top of the agenda for many industry players, who see it as their duty to address this issue. However, the climate issue is not tackled with isolated efforts; rather, its connection to other aspects like biodiversity, renewability and electricity supply becomes apparent. Another interviewee highlights this connection: *"We believe it is important to say that if we do not solve the climate crisis, we undermine the possibility of solving the nature crisis. That is, the further the climate changes come, the greater and the more unpredictable consequences it has for nature" (I9).* When talking about the climate aspect, the interviewees first and foremost refer to the carbon footprint and CO2 emissions. *"You have the direct emissions, and then there are indirect emissions and other emissions" (I12).* Most of the time, the carbon footprint referred to is the one of the actors themselves. An interviewee emphasizes the impact of their firm's own carbon emissions:

"When it comes to CO2 emissions, we need to take some actions. We have over 400 vehicles in daily operations [...] and the majority of them are fossil fueled, [...] so you can see that the emissions from the car fleet are large." (I2)

The same interviewee asserts that they have *"now landed an ambition of cutting the CO2 emissions with 40 % within 2030" (I2).* In addition to the actors' own emissions,

some interviewees mention the emissions of suppliers, and as such the carbon footprint throughout the supply chain and in a life cycle context:

"If you want a good picture of the climate consequences on a global scale, you also have to include emissions happening abroad linked to [...] actions in Norway. You really only get that with a proper life cycle analysis." (I3-1)

"When I speak about footprints – and that also applies to when I speak about footprints from our supply chain – I do not only speak about emissions. A footprint is more of an umbrella term ... the technical term is CO2 equivalents. In a life cycle context, the life cycle costs are calculated in CO2 equivalents." (I1)

Seeing as CO2 equivalents comprise a range of different greenhouse gases (GHGs) in addition to carbon dioxide, it seems like the focus is not only on CO2. SF6 is another greenhouse gas that has been highlighted by some interviewees within the industry. An interviewee mentions that *"[The SF6 gas] is a bad climate offender, [...] which is part of operating these transformer plants of ours" (I2).* The regulators, however, seem to regard the greenhouse gas emissions in the Norwegian renewable energy sector itself as relatively low: *"Generally, the Norwegian renewable energy sector has low climate gas emissions from a life cycle perspective, compared to the energy sources in other countries" (I11).* The same interviewee explains the regulator's view on the climate aspect in individual cases:

"Climate is an overlaying topic for everything we do, but it is not weighted that much in individual cases, because all individual cases are renewable. [...] We do not conduct concrete climate emission assessments in projects. However, there is a political wish of attaining more renewable." (I11)

Thus, it seems like the regulators place greater emphasis on the positive sides of renewable energy production and distribution, and weigh the negative sides against the positive sides on a larger scale. However, the climate aspect is in itself quite complex, and entails an array of different elements, also outside the traditional scope of greenhouse gas emissions and CO2 equivalents. An interviewee further elaborates on what the climate aspect comprises:

"Climate for us has three elements. [...] For one it is what we contribute with of renewable energy that can take out other CO2 emissions. Secondly it is what we do to reduce our own emissions, and lastly it is the adaption to another world, i.e. 'climate resilience', or 'what do you need to do with your operations to adapt to what is happening?'" (I10)

It is apparent that climate gases, and especially CO2 emissions play a major role in the climate aspect, but that climate is a multifaceted concept that also encompasses the positive effects of producing renewable energy, including phasing out fossil fuels and thus reducing the total CO2 emissions. *"Naturally, we are concerned with renewable energy as something that shall contribute to reduce climate gas emissions, which is also important to include" (I3-1).* Another facet of the climate aspect is what I10 refers to as "climate resilience". This is supported by multiple interviewees, although some refer to it as "climate change" or "climate adaption". Regardless of the term used, the concept seems to entail preparing for changes in the climate, and adapting the business operations appropriately. It is mainly the firms involved in production that talk about this concept, which makes sense as it primarily relates to the safety of dams and watercourses as well as flood control. However, NGOs and regulators also mention climate adaption as an important aspect when assessing the impacts of new projects.

"Then you have climate changes, i.e. dealing with the worsening of the climate, or adapting to the climate. That is something we care a lot about, and that can have great importance for society, as it relates to dam safety, [...] rainfall from extreme weather, and [the associated] risk of flood in the watercourses. Our dams can be regulated, to reduce the risk of flood downstream." (I2)

"But then there is climate adaption. The climate is becoming wetter and the hydrology is changing in Norway. You cannot only use historical data when projecting future projects. So we look at impacts of climate changes in our licensing procedures." (I11)

That being said, climate adaption and the regulation of watercourses come at a price: *"So we take a social responsibility, and then we lose money, because we are not able to marginalize the extra rainfall. We let it through so that you reduce the risk of flood in the village or wherever you are" (I2).* This statement indicates that climate change is a financially material aspect, as it necessitates measures such as flood control to be taken, which is a costly affair. I3-1 also emphasizes the consequences of flood for local communities, and the associated cost for mitigatory measures and for society at large: *"It is clear that [flood] is something that affects the local community, but it also has a cost for society at large and for Norway's ... regions' budgets on mitigatory measures like that" (I3-1).*

The investors also take a clear stance on the climate aspect: *"And of course greenhouse gas emissions are material" (I6).* Contributing to decarbonization is underlined as an important reason, which coincides with that of the industry and multiple stakeholders. Electrification is highlighted as an important means to achieve this mission. An interviewee

elaborates:

"[The investors] are not keen to contribute to something that increases [GHG emissions], but rather something that reduces emissions. [...] And typically that happens in many ways, but electrification is rather important. [...] Investors increasingly demand more green companies. Coal is a no-go and oil is not popular either, but everything that contributes to restructuring, electrification, and decarbonization is very 'in' at the time." (I13)

However, when interrogated further on why they deem climate a material aspect, the investors provide a somewhat different perspective on the issue. From the investor perspective, the climate issue – as well as other sustainability issues – largely translate to *risk*, which ultimately affects the expected profitability of investments and the opportunity cost of new projects. Risk can take many forms, one of which being "climate risk", which seems to be of high priority in these times. *"If you travel two years back in time, in 2017 when the TCFD report was introduced, climate risk was something that was not on top of the finance agenda. Today, climate risk towers high on the agenda, both for asset owners, asset managers and investment banks" (I6).*

Regardless, the view that electrification is central to achieve decarbonization is shared by the industry players themselves. There is a notion within the industry that electrification is one of their primary goals, which contributes to a "green restructuring" of society: *"The overarching [aspect] is that concerning renewables, electrification and climate contribution" (I8). "When we as an industry talk about climate, we talk about the electrification of society" (I7). "We have a range of electrification projects, and electrification is a material aspect" (I2).* A regulator shares this view: *"The way in which Norway can solve the climate challenges and reduce emissions, is first and foremost by electrifying sectors that use fossil fuels, such as the transportation and industrial sectors." (I5).* An interviewee from a grid company emphasizes that electrification is not only about electrifying the society, but also about electrifying the company's own operations: *"We build grid and contribute to electrification and green restructuring, but we must do it in a way that also reduces emissions. We must reduce emissions in our own operations, out on the construction sites and at the suppliers, and be a front runner in our industry by electrifying ourselves" (I7).*

Biodiversity

Biodiversity is the second environmental aspect that is perceived as highly material in the industry, both by industry players themselves and the stakeholders. Compared to the climate aspect, the materiality of biodiversity varies more depending on where in the renewable energy value chain we are. While it is deemed highly material in production

and to some extent in transmission and distribution, biodiversity is generally not seen as a material aspect in retail in isolation. Retailers may, however, regard biodiversity as material in other parts of the value chain. Furthermore, the perceived degree of materiality varies across firms and stakeholders; where some consider biodiversity to be a material aspect today, others believe this aspect will increase in prominence and materiality in the time to come. Some interviewees from companies in the industry highlight the importance of biodiversity with the following statements:

"Among the environmental topics, biodiversity and water resource management are really the most material [aspects], and also [the ones] our stakeholders perceive as important. [...] [Biodiversity] is something we believe will increase in prominence." (I10)

"Another thing that has gotten increased attention the last year especially, is this with biodiversity. [...] And an example is with marshes; some years ago it was considered a well suited place to build e.g. a transformer station. Whilst now, we are not supposed to build in marshes, because of climate emissions and biodiversity. So there has been a change there, in the course of a couple of years." (I7)

It is evident that biodiversity is perceived as a material aspect in production and transmission. The importance to stakeholders is also emphasized, indicating that biodiversity is a wide-spanning aspect. Both of the interviewees behind the statements above posit that biodiversity has gained increased attention the past years, to the point it has now become material; I10 also points out that the aspect will keep increasing in prominence going forward. In retail on the other hand, the biodiversity aspect is seen in a different light. While biodiversity is recognized as material for the industry in general, the retailers themselves do not have any significant direct impacts on the aspect, because they chiefly provide immaterial services that do not require many physical assets:

"Regarding biodiversity and those kind of things, the most important thing is that you don't intervene more than necessary. But as I said, we don't have any physical assets; it is customers, brand, competence, etc. We are first and foremost immaterial, as opposed to the two other parts of the value chain that, after all, are very physically present and tie up land areas." (I12)

An interviewee from another retail company provides another perspective on the matter. The person regards the environmental footprint throughout the renewable energy value chain – including that on biodiversity – as material for the company. When asked why the aspect is deemed material, the interviewee tells that it is *"because there is also a footprint connected to production and distribution of renewable energy. I believe that –*

for a company engaged in buying and selling energy – that is a material aspect for us" (I1). Consequently, it appears as the interviewee believes their company has some form of responsibility for the impacts caused further down the value chain.

Investors also emphasize the importance of biodiversity. An interviewee says the following: *"For production for example, land use and the project's impact on biodiversity is a very, very important factor" (I6).* Another interviewee from a regulatory body argues that the protection of biodiversity is a national responsibility: *"Loss of biodiversity is a topic which is becoming increasingly more relevant. All types of nature and biodiversity, like fish and birds, are included in that [topic]. Moss and lichen aren't necessarily topics the municipalities are concerned about, but it is nonetheless a national responsibility we must safeguard" (I11).*

Even though biodiversity is generally perceived as a material sustainability aspect, it is a complex aspect that encompasses a broad range of interconnected issues. The regulators are concerned with the prioritization of issues within the biodiversity aspect, which is a difficult task in impact assessments and other individual cases; it is a question of how different considerations should be weighted against each other. An interviewee illustrates this balancing act: *"There is the impact assessment logic that lies behind [the prioritization]. A red-listed species that is endangered is weighted to a greater degree than an ordinary species such as heather or spruce" (I11).* When speaking of biodiversity, the focus lies primarily on *loss* of biodiversity in general, and impacts on rare, endangered, or otherwise important species in specific. An interviewee sheds some light on what biodiversity comprises:

"When it comes to our infrastructure, primarily the electric grid, it is clear that red-listed species are exposed. If we enter an area that is red-listed, that is not good, but there are good playing rules on that from the government and ourselves. But still, the area is exposed, and contains birds such as the Eurasian eagle-owl. The Eurasian eagle-owl is exposed because it sits on the grid, touches two electrical circuits, and gets the grill. So we have actually established sitting-sticks for the Eurasian eagle-owl on some of the masts. The biodiversity, including species such as salmon and trout in the watercourses, and the Eurasian eagle-owl, definitely has an environmental impact. So the ambition is to curb that impact to the greatest extent possible." (I2)

Typically, impact on red-listed (endangered) species is highlighted as an important factor in the biodiversity aspect. As illustrated by the statement above, when talking about infrastructure and the electric grid in specific, the Eurasian eagle-owl is very frequently accentuated as an example of what the biodiversity aspect entails. It is seen as important

to preserve, especially in Norway where the species is strongly endangered. Another interviewee from the industry emphasizes the importance of preserving the Eurasian eagle-owl: *"Something we try addressing is the issue of birds short-circuiting in [high-voltage] cables. [...] The Eurasian eagle-owl has been important" (I8).* However, the same interviewee argues that bird collisions in general is not a material issue in the local distribution grid: *"Bird collisions is an impact, but you can hardly say it is a comprehensive problem" (I8).*

The perceived importance of impacts on birds is shared by both NGOs, investors, and regulators, although to a varying extent. An interviewee from a regulatory body explains that the Eurasian eagle-owl is a recurring topic in cases they are involved in. Multiple interviewees emphasize that impacts on birds are most relevant in wind power cases, and not so much in hydropower. An investor shares their view on birds in wind power cases: *"For wind power, we are looking to see what collision risk there is for birds, but to know the exact species and what vulnerability those species have, you need to be site-specific" (I4).* Opposingly, an NGO provides a more critical view on the importance of impacts on birds: *"This is a quite difficult matter, because if you ask a wind power opponent, you will always find some bird migration paths through a wind power plant, to push things to extremes. [...] And it's difficult, because one could say: 'Yes, birds are going to die as a consequence, but far more birds die as a result of people having cats'. So then the question is how important it actually is [...]" (I9).*

Another topic under the biodiversity aspect that is frequently highlighted by the industry players, is watercourse environment, and fish in particular. However, this topic only relates to hydropower production, and not wind power. Thus, it is not often mentioned by stakeholders, with the exception of regulators. An interviewee from the industry posits that: *"For hydropower, I would say the largest footprint is impact on watercourse environment, particularly fish. And fish is kind of the top indicator, because it is so easily noticed" (I8).* A company supports this view: *"Regulated watercourses have an impact on the biodiversity, and it is mainly the fish – salmon and trout in particular – that are affected" (I2).* It is evident that biodiversity is a comprehensive aspect that is material for the industry itself and its key stakeholders, despite some differences between wind power and hydropower as well as differing view across the value chain links. However, biodiversity is a complex topic encompassing more than just birds, fish, and red-listed species. An NGO explains the importance of biodiversity on a deeper level, and its connection to ecosystem services:

"There are a lot of reasons as to why biodiversity is important, that isn't just like: 'we like to take care of the species because they are pretty'. A case in point is what we call

ecosystem services, which are things the nature does for us, including e.g. carbon storage and flood protection, and a whole range of services like that. If it rains on cement it rains straight down into our basements, but if it rains on a marsh, the water is taken up by the marsh, and there won't be as much flood. Furthermore, insects that e.g. pollinate the fruit we eat, live there. There is a long chain of things like that, each with their specific function for us humans." (I3-2)

The interviewee emphasizes that there is a vast range of good reasons for keeping the biodiversity intact, besides protecting the species for aesthetic purposes. In particular, the person highlights the connection between biodiversity and ecosystem services, which are crucial for humanity as a whole; carbon storage is mentioned as an example. This view is shared by another interviewee representing the investors, who also highlights carbon storage: *"Sometimes one takes [destroys] marshes that store a lot of carbon, so that all the carbon is released. That is an aspect I definitely believe is present" (I13).*

As with the climate aspect, the investors mainly regard the biodiversity aspect as something affecting financial risk. They term this *nature risk*, which is considered a material aspect by all interviewees in the investor stakeholder group. It is also something that is expected to increase in magnitude and importance the coming years. An interviewee emphasizes that nobody has a high risk appetite when speaking of nature risk, and that the current legislation is not enough to reduce the nature risk sufficiently in itself:

"I think one has to distinguish between general minimum requirements that everyone agrees upon, and what will sort of be additional requirements, that we might have to start pushing on. When it comes to classified areas – from a nature risk standpoint, nobody has high risk appetite; you have a minimum requirement there. You shall not be in a protected area, unless you have a very good reason for it. And you shall not pose a risk if there are many red-listed species, e.g. a Eurasian eagle-owl population." (I4)

Another investor provides an example to illustrate the potential consequences of investing in a project with high nature risk:

"There have been instances where hydropower projects in Norway have been stopped because one finds two freshwater pearl mussels one expects will die if the temperature rises with one degree, for example. [...] But, of course, someone can already choose to refrain from taking a project to NVE, because they themselves feel that it is so conflicted on biodiversity, interventions or visibility [...] that it is not worth pursuing simply based on those aspects [despite the positive contributions to renewable energy]." (I13)

As the interviewee explains, there has been multiple instances where hydropower projects

in Norway have been shut down as a consequence of someone finding a rare species in the watercourse, even in cases of low specimen numbers. Investing in renewable projects may therefore entail a large nature risk and financial risk, as the investor could face a large loss if certain species are found on the site and the project is stopped. Even in projects where the potential upsides are large, the interviewee tells that major conflicts in many cases shy away investors, deterring them from investing in the project. This indicates that biodiversity is in fact a financially material aspect for investors.

Land use

The third major environmental aspect that emerges from the interview data is *land use*. As briefly mentioned, this aspect is deeply connected to other environmental aspects such as climate and biodiversity, as well as social aspects such as local communities and recreation. However, we describe it separately to the other aspects for the sake of clarity and readability. It should also be noted that the materiality of land use depends on whether one speaks about wind power or hydropower, where it is generally considered to be significantly more material in the former. The following statements illustrate the perceived materiality of the land use aspect in general: *"If you have a wind power project in Norway on land for example, I would then think it is relatively material that you have control over your land use" (I6). "How important it [land use] is for an investor is hard to say, but I believe one is much more concerned with it now than previously" (I13). "You can say that if you constantly use more land areas and more energy, it is quite a worrisome development" (I3-1). "When it comes to the transportation it is clear that it ties up a good amount of land area to build infrastructure. So the most important thing of all is managing to get a cost-effective use of the seized land" (I12).*

As illustrated by the statements in the preceding paragraph, land use seems to be a material aspect, although from somewhat different perspectives depending on the stakeholder and firm. I3-2 from an NGO thinks the increased use of land and energy is worrisome, which is further elaborated on by I3-1:

"There is kind of a hierarchy on the four aspects [climate gas emissions, biodiversity, land use, energy use] too – because land use is kind of an indicator on biodiversity. And then you have the energy need: the higher the energy need in society, the higher the CO2 emissions, which again has an impact on biodiversity. Thus, I regard land area need and energy need as two important indicators for both climate and biodiversity. [...] To go a bit more in detail, I will say that land use also has a climate impact through marshes, deforestation, and that whole package. So I tend to say that if we shall take a simple litmus test on whether something is good or bad for the environment, I argue that if there

is a high energy need, then it is often ... questionable; if there is a high land area use, then it is questionable." (I3-1)

In the statement above, the interviewee establishes a clear connection between land use, energy use or energy need, climate and biodiversity, through a good line of reasoning. It is emphasized that land use may be a good proxy for determining the impacts on biodiversity. Furthermore, the total energy need in society is referred to as a "trigger" for CO2 emissions, because the country is far from fully electrified yet. This is again linked to biodiversity, with the interviewee stating that land area use impacts both biodiversity and climate by destroying important nature types like marshes and forests. I13 shares this view: *"A marsh retains a lot of CO2, and if you then start removing it [the marsh], you potentially get a hefty emission of CO2" (I13).* Furthermore, I3-1 believes that energy need and land area use together constitute a good proxy for environmental impacts. The interconnectedness of the land use aspect is also highlighted by interviewee I8, although from a slightly different angle:

"Land area occupation for wind power is also high in materiality, but ... I will contravene that it has particularly big economic and environmental significance. [...] It is of great social significance; it is there the resistance arises. There is such large social resistance, you have something called 'Motvindsaksjonen' [Motvind Norge – a group working against wind power], which really feeds [the opposition]. [...] There are many arguments against noise, light conditions, visibility, etc." (I8)

The interviewee perceives land use to be mostly a social aspect, and not so much an environmental one, in contrast to the NGOs. Furthermore, I8 argues that land use is a necessity in renewable projects, and that it is more about choosing the locations with the least possible impact: *"It's more about choosing the areas where land occupation is the least adverse" (I8).* Another interviewee states that *"the regulations are important means for ensuring that one doesn't tie up land areas unnecessarily" (I12).*

The regulators themselves agree that land area use is a material aspect for sustainability. An interviewee emphasizes the opportunity cost of using land areas to build infrastructure: *"All infrastructure requires use of land area, and thus competes with other possible applications of the same land" (I5).* The same interviewee also establishes the connection between land use and biodiversity: *"There is an increasing awareness about the value of land being utilized, and the biodiversity that may be impacted if something physical is built there. We try to assign a value to the use of land and its consequences even though it cannot be priced directly" (I5).* Furthermore, I5 points out the connection to social aspects just like I3-1 and I8: *"And there is visual disturbance. For instance, the Geirangerfjord*

shall look untouched, there isn't supposed to be a modern transmission tower standing there. There are many considerations to make" (I5). The preceding statements provide a good illustration of the intersection between environmental and social aspects in the renewable energy sector, and as such marks our transition to social aspects.

Summary of environmental aspects

Table 5.3 below summarizes how the various stakeholders and companies prioritize the three main environmental aspects with respect to materiality. Table 5.4 summarizes how the three environmental aspects typically are operationalized into more specific sub-topics.

	Production	**Grid**	**Retail**	**Investors**	**NGOs**	**Regulators**
Climate	High	High	High	High[2]	High	High
Biodiversity	High	High	Low[1]	High[2]	High	High
Land use	High	High	Low[1]	High[2]	High	High

1. But high degree of materiality when seen in a supply chain perspective.
2. Climate and nature risk.

Table 5.3: Prioritization and materiality of environmental aspects

Climate	**Biodiversity**	**Land use**
GHG emissions	Red-listed species	Connection to biodiversity
Decarbonization	Bird collisions	Connection to climate
Climate adaption	Watercourse environment	Connection to social aspects
Ecosystem services	Nature risk	Value of seized land
Energy consumption	Connection to climate	Conflicts
Climate risk	Nature types	Area of land seized

Table 5.4: Operationalization of environmental aspects

5.3.2 Social aspects

In the social category, a vast range of different issues are mentioned, some of which relate to each other as well as environmental and economic aspects. Despite this interconnectedness, we split the most recurring themes into distinct aspects. The most salient social aspects seem to be *local communities*, *recreation*, *human rights*, *working conditions* and *power supply*. We proceed to present each of these aspects individually. A summary of the findings can be found in Table 5.5 and Table 5.6.

Local communities

All interviewees mention impact on local communities in one way or another. The industry players seem to be mainly concerned with local acceptance of renewable projects, and thus spend a lot of resources on tending to local concerns. As it seems, giving something back to the local community is significant to getting acceptance of local projects, as illustrated by I7: *"We consider local communities an important stakeholder because we operate in their neighborhood and depend on their acceptances" (I7).* Getting local acceptance commonly entails giving economic compensation or paying taxes, as interviewee I8 emphasizes: *"We currently work a lot with tax for example, i.e. getting a tax system that anchors things well and leave something locally. Using such instruments to get local acceptance is very important for us" (I8).* If nothing is given back, the local resistance can intensify: *"The resistance mainly comes from the people who get it [infrastructure] without wanting it, and without getting paid for it" (I8).*

The investors also emphasize the importance of giving something back to the local community. In more developing countries, providing a stable access to electrical power might be enough, because of the vast positive ripple effects it entails for society. Additionally, the extra jobs created is a positive side-effect of building new power plants in these countries. In Norway, however, which already has wide coverage of electricity supply and a low unemployment rate, one needs to provide value in other forms to the impacted local communities. An interviewee highlights this issue in relation to wind farms: *"Norway is a rich country after all, and up until the coronavirus we didn't need the [extra] jobs. And these wind farms left too little to the society, which also resulted in people not really seeing the reason to support anything like this" (I13).* In this statement, I13 also emphasizes that a lack of value given back to society or local community results in increased resistance to renewable projects such as wind farms. Another interviewee explains the importance of local anchoring and communication of the added value to the locals:

"I would argue it is relatively material that [...] you also have a plausible explanation on how this project will be able to generate utility for the local community, [...] which will also minimize the risk for delay or cancellation." (I6)

The view that local communities is an important social aspect that needs to be taken into consideration, is shared by multiple other stakeholders. An NGO states that *"it affects people's conception, both real and perceived, that 'here, nature that I love is being impacted', etc., so you need to take that seriously" (I9).* A regulator shares the view of the NGO: *"[...] a local landowner that despairs of a wind power plant, we ought to listen to their concerns" (I11).* I11 proceeds to elaborate on what creates local acceptance,

including political will and local will, which is affected by the project developer's ability to run good processes towards the municipality, where listening and adaption is at heart: *"The processes the project developers run towards the municipality are important to gain acceptance, [...] including listening and adapting their projects to local wishes" (I11).*

The reasons for local resistance in renewable projects are, however, diverse. Creating local acceptance is not simply a question of how much monetary value is given back to the local community or which processes are conducted towards the municipalities. Seemingly, much of the resistance has a direct relation to the fact that beloved nature is ruined, and the disturbance factors that come with the infrastructure. The impact on cultural heritage and animal husbandry is sometimes mentioned as well, in addition to health and safety concerns; however, these aspects are generally not perceived as material in the bigger picture. The statements below illustrate some of these points well:

"We care a lot about avoiding placing wind farms where they are displeasing or cause conflicts with settlements. [...] It is particularly noise that people are concerned with. And then there is shadow cast [or shadow flicker] and ice throw. Those are also things one must take into account. [...] And to a certain extent visual aspects, although one could argue that one must tolerate seeing some wind turbines in the horizon, just like one tolerates seeing everything else. But it should be considered to some extent." (I9)

"And then you have the electromagnetic field from power lines, which also is a parameter that is subject to discussion, where there are some rules stating that you should not have kindergartens and sensitive settlements within a [set] boundary." (I8)

Interviewee I11 from a regulatory body argues that adverse effects like noise and electromagnetic radiation are generally well accounted for in the licensing procedures: *"There are also worries about noise and electromagnetic radiation, risk of cancer. These issues are addressed within the existing legal framework when the license is granted" (I11).* The same interviewee argues that the social aspects, including local communities, are generally well safeguarded as a consequence of legislation and regulatory mechanisms: *"When it comes to social consequences, it is to a great extent safeguarded by mechanisms in Norway, for instance compensation regulations for expropriation. [...] But of course, conflicts arise, which we can see in the media" (I11).*

The claim that social aspects generally are not considered a big problem in Norway, is supported by I13 from the investor stakeholder group. Interviewee I13 claims that social aspects, and the impact on local communities in particular, has an entirely different magnitude in other, less developed parts of the world compared to e.g. the Nordic

countries:

"In Norway, it [social aspects] is not a very big problem, but we have seen companies who operate in other parts of the world, that have to dam up an entire valley when building e.g. a hydropower plant. And [in the valley] there might live [...] hundreds of natives [...] who have to move to another place. That is challenging to handle, and you need a plan for how you are going to manage it. So in those areas, the problems are on another scale than e.g. here in the Nordics." (I13)

Nonetheless, another investor asserts that resistance from local communities poses a risk to his company, and that the use of international standards for risk management in impact assessments do not necessarily mitigate all risk: *"And the general rule when it comes to these guidelines from IFC, the World Bank and the Equator Principles, is that one initially trusts the regulations in OECD. But then there are many examples showing that it doesn't mean you don't get any form of risk for it. So let's say a local community is upset, or some Sámi people believe there is a risk for wild reindeer – then that can pose a reputational risk for us" (I4).* Consequently, the interviewee argues that the impact of renewable projects – and especially wind power projects – on local communities is a material issue that they take very seriously:

"Wind power is generally controversial, and it's more of a local community, 'not-in-my-backyard' issue. So that means that for emerging wind projects, we must take an extra check on that specifically. 'How is the buy-in among the locals?' We might ask that question to a company in which we are on the owner side, or deal with it if there is a fund we enter into." (I4)

Recreation

Another social aspect that stands out as important, is *recreation*, including topics such as outdoor life and tourism ("outdoor life" is in this context used as an equivalent to the distinctive Norwegian term "friluftsliv"). This aspect also has connections to multiple other aspects, and a particularly strong link to the aspect of local communities, which sometimes is difficult to separate from recreation. Both the industry itself, the NGOs, the investors and the regulators regard recreation as an important aspect. As interviewee I9 puts it: *"Outdoor life is also an aspect that should be safeguarded to the greatest extent possible. You should avoid building wind farms in important recreational areas" (I9).* I13 posits that *"you might try to place them [the wind farms] where there already are things from before" (I13).* From these statements, it is emphasized that renewable projects should – to the greatest extent possible – not affect important recreational areas and outdoor

life. A regulator emphasizes that outdoor life impacts along with landscape alteration are commonly seen as the biggest disadvantages arising from licensing cases: *"The impact of power lines on landscape and outdoor life is the disadvantage most people highlight in licensing cases of transmission and distribution" (I11).*

There are also some regulations ensuring that these aspects are safeguarded in the production part of the value chain: *"Social aspects such as landscape aesthetics, hiking and fishing are included in regulations, requirements and the like. [...] The ones we notice the most in everyday life are typically related to various nature preservation interests or outdoor life interests" (I10).* The importance of fishing is also highlighted by I8, who claims that fish is something that people quickly notice: *"Within hydropower, it is especially fish and fishing conditions that is noticed the most, which relates to biodiversity, but also social aspects such as recreation" (I8).* Besides fishing, a regulator also mentions tourism and cultural heritage as important social aspects: *"Many stakeholders have some form of interest in the area: [...] it could be The Norwegian Trekking Association; it could be the tourism industry. There are many stakeholders that care about other aspects than just biodiversity, such as preservation-worthy issues, cultural heritage, etc."(I5).* Although there is a general agreement that recreational areas and outdoor life are aspects that should be accounted for, some interviewees emphasize that different areas should be weighted differently. Interviewee I11 asserts that *"on landscape and outdoor life, nationally valuable areas are weighted more than locally valuable areas" (I11).* This weighting logic is also highlighted by interviewee I3-2:

"Many of these hiking areas have both local and international effects. The 'Hundred-Acre Wood' that you kind of have in your backyard might be very important locally. But Rondane for example, is a nationally and internationally important outdoor area; ruining it would have consequences far beyond the local community." (I3-2)

It is emphasized that areas of national and international importance weigh more than just locally important areas in the sustainability assessment of renewable projects. Rondane is highlighted as an example of an area with significant importance beyond just the local community. Interviewee I5 points to the Geirangerfjord as a similar example, which is an internationally important tourist location. Interviewee I10 highlights the significance of Trolltunga: *"It is also about facilitating outdoor life and such things. If you stand on Trolltunga and gaze outward for example, the lake you see underneath is a regulated lake" (I10).* The importance of accounting for outdoor life and recreation is explained by interviewee I3-1 from an NGO:

"So it could be ... simple things such as outdoor areas that are important for people's

mental health, [...] getting out in nature and doing something for recreation. That is in fact an ecosystem service too, but it's more ... colloquial, something that people might perceive as more obvious [than other aspects]." (I3-1)

When it comes to tourism, the same NGO points out that it can be a positive thing, but not necessarily so, as it could entail increased pressure on the local communities, the climate, and the outdoor areas: *"Increased tourism can be a positive thing, because it means that there is a smaller probability that areas are used for renewable energy development. At the same time, having a lot of tourism will lead to pressure locally, e.g. to build hotels" (I3-2).* Interviewee I3-1 continues: *"You can also have too big of a strain merely in the form of too many people walking in an area. You have wild reindeer that is very bashful for example, and people throw away garbage. So there are pluses and minuses with it [tourism], after all" (I3-1).*

Human rights

Generally, there seems to be consensus among the industry players involved in energy production that human rights is a material social aspect. *"We have a lot of focus on human rights, of course" (I10).* However, human rights is rarely mentioned without also mentioning the supply chain. Seemingly, the companies are not only concerned with human rights in their own operations, but also throughout their supply chains, both within the borders of Norway and abroad. *"Human rights, diversity, equality and anti-corruption are also material aspects both for us and for our stakeholders. [...] Human rights may be just as much about digging into the entire supply chain, and challenging our subcontractors on the topic by posing requirements" (I2).* However, a greater emphasis is placed on supply chain monitoring in international supply chains, where violations on human rights are more common. Despite this, one interviewee emphasizes that it is easy to forget about human rights in Norway due to the established systems, and that one cannot lose focus on this issue within the country's borders, either.

"The most material aspect with respect to human rights, is for many companies the supply chain monitoring. [...] In a big [materiality] analysis, human rights doesn't necessarily top the list, but they are important on [specific locations and processes, e.g. involving indigenous people]. [...] Human rights violations are much more 'in your face' in some markets internationally, but you cannot forget the supply chain here in Norway either. It's easy to be a bit naive and think that we have everything under control because we have good systems and laws. One cannot lose focus." (I10)

Two of the investor interviewees also mention the human rights aspect, although they

seem to focus less on this issue. Interviewee I13 believes the focus on equality among investors has increased, and is now something most investors are concerned with: *"I also think there is a completely different focus on e.g. equality now than it was before. [...] Now one [investors] is much more concerned with having equality; one shall contribute to lifting people up and not let it become kind of a boys' club" (I13).* Interviewee I6 mentions that the laws in Norway generally safeguard the social aspects: *"The S in ESG is relatively dependent on where you are. There exists modern slavery in Norway too, but to a much smaller extent than in many other countries, and one is relatively well covered on social aspects as long as one operates within the law in Norway" (I6).*

Working conditions

Working conditions is a social aspect that is highlighted by multiple players in the industry, primarily those involved in production and grid operations. While these companies argue working conditions – including health and safety (HSE) – is one of their most material aspects, no stakeholders mention this aspect (with the exception of an investor briefly mentioning HSE risk), and neither do the retailers. Interviewee I2 asserts that HSE is their top priority: *"HSE is always at the very top. We shall have zero tolerance, i.e. we shall not have accidents or incidents [injuries] among our employees" (I2).* Interviewee I7 supports this view:

"Safety may always be the most important [aspect]. [...] We have a high-voltage grid, so we need to ensure that our employees and contractors always have a safe day at work. That has always been important in our industry." (I7)

The interviewees behind the preceding statements emphasize that working conditions and HSE in specific are critically important for their companies, and regarded as highly material. They even argue this aspect is the most material aspect that thrones above all, and that it has always been that way. It is fascinating, then, that none of the stakeholders even mention this aspect. Although working conditions seem to be highly material in Norway, the importance of the aspect throughout supply chains outside of the country's borders is also emphasized. A grid company tells that *"there are extreme amounts of bad working conditions and unethical suppliers. [...] We cannot close our eyes for [...] the global problem with bad working conditions and unethical business operations. When we e.g. buy steel towers it is important to control that the suppliers we buy from treat their employees the way they should according to laws" (I7).* A production company shares this view: *"We have many suppliers of everything from turbines to penstocks or whatever it may be. Especially in development projects, there are often suppliers, subcontractors and sub-subcontractors, and then working conditions is typically the big challenge." (I10).*

Power supply

An important aspect to mention when speaking about the renewable energy sector – arguably *the* most important one – is power supply, specifically renewable power supply. In Norway this almost always takes the form of electricity produced from hydro and increasingly from wind. Whether it is mainly a social aspect is arguable, as it also affects the environment and the economy massively. However, it is an aspect that is sometimes forgotten in the shadow of more protruding aspects, such as climate, biodiversity, local communities and recreation. While these aspects are mostly referred to in a negative manner, the actual power supply itself is regarded as a positive aspect. The provision of renewable energy is the main purpose of the renewable energy sector, after all. Even though this is common knowledge, and all interviewees probably are very well aware of this aspect, not everyone explicitly mentions it as a material aspect; it seems like it is often taken for granted.

Although the aspect is briefly mentioned by some of the stakeholder interviewees, they do not elaborate on why it is important. Naturally, however, the importance of renewable power supply is more recognized by the industry players themselves, as well as the regulatory bodies governing the industry. An important thing to note is that the interviewees mainly talk about power supply in the context of *security of electricity supply*, which is seen as the most important facet of the broader topic of power supply. A regulator tells that *"the most dominant benefit is renewable power production and adjustability (flexibility). [...] We shall safeguard the security of electricity supply and ensure an effective use of the energy resources" (I11).* This view is shared by I8, which also emphasizes that the aspect is often taken for granted:

"Our main social mission is to ensure 100 % security of electricity supply. [...] The whole society is based on secure electricity supply. We take it for granted, but it is in fact a sustainability goal, [...] and it's more noticeable in places one doesn't have it, e.g. Africa, where you might have electricity for one hour a day." (I8)

Both the regulatory bodies and the industry itself regard security of electricity supply their main societal mission, and connect this to the UN Sustainable Development Goals, specifically SDG 7 – "affordable and clean energy". However, this does not entail producing as much as possible; rather, it is about producing renewable energy in a way that maximizes the security of electricity supply: *"[The organization] has responsibility for the security of electricity supply, which means that we are supervising the production and consumption of power to make sure that we have enough supply to feed to the consumers. However, that does not necessarily mean it is necessary to build new power production" (I5).*

An NGO emphasizes that although the provision of renewable energy is material in itself, the energy must be produced and delivered in a way that minimizes the carbon footprint and electricity price: *"What's material is to provide renewable energy with the lowest possible carbon footprint and to a low price" (I9).* Even though the production companies play a crucial role in achieving this mission, the significance of the grid companies is also emphasized by themselves, in that they provide critical infrastructure for society and its development. Interviewee I2 posits that grid downtime has ripple effects for other aspects such as local communities: *"If we e.g. have a grid that is not maintained and operated in a sustainable way, you get an increased frequency of power outages, which again results in less sustainable local communities" (I2).* I7 argues that the energy sector has a crucial role in achieving a sustainable society, and that the grid companies have a social mission in facilitating electrification and restructuring: *"We have a social mission, which entails us building grid, and connecting customers [mainly grid companies]. We should not be a brake pad for electrification and restructuring" (I7).*

Summary of social aspects

Table 5.5 below summarizes how the various stakeholders and companies prioritize the five main social aspects with respect to materiality. Table 5.6 summarizes how the five social aspects typically are operationalized into more specific sub-topics.

	Production	**Grid**	**Retail**	**Investors**	**NGOs**	**Regulators**
Local communities	High	High	X[7]	High[3]	Medium	Medium
Recreation	High	High	X[7]	Medium	Medium	High
Human rights	High	X[7]	Low[2]	Medium[4]	X[7]	X[7]
Working conditions	High	High	Low[2]	Medium[4]	X[7]	X[7]
Power supply	Medium[1]	High	High	Medium[5]	Medium[6]	High

1. The power supply is regulated, so the producers operate in accordance with regulatory decisions.
2. But high degree of materiality when seen in a supply chain perspective.
3. Reputational risk.
4. Rarely mentioned, and if so in a supply chain perspective.
5. Important for future return on investment, and important abroad.
6. They have divergent opinions.
7. Insufficient data.

Table 5.5: Prioritization and materiality of social aspects

Local communities[1]	**Recreation**	**Human rights**	**Working conditions**	**Power supply**
Conflicts	Recreational activities	Supply chain	HSE	Electricity produced
Disturbance factors	Cultural heritage	Equality, etc.	Employee satisfaction	SDG 7
Safety concerns	Landscape aesthetics		Supply chain	Security of supply
Job creation	Tourism			Electrification
Reputational risk				

1. This aspect is more material in less developed countries. In Norway it is mostly about conflicts.

Table 5.6: Operationalization of social aspects

5.3.3 Economic aspects

In general, the interviewees talk a lot less about economic aspects of sustainability than environmental and social aspects. The extent to which economic aspects are mentioned also largely depends on the stakeholder group and company; so does the type of economic aspects mentioned and the angle from which they are approached. We identify four recurring aspects belonging to the economic pillar of sustainability, of which some are strongly related: *profitability*, *ethics and business conduct*, *anti-corruption*, and *supply chain governance*. A summary of the findings can be found in Table 5.7 and Table 5.8.

Profitability

Of the economic aspects, profitability is by far the most frequently mentioned one, and is particularly highlighted by the industry players and the regulators, although from different viewpoints. Not surprisingly, the industry seems to be mostly concerned with the profitability of their own operations and projects:

"We have said that sustainable and profitable power production is a material aspect. [...] Profitability is possible because we always strive for getting the best possible resource utilization of the reservoirs. We want as much [water] as possible to go through the generators and supply renewable power to the grid, which again has a good climate effect." (I2)

An interviewee from a retail company points out that customers' willingness to pay is important for the business, and that the supply of renewable energy must be demand driven and based on market mechanisms to promote profitability and sustainability: *"It is a point that ... there is a willingness to pay for clean and green [energy]. Because if there isn't, it is difficult to do business. Our operations are business based after all, and if it [the supply] is not demand driven, you don't get paid, right, you won't invest, and the money won't come to the industry. So that might be what's most important: having a market based system." (I12).* A regulator provides another view, and points out that

there are multiple ways to regulate the market, and that the type of market mechanism being used depends on the market conditions:

"We can make banishments, but a ban can only function if there are alternatives to a product. If not, the authorities prefer tax favoring environmentally friendly solutions, which helps stimulate R&D on new technology. We can also give incentives to facilitate e.g. more renewable power production." (I5)

The regulators also acknowledge the importance of business profitability in the industry. Interviewee I11 tells that *"the industry has a priority of attaining economic profitability. If it's not profitable, they don't apply for licenses to build" (I11).* Without neglecting the importance of profitability for the firms operating in the industry, the regulators also look at the profitability aspect from a different angle. They seem to be more concerned with the economic consequences on a much larger scale: the economic profitability for society at large. To distinguish this from the isolated profitability of the firms, we hereby refer to it as *socioeconomic profitability.* Interviewee I11 elaborates on what economic profitability entails for a regulator:

"If the benefits are greater than the drawbacks, we can grant permission to build. This assessment includes all elements that are affected by a project, including economic aspects. [...] But not business economics – it's socioeconomic assessments we do – not the project's profitability after taxes, but before tax." (I11)

I11 emphasizes that the benefits of a project need to outweigh its drawbacks in order to be accepted, and that economic aspects are essential in this assessment. However, the interviewee stresses that it is not the business economics they look at; rather, they assess the socioeconomic profitability *before tax*, which means that they do not necessarily account for the profitability of the firms. In line with the view of I11, interviewee I5 states that *"what is being built [within renewable energy] has to be socioeconomically profitable. [...] We are first and foremost here for the consumers, and to make sure that the end users get a stable supply of electricity to a reasonable price. We are not here to serve the producers" (I5).*

For the investors, however, the profitability aspect first and foremost materializes as risk and return. An interviewee tells that *"it [investments in renewable energy] is in a way a part of our societal role, and thus there are also potential assessments – 'which technologies can give good risk adjusted return' – at the same time as one contributes to e.g. technological development" (I4).* I4 views "green investments", primarily investments in renewable energy, as a social "responsibility", at the same time as they should generate

good risk adjusted returns. The same interviewee elaborates on what risk means for the company he represents, as well as their biggest risk factors relating to wind power investments:

"There is a financial risk, because you can get delays in the development phase, which is where the risk is largest. There is also a reputational risk. [...] We are also in a situation where our market is getting much tougher competition, which can impair our position. So wind really is one of the ... I would maybe categorize it as one of our most risky investments in Norway." (I4)

Another interviewee from the investor stakeholder group further emphasizes the importance of the profitability aspect in renewable energy investments, which does not necessarily only relate to risk: *"We don't have a single offshore wind farm in Norway, and that's because we haven't had support schemes for funding it. So it hasn't been profitable, because it quickly costs two and a half or three times as much in CapEx [capital expenditures] per megawatt to build offshore compared to onshore" (I13).*

Ethics and business conduct

Ethics and business conduct is another aspect of economic nature, which relates to many of the other aspects. It is mainly the industry players and the investors that highlight this aspect, and not so much the NGOs and regulators. The aspect is also strongly associated with *reputation*, although reputation is not a "universal" aspect like e.g. climate, but rather specific to each organization. An interviewee from retail points out that reputation and CSR are important for them precisely because the society at large is an important stakeholder: *"[...] and the last [stakeholder] group is the society at large, but more in terms of reputation and CSR" (I12).* Interviewee I8 mentions green certification as a means to attract investors: *"There has been a bit more focus now on green labeling and green certification, precisely to also be able to attract investors" (I8).* Two investors also highlight the importance of reputation to them. I4 states the following: *"Let's say a local community is upset, or some Sámi people believe there is a risk for wild reindeer, then that can pose a reputational risk for us" (I4).* I13 also points out the adverse effects of a bad reputation: *"It is something about being 'exposed' in the press or in the news etc., for being kind of an 'infamous' investor that e.g. contributes to large [negative] nature impacts or large CO2 emissions." (I13).*

Another facet of the ethics and business conduct aspect, is *employer attractiveness*, although this is only mentioned by some industry players, such as I2: *"It's obvious that we must have the job seekers in mind and be an attractive workplace" (I2).* Interviewee

I7 agrees, and emphasizes that employer attractiveness is important for competence retainment within the company: *"We work towards being an attractive employer, because we need that competence. [...] It is extremely important that we retain the competence, [...] because we don't know what is to come" (I7).* Apart from reputation and employer attractiveness, *greenwashing*, including unethical marketing, is highlighted as a prevalent issue in the renewable energy sector by some interviewees:

"There is a problem regarding what is ethically responsible to advertise in the energy sector. For instance, it seems like many customers are led to believe that if they buy power from whichever Norwegian or Nordic electricity company, they automatically get renewable energy in their electrical socket. This is not correct, and I believe many energy companies fail to communicate this in their marketing." (I1)

"The solutions aren't always as simple as I believe the energy sector might pretend. 'So just because we built this wind park we saved the climate'. We know that first of all, it has consequences for other things that are important for nature, and it's not always the case that just because you produce more power it means a reduction in climate gas emissions, unless the authorities follow up with some other measures that reduce emissions." (I3-1)

Both of the statements above illustrate an important point: Sustainability and "climate friendliness" is by no means as simple and straightforward as it might seem. Just selling something labeled as renewable energy does not necessarily mean the customer gets what they assume, according to I1. Likewise, just producing more renewable energy does not necessarily mean the climate is better off, according to I3-1. Such issues might materialize as greenwashing if the companies promote something that is not really the case. Interviewee I1 asserts that honest communication is key to avoid unethical marketing: *"No, it's not necessarily unethical, as long as it's communicated well enough" (I1).* An investor talks more broadly about the issue of greenwashing in the industry, and asserts that it is highly prevalent in the market:

"We gladly take a role to work against greenwashing, and we see that there is a lot of greenwashing in this market. Many e.g. criticize green obligations [...] and are very skeptical to how renewable energy is being marketed; they call it 'The Emperor's New Clothes'. Most of the obligations are refinancing and not new capacity expansion, and they are marketed as something that reduce CO2 emissions [by substituting non-renewable energy production] in countries like Norway, where there is no such thing." (I4)

In the statement above, I4 emphasizes that they take an active role in combating greenwashing. Furthermore, the interviewee highlights that green obligations are criticized by

many in the investor community, primarily due to a skepticism about their actual impact. I4 goes on to criticize the claims of emission reductions in the Norwegian renewable energy sector, arguing it is in reality just greenwashing:

"In the Kyoto Protocol's CDM [Clean Development Mechanism], there lies a principle of additionality. [...] And this is quite important, because if you are going to argue for 'avoided emissions' and emission reductions from renewable energy, there needs to be an additionality. There is no additionality in Norway. Renewable energy is entirely commercial. And hence the claim that renewable energy in Norway gives emission reductions is wafer-thin, it's greenwashing. So that is also going to be something we will look at. We will not condone greenwashing if we have a saying." (I4)

However, I4 doesn't view greenwashing as a material aspect for his company, despite its prevalence; I4 argues that greenwashing is not a "big deal" for them: *"The greenwashing effect is probably not so negatively prevalent, because it is renewable we're talking about, [...] and it is not a big deal for us, because nobody calls out greenwashing anyway these days. If a project says: 'We have this much avoided emission', okay fine, just say it and then ... We don't agree, but it's not a no-go" (I4).*

Anti-corruption

Another economic aspect that is deemed material by the industry players is anti-corruption, although it is primarily interviewees from production and grid companies that mention it. *"Regarding responsible business practices or behavior, anti-corruption is obviously high in materiality" (I10).* A grid company asserts that the government has a clear expectation of ethical business behavior: *"There is a pretty clear expectation from the government that we should be leading on business ethics and anti-corruption. That means we should not close our eyes for things that seems a bit ... suspect, you could say, e.g. with suppliers and processes" (I7).* However, not everyone accredit anti-corruption with the same level of materiality as more prominent aspects such as HSE and climate: *"When it comes to anti-corruption and corruption, it's clear that it can affect us. Both employees and suppliers can fall in that trap. [...] So it's on the agenda, but it doesn't have the same priority as the first aspects I mentioned [e.g. HSE and climate]" (I2).*

Interviewee I10 from a production company also highlights that anti-corruption looks different in Norway/Europe and abroad, and that it is an aspect that should not be forgotten in any geographical location: *"I believe it looks very different: You may get the very classic corruption approach abroad, but I think one must be very alert of competition issues and responsible business behavior in Europe as well. So there is a very high focus*

on it independently of geography I would say, but it takes various forms" (I10). An investor also has a word to put in regarding anti-corruption: *"Some have argued that you quickly can move into something that resembles corruption, if you pay someone in a local community for getting permission to build your wind farm. And on the basis of ESG you're then approaching something that will be completely unacceptable for an investor to engage in" (I13).*

Supply chain governance

The supply chain is often mentioned in conjunction with the other sustainability aspects previously mentioned, to a varying degree. For instance, the importance of taking a supply chain perspective when assessing environmental impacts such as climate footprint, and social impacts such as bad working conditions, is emphasized. However, supply chain governance is a topic that is so frequently highlighted as important in various contexts that it qualifies as a unique aspect. Note that the supply chain referred to in this context is each company's own upstream supply chain(s), and not the overarching renewable energy value chain, as described Chapter 3. A production company emphasizes the importance of supply chain governance in a global supply chain: *"You can look at the supply chain and think footprint in a somewhat different way: what you purchase and why, which requirements you impose on suppliers, etc. [...] There are plenty of challenges to face in a global supply chain" (I10).* A retail company shares this view, and asserts that they impose requirements on their suppliers:

"We are a retailer, a service provider – so it's a very limited footprint. There is some energy usage on the building, and some business travel. Other than that, it's very limited. [...] However, we see that our suppliers have hundred times larger emissions than we have. We have thus chosen to impose requirements on them. [...] The ones that don't meet the requirements are not allowed to be our suppliers." (I12)

Even though the retail companies generally don't have any big footprints themselves, their suppliers have large footprints when aggregated. Thus, having control over their supply chain is seen as essential to ensure sustainability, as they have a responsibility for what is happening in their suppliers' operations as well. It must be reminded, however, that the suppliers referred to are not energy producers or distributors: *"When we talk about our suppliers, we talk about all other suppliers than the producers and grid companies. And there we have 150 suppliers, ranging from IT suppliers to consultancies and HR companies" (I12).* To ensure that the suppliers actually comply with the requirements imposed, it is necessary for the companies to monitor the supply chain by conducting regular checks. A grid company tells about an earlier incident where their company

uncovered serious working condition violations through supplier checks, which led them to really consolidate their supply chain governance routines:

"We have conducted checks [the past three years] both at the suppliers abroad [...] and at our construction sites – because there is a lot of foreign labor there, especially among subcontractors. In 2017 and 2018 we uncovered serious violations on working conditions. [...] Since then we have done it more systematically and now perform checks on all big suppliers on our construction sites. [...] We have also seen that it's not only foreign [suppliers], but also Norwegian suppliers that violate wage and working conditions." (I7)

As the preceding paragraphs illustrate, the industry itself seems to take supply chain governance seriously, and increasingly so. This applies to all links in the overarching renewable energy value chain, i.e. production, transmission/distribution and retail. The importance of supply chain governance in the assessment of sustainability is also highlighted by an investor, although they are more concerned with the risk it could entail for them: *"In many cases I think the greatest risk lies in the supply chain, unless you put this in the middle of an eagle's nest of some sort." (I4).* However, the same interviewee asserts that while the supply chain is a very important aspect, it is not necessarily material for them at the time of writing: *"Supply chain is a very important externality, but not important enough for us. That means that we push on it, but it's not certain that it [the investment prospect] will become a no-go – if we get a fairly satisfactory response, we enter. But that may change" (I4).*

Summary of economic aspects

Table 5.7 below summarizes how the various stakeholders and companies prioritize the four main economic aspects with respect to materiality. Table 5.8 summarizes how the four economic aspects typically are operationalized into more specific sub-topics.

	Production	**Grid**	**Retail**	**Investors**	**NGOs**	**Regulators**
Profitability	High	High	High	High	Medium[3]	Low[4]
Ethics and business conduct	High	High	High	High[1]	X[5]	X[5]
Anti-corruption	High	Medium	X[5]	High[1]	X[5]	X[5]
Supply chain governance	High	High	High	Low[2]	High	X[5]

1. Reputational risk.
2. But might become material in the future.
3. They have divergent opinions.
4. Low for business profitability, high for socioeconomic profitability.
5. Insufficient data.

Table 5.7: Prioritization and materiality of economic aspects

Profitability	**Ethics and business conduct**	**Anti-corruption**	**Supply chain governance**
Profit	Reputation	Expectations	Requirements to suppliers[2]
Demand	Employer attractiveness	Bribery	Monitoring and controls
Market mechanisms	Greenwashing[1]	Competition	Risk
Socioeconomic profitability			
Financial risk and return			

1. Prevalent in the industry, but not necessarily material.
2. Ensuring that environmental and social aspects are safeguarded throughout the supply chain.

Table 5.8: Operationalization of economic aspects

5.3.4 Future aspects

In addition to identifying the material sustainability aspects as of today, the interviewees were asked which aspects they believed would increase in materiality in the time to come. Getting the interviewees' opinions on future material aspects can help to inform the current state of materiality – and possibly the continued development of materiality – in the industry. There seems to be a consensus among the interviewees that both climate and biodiversity will continue to increase in materiality in the years to come, even though they are already seen as material. While climate has been material for a long time, the biodiversity aspect seems to have gained increased attention the recent years. Although both aspects are projected to keep increasing in materiality, the focus on biodiversity is assumed to increase more rapidly than that on climate. Interviewee I10 illustrates this point:

"I think we are seeing the contours of some of it already. Climate has been big for a long time, and will continue being big. But I think biodiversity will sail forth with another importance than it has had before, because one sees that destruction of biodiversity can be as devastating as climate changes, and they are interconnected in a peculiar way." (I10)

An interviewee from an NGO believes the climate and biodiversity aspects are immensely important, yet still underestimated in the industry. The person thinks that the understanding of the importance of these aspects will increase, but that it might happen a bit late, i.e. it will not happen until people get a real "wake-up call" from seeing the adverse impacts the aspects entail:

"I think the understanding of the nature and biodiversity will increase, but that it often comes a bit late. If we get an increasingly large land area need etc., we will eventually see that it has gone too far: 'Now, we see that those ecosystem services are threatened – we see that floods happen frequently'. And much of this is also amplified by the climate

changes." (I3-1)

Many of the interviewees also highlight land use as another aspect that will increase in materiality going forward, which is an aspect deeply connected to biodiversity and climate, as well as social aspects. The increase in materiality is largely seen in relation to the continuation of the wind power debate, which is still in an early phase. *"The conflict around wind power has begun and I think it will continue, along with the focus on the associated land area occupation" (I8). "I think land area use [...] and impacts on biodiversity are going to be important" (I6).* The investors generally think that nature risk is going to increase significantly in materiality in the time to come, partly due to the associated conflicts in wind power development. *"For the industry in general, I think nature risk is the most important [aspect] in the bigger picture, because there will be an increased focus on it. At the same time you are going to build more renewable, and then there are going to be increased conflicts" (I4).* The regulators largely agree that environmental aspects such as climate, biodiversity and land use will continue to increase in materiality. However, interviewee I11 also emphasizes that local acceptance is crucial to ensure a positive development within the environmental aspects, and that this is especially true in Norway: *"Regarding Norway specifically, local acceptance [...] can have large significance for the future of wind power, which again is connected to how we safeguard the environment" (I11).*

Another aspect that is highlighted when asked about future materiality, is supply chain governance, although this aspect is not as prevalent as the aforementioned ones. *"I think the responsibility within the various aspects will expand to not only regard the company, but the whole supply chain" (I7).* From this statement, it is clear that I7 believes there will be an increased expectation of companies taking more responsibility for their own supply chain in the future. An investor points out that he thinks the supply chain and life cycle perspective will increase in importance, in addition to nature risk and local buy-in (local acceptance):

"It is local buy-in, nature risk, and supply chain life cycle perspective, quite obviously. [...] I believe those things will rise up, and part of the reason why is that there is a significant lobby that wants to talk renewable energy down. They will kind of try to find a lot of 'shit' on renewable, which you can typically find on these three aspects." (I4)

Some interviewees also mention circular economy as an aspect they think will be increasingly important onward. Interviewee I12 asserts that circular economy is going to be the standard in all industries; the renewable energy sector is no exception: *"I think one will see a direction towards circular economy. [...] It is going to be the standard. In all*

industries" (I12). An interviewee from a regulatory body tells that also they see the circular economy rising, but asserts that issues under this aspect, like recycling, is someone else's area of expertise: *"We see the circular economy rising in importance, although this is not [the organization's] responsibility." (I5).* Another interviewee, from a company, tells that they have much room for improvement when it comes to circular economy, and even believes that the sharing economy might entail opportunities for the company: *"Areas in which we have room for improvement include circular economy and optimization of operative solutions. I'm sure it would be possible to take advantage of the sharing economy to utilize our operating assets more effectively" (I2).* Interviewee I2 further argues that *"some other aspects include innovation and digitalization, which will be critical in order to accomplish this very much needed restructuring, and for us to remain competitive" (I2).* Apart from this, technology or technological development within the renewable energy sector is seen as something that will increase in importance. *"I believe technology will be more important with time – also for [organization] – but a lot of it is currently in the trial phase, and does not affect us as much yet" (I4).*

	Production	**Grid**	**Retail**	**Investors**	**NGOs**	**Regulators**
Climate	High	High	High	High[2]	High	High
Biodiversity	High	High	X[4]	High[2]	High	High
Land use	High	High	X[4]	High[2]	High	High
Local communities	X[4]	X[4]	X[4]	High	X[4]	High[3]
Supply chain governance	High	High	High	High	X[4]	X[4]
Circular economy	X[4]	Medium	High	X[4]	X[4]	High
Technology	X[4]	Medium	X[4]	High[1]	X[4]	X[4]
Digitalization	X[4]	High	High[1]	Medium	X[4]	X[4]

1. Related to new opportunities.
2. Climate and nature risk.
3. Also related to safeguarding the environmental aspects.
4. Insufficient data.

Table 5.9: Prioritization and materiality of future aspects

5.4 Sustainability indicators

An important facet of this study is understanding how the industry players and the stakeholders operationalize sustainability. Specifically, we wanted to gain insights into how they break down sustainability as an overarching concept into more concrete topics/aspects, sub-topics, and subsequently into measurable indicators. This section is concerned with the latter, as the topics/aspects are covered in Section 5.3. In this section we therefore present our findings regarding which indicators the interviewees see as most important

for measuring impacts on the material aspects. The section is structured similarly to the previous one, with environmental, social and economic indicators presented separately, with an associated summary at the end of each subsection. Lastly, we present our findings about challenges related to sustainability operationalization and indicator selection.

5.4.1 Environmental indicators

In the environmental category, the interviewees mention indicators within the climate aspect, the biodiversity aspect, and the land use aspect. In general, they are most confident when talking about climate indicators, and assert that there are already established indicators and frameworks to measure parts of this aspect, primarily greenhouse gas emissions. When it comes to biodiversity on the other hand, there seems to be a lot more uncertainty about how the aspect can be measured and operationalized into concrete indicators. There is a somewhat clearer understanding of how land use is measured, although the intricacies of its connection to other aspects such as biodiversity make land use indicators more nuanced in nature. A summary of the most important findings can be found in Table 5.10.

Climate

Our data indicate that there is an undeniable consensus among the interviewees that the ruling way of assessing climate impacts is measuring greenhouse gas emissions, and CO2 in specific. Although other greenhouse gases are mentioned, e.g. as part of CO2 equivalents, there is no doubt that CO2 in itself is the one major greenhouse gas to measure in the industry. There are numerous ways to measure and quantify CO2 emissions, e.g. direct emissions, indirect emissions, avoided emissions, life cycle emissions, etc. Additionally, there must be drawn a line between what are the actual emissions from the industry players themselves (negative externalities), and what is their contribution to reduce emissions more broadly (positive externalities). For measuring the former, CO2 emissions in metric tonnes/kilos and CO2 equivalents in tonnes/kilos are the most highlighted indicators, although both can take various forms, e.g. tonnes/kilos in total and tonnes/kilos per unit of electricity produced. *"For us it's usually kilos of CO2 per megawatt hour, but the unit of measurement is relative to what you do" (I10).* Interviewee I8 asserts that CO2 and CO2 equivalent emissions are important in the whole industry:

"Since climate and renewability are high [in materiality], CO2 emissions and CO2 equivalent emissions per unit [of electricity] produced are important indicators in all parts of this value chain [the renewable energy sector]." (I8)

An investor also points out the importance of including CO2 or GHG emissions as a

criterion in investment decisions: *"CO2 emissions is always an important criterion in projects. NOx, which you may call local pollution, is also important, [...] although I don't think it is as important of a criterion as CO2. [...] You can also use a more comprehensive GHG criterion which covers a few more gases, but let's say 90 % of it is CO2" (I13).*

Even though quantifying the emissions of the industry players themselves seems to be relatively straightforward, measuring the positive externalities of substituting renewable energy for fossil energy seems to be more challenging. One way of measuring this is what the interviewees refer to as "avoided emissions" or just emission reductions. When asked what specifically is measured within CO2, interviewee I13 answers that *"it's typically how many tonnes reduction there is in the ongoing project" (I13).* I6 also views avoided emissions as a way to measure positive impact: *"It will for instance be 'greenhouse gas emissions avoided', or kilowatt hours generated of renewable electricity" (I6).* Interviewee I13 elaborates on what is meant by CO2 reduction, and argues one has to look at the aggregated effect over the lifetime of a project:

"If you only measure this [the effects] over one year, it is guaranteed that a wind park will contribute to increased CO2 emissions, because building roads and using concrete, etc. entail large CO2 emissions. [...] But after a year or two or three, the 'budget' becomes positive again since it has replaced other types of production with large CO2 emissions. [...] So it is net – call it carbon capture – that is important: How much are you helping to reduce?" (I13)

Interviewee I2 also emphasizes the importance of looking at the net climate emissions over a longer time period, and connects this to electrification. At the same time, I2 assures that they currently do not have KPIs on it today, although it is something they should have; consequently, they must estimate expected CO2 cuts in their electrification projects:

"Electrification is a material aspect for us that we work towards, because it can trigger cuts in the CO2 emissions. [...] That's an example on which we don't have a KPI today, but we could have. [...] So there we will probably gradually build up indicators. We partly have numbers on some of it today, but we are in such an immature phase still. And in our report we must try to estimate expected CO2 cuts through the electrification initiatives." (I2)

Although many interviewees view avoided emissions as an important indicator to measure in the industry, some also criticize this indicator. Interviewee I4 tells that the way avoided emissions are calculated is starting to hang by a thread: *"You calculate the production as if you have zero emissions per kilowatt hour, and you look at what the CO2 intensity is*

for the energy mix where it's produced, and then you multiply the kilowatt hours that you produce from e.g. the wind farm with that mix, and call it 'avoided emissions'. That is starting to hang by a thread now" (I4).

To get a more holistic picture on climate impacts, some interviewees endorse using life cycle assessments, particularly the NGOs. Interviewee I3-1 from an NGO asserts that *"to get a good indicator on whether something is good or bad for the climate, you need a dedicated life cycle assessment, and then you must include things such as land use, imported goods, and everything throughout the whole supply chain. It's not only the fuel used for machines, it's also fuel and resource usage linked to making those machines and the whole package" (I3-1).* The need for life cycle assessment is also recognized by I9: *"One measures the life cycle for the whole production ... everything needed of materials and other input factors for producing a wind turbine. [...] One could create indicators or maybe incentives that reward production with the lowest possible carbon footprint" (I9).*

On another note, interviewee I12 from retail mentions that climate neutrality could be an appropriate indicator on the climate aspect: *"I think that climate neutrality will be an important emission indicator. [...] I believe it is a fairly binary [indicator]" (I12).* Furthermore, I12 asserts that the degree of renewable energy out of the total energy usage should be a good indicator independently of what the operations are: *"No matter what you're doing – whether it be transport, production, service or whatever – the share of renewable energy relative to the total energy consumption should be an indicator" (I12).* This view is supported by the NGOs and regulators, who claim that this is also measured on a national level.

Biodiversity

Compared to climate, there is a lot more uncertainty about how biodiversity should be measured, although there is a common understanding of how it partly is measured today. The most common way of quantifying biodiversity impacts today seems to be counting and estimating the number of red-listed or endangered species affected by a project, usually in the impact assessment phase. *"For red-listed species one can report which species are affected and to what extent. There are four different categories of red-listed species: 'critically endangered', 'endangered', 'vulnerable', and 'near threatened'" (I11).* A production company asserts that they report on red-listed species: *"We usually make lists over red-listed species, which is more of a 'listing'" (I10).*

In addition to the red-listed species, assessing the conditions for fish seems to be the most important for hydropower, while birds are more important in wind power projects. I8

suggests some indicators for fish conditions: *"What you measure is dependent on which watercourse you're in, but 'successful fish migration' and 'achievement of spawning stock targets' are such indicators" (I8).* I9 shares their view on bird indicators: *"I believe bird mortality is important to monitor, but above all else I think good preliminary work is key" (I9).* However, a range of other species are also important in both cases, and do not only include animals. Many interviewees emphasize that it is just as important to assess which nature types (e.g. marsh and forest) are impacted, and to which extent, which also has a strong connection to the land use aspect. Interviewee I8 illustrates this point: *"Indicators where you look at occupation of special nature types, not just general occupation of land area, are also important. Sheer mountain is in that respect less valuable than important wetland" (I8).* I3-1 elaborates on what is meant by nature types and their importance:

"Nature type is a form of overarching definition on the area. You can rank different nature types, such as marshes, coastal areas, forests, and various types of cultural landscape that might have lots of insects and other sorts of animals that don't thrive in the mountains for example. So you must assess both red-listed species and nature types in some way." (I3-1)

Although the impacts on red-listed species, fish, birds and specific nature types are highlighted as means to measure the broader impacts on biodiversity, there is a prevailing uncertainty among the majority of interviewees how this concept best can be measured. Assessing the real impacts on biodiversity seems to be a major challenge in the whole industry and for all stakeholder groups. This is largely due to the fact that biodiversity impacts are complex and difficult to quantify: *"We work a bit to find one [indicator], but it's difficult with biodiversity, because it's not easy to quantify" (I10).* Interviewee I8 asserts that biological data is inherently full of noise, which complicates the measurement of the effects: *"Biological data is full of noise, because of natural variation. Thus, you must measure a combination of various indicators and separate your own impacts from the sheer noise, to be able to tell whether you've been successful" (I8).* Furthermore, interviewee I11 emphasizes that there currently is a lack of knowledge on biodiversity impacts: *"There is still not full knowledge about biodiversity and sum-effects of interventions that affect biodiversity; it is a relatively new topic after all. There is a huge loss of biodiversity in the world, and to what extent our industry contributes to that, is uncertain" (I11).* From the investors' point of view, nature risk also seems to be difficult to operationalize into concrete indicators:

"One should find some form of indicator on nature risk, but what should that be? It could be a binomial one. Many try using a monetization of environmental damage, but those methods are pretty rough and uncertain. [...] There are a lot of things you can't measure, and usually it limits itself to measuring what one calls 'ecosystem based services', but

you don't measure e.g. the effect of losing a species. A process that is not directly useful for humans in some form of economic activity, won't be measured. So in that regard, I think it would have to be a binomial one [indicator]. [...] [Nature risk] can be expressed in some way, but I don't really know how. One would have to invent a new one [indicator]. You can't just measure X number of sea eagles. You have to see the totality, which is a challenging assessment." (I4)

Land use

Although land use is closely related to biodiversity, the interviewees generally have more confident opinions on how this aspect can be measured. Firstly, the majority highlights total affected land area as an indicator, usually measured in square meters or square kilometers. *"It's natural to report on total land area use, or how much land area that is 'affected'" (I6). "[...] and sheer land area occupation, i.e. how much is cemented down, transformed to roads, landfills, etc. [...] You try to minimize the road length [in kilometers], and often measure total square meters of sheer occupation" (I8). "The number of square kilometers e.g., is a very simple indicator, which I absolutely think is very useful and will be material" (I3-2).* However, interviewee I3-1 points out that this indicator is better fit for wind power than hydropower, because hydro does not require as much land area. Furthermore, I3-1 argues that it is precisely in the river that the biodiversity is high, and that hydropower therefore requires different indicators than wind power:

"It's clear that hydropower usually isn't as land area demanding in itself, because the river is already there. Some plants require large dams, but many plants are built without it. [...] Although there might not be as many square kilometers, [...] it's precisely in the river that you have a very high biodiversity. So the land area indicator is probably better on wind power, whereas for hydropower you need [...] more specific indicators. But in the bigger picture, land area use is the big indicator. If we e.g. think about grid, that requires a lot of land." (I3-1)

Even though land area use is generally seen as a simple and effective indicator on an aggregated level, it might not be an appropriate indicator in individual projects. This is due to the context-specificity and distinct characteristics of each project. Interviewee I3-1 argues that there is a trade-off between total land area affected and the value of the land affected, which relates to nature types: *"If you build a power line that goes outside [of a specific area], it might become 500 meters longer because you have to take a turn. But it is still a lot better than cutting through a valuable area. [...] If you are going to assess one power plant or power line, you need a more qualitative assessment [than on a societal level]" (I3-1).* Still, I3-1 recommends including the land area indicator

on company-level: *"However, the land area indicator is absolutely something I would include on company-level too. You can e.g. have an indicator on how much land area is affected per unit of electricity produced, and how many red-listed species are affected by a development project. I think it has to be a mix of qualitative and quantitative indicators" (I3-1).*

The importance of assessing which nature types are affected and including that as part of the measurement, is emphasized by multiple other interviewees. I13 tells that *"biodiversity in a broad sense can be broken down to e.g. how many cubic meters of marsh that is removed" (I13).* Interviewee I3-2 elaborates on how nature type impact can be measured, e.g. by using INON: *"There are some things one could use, e.g. what's called INON [non-invasive nature areas]. [...] For instance, the number of square kilometers INON could be an indicator, but also the number of square meters of nature type" (I3-2).* However, a regulator asserts that INON has been dropped by the government due to it not being seen as appropriate, and consequently is not weighted in their assessments. Furthermore, interviewee I11 emphasizes that one should distinguish between national, regional and local value, which requires more qualitative assessments: *"On landscape and outdoor life there are much more qualitative descriptions, but there are categories of national, regional and local value. So one can have an indicator on the extent to which one impacts [these categories]" (I11).*

Summary of environmental indicators

Climate	**Biodiversity**	**Land use**
CO_2 emissions**	Red-listed species**	Total area affected (km^2)**
CO_2 equivalents*	Fish migration	Nature type area affected*
Climate neutrality	Spawning stock	Value of affected land
Avoided emissions*	Bird mortality	
Renewable fraction*	Nature types affected*	
CO_2 intensity*		

** Mentioned by all or almost all companies and stakeholders groups.

* Mentioned by several companies and stakeholders groups.

Table 5.10: Environmental indicators

5.4.2 Social indicators

In general, the interviewees identify significantly fewer indicators on the social pillar of sustainability than on the environmental. The indicators that are mentioned also seem to

be more random, and not necessarily reflect the social aspects deemed material. Aside from the degree of security of electricity supply and to some extent the income allotted to impacted local communities, no particular indicators stand out. That does not mean the other indicators are unimportant; it simply means that they are not mentioned by many of the interviewees and not really elaborated on. Examples of such indicators are: employee satisfaction; sick leave; number of serious workplace-related injuries; fish catch rates/quantities; number of jobs created; safety zones, visibility zones and noise zones; distance to settlement; and total energy produced in kilowatt/megawatt/gigawatt/terawatt hours. Note that this list is not exhaustive, but includes examples of social indicators that are mentioned. An indicator that is more commonly mentioned, is the degree of security of electricity supply, which is more of a "composite indicator" encompassing a multitude of more concrete indicators. *"In our reports we have indicators saying something about the frequency of power outages and length of power outages" (I2). "For the security of electricity supply, it is downtime and frequency [in Hz] in the grid. [...] Those are very strong indicators in our industry. [Security of electricity supply] might be the most important parameter we govern after" (I8).*

Many interviewees mention that the impacts on local communities must somehow be measured, but struggle to find good indicators for this purpose. Oftentimes, they highlight that sufficient compensation is important, and suggest having an indicator on income allotted to the local community. One interviewees, however, emphasizes that one could use a more proactive indicator on the degree of local involvement, although the way to measure it is unclear: *"Involvement is a keyword here, i.e. that the municipality and the local community must secure a certain involvement in the process, so that it [the project] isn't experienced as arbitrary or unprepared. [...] It must be an important indicator then, that one manages to have better involvement" (I9).* Interviewee I11 from a regulatory body emphasizes the degree of municipal resistance: *"You could rank whether the municipalities are for or against" (I11).* Interviewee I4 reflects on the same issue, and suggests an indicator on the degree of disagreement: *"On local communities one could envisage counting how many people are disagreeing, and dividing it by the number of people affected, and look at the percentage disagreeing strongly. [...] But if one were to express an indicator saying something about the risk for [organization], one could maybe ... give it a reputational risk assessment or construction risk assessment or something. Who knows" (I4).* When trying to translate the local community impact to risk, I4 is more uncertain of how a good indicator can be expressed, as seen in the statement above. The same interviewee argues that some things always require qualitative judgments on top of the quantitative indicators:

"I think that one can express some things as an indicator, while other things will require a bit more qualitative assessments. [...] The goal is good relations and buy-in from the local community, so 'what is your strategy to achieve this and the proof that you have done what you claim?' Risk assessments and indicators are just the icing on the cake, and what you manage to quantify or count. There are also a lot of things underneath the top of the iceberg, that must be assessed more 'case by case' and a bit more qualitatively." (I4)

From another perspective, a regulator suggests that the need for expropriation could be used as a social indicator as well: *"And on the social [aspect] you could rank whether there is a need for expropriation or not. If they have managed to come to a local agreement, that's a sign it is less conflicted" (I11).* On a completely different note, an investor states that there is a need for a broader set of indicators going forth, for instance related to the supply chain. The interviewee asserts that investors in general always welcome certifications, life cycle assessments, and more indicators:

"I think one should have a much broader set of indicators going forth, for example within supply chain, where one could have some binomial indicators: 'is there full traceability?' – yes or no. 'Is it certified?' – yes or no. 'Have you used ISO 14000 for life cycle assessments etc.?'. These are things investors gladly would have. Certifications are always good. Everything that has been checked by a third-party is also appreciated." (I4)

Summary of social indicators

Local communities	**Recreation**	**Working conditions**	**Power supply**
Income to local community*	Fish catch rate/quantity	Employee satisfaction	Power production volume*
Need for expropriation		Serious injuries	Power outages
Local involvement		Sick leave	Grid frequency
Degree of disturbance			
Degree of disagreement			
Jobs created			

* Mentioned by several companies and stakeholders groups.

Note: Human rights are omitted because no indicators were suggested.

Table 5.11: Social indicators

5.4.3 Economic indicators

Just as with the social aspects, the interviewees generally do not talk much about how the economic aspects can be measured directly, although some of them are measured by traditional accounting practices. Some of the mentioned economic indicators are: present value of the project; lifetime income; various forms of cost, such as investment cost, life

cycle cost and operating costs; number of customers; number of applicants to a position; external ratings; customer satisfaction; economic compensations; taxes and fees; dividend rate; terawatt hours of electricity produced; life cycle assessments; certifications; and various forms of risk. Interviewee I12 from a retail company points out that the price of carbon credits may also prove to be a good indicator for sustainability, and asserts that pollution must come at a cost: *"It must be costly to pollute" (I12).* Furthermore, I12 suggests that the price of the guarantees of origin could be a good indicator, as it provides an incentive to produce renewable energy. However, both of these indicators are on more of a societal level, and are not something individual companies are able to influence. Some of the other economic indicators mentioned above are also used by the regulatory bodies when processing license applications and when performing sustainability assessments in general, although from a socioeconomic point of view. The regulators are generally more concerned with indicators on a much broader scale than the companies or the other stakeholder groups, as their goal is to safeguard the societal interests at large. Examples of such indicators are the socioeconomic benefits, the electricity price, share of renewable energy out of total national energy consumption, and indicators on energy efficiency, as highlighted by I5: *"You can measure the energy intensity and compare it to a year of reference, [...] e.g. for corresponding production or per capita" (I5).*

Interviewee I1 emphasizes the mantra of "energy balance" in the industry, and mentions strain on the electric grid as a potential economic indicator for grid companies: *"In the energy sector the mantra is that there shall be a correspondence between supply and demand. The balancing of the electric grid is kind of every electrical engineer's 'lodestar'. [...] If one manages to distribute the energy in a more even manner, [...] that's a benefit for our customers and an economic benefit for the grid company" (I1).* Another indicator that can be seen as an economic one, is the income allotted to the local communities, although this is mentioned under Section 5.4.2. However, interviewee I9 posits that such income allocation could be ensured by introducing specific taxes that go to the municipality or the county municipality: *"When you ask for an economic indicator, it's clear that [...] the municipality or the local community must be left with a predictable share of the income from a wind farm. Today one doesn't have a nature resource tax or a ground rent tax on the wind farm, that fully or partially is allotted to the municipality or the county municipality. But we believe one ought to get that in order to legitimize future development" (I9).*

Summary of economic indicators

Profitability	Ethics and business conduct	Supply chain governance
Present value*	Number of applicants	Certification (yes/no)
Income	External ratings	Full traceability (yes/no)
Costs*	Customer satisfaction	Life cycle assessment (yes/no)
Number of customers	Economic compensations	
Strain on grid		
Electricity price		
Carbon credit price		
Taxes and fees*		
Risk and return		

* Mentioned by several companies and stakeholders groups.

Note: Anti-corruption is omitted because no indicators were suggested.

Table 5.12: Economic indicators

5.4.4 Challenges related to indicators

As briefly touched upon throughout this section (Section 5.4), there appears to be a lot of challenges to defining good indicators for measuring sustainability impacts. The challenges are apparent in all the three pillars of sustainability, i.e. on environmental, social and economic aspects, although some areas are more manageable than others. In general, many interviewees point out that there is a lack of good indicators, and that finding them is a big challenge. Interviewee I10 illustrates this point: *"I mean, indicators on sustainability is still a tough nut to crack, [...] and has been a conundrum for at least as long as I have been working with it" (I10).* Many interviewees tell that they wish they had more indicators, including I2: *"I wish we had more KPIs" (I2).* I2 also tells that their company has very few indicators on a broader, more strategic level, but more detailed indicators on the specific projects. I10 highlights the same issue, and points to the fact that even if you have good indicators on project level, it is difficult to aggregate the indicators to a broader level:

"The area of sustainability indicators is immature. That is because some of it is difficult to quantify; indicators are usually numbers, and they often become difficult to aggregate. However, you can have good indicators e.g. on a project level, that say a lot about a specific setting. Still, if red-listed species X and red-listed species Y are well handled in project A, but don't exist in project B, why should you count them in project B? A lot is context-related, so it's difficult to aggregate good indicators." (I10)

The challenge of such "context-specificity" is also highlighted by numerous other interviewees, and seems like a major barrier to sustainability measurement. Interviewee I4 asserts that one as an investor also has to do a materiality assessment specifically for each project: *"This just illustrates the mindset that you must always conduct a materiality assessment for each individual project" (I4).* The context-specificity problem is also particularly apparent for the regulators, who have to deal with the issue in each licensing case: *"I represent the government, [...] and we shall place emphasis on [issues] depending on the consequences in each individual project" (I11).*

Another problem with choosing the appropriate indicators to use, is the challenge of actually measuring sustainability impacts. For instance, as mentioned under Section 5.4.1, interviewee I8 asserts that biological data is inherently full of noise and difficult to measure accurately. I10 posits that CO2 etc. is somewhat easier to quantify, but that many social aspects are particularly difficult to measure accurately: *"Even though there are a whole bunch of assumptions going into CO2 accounting and reporting etc., it's possible to count. Things that are easily counted are also easier to make a good indicator on. And then there are more difficult [areas], maybe more on social aspects such as human rights. [...] What do you really count then? What is a good indicator?" (I10).* Interviewee I3-2 argues that also ecosystem services are difficult to define and measure: *"It [ecosystem services] is hard to define, because there are so many and complex services. It's not a list of 10 things where you can say how much each of them do; there might be 500 different little things in an area [with each their function]. [...] So I don't know exactly how one could measure that..." (I3-2).* A regulator asserts that it is also difficult to quantify the value of a particular land area and its alternative uses: *"There could be alternative uses of that land area, and there could be losses of biodiversity. So both, and especially the latter, are difficult, because it is hard to quantify the value" (I11).*

Related to the challenge of measuring is the lack of data in many of the same areas. For instance, interviewee I7 claims that there is a lack of high quality data on vulnerable areas: *"It is evident that [...] in the national map every project developer uses, there are many locations that haven't registered any vulnerable areas or vulnerable species. But that does not mean they don't exist; in many cases it means that they [investigators] haven't been out there and registered it" (I7).* Interviewee I8 misses data on wind power, and also mentions a lack of data on nature types: *"Yes, [there is missing data] on wind power for example. That is, exactly the issue of adapting: What are the best locations? Where are those valuable nature types? What should we avoid? How can we combine good wind with low impact, i.e. small footprint? There is a lack of predictability in where it will be profitable for society to put its efforts, which is something we have too little knowledge*

on" (I8). I8 mentions that we have too little knowledge to create a predictability in which areas should be used for wind power development. As previously mentioned, I11 also points out that there is a lack of knowledge on biodiversity and the consequences of impacting it.

However, when talking with the retailers, it becomes apparent that they are concerned with completely different types of data compared to the grid and production companies. In retail, it is mostly customer data that is emphasized, which I1 sees as a large opportunity rather than a problem: *"The ones wanting to use consumer data must have the ethics in order, but I look at this as a giant opportunity. [Company] has for instance access to an insane amount of consumer data. [...] How can we take advantage of this amount of data to say something about whether something is sustainable or not?" (I1).*

Regardless of the data in question, some interviewees assert that there is no point in having more indicators just to have them, i.e. having indicators that don't necessarily add any value besides the number they represent. Interviewee I2 sheds some light on this issue, and asserts that they must report for a reason: *"We must stop reporting for the sake of reporting. We must use the data for something analytic, we must look out for trends, and measure the data up against our indicators. And these are areas that are insufficient today." (I2).* Interviewee I10 elaborates on the same issue:

"The most important thing is that indicators are helpful to get you further, to do something better. As long as it's just a litany of something, it's kind of 'okay, is it 14 species or is it 17 species?'; 'is it better or worse than it was last year?' Who knows? I mean, it doesn't help. [...] So the indicators aren't necessarily something that push the work forward, it kind of becomes 'indicator for having an indicator'. And they don't necessarily measure quality, they just measure something." (I10)

I10 continues to elaborate on the challenges of sustainability reporting in general, and posits that it would be of great value to identify an appropriately small selection of indicators that are meaningful, so that the focus can be directed towards these: *"You can quickly waste an awful lot of time on indicators and reporting, instead of actually doing things that work – it is a balancing act. [...] It's something about finding an appropriate selection of indicators that are meaningful, and not exaggerate on all sorts of things, because then you actually lose focus from doing things in practice" (I10).* Even though it is a challenge to pick the best indicators today, I10 thinks that a professionalization of the processes would help greatly: *"I think everyone would be better off with a professionalization of the processes" (I10).* Interviewee I6 argues that reporting may still be lacking even when there is a professional standard to follow, as in the case with TCFD (Task Force on

Climate-related Financial Disclosures): *"Overall, one sees that e.g. TCFD reporting is ... lacking. Even if you look at the top 100 companies on Oslo Stock Exchange, you will find extensive shortcomings" (I6).* Another investor asserts that *"generally, everyone in finance wants better reporting, better flow of data and better standardization. It is no longer enough to simply report on kilowatt hours" (I4).*

In general, the interviewees struggle with coming up with suggestions for potential indicators, or even identifying areas that lack indicators today. Interviewee I13 from the investor stakeholder group tells that *"to come up with some wise points on that matter, I would need a bit more time to think" (I13).* From a regulatory body, I11 tells that *"it's very difficult to know which indicators that are missing" (I11).* Furthermore, the regulators emphasize that a challenge for them is the fact that many things don't have an assigned value, because they are difficult to quantify. Consequently, pricing what today is deemed "non-priced consequences" is generally seen as a major challenge in the industry.

A simple conceptual model summarizing our findings with respect to indicator identification and selection challenges is presented below.

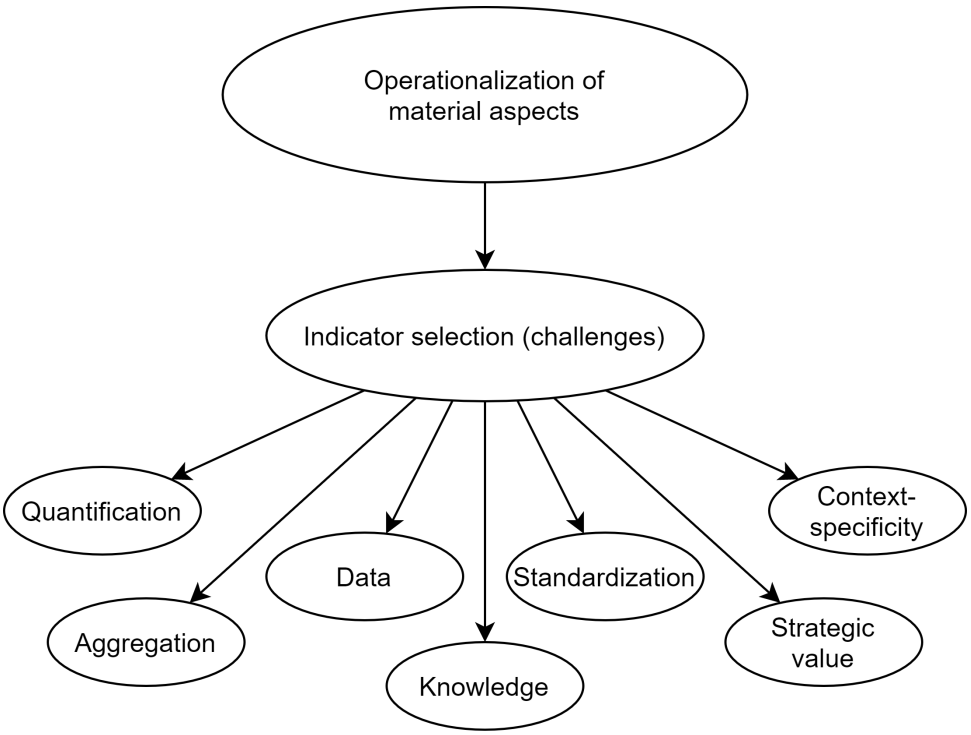

Figure 5.2: Challenges with indicator identification and selection

5.5 Factors for materiality

Part of understanding materiality in the renewable energy sector is understanding *why* certain aspects are deemed material by different companies and stakeholders. Some of the reasons for materiality become evident in the presentation of aspects under Section 5.3, although they are not presented explicitly. To get further insight into the reasons underpinning materiality – which we term *factors for materiality* – we asked the interviewees more explicitly why they considered specific aspects to be material. From the transcribed data, five distinct factors emerge: *stakeholder pressure*, *contribution to the SDGs and common goals*, *historical events*, *expectations about the future*, and the *business case*. In the following, we present the findings on each of these broad factors for materiality, keeping in mind that some of them are mentioned briefly or indirectly in Section 5.3. A brief model and summary of the materiality factors are presented in Figure 5.3 and Table 5.13 respectively. It should be noted that the factors as we present them primarily are seen from the perspective of the industry itself, i.e. the companies operating within the renewable energy sector, although the stakeholder perspective is sometimes included. It should also be noted that it is sometimes difficult to draw the line between factors for materiality and just drivers of sustainability in general, as the interviewees often talk about these indistinguishably.

5.5.1 Stakeholder pressure

The first, and by far the most commonly highlighted factor for materiality is *stakeholder pressure*. This is the broadest factor, comprising various forms of pressure from a range of different stakeholders. We identify four main stakeholder groups that can exert pressure on the companies: *government and regulators*, *the financial sector*, *civil society* including e.g. NGOs and the public, and *internal stakeholders* such as employees. The common denominator for all of these stakeholder groups is the fact that they influence or pressure the companies in some way or another. This pressure can be of a more general character, e.g. higher expectations of sustainable business practices – or more specifically targeted to certain aspects, such as climate or biodiversity – depending on the stakeholder group.

Government and regulators

In general, pressure from the authorities, mainly comprising the government and regulatory bodies, is emphasized as one of the biggest factors for materiality. New laws and regulations force the industry players to change in order to comply with these, as illustrated by interviewee I7: *"At the same time I can see political requirements coming, which forces everyone to change. Then, we don't have any choice" (I7).* Another interviewee says

that the industry "wakes up" when new legislation proposals (bills) come: *"Laws are also important – one can just look how the industry wakes up when new legislation proposals come, e.g. the one from the Norwegian Ethics Information Committee [Etikkinformasjon-sutvalget]" (I10).* Interviewee I2 mentions that pressure from e.g. authorities helps putting sustainability on the agenda: *"We are kind of put under pressure both from authorities, owners and employees. It is pressure in a positive sense, in the form of expectations of acting sustainably and putting sustainability on the agenda" (I2).*

Some interviewees provide examples of specific sustainability aspects whose materiality are affected by regulations. I12 exemplifies: *"You could say, the regulations are an important means for not tying up unnecessary land areas, for example" (I12).* Interviewee I8 mentions that there is a convention on biodiversity under the UN that was enacted the same year as the Climate Convention, but that it has not come as far procedurally: *"We have the Convention on Biological Diversity under the UN, which is actually a parallel to the Climate Convention. It hasn't come as far procedurally, but they are going to meet up in the fall to set compulsory goals for biodiversity, just as the Paris Agreement did for climate." (I8).* This might be one reason why biodiversity traditionally has not been as material as the climate aspect. It is not improbable that the new goals arising from the Convention on Biological Diversity will contribute to increasing the materiality of biodiversity going forward.

The NGOs emphasize that regulations are crucial for safeguarding the environment. They argue that the industry's main objective is to earn money, and consequently that the regulations and general conditions are important to hinder irresponsible projects. As such, the legislation largely decides the extent to which companies care about particular aspects, according to the NGOs. Interviewee I3-1 illustrates this point: *"I mean, the industry shall earn money, so really it is the legislative framework that is the important thing here. As long as it is legal and they get licenses to build in a nature area, many [companies] do so as soon as they profit from it" (I3-1).* Furthermore, it is emphasized that legislation in itself is not necessarily enough to ensure sustainable business practice; if the legislation is not strict enough, companies will still develop new projects without fully accounting for the negative externalities. This point is highlighted by interviewee I9, who argues that the earlier excessive licensing for wind power is the main reason for today's heated conflict.

"It is first now we are getting a lot of wind farms in Norway. Some of the reason we have the level of conflict we have, is a 'ketchup effect'; for a long time it was expensive to build, there were no electricity certificates, the price was low, and it wasn't [profitable]. So the authorities gave out an excessive pile of licenses – seen in hindsight – and then suddenly everyone were going to build before 2021. [...] And that is the reason we have the level of

conflict we have today." (I9)

The financial sector

After the government and regulators, the financial sector is highlighted as a stakeholder group exhibiting the opportunity to exert great pressure on the industry. The financial sector in this context mainly comprises institutional investors, but also lending institutions. There seems to be consensus among the industry players that investors play a major role in putting sustainability issues on the agenda, and that they have the potential to influence which issues are prioritized in the industry. From the regulatory bodies, interviewee I5 thinks that the financial sector is tougher than the authorities, and thus might be better fit for driving change: *"I think they [the financial sector] maybe are more powerful than the authorities. [...] The financial sector can decide to only support financially and environmentally sustainable projects, which is as powerful as a ban from the authorities." (I5).* An interviewee from the production part of the industry also emphasizes that the financial sector might be the most effective stakeholder to put sustainability issues in focus:

"Out of all [stakeholders], the most effective is maybe the financial sector, because then, for some reason, it's serious. If a bank or an insurance company requires something because they mean it's important, it will be listened to in another way." (I10)

The same interviewee tells that the financial sector has shifted their focus more towards sustainability issues the past years, with ESG analyses now being an integral part of their investment decisions, and claims that *"it is an actual risk for their investments that companies don't do this [sustainability] properly" (I10).* Another interviewee tells that the financial sector has become more noticeable, with their sustainability ratings and updated conditions: *"Another stakeholder we notice a lot is the financial market, which has started rating us on sustainability. [...] It shows that we get more favorable conditions if we get a good sustainability score from the lenders" (I7).* I7 further explains that they have started to provide more figures/numbers in their reports to accommodate for the increased information demand from financial rating companies. The interviewees from the investor stakeholder group also highlight their own position to demand more data and their power to influence the focal direction of the companies. Interviewee I6 emphasizes that the financial sector has a particularly strong position to demand more numbers, as they have the power to deny the financing of a project or company:

"The financial sector is in a privileged position, considering that nothing is carried through if it isn't financed [...] And if one says that 'we don't want to finance this unless we

get some numbers on it', one is in a strong position to be able to demand data. So the financial sector's ability to influence is clearly present." (I6)

The ability to set demands and requirements is generally highlighted as the investors' primary method for influencing companies. For instance, an interviewee asserts that they can require additional documentation such as sustainability risk assessments and action plans from companies, to assess whether their investment criteria are fulfilled:

"Other instances can be individual investments that come to us, and then it's more about setting requirements. We have a very concrete example right now with a solar power plant, where we haven't been satisfied with the documentation we have gotten. [...] We have asked: 'Okay, let us see the environmental/social risk assessment, let us see the action plan, let us see this and that'. We have been clear that this is one of three requirements we set. [...] And they throw themselves around, and we have phone conferences where they have to answer this. [...] Generally, if we want a change, we will have to require that change and get some form of verification that the change is implemented." (I4)

Interviewee I4 further emphasizes that they do not necessarily set strict requirements in all cases, and that they usually "push" the companies in their portfolio to improve on desired areas and challenge them on negative aspects: *"We try to push some of the companies we invest in to become better, and we kind of plant seeds. We won't set absolute requirements initially, but we come with some [suggestions] and challenge them on emissions etc." (I4).* Furthermore, I4 tells that they have the opportunity to influence through ownership and board membership: *"If we are on the owner side in a company or fund, we are also part of the board of directors, so then we can work [influence] that way" (I4).*

Civil society

The civil society is also identified as a stakeholder group with big influential power when it comes to sustainability issues. The civil society comprises a multitude of different stakeholders, such as NGOs, community groups and social movements, and is therefore a very heterogeneous group. For the sake of simplicity, we also view the general public as part of civil society, which in some way makes the civil society a manifestation of the public will. This grouping is also done based on the fact that these stakeholders are in many ways connected, and often mentioned collectively by the interviewees. The importance of the public opinion is to a large extent highlighted in Section 5.3 already, especially in Section 5.3.2, where e.g. people's and NGOs' opinions about impacts on local communities, recreational areas, and outdoor life are emphasized. Reactions from the public are largely reflected in the massive conflicts and polarizing debate around

wind power development in Norway. Large demonstrations against wind power is not uncommon, and in extreme cases people have even chained themselves to the ground and sabotaged renewable projects: *"There have been demonstrations everywhere, both locally and nationally, to stop wind power development. [...] In relation to the development on Frøya particularly, things have gone wild. [...] There, people have chained themselves [to the ground] and tried to sabotage plants. And I recently saw a person getting convicted for having done vandalism for 14 million NOK or something" (I13).*

It is clear that such extreme actions have a negative impact on the firms behind the projects, and they don't necessarily reflect the public opinion at large even though they might have a big voice. However, the public opinion in itself can have a big influence on the industry besides the direct effects of demonstrations. For instance, a grid company points out that the placement of new infrastructure is largely influenced by the public opinion as well as environmental aspects. Furthermore, interviewee I8 emphasizes the influence of the public opinion on the locations of new infrastructure, and refers to the discardment of an official proposal for wind power development in Norway:

"The 'Proposal for a national framework for wind power' ['Forslag til nasjonal ramme for vindkraft'] by NVE suggests 13 areas in which wind power development is best suited, based on all kinds of assessments. But then the social attention was drawn to this, and everyone seeing that they were within one of the areas, protested. So a lot of turbulence surfaced, and the government had to discard it." (I8)

Even though NGOs are not explicitly mentioned as often as the public opinion in general, they play a major role in influencing the public opinion, and in some cases also communicate the public opinion through their channels. An NGO elaborates: *"Our way of influencing is very political, and is centered around having publicity in media, confronting politicians, writing factual proposals, and participating in official hearings, etc. But there is also a significant element of engaging people – in order to spread the message, change their attitude, and engage even more people" (I3-1).* The investors also seem to care about the public opinion and the opinions of NGOs. Interviewee I6 explains that the financial sector's risk ultimately will reflect that of society, and that it is up to each individual investor to assess the risk of each project and take the necessary measures. Consequently, I6 claims that the society to a great extent decides which projects will be financed:

"The financial sector's responsibility is to finance the projects. And ultimately, the financial sectors' climate risk and nature risk will reflect society's climate risk and nature risk, because the financial sector finances projects society wants. If society didn't want these projects, they would not be financed. And then it's up to each individual investor to assess

which risk they see in the various projects." (I6)

Interviewee I4 also emphasizes that there is a significant risk associated with the public opinion and NGOs: *"If there is an area in which I feel we have a risk, [...] it's really towards that stakeholder segment comprising wind power opponents and climate skeptics, not so much the ones in business" (I4).* On the other hand, interviewee I13 points out that expectations from capital providers such as large pension funds is a driving force for many investors to focus on sustainability, as they often pose this as a requirement: *"This type of focus on e.g. climate change means that investors must be a bit more alert, because if they're not, they don't get allocated capital; they won't get money from – call it investors – to invest. Because it's clear that when an investor builds a wind farm, it [the money] comes from somewhere. And it's usually from pension funds, [...] where this [sustainability] has gotten substantially more focus" (I13).*

Internal stakeholders

Some companies mention internal stakeholders, primarily employees, as a group that helps drive sustainability efforts forward, although the connection to materiality is unclear. An interviewee tells that their company is put under pressure from internal stakeholders, including owners and employees, in addition to authorities: *"We are kind of put under pressure both from authorities, owners and employees. It is pressure in a positive sense, in the form of expectations of acting sustainably and putting sustainability on the agenda" (I2).* Interviewee I10 also mentions that the top management and the board of directors are crucial internal stakeholders for ensuring that sustainability is prioritized: *"There is no doubt that you get real effect first when it [sustainability indicators] is written on the scorecards of the ones sitting at the top. [...] Having an active board of directors that actually brings these things up regularly and really go in depth, also has a big effect. A really big effect" (I10).* However, the interviewees generally seem to mention employees more commonly than top management and the board of directors when talking about influence on sustainability efforts.

Furthermore, the culture, identity and values of the company is particularly highlighted as a reason for the sustainability focus of internal stakeholders. This is largely connected to the feeling of pride, and the feeling of responsibility to contribute, which interviewee I7 argues is a strong part of their company culture: *"The culture is characterized by tidiness and orderliness, as it has been for years. And I also think it [contributing] gives many people joy. When I ask elderly people who have worked in [organization] for a long time why they e.g. like working in projects, they typically say: 'We are proud of building the country'" (I7).* Another interviewee supports the claim that internal stakeholders such as

employees are affected by the company culture and values, and even posits that there is a distinctive "Norwegian DNA" in many companies, which contributes to good business practices:

"It's very easy to think that it's only pressure from the outside. But many Norwegian companies, and especially old companies, have a DNA in a way; it's Norwegian, it comes from Norway. It lies in the Norwegian work culture to behave honestly and sincerely, and take care of one's employees. Many companies have a set of values that to a certain extent motivates them to do these things, although it varies a bit from company to company what it is. And then the next step one takes is establishing formal rules, policies and procedures in accordance with good practice." (I10)

5.5.2 Contribution to the SDGs and common goals

The second factor for materiality that emerges from the data, is *contribution to the SDGs and common goals*, although this might be more appropriately classified as a driver of sustainability on a more general level. However, this factor can in many cases be traced to specific sustainability issues, and as such influence materiality. "Contribution" in this sense is to be understood as internally driven actions towards the SDGs and common goals, unaffected by any form of external pressure. Thus, it may in itself be regarded as an altruistic factor for materiality. It is mainly the industry players that mention this factor, and very often it is connected to SDG7 - "clean energy for all", as well as the main societal mission of the renewable energy sector: to ensure security of electricity supply. Interviewee I8 illustrates this with the following statement: *"Our main social mission is to ensure 100 % security of electricity supply. [...] The entirety of our operations is rooted in that" (I8).* The same interviewee continues: *"The most important aspects are undoubtedly renewability and climate, and being part of the solution in these areas is crucial. That's where we believe we have the largest social mission in addition to ensuring security of electricity supply" (I8).*

Interviewee I7 emphasizes the increased importance of their company in relation to the SDGs, and mentions that they have noticed an increased rush of customers wanting to connect to the grid: *"If one thinks about sustainability goals and the UN SDGs, of course the power sector will become much more important. And we had a tremendous rush of applications for grid connection some years ago." (I7).* From this statement it looks like the company's role in society will be even more crucial going forward, and that to achieve the common goals, sustainable and efficient grid operations are imperative. Generally, the SDGs seem to be a lodestar for sustainable development that "nudges" firms to work on their sustainability. Interviewee I10 emphasizes how the SDGs can function as a motivator

for firms to contribute to nature and society:

"I think the nice thing about the sustainability goals [...] is that they present an opportunity to contribute. [...] Mere risk management is not motivating in itself, so I think contribution towards the SDGs will increase in the future. It's motivating to see that business actually contributes, and isn't just a hindrance." (I10)

The same interviewee also argues that the technology on some fronts today are sufficiently developed to be able to fix some of the prevailing sustainability problems. Specifically, the interviewee highlights the 1.5 degree goal of global warming as something that can be achieved with today's technology, and argues that this in itself is a factor for materiality: *"Now we are at that point where we actually have the technology to do it [reach the 1.5 degree target]. It just needs to be deployed on a large scale to reach it. [...] So the reason why it [climate] is material is that we actually can contribute by taking a lot of CO2 out for real: to offset other energy forms such as oil and coal." (I10).*

5.5.3 Historical events

Historical events and the lessons learned from them are identified as another factor for materiality in a sustainability context. It is the interviewees from the industry itself and the investor stakeholder group that seem to be concerned with this factor the most. A range of examples of historical events that in some way altered the organization's perception of a certain sustainability issue are provided. Such events may include major campaigns, scandalous discoveries, and natural disasters. In many cases these stories illustrate that the materiality of an aspect changed dramatically after the incident took place, almost exclusively in an increasing manner. In other words, the relevant sustainability aspects usually seem to increase in materiality in the wake of memorable historical events concerning sustainability issues. When asked why environmental footprints are deemed material, interviewee I8 answers by explaining the significance of historical events in the context of hydropower:

"First, the hydropower industry was developed without any specific environmental focus, 50-70 years ago. And then the awareness of the environment started spreading with the Mardøla campaign ['Mardøla-aksjonen'] and subsequent campaigns. With the large campaigns, the fight for preserving environmental assets started to become very evident. This shaped the dilemma in society, and then protection plans and something called 'Samlet plan' surfaced. Following this, parliamentary resolutions etc. about the preservation and protection of the environment in relation to hydropower utilization, appeared. And then there was the famous New Year speech of Stoltenberg in 2001 if I recall correctly, in which

he said that the time of the great hydropower development is over. That was a reflection of the increasing environmental focus, and that we now have to spare the rest of the watercourses. So we have lived in that reality." (I8)

In the statement above, I8 refers to scandalous historical events such as the Mardøla campaign in 1970, which marked the beginning of a long period of activism. The interviewee tells that such events sparked the development of protection plans, development plans and parliamentary resolutions that formed the basis for new legislation. A speech by the famous Norwegian politician Jens Stoltenberg is also highlighted as a symbol of the environmental focus that has been geared towards hydropower. This is a focus that continues to prevail and grows stronger for each day, although it gradually has shifted away from hydropower towards wind power – a hot topic in the current public debate. The example by interviewee I8 only goes to show that historical events have the potential to really disrupt the notion of sustainability in the status quo, and change which issues are material for an industry. Relating to the electric grid, I8 mentions "monster masts in Hardanger" as another exemplary event that put environmental and social aspects on top of the agenda: *"You also have the grid side, where you might remember the Hardanger ... monster masts and the Hardanger conflict, where there was more or less factual resistance. But again it is land area occupation and visibility that are the impacts" (I8).*

Another example of a historical incident that affected materiality is provided by interviewee I7. This is the same example as described under Section 5.3.3, about the time the company discovered serious violations on working conditions in their supply chain: *"In 2017 and 2018 we uncovered serious violations on working conditions. And it was kind of a wake-up call that it was so serious. Since then we have done it more systematically and now perform checks on all big suppliers on our construction sites. [...] The ambition is that we shall check everyone, suppliers and subcontractors, on all of our workplaces" (I7).* It is evident that the "wake-up call" the company experienced in 2017 and 2018 left a mark on the company, as they subsequently increased their efforts on ensuring good working conditions in the supply chain; one could say the materiality of this social aspect increased after the incident.

An interviewee from a distribution/production company tells a story about a period with frequent power outages in a municipality: *"Last year and the year before that there were frequent power outages [in a specific municipality]. It happened so frequently that the customers, the authorities and the municipality asked questions about it, and it rose quite high up in society – to the municipal council meeting, where we explained it, and told which plans we had for upgrading the electric grid" (I2).* As I2 explains, frequent power outages during a period compelled the company to explain themselves to the municipal

council. Additionally, the incident led the company to make plans for upgrading the grid, to prevent similar incidents in the future. In other words, the incident advanced the focus on a stable grid, which largely translates to ensuring security of electricity supply.

It is not only the industry players who indicate that historical events affect materiality; the investors also emphasize that earlier incidents have affected their sustainability focus and risk considerably. Highlighted events include the Alta conflict in the 70s – comprising numerous demonstrations and people chaining themselves to the ground – as well as the more recent case with Frøya presented under Section 5.5.1 and the wind power conflict on Fosen. Interviewee I4 particularly highlights the Fosen project as a big risk: *"Fosen has been very expensive, with these lawsuits – so it is a risk now. I wouldn't call Norway a low-risk country for wind anymore; in that case I think you must look to Sweden or other places" (I4).* Furthermore, I4 tells that *"the licensing requirements [in the Fosen project] are fulfilled, in my understanding, but you still have a conflict" (I4).* The same interviewee points out that the conflict and risk arising from the Fosen project came as a surprise, and that there always will come surprises that affect sustainability aspects:

"I think what's a bit difficult is the fact that some things are a surprise. I think the case of Fosen was a surprise. With the assessments that had been done, I don't think one considered this to be such a high risk, and now it has become a known risk. [...] We follow our general attitude that we wish to have best practice when it comes to both identification and handling of various sustainability aspects, but there will always come a surprise. And then it's very easy to look back and say: 'Okay, here we should have influenced this and that'." (I4)

5.5.4 Expectations about the future

Although only a minority of the interviewees mention it, another potential factor for materiality seems to be expectations about the future, which to some extent relates to historical events. Most importantly, the expectation of future changes in the legislative landscape – primarily introduction of new regulations – is seen as a factor that affects which sustainability issues are material. Interviewee I7 expresses that the anticipation of future climate risk and the expectation of new regulations induce the company to prepare itself to meet these challenges, by being in front on the relevant sustainability issues and protect itself against risk:

"Another aspect of climate is our own adaption. [...] We must include climate risk in our plans so that we supervise where we build and how we secure the electric grid in Norway – physically, but also in the sense of being ahead of new requirements. [...] If we're going

to have a chance of reaching the 2030 goals, there has to come stricter requirements. We shall be prepared for that, and be one step ahead." (I7)

5.5.5 Business case

Lastly, factors more or less relating directly to business or economic aspects – such as reputation, costs and risk – are identified as something also affecting materiality. As all these factors are of similar nature, we collect all of them together under the umbrella of *business case*. It is mainly the industry players that talk about this factor, naturally, as it affects the economic aspects relating to their business operations, and ultimately their bottom line. The pressure to maintain a good reputation is particularly highlighted as an important driver of sustainability, although it is of a more general character. An NGO posits that some companies have a self-interest in appearing "better", e.g. with respect to their reputation and expectations from customers: *"There are quite a few power companies that also have a self-interest in appearing better etc., so there are some who do a bit more than what the legislation requires, [...] partly because there is a fair amount of customers that expect it. They won't buy power from a company that doesn't have the ... the seal of approval [e.g. Ecolabel], for instance" (I3-1).* From the business perspective, interviewee I2 emphasizes that the reasons why their company reports on sustainability mainly relate to their reputation, trust and employer attractiveness, which are important aspects for maintaining their competitive ability:

"Apart from that [statutory sustainability reporting], we have internal decisions that we shall report on sustainability. And then the aspects of building reputation and trust, and strengthening the competitive ability are important. Because if customers and suppliers look for our sustainability reporting and don't find it, big questions will probably come our way: 'Why do you choose to not report on this?' You also have the aspect of attractiveness among employees; I think that those who are job seeking look at the annual report as a source of knowledge about the company they wish to apply to." (I2)

Another factor related to the business case is the potential cost of making the wrong decisions. Interviewee I7 highlights that moving infrastructure after it has been built in one area, is extremely expensive for the company. Consequently, I7 emphasizes that it is of utmost importance that the preliminary work for a new project is transparent and thorough, particularly the work with impact assessment of the location: *"We cannot risk doing a bad impact assessment of biodiversity, because then we have to do changes in the project at a later point in time if e.g. vulnerable nature or species are discovered. Such changes will be more expensive than including it in the early phase of planning. So we have to do everything correctly the first time" (I7).* Speaking of costs, some interviewees

also emphasize the potential great effect of market mechanisms and economic incentives. In this context, the existing mechanism with carbon credit is particularly used as an illustrative example. Interviewee I12 explains why they believe such mechanisms are effective tools to facilitate sustainable development, and exemplifies with carbon credit:

"We have a regime with EU Emissions Trading, where they have restrained the access to carbon credit so that it now should be quite expensive to pollute. This creates incentives for transitioning to renewable, as long as the carbon credits are pricey enough. However, carbon credits are in reality way too cheap today, which hampers the green shift. We have a lot of faith in market mechanisms, because the whole crisis is demand driven and kind of created by the market in the first place. If it is costly enough to pollute, that is a very good driver for change." (I12)

For the investors, risk is perceived as the cardinal factor for materiality. This is well illustrated throughout Section 5.3, where risk in various sustainability contexts is highlighted. Interviewee I13 provides a clear answer to what the investors consider to be their main factor for materiality: *"I think that if this is going to be a good story in the end, if it's going to be [...] as far as possible conflict free, it's simply risk [that is the main factor]. I think that your business risk increases if they [the conflicts] are significant; then a lot can happen: you are more exposed to some form of regulation later that means you may not be allowed to continue what you're doing" (I13).*

Summary of materiality factors

A simple conceptual model summarizing our findings with respect to potential factors that can affect the development of materiality is presented below, followed by a table briefly summarizing what each factor entails.

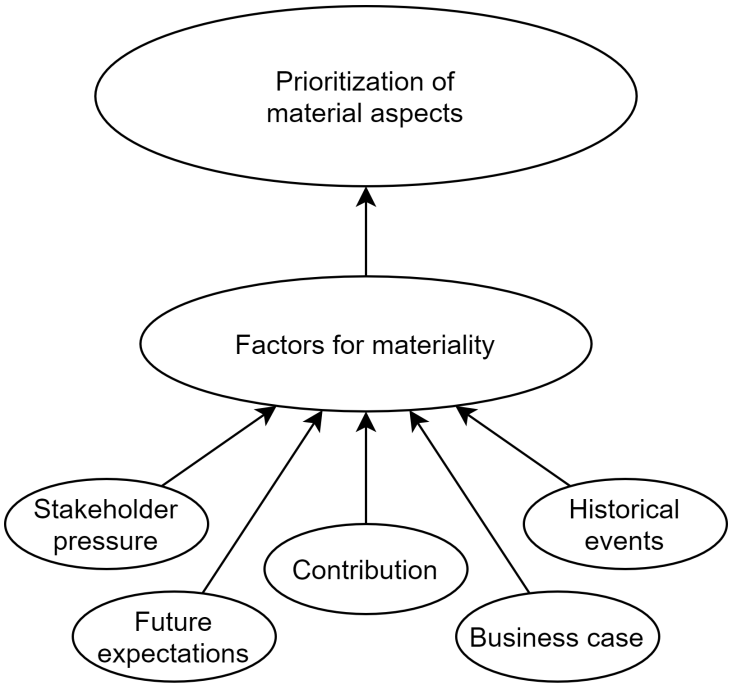

Figure 5.3: Factors for materiality

Stakeholder pressure[1]	**Contribution**	**Historical events**	**Future expectations**	**Business case**
Legislation	Climate (SDG 13)	Conflicts	New regulations	Reputation and trust
Access to capital	Renewable energy (SDG 7)	Campaigns	Future risk	Employer attractiveness
Public opinion	Security of electricity supply	Surprising discoveries		Cost of wrong decisions
Activism		Operational problems		Market mechanisms
Internal expectations				Economic incentives
Values and beliefs				Risk
Feeling of responsibility				

1. Most evident forms of stakeholder pressure (not exhaustive).

Table 5.13: Various forms of the materiality factors

6

Discussion

This chapter is dedicated to discussing the empirical findings from Chapter 5 in relation to the existing literature presented in Chapter 2. Through this discussion we seek to place the results of the study within the larger body of literature, and theorize about the findings that seem to go beyond the prevailing theory. The chapter is structured after our two research questions, although RQ1 is split into two separate sections: Section 6.1 and Section 6.2, reflecting its dual nature. For each of these sections respectively, we discuss our findings about the prioritization and operationalization of sustainability issues, in light of the literature on these topics. Then, we continue by discussing the findings relating to RQ2 in Section 6.3, and connecting it all to the literature on stakeholders and dynamic materiality.

6.1 Prioritization of sustainability issues

Part of the first research question of this study is to assess the materiality perceptions of the companies operating within the Norwegian renewable energy sector and their key stakeholders. An integral element to this is examining how they prioritize sustainability issues and decide the materiality of each issue. In the following, we first discuss our findings purely relating to materiality perceptions, before we transition into discussing some potential challenges with materiality assessment and prioritization.

6.1.1 Stakeholder perceptions of materiality

On a broad level, our findings regarding company and stakeholder perceptions of materiality are in line with those of Kuh et al. (2020), stating that the three issues *greenhouse gas emissions*, *labor practices* and *business ethics* are generally material in all industries, and

constitute what the authors term *core materiality*. However, we find that the two latter issues are more clearly labeled as material among the industry players than among the stakeholders, who in many cases do not even mention them. Furthermore, Wilson (2003) states that "goals of economic stability, environmental protection, and social justice are common across many stakeholder groups". While the stakeholders interviewed in this study generally do not seem to regard social and economic aspects as highly material, we do not have sufficient evidence to conclude that they consider them immaterial.

In some cases it is, however, clear that the stakeholders prioritize differently, which is to be expected according to the stakeholder diversity theory (Lamberton & Zhou, 2011; Zhou, 2017). An example is the NGOs' strong focus on environmental aspects to the detriment of social aspects and sometimes economic aspects, which is natural considering they are environmental NGOs. On the other hand, the investors perceive economic aspects as highly material and the social aspects as less material, while mainly translating the environmental aspects to risk. These views to a varying extent misalign with those of the NGOs and the regulatory bodies, where the latter is more concerned with the socioeconomic profitability. The discrepancies in materiality perception may largely be ascribed to the different identities, stakes and interests of the stakeholders, again aligning with the theory of stakeholder diversity (Lamberton & Zhou, 2011; Zhou, 2017). Generally, one can say that the NGOs have their main interest in environmental conservation; the investors are concerned with risk-adjusted returns from profitable projects; while the regulators shall look after the interests of the greater society. Usually, the conflicting interests become evident in relation to renewable energy development projects, e.g. the installment of new wind power production capacity or grid infrastructure.

Still, many aspects are deemed material by most – if not all – stakeholders and companies. This is especially true for the environmental aspects, which can generally be said to have a low level of complexity, according to Lamberton & Zhou (2011). On the contrary, social and economic aspects can be said to have a higher complexity grade. If we look to stakeholder theory, and stakeholder salience theory in particular, we can get some cues about why materiality perceptions are so aligned on the environmental aspects. The stakeholder salience theory by Mitchell et al. (1997) holds that the focal issues of a firm may be influenced to a varying degree by its stakeholders, depending on the stakeholder's power to influence the firm, the legitimacy of their relationship, and the urgency of the stakeholder's claim on the firm. Regulatory bodies – which are categorized as primary stakeholders (Clarkson, 1995) – have the power to influence firms significantly by imposing requirements and regulations; they have a highly legitimate relationship with the industry; and they possess the attribute of urgency, as their demands may call for

immediate action. In total, this makes the regulatory bodies highly salient stakeholders, which are in a position to greatly influence the companies' prioritization of sustainability issues. Consequently, companies have no real choice but to respond to the claims from the regulatory bodies (Mitchell et al., 1997; Neville et al., 2011; Zhou, 2017). Seeing as the regulators perceive e.g. climate, biodiversity and land use as highly material, and to a varying extent enforce laws and regulations on these aspects, firms are compelled to comply.

The same logic could to some extent be applied to investors – which is also a primary stakeholder group (Clarkson, 1995) – although they naturally are less salient than regulators as companies may not always depend on them as much. Claims by NGOs would presumably count even less, as NGOs are seen as secondary stakeholders (Clarkson, 1995) that have less power and are less salient than both regulators and investors (Mitchell et al., 1997). That being said, NGOs could still be able to greatly influence firms as long as their *claims* are legitimate and urgent (Eesley & Lenox, 2006; Neville et al., 2011). We have witnessed this multiple times in e.g. impact assessment cases, where companies have responded to claims by NGOs about negligence of biodiversity in the area affected by the project.

6.1.2 Materiality in retail

A few more words should be spoken about the retail part of the renewable energy value chain, because its materiality perceptions do not necessarily seem to comply with those of production and grid. For instance, contrarily to production and grid, retail seems to perceive the aspects of biodiversity, land use, human rights and working conditions as immaterial (although sometimes material when seen in a supply chain context). With the exception of climate and GHG emissions, it is primarily production and grid that are regulated on environmental aspects (see Chapter 3), which could be a partial explanation for why retail does not consider biodiversity and land use material, in line with stakeholder salience theory (Mitchell et al., 1997). Furthermore we can, despite retail being included in our definition of the "renewable energy sector", argue that production and grid companies are in fact stakeholders of the retail companies. The reason for this is that they possess a form of supplier-customer relationship, in accordance with the stakeholder theory by Freeman (1984), which would entail them having a different set of stakeholders. Then, by drawing on the concept of stakeholder diversity (Lamberton & Zhou, 2011), we can theorize about the divergent materiality perceptions being a result of differences in identity and interests, which is in accordance with Zhou (2017).

However, it is not only the perceived materiality of environmental aspects that are divergent. Social aspects such as human rights and working conditions may not be seen as

material either, since retail has very different operations compared to production and grid, with fewer concerns for workplace safety and international subcontractors. Similarly, retail cannot be said to impact the environmental aspects to the same extent as production and grid. In fact, retail is very different to the production and grid parts of the value chain; while production and grid are very capital intensive with large infrastructure and power plants, retail is more labor intensive and mostly consists of intangible assets. This in itself may be a good explanation for different perceptions of materiality between retail and production/grid, and consequently, we will refer to production and grid as the "industry" and treat retail separately to the "industry" in the following discussion. This separation is also appropriate considering that the stakeholders almost exclusively refer to production and/or grid when talking about the "industry".

6.1.3 Perceived materiality compared to existing frameworks

By comparing the perceived materiality of aspects – as seen from the industry's point of view – with the GRI G4 Electric Utilities Sector Disclosures from GRI (2013a) ("G4"), we make multiple observations. First of all, with our new definition of the "industry", it is clear that there is a strong consensus on the three main environmental aspects of climate, biodiversity and land use. Thus, there seems to be a relatively high level of conformity between the material environmental aspects put forth in G4 and the perceived material environmental aspects of the industry itself, although not all G4 aspects are mentioned. Of the social G4 aspects, the ones relating to local communities, access, and health and safety are most commonly highlighted as material by the interviewees. Only the G4 aspect *availability and reliability* is emphasized as a material aspect within the economic dimension of sustainability. Comparing our findings to the SASB Electric Utilities & Power Generators framework by SASB (2018a), we see a clear concordance with the aspects *greenhouse gas emissions & energy resource planning*, *air quality*, *workforce health & safety*, and *grid resiliency*, as well as the aspects *workforce health & safety* and *ecological impacts of project development* from the SASB Wind Technology & Project Developers framework (SASB, 2018b). On the other hand, many of the sustainability aspects considered material by GRI and SASB are mentioned to a severely limited degree or not at all by the interviewees. Of course, aspects such as *coal ash management* and *nuclear safety & emergency management* do not really apply to the renewable energy sector specifically, but the apparent disregard for aspects like *system efficiency*, *materials*, *water*, *effluents and waste*, *disaster/emergency planning and response*, and *end-use efficiency & demand* should be questioned, and possibly researched further.

6.1.4 Challenges with materiality assessment and prioritization

Even though it was not the primary aim of this study, our findings give indications of several challenges related to materiality assessment and prioritization of sustainability issues. In broad terms, these challenges can either be connected to the degree of familiarity with such processes, the lack of a standardized materiality and reporting procedure, or inherent trade-offs between stakeholder interests and between sustainability aspects. Specifically, the main challenges uncovered relate to the interpretation of materiality, the use of materiality matrices and analysis, the degree of familiarity with such assessments, stakeholder engagement, and weighting of issues with trade-offs.

From the interviews in this study, it becomes apparent that there are some challenges with the interpretation of materiality, where different people may have a completely different grasps of the concept. We would argue that one of the reasons for this might be that materiality in a sustainability context is a relatively new concept that only the recent years has gained real traction (Ioannou & Serafeim, 2019; Jones et al., 2016b; Whitehead, 2017). Consequently, one can speculate if materiality is a concept that has yet to be fully rooted on a wide scale. In our own experience, despite providing the interviewees with a definition of materiality prior to the interview, several of them asked for further explanation of the concept during the interview. It thus seems as if materiality is a concept that can be difficult to understand and interpret, both for companies and stakeholders. Despite the fact that it seemed easier for companies that were used to conducting materiality assessments to understand the concept of materiality, we still experienced that their fundamental understanding of materiality varied to some extent, even in instances where they all reported according to GRI. This finding is in line with the arguments of Cohen (2016), GRI (n.d.-d) and McElroy (2011) that many "misinterpret" materiality and assess issues' impact *on* the business and its goals rather than impacts *of* the business on the three dimensions of sustainability. Although this is more in line with integrated reporting (IIRC, 2013a), it does not reflect the reporting principles of GRI, and only represents half of the double materiality concept (European Commission, 2019). It could thus be argued that the discrepancy in how companies define materiality partly could explain why sustainability reports even from companies within the same sector, are non-comparable, in accordance with the findings of Boiral & Henri (2017) and Talbot & Boiral (2018).

This leads us to the second point, namely that we found discrepancies in whether or not the companies used materiality matrices in determining materiality and prioritizing issues. In addition, they seemed to classify issues as either material or immaterial, rather than evaluating the degree of materiality on a continuum, as suggested by Unerman & Zappettini (2014) and Whitehead (2017). Among those previously using a materiality

matrix, despite most of them doing so according to the GRI guidelines, there were divergent views and understandings of how to use it. As mentioned, some reported on the impact sustainability issues had on the organization, rather than the organization's impact on those issues, thus deviating from the GRI guidelines. Seen in light of Calabrese et al. (2019), the GRI framework does not offer more than mere guidelines; it calls for qualitative and subjective judgments (Koehler & Hespenheide, 2014; Whitehead, 2017; Zhou, 2017); and thus the possibility of misinterpreting the concept of materiality increases (Cohen, 2016). Consequently, the misinterpretation and misuse of materiality matrices (Puroila & Mäkelä, 2018) and assessments may be effectuated by precisely the lack of a systematic approach towards the materiality and reporting process.

Thirdly, while proper stakeholder engagement is a crucial factor for creating good materiality assessments (e.g. AccountAbility, 2006; Calabrese et al., 2019; Font et al., 2016; GSSB, 2016a; Zhou, 2017), the actual engagement between the companies and their stakeholders seems to be somewhat inconsistent with the perceptions thereof. On the one hand, the companies report that they interact with a variety of their stakeholders, e.g. through physical meetings; stakeholder engagement in licensing and development processes also seems to be present. In addition, several of the stakeholders express that they engage with the companies in the renewable energy sector. On the other hand, while some companies had a clear prioritization of their stakeholders, the majority seemingly did not; they often struggled with ranking their stakeholders with respect to salience or capability to influence the firm. This could reflect the lack of a conscious attitude towards stakeholder engagement outside of the mere formalized processes, as well as the importance of involving stakeholders in the reporting process, although this is mostly a speculation from our side. If such stakeholder engagement in fact is not present, it could potentially mean that the companies get a skewed or incomplete picture of materiality, as they may miss valuable input from their stakeholders. This could result in inferior materiality implementation and sustainability reports (Torelli et al., 2020), missed opportunities for facilitating a better understanding of issues (AccountAbility, 2015) and for generating societal, corporate, and political benefits (Silva et al., 2019).

Lastly, the weighting of sustainability issues and their inherent trade-offs seems to be one of the most pressing challenges with materiality assessment in the renewable energy sector. A high level example could be the trade-off between producing more electricity from renewable sources of energy (which in itself is a positive effect), and the necessary exploitation of land areas and local impacts on biodiversity (which are negative effects and partially externalities). Among these aspects there is also an inherent trade-off between land use and biodiversity preservation, along with many other complex interconnections.

This interconnectedness has for a long time been emphasized as one of the greatest barriers to sustainability measurement (e.g. Farrell & Hart, 1998; Gallopín, 1997; Independent Group of Scientists appointed by the United Nations Secretary-General, 2019; Needles et al., 2016; Zhou, 2011), also in the renewable energy sector (Santoyo-Castelazo & Azapagic, 2014). Naturally then, it complicates the process of prioritizing sustainability aspects, which requires you to weigh positive effects against negative effects. This challenge has been emphasized by the majority of the interviewees, who seem to struggle with ranking various aspects against each other.

6.2 Operationalization of sustainability issues

The other part of the first research question of the study is concerned with how the industry players and the stakeholders operationalize sustainability issues, including how they decide which indicators are best fit for measuring the material aspects. In the following, we start by discussing our findings about indicator selection, before moving over to discussing some prevalent challenges with operationalizing and measuring sustainability, including the difficulties with selecting good indicators.

6.2.1 Indicator selection

It is not only the prioritization of sustainability issues with respect to materiality that appears to be challenging; also the operationalization of such issues seems to entail a range of challenges. Specifically, the challenges identified relate to the identification and selection of sustainability indicators to measure and report on. Compared to the prioritization of issues, the interviewees seemed to struggle even more with identifying which indicators would be best fit for measuring the material aspects, which is also illustrated by e.g. Ribera (2017) and Zhou (2017). There were also differences in the extent to which indicators were identified in the different sustainability dimensions. Generally, it seemed easier to find indicators on the environmental aspects than on the social and economic aspects, with social indicators being the most difficult to identify. On many aspects the majority of interviewees did not have any indicator suggestions at all. That being said, some indicators were identified by all interviewees without much doubt.

Environmental indicators

Starting with environmental indicators, there is an unanimous agreement that indicators on emissions are important in the industry, which relates to the material aspect of climate. In specific, CO2 emissions and CO2 equivalent emissions were highlighted as the decidedly most important indicator(s) on climate, and were mentioned by all interviewees.

Interestingly, all of the stakeholders highlighted CO2 intensity (i.e. weight of CO2 divided by unit of energy produced) as a highly important indicator, although this was not mentioned by the companies. The importance of indicators measuring CO2(eq) emissions in the energy sector is exhaustively highlighted both in academia (e.g. Evans et al., 2009; La Rovere et al., 2010; Liu, 2014; Mainali, 2012; Onat & Bayar, 2010; Santoyo-Castelazo & Azapagic, 2014) and in the sector-specific reporting standards by GRI (GRI, 2013a) and SASB (SASB, 2018a). One of the reasons why there is a strong consensus on the importance of CO2-related indicators could be the widespread knowledge about CO2's and other GHG's significance to climate changes, as well as the existence of regulations and standardized frameworks tailored for CO2/GHG reporting (e.g. TCFD). Furthermore, it is clear that the renewable energy sector plays a crucial role in sustainable development (Dincer, 2000; Güney, 2019; Independent Group of Scientists appointed by the United Nations Secretary-General, 2019; TWI2050, 2018) by gradually replacing fossil energy with renewable energy, and thus contributing majorly to SDG 7 and 13 (UN DESA, n.d.). Due to this, the industry may have some extra pressure on it to take the lead as a good example, rendering GHG emissions an indicator of particular importance.

Still within the climate aspect, it is noteworthy that the industry (excluding retail) and the investors mention avoided emissions as a possibly important indicator, while the NGOs and the regulators do not mention this at all. At the same time, the NGOs, regulators, and retail companies mention renewable fraction as an important indicator, which is not mentioned at all by any of the other groups. One can speculate in what might cause this difference in perception. It could be that the companies believe avoided emissions reporting is highly demanded by their stakeholders, and thus could improve their credibility or reputation, or otherwise be a "selling point" that could help persuade potential opponents to agree to new development projects. However, from our results, it does not seem like the NGOs or the regulatory bodies care much about this indicator, and the investors are divided in their views. On the other hand, an indicator representing renewable fraction could be more relevant for those interested in seeing the aggregated effects of renewable energy, for instance a regulatory body, and NGO, or the government, although this indicator is not regarded as material by the industry itself.

As for biodiversity, the most prominent indicator is red-listed species affected, although there are disagreements and uncertainty about how to measure it and how good of an indicator it really is. Despite biodiversity being listed as a material aspect in the GRI G4 Electric Utilities Sector Disclosures (GRI, 2013a), it does not contain red-listed species specifically; neither does the SASB Electric Utilities & Power Generators standard (SASB, 2018a) nor any of the academic papers mentioned in Chapter 2. However, within the

updated GRI Standards, the subtopic of biodiversity describes that companies should report on the number of red-listed species (GSSB, 2016b). In the global SDG indicator framework by the UN, "Red List Index" is also included as an indicator on biodiversity loss, under goal 15 and target 15.5 (IAEG-SDGs, 2020).

Another important indicator within the realm of biodiversity seems to be which nature types are affected by development projects. However, this indicator is clearly linked to the land use aspect, where land area affected measured in km^2 is perceived to be the single most important indicator. When seen in conjunction, one can create indicators measuring the area used of various nature types, and that way distinguish between different ecosystems and habitats. This was also pointed out by some of the interviewees. Existing research also suggests measuring land use in the energy sector (e.g. Evans et al., 2009; La Rovere et al., 2010; Onat & Bayar, 2010; Santoyo-Castelazo & Azapagic, 2014), although nature types are not mentioned. However, Evans et al. argue for an indicator measuring km^2 per TWh of electricity, which is only mentioned specifically by one or two of the interviewees in this study. The GRI G4 and the SASB Wind Technology & Project Developers standards also include land use requirements as a material aspect for electricity production, but do not propose any specific indicators. Within the GRI Standards from 2016 on the other hand, reporting should include km^2 or other relevant units of measurement for area impacted (GSSB, 2016b).

Still, the inclusion of issues and indicators related to biodiversity is severely limited in the existing reporting standards and sustainability frameworks. Seen in light of the findings of this study – suggesting that biodiversity is a highly material aspect, but one that is difficult to assess and quantify – it seems as if the topic has quite recently become material for the industry. Furthermore, the way of operationalizing, quantifying and measuring impacts on biodiversity is still nascent and highly uncertain, although it seems to be in the works. For instance, when the *Post-2020 Biodiversity Framework* under the Convention on Biological Diversity officially launches in 2021 (CBD, n.d.), the general conception of how biodiversity should be measured may be altered and improved significantly. This will be crucial, considering that loss of biosphere integrity alongside climate change is a "core" planetary boundary, that will have serious repercussions for humankind if significantly infringed (Rockström et al., 2009; Steffen et al., 2015).

Social and economic indicators

In contrast to the *somewhat* aligning perceptions of material indicators on the environmental aspects, we find a major divergence in perceptions of material social indicators, accompanied by a much larger degree of uncertainty and guesswork, as well as fewer

indicator suggestions in general. The interviewees also seemed more restrained with proposing indicators on the social aspects. Of the mentioned indicators, income allotted to local communities was by far the most prominent one, although it was only emphasized by production companies, grid companies, and investors. Furthermore, the indicator is not mentioned explicitly in SASB. However, it can be argued that it is indirectly a part of the GRI G4 aspect "local communities" (GRI, 2013a). This is supported by Liu (2014), who asserts that social indicators should include job creation and benefited residents. Furthermore, number of serious workplace-related injuries were mentioned by several interviewees as a possible indicator, which is also to be found in both GRI G4 and SASB, although in the form of "rate" and "type" of injury (GRI, 2013a; SASB, 2018a). Not surprisingly, indicators relating to the workplace environment, such as sick leave and employee satisfaction, were highlighted as important by some companies, but not brought up at all by any of the stakeholders. Regarding the economic aspects, the indicators highlighted by the interviewees primarily consist of traditional accounting metrics for profitability, costs and taxes, although in somewhat different forms depending on the stakeholder.

6.2.2 The operationalization challenge

As apparent in Section 5.4.4 there seems to be numerous challenges with defining good indicators for measuring sustainability impacts, both within the environmental, social, and economic aspects. Firstly, the lack of generally accepted indicators is highlighted as a challenge, as it complicates the process of selecting which indicators to measure and report on. This is also highlighted in academia as an impediment to transparent and comparable sustainability disclosures (e.g. Boiral & Henri, 2017; Talbot & Boiral, 2018), which in turn may hamper sustainable development by reducing the accountability of firms. However, the interviewees point out that identifying indicators on a project level is not the biggest problem; it is even more difficult to aggregate indicators to a broader, strategic level, which should be the ultimate goal. The problems with aggregating sustainability indicators are highlighted by a multitude of researchers (e.g. Bell & Morse, 2008; Farrell & Hart, 1998; Gallopín, 1997) who all argue that accurately and compactly representing the concept of sustainability and connecting different indicator sets to each other are two major issues. Reporting for the sake of reporting is not particularly helpful, and the interviewees emphasize that the indicators ought to give insights that are valuable to performance assessment and strategic decision-making. In light of this, Whitehead (2017) asserts that "in practice indicators tend to be more descriptive than analytical and have limited ability to demonstrate solutions to a problem" (p. 402), which partially justifies the interviewees' frustration. This is why it is so important to view the indicators through

a materiality lens; they should be seen in conjunction with, and be derived from the material sustainability aspects (GRI et al., 2015; Ribera, 2017; SASB, 2018a; Whitehead, 2017).

Even when taking a materiality perspective on indicators, a range of challenges prevail. From our results, we find that even though the majority of the interviewees have a good grasp of their organization's material aspects, they struggle to operationalize the aspects and determine which indicators are best suited for measuring them. This operationalization challenge partly arises due to the lack of generally accepted indicators, but also entail a range of more specific, underlying challenges. One could possibly even argue that these underlying challenges impede the development of generally accepted indicators and frameworks. The first challenge we identify is the difficulties of quantifying sustainability impacts, particularly those relating to the environment and social aspects. For instance, it is highly uncertain how one should quantify biodiversity impacts of a renewable project, as biodiversity is an immensely complex aspect that is interrelated with a multitude of other aspects. One cannot set a simple price on it either, as the value of biodiversity (loss) cannot be assessed confidently. Thus, we argue that the quantification problem also is related to the lack of knowledge and the lack of credible data on sustainability aspects. For instance, an interviewee emphasizes that biological data is difficult to measure accurately due to its inherent noise. Generally, there seems to be a lack of credible data on vulnerable areas and nature types as well, which makes it harder to assess the impacts of potential wind farms in particular. The lack of data therefore seems to be strongly connected to the lack of knowledge.

Another challenge with selecting indicators is the context-specificity of each project. It seems as if one cannot create a generic "one size fits all" set of indicators to measure sustainability in the industry, since the context along with the consequences vary between projects. Thus, there is a need to conduct a tailored materiality assessment for each individual project, and not rely on predetermined indicators. This project-level context-specificity may be a challenge to selecting which sustainability indicators to measure and report on in general. As a consequence, producing sustainability reports of high quality becomes a difficult and resource-intensive task. Moreover, high context-specificity severely hampers the comparability of reports (e.g. Cohen, 2016), which was part of the reason why the SASB standards were developed in the first place (Rogers & Serafeim, 2019). However, the SASB standards do not account for variations within a specific industry, not the least within a specific company. Such context-specificity is more in line with what Kuh et al. (2020) claims to be the company's own unique "materiality signature". Some interviewees believe a standardization and professionalization of reporting processes is the

key to facilitating better sustainability reporting.

6.3 The evolution of materiality

In this last section of the chapter we discuss our findings pertinent to the process with which sustainability issues evolve from being immaterial to being material over time. From our findings we identified five main reasons for why a sustainability issue might evolve to become material, which we termed *factors for materiality*. These five factors for materiality will be discussed in the following subsections: *Stakeholder pressure*, *Contribution to the SDGs and common goals*, *Historical events*, *Expectations about the future*, and *Business case*, in that order. The discussion of all five factors is seen from the perspective of the industry. We will at some points also discuss a factor from the perspective of a stakeholder, but this will always be explicitly stated.

6.3.1 Stakeholder pressure

As emphasized in Section 5.5.1, stakeholder pressure is undoubtedly the most prominent factor for materiality emerging from our data. In general, it seems like pressure from stakeholders might be the cardinal factor for materiality. Stakeholder pressure can take many forms, and may come from a vast range of different stakeholders; hence, stakeholder pressure may be seen as a wide-ranging factor unified by demands and influences from many stakeholder groups. On the basis of our findings, we separate the most protruding stakeholders into four distinct groups: *government and regulators*, *the financial sector*, *civil society*, and *internal stakeholders*. These stakeholder groups all influence or pressure the industry in different ways, with a varying degree of power and salience. We go on to discuss the way in which the different stakeholder groups influence or exert pressure on the industry, before discussing the findings in light of the pathways framework proposed by Rogers & Serafeim (2019) and lastly hypothesizing about future materiality development in the industry.

Various forms of pressure

The government and regulators (regulatory bodies) are in reality two different stakeholders that we choose to group together based on the fact that they are both part of the Norwegian authorities in a broader sense. Although more general political policies may be proposed by the government, the more specialized regulatory bodies have the task of exercising a regulatory authority over a specific area. This way, the government and the regulatory bodies play a role in the formation and enforcement of laws and regulations, respectively. Our findings indicate that legislation is a major factor for materiality, as it forces the firms

to change in order to comply. This is in line with the more general driver of sustainability termed "regulatory requirements" as identified by Whitehead (2017) and the external driver termed "regulation and legislation" by Lozano (2015). Considering the undeniable importance of legislation, it could possibly even be regarded as a factor for materiality in its own right. The NGOs also point out the importance of legislation, and go as far as saying that sufficiently strict legislation is an absolute necessity to prevent irresponsible business practices, as firms seek profit maximization without voluntarily accounting for externalities.

Another stakeholder group is the financial sector, which by many is seen as the most effective stakeholder group to put pressure on the industry, next to the government and regulators. Similarly to the regulators, they can impose requirements on the industry, although in a different manner; instead of enforcing regulatory requirements, they have the power to make certain demands on companies by controlling the conditions for financial capital. This can e.g. take the form of requirements for big investments, lending conditions, and insurance premiums. However, the importance of the financial sector seems to be lower in retail than in the the much more capital intensive value chain links of production, transmission and distribution. Our findings seem to be in line with e.g. Amel-Zadeh & Serafeim (2018) and Eccles & Youmans (2016), who claim that investors are capable of demanding material sustainability reporting.

The third stakeholder group – the civil society – also seems to have great influential power over the industry and the potential to change the materiality of sustainability issues. This coincides with the driver of sustainability called "societal desires" (Whitehead, 2017) and the external drivers "society's raising awareness" and "NGOs activism" (Lozano, 2015). Although the general public may not be regarded as a part of civil society per definition, for the purpose of this discussion, we group the general public and NGOs together based on their similarities and connectedness. Despite the similarities, the NGOs primarily pressure the industry through activism and political engagement, while the general public pressures the industry through the public opinion, heavy debates and escalation of conflicts, e.g. in the form of demonstrations and campaigns. Although not explicitly voiced by the interviewees, not complying with the public opinion may damage the companies' reputation, and in that way negatively affect economic aspects. This argument is supported by Lozano (2015), who classifies reputation as a "connecting driver" between internal and external drivers of sustainability. The most common way for both the NGOs and the public to influence seems to be through the use of digital media, and particularly social media. Expressing views on social media allows for rapid spread of information and great publicity, which is something the industry players find impossible to

control. Kuh et al. (2020) argue that smartphones and social media collectively make up a powerful force in driving issues to materiality due to the hyperconnectivity they entail, which is supported by our findings; this point is also mentioned by Eccles (2020). Also the financial sector emphasizes that it is influenced by the civil society, as not complying with their views and expectations may pose a significant risk to them.

Lastly, we identified stakeholders within the company itself (internal stakeholders) as another group exerting pressure on the industry, through setting expectations to the business and putting sustainability on the agenda. This largely resembles the driver of sustainability that Whitehead (2017) terms "business sustainability", as well as the internal drivers highlighted by Lozano (2015), including e.g. "leadership", "business case", "company's culture" and "moral and ethical obligation to the contribute to CS (corporate sustainability)". The real rationale behind such pressure remains unclear, and could very well be self-serving interests of e.g. employees, owners, top management and the board, such as profit maximization and good working conditions, depending on the stakeholder. However, WEF & BCG (2020) emphasize that employees increasingly expect firms to have sustainable business models and largely base their choice of employer on this criteria, which suggests that many internal stakeholders *actually* care about sustainability. Some of the interviewees argue that the employee expectations are connected to the company culture and values as well as the feeling of responsibility, which could be another valid rationale, in line with Lozano (2015). The direct influence of internal stakeholders on the materiality of specific aspects, however, is not clearly established through our findings; it could very well be that internal stakeholders play a key role in driving sustainability efforts forward more generally without directly influencing the materiality of specific aspects.

Nonetheless, the preceding paragraphs all illustrate the point that firms are continuously pressured with respect to sustainability issues from multiple angles, both internally and externally. This is in line with the original stakeholder theory by Freeman (1984) and the distinction between internal and external stakeholders by Reed (1999). Our findings also seem to correspond to the differences in stakeholder power naturally arising from the differences between primary and secondary stakeholders, as proposed by Clarkson (1995). Using this dichotomy, the government and regulators, the internal stakeholders, and partly the financial sector, are to be regarded as primary stakeholders, while the civil society falls within the definition of secondary stakeholders. This would imply that the three former stakeholder groups have more power and salience than the civil society, in line with the original stakeholder salience theory (Mitchell et al., 1997). Despite this, our findings suggest that this stakeholder group has the potential to significantly influence the industry players as well, which is in concordance with the "updated" view on stakeholder

salience theory (Eesley & Lenox, 2006; Neville et al., 2011).

We also identified differences in how the stakeholders exert pressure, and the consequences that follow from the pressure exerted; this coincides with the stakeholder diversity theory presented in the literature review (Lamberton & Zhou, 2011; Zhou, 2017) and the arguments of Zhou (2017) about differing actions and degree of influence. For instance, pressure arising from a regulator that starts enforcing new legislation is generally very high, as it forces the industry players to comply with new regulatory requirements. Thus, pressure from a regulator induces the whole industry to change by having to take actions for reaching new compliance. This represents the fifth and final stage of the framework with pathways to materiality by Rogers & Serafeim (2019), who emphasize that new regulation (along with disruptive innovations) is what drives a sustainability issue to become financially material for the entire industry. This view supports the argument of Lydenberg et al. (2010) that legal/regulatory/policy drivers greatly impact what is material in a sector. A recent example of this is the introduction of the new EU Taxonomy for sustainable activities brought forth by the European Commission earlier this year.

Furthermore, Lydenberg et al. emphasize that stakeholder concerns and societal trends play an important role in determining sector-based materiality. However, Rogers & Serafeim (2019) argue that pressure from stakeholders such as investors or NGOs (excluding regulators) in itself is not enough to make an issue material on industry level. Such pressure falls into the third stage of the pathways framework, where the issue is starting to become financially material for some companies. As follows, Rogers & Serafeim claim that stakeholder pressure is an intermediate step towards new legislation or innovation, and subsequently industry materiality. From our results, however, it does not seem like the interviewees draw the same distinction between regulators and other stakeholders; nor are they particularly explicit about their relative influential power. Without speculating too much in why this might be, a potential explanation could be the challenges associated with identifying and prioritizing stakeholders, as highlighted by numerous researchers (e.g. Eesley & Lenox, 2006; Mitchell et al., 1997; Phillips, 1997).

Pathways to materiality

From our findings, it is clear that there is consensus among stakeholders and industry players on the materiality of some aspects, while they are more divided in their views on other aspects (although we do not have sufficient data to conclude on the materiality perception of all aspects). To try to get an understanding of materiality development in the renewable energy sector, we look at the current materiality picture in relation to the pathways framework by Rogers & Serafeim (2019). Firstly, our findings indicate that there

is a strong consensus on climate, biodiversity and land use being material aspects in the industry (with the exception of retail). As these aspects seem to be material for the entire industry, they fall within the fifth stage of the pathways framework by Rogers & Serafeim (2019), where regulation or innovation is causing the aspects to become material. It can in this context be mentioned that Norway has a set of laws and regulations governing the climate aspect (mainly the "Pollution Control Act", "Greenhouse Gas Emission Trading Act", and "Climate Change Act"), the biodiversity aspect (mainly the "Nature Diversity Act" and the "Act of 15 May 1992 no. 47 relating to salmonids and freshwater fish etc."), and the land use aspect (mainly the "Planning and Building Act").

Furthermore, there seems to be an industry consensus that the social aspects of local communities, recreation, working conditions, and power supply are highly material; consequently, these aspects also fall within the fifth stage of the pathways framework by Rogers & Serafeim (2019). For these aspects, it can be mentioned that there are laws for outdoor life and recreation (mainly the "Outdoor Recreation Act"), working conditions (mainly the "Working Environment Act"), and power supply (mainly the "Energy Act"). Power supply in the sense of a stable/secure electricity supply is generally seen as a lower priority in production, as the production volumes are heavily regulated and outside of their control. Local communities are also affected by multiple laws in various ways. In addition, the comprehensive licensing procedures mentioned in Chapter 3 ensure that each new project (hydro, wind or grid) comply with the relevant laws and regulations for the social and environmental aspects above. Following from this, all the aforementioned aspects seem to be in stage 5 of Rogers & Serafeim's pathways framework. The high degree of regulation in the renewable energy sector can in itself possibly explain why so many aspects are considered to be highly material by the industry at large. Such claim is supported by the fact that our identified industry-material aspects largely resemble the aspects highlighted as important in the license processing, including the impact assessment (Vindportalen, 2020).

Despite the comprehensive legislation in the industry, major conflicts and uproar arise when new plans for wind power and grid development are announced, mainly from NGOs, activist groups, the people affected, and to some extent the general public. This indicates that not all aspects are sufficiently covered by the current legislation, or that the current legislation is not strict enough to fully protect the social and environmental aspects. As the companies in many cases lack the ability to self-regulate in order to respond to these interests, or otherwise have no self-interest in doing so, the very same aspects that are deemed material might in reality be in stage 3 of the pathways framework ("Stakeholder Pressure"). Our findings may suggest that this is the case, as many of the stakeholders

assert that the companies will follow through with a project as long as they are granted a license. This could, however, be due to the discrepancy between our definition of materiality and the notion of financial materiality as used in the framework. We used the definition of materiality by GRI (GSSB, 2016a), where aspects may be classified as material even though they do not directly translate to financial performance. Although this is a possibility, it is more likely that the regulations are lacking in some areas, and that the companies are at the mercy of the regulations and generally do not address the issues themselves (with a few exceptions).

When it comes to the economic aspects, profitability is by definition financially material for the whole industry. In addition, there seems to be a consensus that ethics and business conduct, anti-corruption, and supply chain governance are material economic aspects. These three aspects may also partly be financially material, e.g. through the connection to reputation and procurement, respectively. However, neither of these aspects can be claimed to be intrinsically financially material in their entirety. That being said, corruption is strictly regulated in Norway directly through "The Penal Code", but also through conventions from the UN, COE, and OECD (Transparency International Norge, n.d.). Ethics and business conduct outside of this is also regulated to some extent, but through a series of non-related regulations such as "The Anti-Money Laundering Act" and the "Equality and Anti-Discrimination Act". However, there are – to our knowledge – no specific laws or regulations in Norway that impose strict requirements on supply chain governance. Thus, this aspect seems to be material for the whole industry, even though it is not strictly regulated, which is not in line with the pathways framework. This could again possibly be explained by the differences in the definition of materiality. Another potential explanation can be that the aspect currently is being pushed on by stakeholders such as NGOs – who in this case perceive supply chain governance as highly material – and consequently is starting to become financially material for some companies (stage 3). Our findings also indicate that some companies are starting to take extra responsibility to safeguard this aspect, which could translate to them self-regulating to shrink the misalignment between social and business interests in order to deter stakeholder pressure and regulation (stage 4).

In general there is little disagreement about which aspects are material in the industry, but there are some aspects that seem to have different focus. Specifically, human rights seem to be prioritized higher in production than in grid. This could have to do with the fact that some of the production companies have operations abroad, and in more developing countries, as pointed out by the interviewees themselves. Human rights seem to be more important in the operations abroad, whereas in Norway they are generally

well safeguarded. Besides parts of the transmission grid, most of the grid operations are within the borders of Norway, which could explain their lesser focus on human rights. As follows, human rights might be in stage 4 of the pathways framework.

For retail the materiality picture looks a bit different than for the rest of the industry. While the retailers have the same perception of materiality on some aspects, such as climate, power supply, profitability and business ethics, they do not view the other material aspects in production and grid as material for them. Seeing this in the light of the pathways framework from Rogers & Serafeim (2019), the reason for the discrepant perceptions might very well be that retail is not affected by the regulations to the same extent as the rest of the industry. Consequently, the retailers deem aspects such as biodiversity, land use, local communities, and recreation as immaterial for them directly, which places these issues in the first stage of the pathways framework, namely the "status quo". As follows, the aspects are financially immaterial, and there is no large degree of misalignment between business and social interests. The social aspects of human rights and working conditions are not seen as material either, which could be because the retailers neither have operations abroad nor a dangerous work environment. However, they do view some of the aspects as important when seen in a supply chain context, i.e. they have a responsibility for their suppliers and subcontractors. The power supply aspect is intrinsically financially material in retail, as selling electricity to consumers is their function in the renewable energy sector, and the reason why they exist.

Future materiality development

Due to the high degree of sector regulation (with the exception of retail), the dynamism of materiality in the sector might be lower than what would be expected for less regulated sectors. Generally, there is a conception that many of the same issues that are material today will increase in materiality going forward. Only three "new" aspects are highlighted by the interviewees as something they think will increase in materiality in the future: *circular economy*, *technology*, and *digitalization*, including data analytics. None of these aspects are perceived as highly material today, and it is mainly the retailers who mention them, as well as the grid companies, investors and regulators to some extent. WEF & BCG (2020) argue that the rate at which currently immaterial issues become material is accelerating; consequently, circular economy, technology, and digitalization might evolve to become material over the next few years, depending on the degree of stakeholder pressure (and other factors for materiality).

However, the reason why the aspects are predicted to increase in materiality is unclear, and no stakeholder pressure is explicitly mentioned by the companies. The only stakeholder

that mentions circular economy is a regulator, who at the same time asserts that the aspect is outside their sphere of influence. Still, the fact that a regulator considers circular economy an aspect that will become material for the sector, may be a signal that circular economy is something the sector should be prepared for. Interestingly, Laclau (2019) argues that energy and resource companies in particular could have a lot to gain from integrating a circular economy logic in their operations. Jensen, Purnell, & Velenturf (2020) emphasize the importance of embracing the circular economy in the renewable energy sector, and argue that it is "essential that the components of LCI and the materials they share and are comprised of, are designed with a circular economy in mind" (LCI = "low carbon infrastructure"), and consequently that "LCI must be designed for durability, reuse and remanufacturing" (p. 266). On a different note, the investors are the only stakeholders that mention technology and digitalization, which they highlight as large opportunities for companies in the time to come. One can hardly say that the regulators or the investors in this case exert pressure on these aspects (including circular economy). Quite contrarily, the aspects represent opportunities and are generally seen in a positive light.

Kuh et al. (2020) posit that it is mainly ESG issues representing negative externalities that become material, because they may eventually be internalized by firms and incur additional costs. Thus, it does not seem like any sudden "new" aspects will surprisingly appear and skyrocket to materiality in the sector, as most of the major negative issues are already seen as material and are well incorporated into the legislation and licensing requirements. However, Kuh et al. (2020) emphasize that also issues reflecting positive externalities can become material if they "result in the creation of intangible value that later boosts revenue, market share, or profitability" (p. 8). Consequently, the three "new" aspects of circular economy, technology, and digitalization could possibly become material as long as they fulfill one of these criteria.

Considering the resource effectivization and potential cost savings and profitability associated with a circular business model (Jørgensen & Pedersen, 2018; Laclau, 2019), new technology (Jensen et al., 2020) and digitalization (DNV GL, 2018; Küfeoglu, Liu, Anaya, & Pollitt, 2019), as well as the potential added value of data analytics (Sodenkamp, Kozlovskiy, & Staake, 2015), it is not unlikely that these issues might become material in the coming years. For retail specifically, data analytics might even be a source of temporary competitive advantage, as it enables customer experience improvement. However, these are mostly speculations from our side based on the limited data at hand, and there could quite possibly be emerging aspects that are overlooked in the shadow of the more prominent material aspects. Considering the rapid escalation of wind power and all the

controversy associated with it, it is not unlikely that some "latent" issues are missed by the stakeholders or the companies themselves. In fact, identifying such "latent" issues is a difficult task, and the usage of dedicated methods and processes for predicting future materiality is still nascent, due to the research on this field currently being in its infancy (Eccles, 2020; Kuh et al., 2020; Rogers & Serafeim, 2019; WEF & BCG, 2020). It should be mentioned that the already material issues also could increase even more in materiality as a consequence of major stakeholder pressure and new legislation.

Although most of the existing literature on dynamic materiality show that stakeholder pressure in one form or another is the primary factor for (financial) materiality, our findings paint a somewhat more diverse picture. While we too find stakeholder pressure to be the most important materiality factor, we also identify some other potential factors for materiality (i.e. using GRI's definition of materiality), that can further our understanding of materiality development over time. That being said, many of these factors are in some way connected to stakeholder pressure and to each other. We now proceed to discuss each of these factors separately, as well as the connections between them.

6.3.2 Contribution to the SDGs and common goals

Contribution to the SDGs and common goals is the second factor for materiality emerging from our data. This factor can be seen as a parallel to the internal driver of sustainability termed "moral and ethical obligation to the contribute to CS (corporate sustainability)" by Lozano (2015). Although this factor often is mentioned as a more general motivator to work towards sustainability, it is sometimes connected to specific sustainability issues. For instance, making a real contribution towards CO2 reduction by offsetting fossil energy production, is highlighted as a reason in itself for why the climate aspect is material. This view may have its roots in the notion of a collective responsibility for the environment and society derived from the 2030 Agenda proposed by UN (2015); it may even be reinforced by the worrisome trends showing that we are not on track to reach the SDGs by 2030.

In particular, the Independent Group of Scientists appointed by the United Nations Secretary-General (2019) documents that climate change and biodiversity loss are two of four aspects moving in the wrong direction. Furthermore, the Independent Group of Scientists appointed by the United Nations Secretary-General proposes "Energy decarbonization with universal access" and "Global environmental commons" as two of in total six promising entry points to achieve the necessary transformations in a timely manner. The renewable energy sector plays a major role in taking on these two entry points, as they ought to provide renewable energy to the world and doing so with the least impact possible on nature and biodiversity. According to the Independent Group of Scientists

appointed by the United Nations Secretary-General (2019), the technologies for moving to decarbonized pathways already exist, so achieving this goal is possible. However, they assert that the progress has been hampered by slow progress in smart-grid management and long-term electricity storage; as follows, extra focus must be directed towards grid development and storage technology.

Seeing as the renewable energy sector collectively has a major global responsibility to ensure sustainable development in some areas, and we have entered the Decade of Action (UN, n.d.), individual companies might feel an extra responsibility to work on their own sustainability. In this context, it must be mentioned that dissimilar companies have different externalities, and different ability to address specific issues. For instance, a renewable energy producer might have the ability to address biodiversity impacts to a much greater extent than an electricity retail company. This is where the concept of materiality comes into the picture, because if each firm focuses on addressing their own material issues first, they will contribute much more to sustainability as well as their own financial performance than if they were to focus on immaterial issues (Jørgensen & Pedersen, 2018; Khan et al., 2016; Rogers & Serafeim, 2019). Consequently, one could argue that contribution to the SDGs and common goals is in fact a factor for materiality, if the firms choose to focus on their biggest impacts. On the other hand, issues that have large social, environmental and/or economic impacts are per definition already material as long as they are also important for stakeholder decision-making (GSSB, 2016a). Thus, the question is no longer whether the issue is material, but instead how the balance between the issue's *salience* and *risk* is, according to Whitehead (2017). Whitehead argues that highly salient issues that also are associated with high risk most likely will be addressed first. As follows, some issues that are material could be ignored if they are less salient or entail less risk. In this light, contribution to the SDGs and common goals can arguably be called a factor for materiality per definition, but it can be a factor for putting material issues on the agenda (as long as they are salient enough or entails enough risk).

The real motivation behind contributing to the SDGs and common goals is, however, not evident. While the feeling of responsibility and more altruistic motives certainly could be one reason, it is likely that other influences and motivations also play a part. For instance, it could be connected to business case factors such as reputation and an expectation of increased financial performance (Muhmad & Muhamad, 2020), which is an effect documented by Eccles, Ioannou, & Serafeim (2014), Khan et al. (2016) and Muhmad & Muhamad (2020). It could also possibly relate to the opportunity for innovation, which is highlighted by Lydenberg et al. (2010) and Rogers & Serafeim (2019) as a factor for industry-materiality. Another potential reason for contributing to the SDGs and common

goals may be the growth in evidence and transparency related to environmental and social impacts (Kuh et al., 2020; WEF & BCG, 2020), which induces firms to act sustainably. This again could be connected to reputation and expectations about future conditions, and not the least to stakeholder pressure, as increased evidence and transparency makes it easier for stakeholders to access business-relevant information. Thus, it is difficult to assess whether contribution to the SDGs and common goals is an internally or externally driven factor for materiality. The factor may even be connected to historical events that shifted the company's motivation for contributing. It only goes to show that the motivations behind sustainability initiatives and contributions may be manifold. Nonetheless, the opportunity to contribute to the SDGs and common goals seems to be a good motivator for addressing one's material issues.

6.3.3 Historical events

The next factor for materiality we identified in Chapter 5, is historical events. Contrary to the other factors, this one is largely backward-looking, and does not necessarily say much about future development. However, as argued in Section 5.5.3, certain historical events have the potential to leave a permanent mark on the actors involved and the materiality of the relevant issues. The Mardøla campaign and the monstermasts in Hardanger are good examples of this, elevating the respective issues of environmental hydropower impacts and land area use in grid construction to industry-materiality. The example of the Mardøla campaign also shows that such events potentially can lead to new legislation on the relevant issues, and therefore also affect the government and regulatory bodies. Furthermore, our findings show that investors can be heavily affected by the same events, as the events may cause unforeseen significant risk that was not accounted for, and potentially huge monetary losses. The historical events we talk about usually emerge as a result of a heated conflict between one or more industry players and one or more stakeholder groups. It thus becomes evident that this factor has a strong connection to stakeholder pressure, as it is the stakeholders who escalate the issue in question. Thus, the factor we identified as historical events in the results chapter is in reality not necessarily an independent factor for materiality; rather, it goes under the stakeholder pressure factor which we previously discussed. However, sudden and ravaging events such as natural disasters, as well as risk and scandalous events internally in companies, might be exceptions. Events of this character may drive companies to make adjustments and elevate the materiality of certain issues without directly involving stakeholder pressure.

Regardless, when actually looking at the events in hindsight, one might discover that there are some valuable lessons to be learned from them, that can be used to inform future materiality development. For instance, one could look at current development of

events similar to those that have happened in the past, and hypothesize about which issues might increase in materiality as a consequence of contemporary or future events. This way, historical events may have a value outside of hindsight, as they potentially can provide insights into future materiality development. The example of a firm discovering serious violations on working conditions in their own supply chain shows that also internal conditions or events can elevate the materiality of an issue significantly, although primarily internally in the company and not for the whole industry. Events of this type do not necessarily involve external stakeholders, and can be even more valuable for firms in order to address their own externalities.

6.3.4 Expectations about the future

Naturally following from the previous factor and in many ways connected to it, is the factor of expectations about the future. Our findings suggest that such expectations e.g. can be about new legislation or future risk. Future expectations can in itself raise the materiality of an issue today, as the firm allocates more resources towards the preparation for the potential future changes. Biodiversity and supply chain governance are examples of aspects that are believed to increase in materiality in the future, and firms might therefore prepare for new biodiversity regulation, nature risk, and increased expectations of supply chain governance among stakeholders. Again, expectations about the future might not qualify for a distinct materiality factor by itself, but can help enhancing our understanding of how materiality evolves. That being said, future expectations were not mentioned by many interviewees, so this is mostly a speculation from our side.

6.3.5 Business case

The umbrella of the business case encompasses factors relating directly to business or economic aspects, such as reputation, costs, employer attractiveness, risk, and market interventions and incentives. This way, it is not really "one" factor, but rather a collection of many sub-factors. In many ways, it can be connected to internal drivers of sustainability, e.g. "business case" and "avoiding risk", as well as the connecting driver "reputation" (Lozano, 2015). Whitehead (2017) collects many of these drivers under the umbrella driver "business sustainability", with the business case being at the forefront. Lydenberg et al. (2010) also use financial impacts/risk as a major criteria for determining which issues are material on sector-level. Just as with the other factors for materiality discussed earlier, the business case is largely connected to the stakeholder pressure factor, as well as other factors. For instance, effects on reputation, employer attractiveness and risk may greatly depend on stakeholder opinions and pressure, both internal and external. As discussed briefly earlier, the business case might actually be the underlying factor for the

contribution factor and the future expectations factor, although this might not always be the case. Moreover, the business case factor cannot necessarily say something about how materiality evolves, other than saying that certain issues become material if they significantly affect a facet of the business case factor.

6.3.6 Updated model of materiality factors

Based on the preceding discussion, we make an updated conceptual model for the materiality factors, showing the potential connections between them. The new model is presented in Figure 6.1, where the arrows illustrate the relations between the factors. The arrows point *from* the assumed underlying factor *to* the assumed dependent factor. For instance, the model illustrates that stakeholder pressure is assumed to influence all of the other factors in one way or another, thus making it the primary factor for materiality. By the same token, both historical events and the business case are assumed to influence contribution and future expectations. Although the model illustrates the possible connections between factors, the strength of the relationships are unknown. There may also be mutual connections between some of the factors, as well as direct and indirect connections between more of the factors than illustrated. However, the model as presented represents our findings in a good way, and may act as a simple conceptualization of the materiality factors and their apparent connections. It also showcases the complexity of the materiality concept, and that what ultimately determines what is deemed material to a large extent depends on the pressure of various stakeholders.

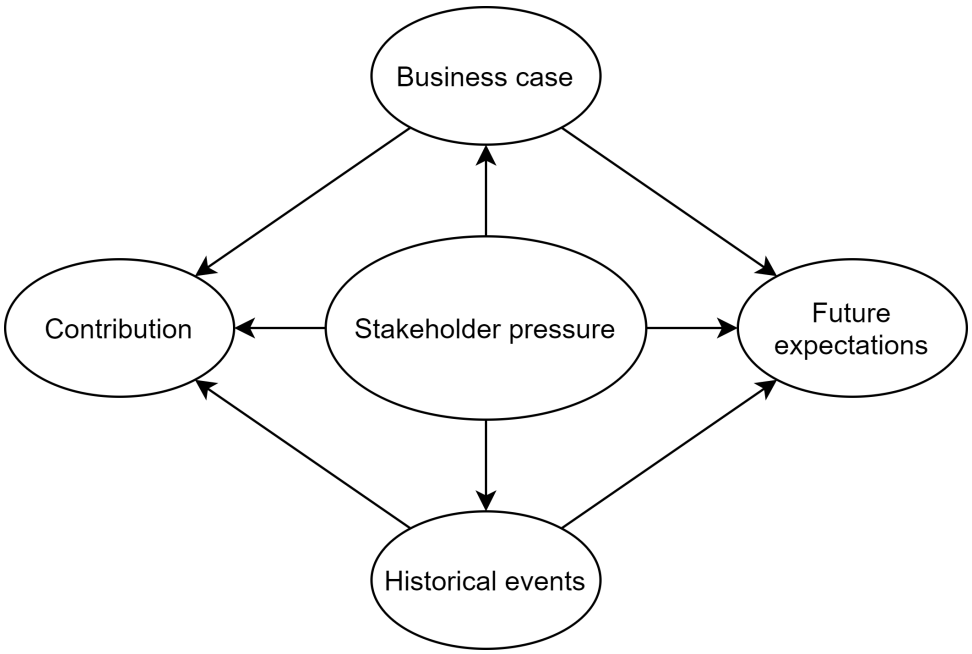

Figure 6.1: Factors for materiality and their connections

7

Concluding remarks

In this final chapter, we make some concluding remarks about the study to wrap everything up. We start by formulating a conclusion to the two research questions, and proceed to discuss the theoretical and practical implications of the study. Then, we discuss the limitations of the study, before rounding off by suggesting avenues for future research.

7.1 Conclusion

The aim of this study was two-fold: On the one hand, it was set out to gain insights into sustainability materiality in the Norwegian renewable energy sector by investigating industry and stakeholder perceptions of materiality. On the other hand, the thesis was meant to examine the stakeholder and industry dynamics, and further explore how materiality develops in the industry. To shed light on these issues, we conducted a qualitative case-study with the purpose of investigating the two following research questions more in depth:

* *RQ1:*
  How do companies in the Norwegian renewable energy sector and their key stakeholders prioritize and operationalize sustainability issues and assess their materiality?

* *RQ2*
  How do sustainability issues evolve to become material in the renewable energy sector in Norway?

In specific, we explored how sustainability aspects were prioritized by different industry players and stakeholders, as well as the rationale behind their prioritization. Furthermore,

we investigated how these aspects were operationalized into measurable indicators, and asked about expectations of future material issues. We did this by conducting a series of semi-structured interviews with companies from every link in the renewable energy value chain, as well as stakeholders within the groups of regulatory bodies, investors, and NGOs.

7.1.1 Prioritization of sustainability issues

Regarding the first research question it should be noted that even though we view the renewable energy sector as a value chain consisting of production, transmission/distribution (grid) and retail, retail distinguishes itself significantly from the other two with respect to sustainability impact. This mainly seems to be due to the fact that retail companies chiefly are immaterial by nature (i.e. they mainly have intangible assets), and do not impact nature and society the same way as the production and grid companies. Generally, the stakeholders seem to have most interest in production and to some extent grid, especially the investors and NGOs. When speaking of environmental issues, there seems to be a general consensus among all companies and stakeholders that climate is a highly material sustainability issue that will keep increasing in importance. It is mainly CO2 emissions or CO2 equivalents that are emphasized within the climate aspect, but also adaption to climate change is highlighted as a priority. Excluding retail, there is also consensus that biodiversity and land use are material aspects, although there is still not a full understanding of the impacts on biodiversity. However, these aspects may also be material for retail if seen in a supply chain context. Furthermore, climate, biodiversity and land use are all interconnected in a complex way, and cannot be seen in isolation from each other.

Despite the high degree of consensus on environmental aspects, there is greater divergence in the perception of social aspects. For companies within production and grid, there seems to be a general consensus that local communities, recreation, and working conditions (including HSE) are highly material, while the stakeholders have somewhat divergent views on these aspects. Power supply is generally seen as a material aspect by both the companies and the stakeholders, although it is the security of electricity supply that is the primary concern in Norway, and the main societal mission of the industry. When it comes to the economic aspects, profitability and ethics and business conduct are material aspects for the whole industry and the investors. The regulators are more concerned with socioeconomic profitability than business profitability. Anti-corruption is also highly material for production companies and investors, while supply chain governance is material for the entire industry as well as NGOs, and predicted to become material for investors as well. Furthermore, all the environmental aspects are predicted to increase in materiality

in the future, and especially biodiversity which is still nascent in sustainability reporting. Supply chain governance is also believed to become even more important in the future. Additionally, some companies and stakeholders highlight circular economy, technology, and digitalization – including data analytics – as issues that could evolve to become material the next few years.

Due to the diversity of stakeholder interests, there are different rationales for labeling something as material in a sustainability context. For the companies, there seem to be multiple possible reasons for materiality, but usually it is either due to pressure from stakeholders in some form, or due to business opportunities or risk. For the investors, risk is perceived as the cardinal factor for materiality, and may take many forms; climate risk, nature risk and reputational risk are particularly emphasized. The NGOs are mostly concerned with promoting their own views, which vary depending on the type of organization. There even are major conflicts of interest between NGOs regarding wind power development and renewable energy, and their prioritization of sustainability issues are thus not coherent. The regulatory bodies have to take a neutral stance, and strive to do what is most beneficial to society at large. They have a responsibility of ensuring that only projects that satisfy the legislative requirements are carried through with. This means that they cannot necessarily prioritize sustainability issues on a general level, as the materiality of specific aspects vary across projects, and thus needs to be assessed and weighted accordingly for each individual project.

Generally, we observe some recurring problems and challenges with materiality assessment and prioritization. Firstly, the concept of materiality seems to be unknown to many of the stakeholders, primarily the regulatory bodies and the NGOs, but also some of the companies. There were also divergent perceptions of the definition of materiality among those who were familiar with the concept, as well as different reporting practices among companies. The usage of materiality matrices seems to be unusual in the industry, even among companies conducting materiality assessments, and the prioritization of issues is not always clear. Rather, a more dichotomous logic seems to be commonly applied, i.e. classifying issues as either material or immaterial. Many of the companies do not seem to have a clear prioritization of their stakeholders either, which could indicate a lack of stakeholder engagement in the reporting process. If this is the case, the materiality assessments and the resulting sustainability reports may prove to be less valuable for both the companies themselves and their stakeholders, and even less comparable. That being said, the most pressing challenge to the prioritization of issues seems to be the difficult trade-offs occurring when weighing issues against each other. For instance, when building a new wind farm, one must weigh the positive benefits against the negative impacts on

nature and society, and also balance the negative impacts appropriately. Because of the complex and interconnected nature of these issues, the inherent trade-offs between them can be an impediment to making a strategic prioritization.

7.1.2 Operationalization of sustainability issues

When it comes to the operationalization of sustainability issues, we observe widespread opinions and even more uncertainty than for the prioritization of aspects. As mentioned, GHG emissions, mainly comprising CO2(eq) emissions, is a concrete indicator on climate that is highlighted by everyone, as well as the associated positive effect of phasing out fossil energy and decarbonization (through electrification). Furthermore, the climate aspect is sometimes operationalized into climate adaption, climate risk, and energy consumption. Biodiversity is mainly operationalized into the loss of rare and red-listed species such as the Eurasian eagle owl, and specific nature types such as marsh. Apart from this, biodiversity seems to comprise watercourse environment, bird collisions and nature risk, as well as a strong connection to ecosystem services. Land use is another aspect that strongly relates to biodiversity and climate, but also to social aspects and conflicts, especially with respect to wind power development. It is mainly operationalized into the total area of land (of specific nature types) seized by a project, and sometimes the value and opportunity cost of the seized land.

As with the prioritization of social aspects, there is greater divergence in the operationalization of social aspects than for environmental aspects. While there is a general agreement that local communities can be operationalized into conflict level or degree of disagreement, disturbance factors, local acceptance and value anchored locally, not everyone has the same perception of e.g. safety concerns, job creation, and reputational risk. Regarding recreation, it is mainly issues concerning outdoor life and leisure activities that are emphasized as important, although cultural heritage, landscape aesthetics and tourism are also mentioned. Human rights and working conditions are almost always seen in a supply chain perspective, and HSE on the workplace, including serious injuries, is always the top priority for production and grid companies. Lastly, the social aspect of power supply is primarily mentioned by the industry players and the regulators, who operationalize it into electricity produced, security of electricity supply (power outages, grid frequency, etc.) and the facilitation of electrification, all related to SDG 7.

The operationalization of the economic aspects is also highly divergent across companies and various stakeholders. Even though profitability is generally seen as a material aspect, it is measured differently by each stakeholder. For the industry, profitability is mainly measured by calculating the present value of projects and various costs, while the investors

are more concerned with risk and return. Reputation, anti-corruption and employer attractiveness are emphasized as important facets of ethics and business conduct by the industry itself, while the investors are more concerned with requirements, certifications and traceability in a supply chain perspective. Lastly, taxes and fees – especially to the impacted local communities – is mentioned as a critical economic aspect in the industry.

Identifying indicators with which to measure the material sustainability aspects seems to be a challenge much tougher than prioritizing the aspects, which is difficult in itself. The prevailing uncertainty of how sustainability aspects should be operationalized and measured seems to reflect a long-lasting lack of coordinated efforts to resolve the complex issue of sustainability measuring and reporting. Through this study, we somewhat unintentionally discovered seven potential barriers or challenges to the operationalization of sustainability issues, some of which may be specific to the renewable energy sector. The first, and maybe the biggest challenge, is the quantification of certain aspects, e.g. biodiversity. Secondly, many indicators are difficult to aggregate to a strategic level. Thirdly, the lack of standardization and professionalization seems to complicate the selection of good indicators for companies. Lacking knowledge also makes it challenging to select the right indicators, and to know how various aspects actually can be measured in a good way, e.g. biodiversity. The lack of data also makes it difficult to measure certain indicators. Furthermore, finding indicators that provide strategic value outside of just "measuring something to measure something", is a challenge. Finally, varying conditions and characteristics between projects (context-specificity) seems to be a major impediment to creating a set of common, comparable indicators in the industry.

7.1.3 The evolution of materiality

Regarding the second research question, we identified five possible reasons for why a sustainability issue might evolve to become material. These five *factors for materiality* include stakeholder pressure, contribution to the SDGs and common goals, historical events, expectations about the future, and the business case. Even though we distinguish between these factors, they are in many ways connected and of various scope and importance. Stakeholder pressure by far seems to be the biggest driving force for materiality, apart from factors directly impacting business performance. One could argue that all factors relate to stakeholder pressure in one form or another, making it an all-encompassing factor that can be split up in various forms and sub-factors. In this study, we found the government and regulators, the financial sector, the civil society, and internal stakeholders to be the most influential stakeholders, all exerting pressure in different ways. Contribution to the SDGs and common goals is a factor (allegedly) rooted in internal motivation rather than external pressure. The fact that firms have the opportunity to make a real contribution

toward sustainable development, seems to be a motivator for improving sustainability and emphasizing material issues. Historical events is a factor that can have great explanatory power for the materiality of certain issues today, although it is more backward-looking than the others. A range of historical events in the industry involving big conflicts and campaigns, have shown to leave permanent marks on the materiality of certain issues in the development phase of new energy infrastructure, by raising the issues to legislative alteration. New regulations force companies to change in order to comply with the present requirements. Although historical events largely involve some form of stakeholder pressure, they can also consist of critical events internally in the company, or random or otherwise uncontrollable events such as natural disasters. Expectations about the future is a more proactive factor for materiality, which mainly relates to expectations about new legislation or future risk; however, future opportunities should not be forgotten. Lastly, other business case factors such as reputation, costs, employer attractiveness, risk, market interventions and incentives could strongly affect the materiality of issues, although most of them are in some way connected to stakeholder pressure.

Since the renewable energy sector in Norway is highly regulated already, pressure from the government and regulatory bodies in the form of legislation seems to be the single most important factor for materiality in the industry. However, legislation is not static; it is continually being subject to discussion and alteration, especially in light of the current and historical heated debate on renewable energy and grid development. It is evident that there is great resistance among the public and a range of organizations, which hinders new development and raises issues such as biodiversity and social impacts to regulatory evaluation. Multiple historical events have proven to permanently raise the materiality of certain issues for the whole industry, as a consequence of new legislation. Thus, the general pathway through which issues become material in the renewable energy sector seems to be something along the lines of: 1) Company proposes a plan for a new development project. 2) Civil society and the public react to the development plan and form opposition. 3) Company either complies or ignores the opposition and takes the consequences. 4) Conflict escalates and draws the attention of regulators. 5) Regulators evaluate the need for new legislation. 6) New legislation is enacted by the authorities or passed down from the EU, making the relevant issues highly material for the whole industry.

It should be noted that the pathway to materiality outlined above is a simplified and stylized example, which is only based on stakeholder pressure. In reality, other factors such as the ones identified in this study, will also play a role in the evolution of materiality, and enrich the understanding thereof. However, not all of them have the potential to increase the materiality on industry-level in the same way as stakeholder pressure. For example,

a specific company's societal contribution and reputation may very well influence the materiality of certain issues for that company, even though the industry-materiality is not affected. Analyzing and combining insights from multiple materiality factors could help better inform the ever-changing materiality picture in the industry and the implications for companies.

7.2 Theoretical implications

The results from the study may have some broader theoretical contributions on the topic of corporate sustainability and materiality, that go beyond just the renewable energy sector. Firstly, the findings indicate that there could be some systematic challenges that organizations face in the process of prioritizing sustainability issues. As described in Section 1.3, prioritization is to be understood as the process of weighting various sustainability issues according to their materiality, or importance to the organization. Prioritization challenges largely translate to challenges associated with conducting materiality assessments, which still seems to be in a fairly nascent phase for the majority of organizations. The lack of a universally accepted framework for assessing materiality and reporting on sustainability seems to be a barrier to creating a common understanding of what sustainability and materiality entail, which has also been emphasized by numerous scholars in the field. In this way, the thesis may serve as an empirical example of the challenges and resulting confusion arising from the lack of a common understanding of materiality. This is a topic that seemingly has not yet been sufficiently illuminated in the academic literature, which is surprising considering the recent bloom of materiality assessment in the corporate world. Thus, these findings could be used as a point of departure in succeeding research about challenges with prioritization of sustainability issues. The results of this study should, however, be seen in context with the recent statement of intent by CDP, CDSB, GRI, IIRC and SASB to develop a comprehensive and unified corporate reporting system (CDP et al., 2020), which may address some of the most prominent challenges identified.

Furthermore, the study has identified a set of potentially systematic challenges related to the operationalization of sustainability issues, that may also apply across industries. As described in Section 1.3, operationalization in this context is to be understood as the process of breaking down broad sustainability topics into concrete and measurable issues with relevance to the organization. An important part of this process is to identify, select, and measure the indicators most appropriate for determining the organization's sustainability. The results of this study indicate that such operationalization is a major difficulty in today's corporate world that impairs the quality of sustainability reports. This seems to be another topic that has yet to be researched extensively in the academic

community, which seems to be more concerned with the upsides, opportunities and methods rather than the hindrances to sustainable development. However, it is important to look at both sides of the coin, since an understanding of potential hindrances may be extremely helpful to finding solutions that propel sustainable development even faster. That being said, general problems with sustainability measurement and indicators have to some extent been emphasized in academia for a long time, after the release of the Brundtland Report in 1987.

Other significant theoretical findings of the study relate to the development, or evolution of materiality. First of all, our results largely support the recent literature on materiality development or dynamic materiality, and particularly the pathways framework proposed by Rogers & Serafeim (2019), which describes the pathways through which a sustainability issue becomes financially material. Our study is thus the first of its kind to provide empirical evidence for the pathways framework, as far as we know. However, it must be noted that it was not the purpose of the study to test an existing framework empirically; after analyzing our data inductively, the findings just so happened to fit well into the framework. Consequently, this study provides some degree of verification of existing theory within the emerging field of materiality development or dynamic materiality. In addition, our findings suggest that there might be other factors that determine the degree of materiality, that are not included in the existing frameworks. Specifically, contributions to the SDGs and common goals, expectations about the future, historical events, and the business case are identified as potential factors for materiality, which can enrich our understanding of how materiality develops.

Lastly, we must remind you that this is a study with many exploratory elements, and that the findings arising from it may not in any way be seen as certain answers. Rather, the findings should be seen as hypotheses and indications of theoretical concepts and explanations that must be researched further in order to draw conclusions. That does not undermine the value of the findings, as this was the main purpose of the study in the first place and only reflects our methodological choices.

7.3 Practical implications

This study also has multiple practical implications for the renewable energy sector and its stakeholders, as well as for sustainability practitioners and policymakers in general. Firstly, it provides practical insights into what is deemed material with respect to sustainability in the industry, seen from both the industry and stakeholder perspectives. Corporate executives and sustainability practitioners within the renewable energy sector could use

these insights in their reporting practices and their work towards sustainable development. By shifting their focus towards the most material aspects and disclosing the appropriate information, companies in the Norwegian renewable energy sector have the potential to improve their sustainability – and possibly even reputation – considerably. Furthermore, the insights on various stakeholder perceptions of materiality allow companies to make adjustments to better accommodate for their stakeholders' needs and wishes. Besides, this study highlights the importance of good stakeholder engagement in the materiality process and the common lack thereof, which hopefully helps draw more attention to this topic. Based on our findings we would assume the lack of good stakeholder engagement is also prevalent in other industries. Generally, companies could benefit from making more clear assessments of their stakeholder landscape and engaging their stakeholders more in the reporting process. Forming new partnerships and alliances could also be helpful for addressing some of the prevailing sustainability challenges (Jørgensen & Pedersen, 2018).

The key stakeholders in the renewable energy sector could also use the results of this study to gain a better understanding of the perspective of the industry players, as well as the perspective of other stakeholders with whom they may interact. The same results may potentially be used more generally across industries to get insight into how various stakeholders assess materiality. Both the industry players and the stakeholders may use the potential future material aspects identified to plan their actions in advance, and maybe even find new opportunities. In addition, the factors for materiality and insights on materiality development in the industry could be valuable for informing strategic decisions and improving dynamic capabilities. Anticipation of materiality development is already an area in which investors have begun initial explorations, according to WEF & BCG (2020), and that will be increasingly important for companies in all industries for attaining competitive advantage going forth.

On a broader level, the study may help raise awareness of some of the prevailing problems and challenges related to the prioritization and operationalization of sustainability issues. Companies, sustainability practitioners and executives could act on this information to identify and remedy some of their own problems and increase the quality and effectiveness of their sustainability work and reporting process. Even though these findings are preliminary, they could act as a catalyst for subsequent discussions about the problems of today's sustainability reporting, as well as the implications for future policy-making. For instance, the findings could be used as an argument in the discussion about the development of a common framework for sustainability reporting, which already seems to be on the radar, according to (CDP et al., 2020). Such discussions will be imperative to the continuation of sustainable development on a macro level, and the discussions'

outcomes (in terms of standards and regulations) may largely determine our success in reaching the SDGs and the 2030 Agenda.

7.4 Limitations

This study has several limitations. As it is a qualitative case study, the most significant limitations relate to the generalizability of the results. Although the methodological choices were carefully aligned with the overall purpose of the study, it was not set out to produce generalizable results; rather, the goal was to explore a relatively unexplored academic field to gain insights for hypothesis and theory development. Consequently, we used a confined sample consisting of 13 interviewees, that was created by using purposive sampling techniques. Furthermore, the sample was split up in 7 sub-samples representing various links in the renewable energy value chain and various stakeholder groups, making up a very heterogeneous sample with few interviewees in each sub-sample. This does not allow for drawing statistical inferences in the traditional sense, which means that our results only can produce theories and hypotheses about the issues at hand. However, these theories may be further researched and developed in subsequent studies, and eventually tested for statistical significance on larger samples. It should also be noted that qualitative interviews as a research method almost inevitably entails some degree of bias and subjective interpretation, which is a weakness that must always be accounted for in such studies.

A prerequisite of a good materiality assessment is to gather insights from all important stakeholders and integrate them in the process. Thus, the limited number of distinct stakeholders we interviewed is another weakness of the study. Only interviewing three stakeholder groups is not sufficient to see the whole materiality picture in the industry, even though these may be some of the most relevant stakeholders. To get a clearer picture we could have included more stakeholders, or even performed a stakeholder assessment to rank various stakeholders prior to choosing which ones to interview. However, limiting the number of distinct stakeholders was a conscious choice that was made with respect to the limited scope of the study and the resources at hand. Since including more stakeholders was not feasible, we chose the seemingly most salient stakeholders in the industry to be interviewed, partly inspired by the literature on materiality development.

Furthermore, it was difficult for us to prioritize aspects with respect to the degree of materiality on the basis of what the interviewees told us. In many cases when the interviewees were talking about specific aspects, the degree of materiality associated with that aspect was not immediately apparent to us. For instance, it could be that they talked mostly about their current focal areas instead of the most material issues for the

organization at large. This issue sometimes became apparent when triangulating the transcribed data with the materiality matrices drawn by the interviewee itself or by the organization. Thus, there might be some material aspects that were not clearly mentioned by the interviewees, and that we therefore missed completely or ranked inaccurately (since aspects might be material without being in focus, e.g. if they are already taken well care of). Another facet of the same issue is that some of the interviewees had seemingly different interpretations of the materiality concept, especially those who were not already familiar with it (primarily stakeholders, but also some companies). Even though we explained our definition of materiality briefly prior to and during every interview, differing interpretations of the concept may reduce the validity, or credibility, of our data.

The fact that we interviewed two environmental NGOs might also skew the results somewhat towards environmental aspects of sustainability. We also see a tendency of talking mostly about environmental aspects among the other interviewees, which is a common bias pointed out by Whitehead (2017). As a consequence, the study has gained fewer insights on the social and economic pillars of sustainability, although they are still represented. Including socially and economically oriented NGOs and interviewing people with greater competence on these areas could contribute to the remediation of this bias in studies with a greater scope and resource base. Another limitation of the study is the lack of examples on immaterial sustainability aspects. Because we asked specifically for material aspects in the interviews, we did not get many examples of immaterial aspects, which could have been used to create a reference point against which to compare materiality. It should also be noted that we do not have sufficient data to conclude which indicators are best fit for measuring sustainability in the renewable energy sector, only some pointers. Instead, a systematic pattern of challenges related to defining good sustainability indicators emerged.

An important observation that also relates to the generalizability or transferability of the results, is that the research setting may be specific to Norway, at a specific time. Firstly, the country's geography and resources may influence which aspects are considered most material in the domestic renewable energy sector. Norway is known for its hilly landscape and vast potential for hydropower generation, as well as its affluence level and strong social system. These are all examples of specific characteristics that may render the results of the study incomparable to other countries, even on company or stakeholder level. The heavy regulation of the Norwegian renewable energy sector also means that some of the findings may not be applicable to the renewable energy sector even in similar countries, if their levels of regulation significantly differ. Furthermore, the industry is in an ever-changing state characterized by rapid technological development, which could alter

the relevance of some of the findings only in a few years. For instance, the ongoing debate on land-based wind power is extremely heated at the time of writing, but we already see the contours of a shift towards more offshore wind. Seeing as our results greatly relate to land-based wind power, they are expected to decrease in relevance in the long term.

Despite the aforementioned limitations, we still believe this study has academic and practical value beyond simply showing a snapshot of today's materiality picture. The materiality concept in the context of sustainability is still developing, and empirical research in this field is more relevant than ever. Although some of the results of this study may not be applied universally, some of the theories emerging from the data show indications of systematic explanations that may still prove to be transferable to other industries with similar characteristics, perhaps the maritime transport or fishing industries. These patterns would be highly interesting to research more in detail. In the last section we elaborate on how this study can be followed up by subsequent research.

7.5 Avenues for future research

Based on the findings and limitations of this study, we suggest multiple avenues for future research. Firstly, as our study was intended for qualitative exploration rather than statistical generalization, it would be appropriate to verify our results by conducting a quantitative study with a large sample. For instance, a quantitative survey study using questionnaires could be set out to test the materiality of the proposed aspects and indicators from this study on a larger scale, increasing the external validity and allowing for wider generalizations. Such a study should also include participants from other countries to test the generalizability to settings outside of Norway. To get a more comprehensive understanding of materiality in the renewable energy sector, qualitative case studies similar to this one could also be conducted with different stakeholders and companies, perhaps digging deeper into the prioritization rationale.

Furthermore, the results of this study touched briefly upon challenges related to the prioritization of sustainability issues, which can be translated to challenges associated with materiality assessment. Because these findings happened to emerge without being the focal area of the research, the resulting theory is not sufficiently grounded in empirical data. The academic literature also seems to be lacking on this topic. Thus, we suggest studying the challenges with prioritization of sustainability issues more thoroughly, for example by conducting a series of in-depth interviews, focus groups, or even surveys on the topic. It would not necessarily have to relate to the renewable energy sector, as such prioritization challenges may be universal across industries. The goal should thus be to

develop a more robust theory about sustainability prioritization challenges. The very same suggestion applies for challenges related to operationalization of sustainability issues, which is yet another topic that has been partially explored in this study, and is lacking in the academic literature.

To really go in depth, it is a possibility to study specific challenges either related to prioritization or operationalization. For instance, a study analyzing how material sustainability aspects or indicators interact in order to gain deeper insights on the trade-offs between them, could be a valuable contribution to the literature as well as for practical applications. Studying the (mis)alignment between the indicators disclosed in sustainability reports and the proclaimed material aspects for the organization – as well as the reasons thereof – could also be an interesting approach to uncovering the scope of which these challenges are present, or even discovering other challenges. Besides, the results of this study are limited with respect to concrete, measurable indicators for sustainability, particularly for biodiversity and social aspects in general. Thus, it could also be useful to conduct studies aimed at identifying and defining the objectively best indicators on these topics. In this context, looking at the indicators in a life cycle perspective could enhance the results even further and make them more relevant for the future.

On a different note, this study proposes some potential factors for materiality, i.e. factors that determine whether a sustainability aspect becomes material. The findings on this topic largely relate to that of other recent studies on the phenomenon of materiality development or dynamic materiality. As some of the findings in this study are novel, however, we suggest researching factors for materiality more in depth. For instance, we suggest conducting a series of in-depth interviews on this topic in specific, preferably in another research setting, to see if the same factors apply across industries and get a better understanding of the phenomenon overall. Lastly, we see the potential connection between materiality anticipation and dynamic capabilities, which would be a highly interesting field to explore in detail. The most recent literature on dynamic materiality (see e.g. WEF & BCG, 2020) argues that being able to predict how materiality will develop within one's industry is going to be a crucial skill for remaining competitive in the market. As this is still a nascent field of research, we advise starting out by conducting a qualitative case study on a company that already anticipates and acts on materiality development well (if such company exists). This could yield valuable insights into how companies may apply frameworks, procedures and other methods in practice to accommodate for this new conception of dynamic materiality.

8

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9

Appendix

9.1 Appendix A: Information sheets

9.1.1 A1: Information sheet to companies

Informasjonsskriv til intervjuforberedelse

Dette informasjonsskrivet har som formål å gi en oversikt over hvilke temaer vi ønsker å diskutere med deg i intervjuet. Det vil også bli gitt en forklaring på sentrale begreper. Generell informasjon om studien finner du i det vedlagte samtykkeskjemaet.

Temaer vi ønsker å diskutere er som følger:

- Kort om deg og ditt nåværende arbeidsområde
- Hvem som er deres viktigste interessenter
- Hvilke bærekraftsaspekter dere anser som vesentlige og hvorfor
- Hvilke indikatorer dere anser som vesentlige å måle og hvorfor
- Hvordan dere kan påvirke disse aspektene og indikatorene
- Hvilke aspekter og indikatorer dere tror vil bli vesentlige i fremtiden og hvorfor
- Hvorvidt deres interesser kolliderer med de til andre bransjeaktører og interessenter

I tillegg vil vi medbringe en tom vesentlighetsmatrise som vi ønsker at du fyller ut under intervjuet.

Viktige definisjoner

Fornybarnæringen:
- Her er det snakk om alt som inngår i produksjon, transmisjon, distribusjon og salg av elektrisitet fra fornybare energikilder (vannkraft, vindkraft, solenergi, bioenergi og bølgekraft), herunder selskaper involvert i ett eller flere ledd av denne "overordnede" verdikjeden. Andre tilkoblede verdikjeder og leverandører vil derfor være sekundært.

Interessent:
- Aktører (personer, grupper, organisasjoner, etc.) i eller utenfor fornybarnæringen som kan påvirke eller er påvirket av en bransjeaktørs drift, resultater og prestasjoner.

Bærekraftsaspekt:
- Et fenomen/tema/problemstilling som er viktig sett fra et bærekraftsperspektiv, dvs. at det er viktig for økonomiske, miljømessige og/eller sosiale forhold på lang sikt. Eksempler på bærekraftsaspekter er klimagassutslipp og tap av biologisk mangfold.

Vesentlig aspekt:
- At et aspekt er vesentlig (*material*), innebærer at det
  1. Reflekterer selskapets signifikante påvirkning på økonomiske, miljømessige og sosiale forhold; og/eller
  2. Substansielt påvirker vurderingene og beslutningene til interessenter.
- Merk at det under punkt 1 er snakk om selskapets påvirkning *på* disse forholdene, og ikke forholdenes viktighet for selskapets lønnsomhet e.l. Punkt 2 kan tenkes på som at aspektet er svært avgjørende for hvilke beslutninger interessenter tar.

Indikator:
- Noe som kvantitativt eller kvalitativt måler et konkret bærekraftsaspekt. En indikator måler ofte noe spesifikt innunder et større bærekraftsaspekt, og brukes gjerne som en tilnærming til å anslå ytelsen på dette aspektet. Eksempelvis kan en indikator for å måle klimagassutslipp være antall tonn CO2 sluppet ut. Viktige indikatorer omtales gjerne som *Key Performance Indicators* (KPI).

Vesentlighetsmatrise:
- En 2x2-matrise for visualisering av hvordan vesentlige bærekraftsaspekter prioriteres. X-aksen angir signifikansen av selskapets påvirkning på økonomiske, miljømessige og sosiale forhold, mens y-aksen angir graden av viktighet for interessenters vurderinger og beslutninger.

9.1.2 A2: Information sheet to stakeholders

Informasjonsskriv til intervjuforberedelse

Dette informasjonsskrivet har som formål å gi en oversikt over hvilke temaer vi ønsker å diskutere med deg i intervjuet. Det vil også bli gitt en forklaring på sentrale begreper. Generell informasjon om studien finner du i det vedlagte samtykkeskjemaet.

Temaer vi ønsker å diskutere er som følger:

- Kort om deg og ditt nåværende arbeidsområde
- Hvilken del av bransjen dere har størst interesse i (dvs. hvilke ledd i verdikjeden)
- Hvilke bærekraftsaspekter dere anser som vesentlige i bransjen, og hvorfor
- Hva dere synes om bransjens tiltak mht. de vesentlige aspektene
- Hvilke indikatorer det er vesentlig for dere at det rapporteres på i bransjen, og hvorfor
- Hvordan dere kan påvirke disse aspektene og indikatorene (grad av innflytelse)
- Hvilke aspekter og indikatorer dere tror vil bli vesentlige i fremtiden, og hvorfor
- Hvorvidt deres interesser kolliderer med de til andre interessenter og bransjeaktører

I tillegg vil vi medbringe en tom vesentlighetsmatrise som vi ønsker at du fyller ut under intervjuet.

Viktige definisjoner

Fornybarnæringen:

– Her er det snakk om alt som inngår i produksjon, transmisjon, distribusjon og salg av elektrisitet fra fornybare energikilder (vannkraft, vindkraft, solenergi, bioenergi og bølgekraft), herunder selskaper involvert i ett eller flere ledd av denne "overordnede" verdikjeden. Andre tilkoblede verdikjeder og leverandører vil derfor være sekundært.

Interessent:

– Aktører (personer, grupper, organisasjoner, etc.) i eller utenfor fornybarnæringen som kan påvirke eller er påvirket av en bransjeaktørs drift, resultater og prestasjoner.

Bærekraftsaspekt:

- Et fenomen/tema/problemstilling som er viktig sett fra et bærekraftsperspektiv, dvs. at det er viktig for økonomiske, miljømessige og/eller sosiale forhold på lang sikt. Eksempler på bærekraftsaspekter er klimagassutslipp og tap av biologisk mangfold.

Vesentlig aspekt:

- At et aspekt er vesentlig (*material*), innebærer at det
  1. Reflekterer et selskaps signifikante påvirkning på økonomiske, miljømessige og sosiale forhold; og/eller
  2. Substansielt påvirker vurderingene og beslutningene til selskapets interessenter.
- Merk at det under punkt 1 er snakk om et selskaps påvirkning *på* disse forholdene, og ikke forholdenes viktighet for selskapets lønnsomhet e.l. Punkt 2 kan tenkes på som at aspektet er svært avgjørende for hvilke beslutninger selskapets interessenter tar. Med *selskaper* menes her bedrifter i bransjen, mens *interessenter* blant annet er dere.

Indikator:

- Noe som kvantitativt eller kvalitativt måler et konkret bærekraftsaspekt. En indikator måler ofte noe spesifikt innunder et større bærekraftsaspekt, og brukes gjerne som en tilnærming til å anslå ytelsen på dette aspektet. Eksempelvis kan en indikator for å måle klimagassutslipp være antall tonn CO2 sluppet ut. Viktige indikatorer omtales gjerne som *Key Performance Indicators* (KPI).

Vesentlighetsmatrise:

- En 2x2-matrise for visualisering av hvordan vesentlige bærekraftsaspekter prioriteres. X-aksen angir signifikansen av et selskaps påvirkning på økonomiske, miljømessige og sosiale forhold, mens y-aksen angir graden av viktighet for interessenters (dvs. deres) vurderinger og beslutninger.

9.2 Appendix B: Interview guides

9.2.1 B1: Interview guide for companies

Del 1: Innledning (5 min)

- Takk for din deltakelse!
- Formålet med denne studien er å skaffe innsikt i vesentlige bærekraftsaspekter og indikatorer i fornybarnæringen, sett fra ulike selskapers og interessenters perspektiv.
- Vi minner om at vi skriver oppgaven i samarbeid med non-profit-stiftelsen TERRAVERA, som ønsker å bruke resultatene fra studien i sitt prosjekt. Merk at det kun er vi som har tilgang til rådataene, og at TERRAVERA bare vil få sluttproduktet.
- Opplysninger om deg og ditt selskap vil bli anonymisert så langt det lar seg gjøre, og alt du sier vil behandles konfidensielt. Vi vil lagre data på en måte som sikrer dette.
- Vi minner om at vi vil sende deg informasjon vi ønsker å benytte fra dette intervjuet til godkjennelse før vi inkluderer det i utredningen.
- Dersom det er spørsmål du ikke kan eller vil svare på, har du rett til å unnlate å svare.
- Vi vil gjerne ta lydopptak av intervjuet for å foreta en transkribering senere og sikre korrekt gjengivelse av informasjon. Alle lydopptak vil bli slettet innen prosjektets slutt. Er dette noe du godtar?
- Hvor lang tid har du til rådighet? Vi ser for oss at intervjuet vil vare ca. 60 minutter.

Del 2: Generelt om intervjuobjektet (5 min)

- Kan du starte med å fortelle litt om dine kompetanseområder og rolle i selskapet?
  - Hvor lang fartstid har du i bransjen?
- Kan du fortelle litt om hvordan du arbeider med bærekraft?

Del 3: Vesentlighet (20 min)

- Hvem er deres viktigste interessenter? (veldig kort, kun et steg på veien til aspekter)
  - Kan du rangere interessentene etter grad av innflytelse?
  - Hva er begrunnelsen for denne rangeringen?
- Hvilke aspekter anser du som vesentlige i selskapet og bransjen i dag?
  - Hvorfor er aspektene vesentlige?
    (Kan f.eks. være press fra interessenter, filantropiske årsaker, rykte, etc.)
  - Hvordan forholder dere dere til aspekt X? (f.eks. biologisk mangfold)
- Kan du plassere de ulike aspektene i denne [fysiske] vesentlighetsmatrisen?
- Til hvilken grad har dere mulighet til å påvirke eller kontrollere aspektene?
  - Hvorfor kan de ikke påvirkes / hvordan kan de påvirkes? (og gjør dere det?)
- Hvis du ser inn i "krystallkulen" – hva tror du kommer til å bli vesentlig i fremtiden?
  - Hvorfor kommer disse aspektene til å bli vesentlige?
  - Til hvilken grad kan dere påvirke eller kontrollere aspektene?

Del 4: Indikatorer (15 min)

- Gitt at dere mener... Hvilke indikatorer anser du som vesentlige å måle i dag?
  - Hvorfor er indikatorene vesentlige å måle?
    (Kan f.eks. være press fra interessenter, filantropiske årsaker, rykte, etc.)
  - Hvordan forholder dere dere til indikator X? (f.eks. tonn CO2-utslipp)
- Til hvilken grad har dere mulighet til å påvirke eller kontrollere indikatorene?
  - Hvorfor kan de ikke påvirkes / hvordan kan de påvirkes? (og gjør dere det?)
- Opplever du at dere formidler informasjon om disse indikatorene godt nok eksternt?
  - Hvorfor / hvorfor ikke?
- Hvis du ser inn i "krystallkulen" – hvilke indikatorer tror du kommer til å bli vesentlige i fremtiden?
  - Hvorfor kommer disse indikatorene til å bli vesentlige?
  - Til hvilken grad kan dere påvirke eller kontrollere indikatorene?

Del 5: Oppfatning av andre interessenter (10 min)

- Til hvilken grad føler du deres interesser kolliderer med de hos deres interessenter?
  - Hvorfor kolliderer de?
- Til hvilken grad føler du deres interesser kolliderer med de hos andre bransjeaktører?
  - Hvorfor kolliderer de?
- Hvem mener du har det største ansvaret for å rette opp i negative vesentlige aspekter i bransjen?
  - Hvorfor mener du dette?

Del 6: Avslutning (5 min)

- Før vi avslutter: Har du noe mer på hjertet som du ønsker å legge til?
- Har du noen spørsmål om intervjuet eller oppgaven, evt. lagring/bruk av data?
- Er det greit om vi tar kontakt for eventuelle oppfølgings- eller oppklaringsspørsmål?
- Kunne vi fått tilsendt vesentlighetsanalysen deres?
- Vi sender deg en e-post med informasjonen vi ønsker å bruke i god tid før 1. juni.
- Tusen takk for din deltakelse! Ønsker du å få tilsendt resultatene når de foreligger?

9.2.2 B2: Interview guide for stakeholders

Del 1: Innledning (5 min)

- Takk for din deltakelse!
- Formålet med denne studien er å skaffe innsikt i vesentlige bærekraftsaspekter og indikatorer i fornybarnæringen, sett fra ulike selskapers og interessenters perspektiv.
- Vi minner om at vi skriver oppgaven i samarbeid med non-profit-stiftelsen TERRAVERA, som ønsker å bruke resultatene fra studien i sitt prosjekt. Merk at det kun er vi som har tilgang til rådataene, og at TERRAVERA bare vil få sluttproduktet.
- Opplysninger om deg og ditt selskap vil bli anonymisert så langt det lar seg gjøre, og alt du sier vil behandles konfidensielt. Vi vil lagre data på en måte som sikrer dette.
- Vi minner om at vi vil sende deg informasjon vi ønsker å benytte fra dette intervjuet til godkjennelse før vi inkluderer det i utredningen.
- Dersom det er spørsmål du ikke kan eller vil svare på, har du rett til å unnlate å svare.
- Vi vil gjerne ta lydopptak av intervjuet for å foreta en transkribering senere og sikre korrekt gjengivelse av informasjon. Alle lydopptak vil bli slettet innen prosjektets slutt. Er dette noe du godtar?
- Hvor lang tid har du til rådighet? Vi ser for oss at intervjuet vil vare ca. 60 minutter.

Del 2: Generelt om intervjuobjektet (5 min)

- Kan du starte med å fortelle litt om dine kompetanseområder og rolle i organisasjonen?
  - Hvor lang fartstid har du i bransjen?
- Kan du fortelle litt om hvordan du arbeider med bærekraft?

Del 3: Vesentlighet (20 min)

- Hvilken del av fornybarnæringens verdikjede har dere størst interesse i? (veldig kort, kun et steg på veien til aspekter)
  - Hvilke selskaper har dere størst interesse i?
- Hvilke aspekter anser du som vesentlige i bransjen i dag?
  - Hvorfor er aspektene vesentlige?
  - Hvordan forholder dere dere til aspekt X? (f.eks. biologisk mangfold)
- Kan du plassere de ulike aspektene i denne [fysiske] vesentlighetsmatrisen?
- Til hvilken grad har dere mulighet til å påvirke eller kontrollere aspektene?
  - Hvorfor kan de ikke påvirkes / hvordan kan de påvirkes? (og gjør dere det?)
- Hva synes du om tiltakene bransjen gjør mht. til de vesentlige aspektene?
  - Er det noen vesentlige aspekter du mener ikke blir tatt tak i? Hvilke?
- Hvis du ser inn i "krystallkulen" – hva tror du kommer til å bli vesentlig i fremtiden?
  - Hvorfor kommer disse aspektene til å bli vesentlige?
  - Til hvilken grad kan dere påvirke eller kontrollere aspektene?

Del 4: Indikatorer (15 min)

- Gitt at dere mener... Hvilke indikatorer er det viktigst for dere at det måles og rapporteres på i bransjen i dag?
  - Hvorfor er det viktig at indikatorene måles og rapporteres på?
  - Hvordan forholder dere dere til indikator X? (f.eks. tonn CO2-utslipp)
- Til hvilken grad har dere mulighet til å påvirke eller kontrollere indikatorene?
  - Hvorfor kan de ikke påvirkes / hvordan kan de påvirkes? (og gjør dere det?)
- Hvilke av disse indikatorene opplever dere at det ikke gis tilstrekkelig innsikt i i dag?
  - Hva er implikasjonene av dette?
- Hvis du ser inn i "krystallkulen" – hvilke indikatorer tror du kommer til å bli vesentlige i fremtiden?
  - Hvorfor kommer disse indikatorene til å bli vesentlige?
  - Til hvilken grad kan dere påvirke eller kontrollere indikatorene?

Del 5: Oppfatning av andre interessenter (10 min)

- Til hvilken grad føler du deres interesser kolliderer med de hos selskaper i bransjen?
  - Hvorfor kolliderer de?
- Til hvilken grad føler du deres interesser kolliderer med de hos andre interessenter?
  - Hvorfor kolliderer de?
- Hvem mener du har det største ansvaret for å rette opp i negative vesentlige aspekter i bransjen?
  - Hvorfor mener du dette?

Del 6: Avslutning (5 min)

- Før vi avslutter: Har du noe mer på hjertet som du ønsker å legge til?
- Har du noen spørsmål om intervjuet eller oppgaven, evt. lagring/bruk av data?
- Er det greit om vi tar kontakt for eventuelle oppfølgings- eller oppklaringsspørsmål?
- Vi sender deg en e-post med informasjonen vi ønsker å bruke i god tid før 1. juni.
- Tusen takk for din deltakelse! Ønsker du å få tilsendt resultatene når de foreligger?

9.3 Appendix C: Consent form

Forespørsel om deltakelse i forskningsprosjekt om bærekraftsmåling i fornybarnæringen

Bakgrunn og formål
Vi er to masterstudenter fra Norges Handelshøyskole (NHH) som skal skrive en masteroppgave innenfor temaet *bærekraft*, mer spesifikt innenfor *bærekraftsmåling/-rapportering*. Formålet med denne studien er å kartlegge hva ulike selskaper og interessenter i fornybarnæringen anser som vesentlig (engelsk: *material*) med henhold til bærekraft, og se på graden av overensstemmelse. Dette vil gjøres gjennom å foreta en vesentlighetsanalyse (engelsk: *materiality assessment*) av bransjen, fundert i oppfatningene til sentrale bransjeaktører og interessenter. Masteroppgaven skrives etter ønske fra non-profit-stiftelsen TERRAVERA^{TM}, som ledd i utviklingen av en felles plattform for deling av transparent og faktabasert kunnskap om bærekraftsmåling.

Utvalget
Utvalget i vår studie bestemmes på grunnlag av målrettet oppsøking av sentrale personer med tilknytning til bransjen, og vil bestå av anslagsvis 10–14 personer. Disse personene er nøye utvalgt på bakgrunn av deres ekspertise på bærekraft i bransjen, og er ment å representere sine respektive interessentgrupper eller ledd i bransjens verdikjede. Deltakerne som blir forespurt avgjør selv om de ønsker å delta.

Hva innebærer deltakelse i studien?
I denne forespørselen ber vi deg om å delta på et intervju med en varighet på ca. 1–1,5 time (pluss et potensielt, uforpliktende oppfølgingsintervju). Spørsmålene vil i hovedsak omhandle hvilke bærekraftsaspekter som er vesentlige i bransjen og hvilke indikatorer som er viktigst å måle, samt en begrunnelse på hvorfor. I tillegg vil det spørres om ulike interesser i bransjen. Intervjuet vil bli tatt opp på lydbånd og det vil potensielt bli tatt notater underveis. Resultatene av studien vil bli publisert anonymt og eventuelle bedriftssensitive opplysninger vil ikke bli tatt med i selve masterutredningen. Eventuelle sitater vi ønsker å anvende i oppgaven vil sendes til bekreftelse før publisering. Studien avsluttes formelt den 1. august 2020.

Frivillig deltakelse
Det er frivillig å delta i studien og du kan når som helst trekke ditt samtykke (innen 1. juni 2020) uten å oppgi noen grunn. Alle opplysninger om deg vil bli anonymisert så langt det lar seg gjøre. Ditt samtykke kan trekkes ved å kontakte undertegnede gjennom skriftlig tilbakemelding per e-post eller SMS. Det vil ikke ha noen negative konsekvenser for deg dersom du ikke ønsker å delta eller senere velger å trekke deg.

Ditt personvern – hvordan vi oppbevarer og bruker dine opplysninger
Vi vil kun bruke opplysningene om deg til formålet vi har fortalt om i dette skrivet. Vi behandler opplysningene konfidensielt og i samsvar med personvernregelverket. Det er i utgangspunktet kun undertegnede som vil ha tilgang til personopplysninger, men etter ønske fra TERRAVERA^{TM} ber vi om ditt samtykke til å dele ditt navn med dem. I slutten av dette skrivet finner du en avkrysningsboks for dette, som er frivillig å huke av. Personopplysninger, slik som navn og kontaktinformasjon, vil erstattes med en kode og lagres separat fra øvrig data. I selve utredningen vil kun generelle bakgrunnsopplysninger om type interessent/selskap, rolle og arbeidsområde til intervjuobjektet publiseres.

Hva skjer med opplysningene dine når vi avslutter forskningsprosjektet?
Prosjektet skal etter planen avsluttes 1. august 2020. Personopplysninger og lydopptak vil slettes innen prosjektslutt.

Dine rettigheter
Det er helt frivillig å delta i prosjektet. Dersom du kan identifiseres i datamaterialet har du rett til innsyn i hvilke personopplysninger som er registrert om deg, og kopi av disse om ønskelig. Videre har du rett til å få rettet og slettet personopplysninger om deg, og du har rett til å sende klage til personvernombudet eller Datatilsynet om behandlingen av dine personopplysninger.

Hva gir oss rett til å behandle personopplysninger om deg?
Vi behandler opplysninger om deg basert på ditt samtykke. På oppdrag fra Norges Handelshøyskole har NSD – Norsk senter for forskningsdata AS vurdert at behandlingen av personopplysninger i dette prosjektet er i samsvar med personvernregelverket.

Ved å signere denne erklæringen samtykker du til å delta i studien. Hvis du har spørsmål til studien, eller ønsker å benytte deg av dine rettigheter, ta kontakt med:
- NHH, ved prosjektveileder Lars Jacob Tynes Pedersen: Lars.Pedersen@nhh.no
- NHHs personvernombud: personvernombud@nhh.no
- NSD – Norsk senter for forskningsdata AS, på e-post: personverntjenester@nsd.no, eller telefon: 55 58 21 17
- Undertegnede

Dersom du ønsker å bli informert om resultatene fra studien når disse foreligger, kan du kontakte undertegnede.

Med vennlig hilsen

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E-post: arvind.fossan@student.nhh.no
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Kryss av i boksen hvis du godkjenner at ditt navn deles med TERRAVERA^{TM} (valgfritt).

☐ Jeg godkjenner at mitt navn deles med TERRAVERA^{TM}.

Jeg har lest og forstått denne skriftlige informasjonen og er villig til å delta i studien.

Navn (blokkbokstaver): .....

Signatur: .....

Telefonnummer: .....

E-post: .....

9.4 Appendix D: Pathways to materiality framework

	Status Quo	Catalyst	Stakeholder Pressure	Company Response	Regulatory Response and Innovation
	Issue financially immaterial	**Issue still financially immaterial**	**Issue becoming financially material for some companies**	**First sign issue could become financially material for entire industry**	**Issue financially material for entire industry**
Description of state	Degree of misalignment between business and societal interests is tolerated and no industry players pursue increased profits by increasing negative externalities. Misalignment is either accepted by societal norms or due to a lack of information about true state of affairs.	Some companies deviate from equilibrium seeking to capture more rents, increasing business and social misalignment. Some companies are successful in capturing rents. Alternatively, societal expectations can change due to information about companies' existing behavior and about true state of negative externalities.	NGOs, media and other stakeholders react to the furthering of the misalignment between business and societal interests. Political stirring may occur, but action is unlikely at this point. Public ire is generally focused on the offending companies and not on the practices of the industry as a whole.	Companies attempt to regain trust through company-specific or industry self-regulation, aiming to minimize the cost of reaction while successfully deterring stakeholder pressure and regulation. Politicians or regulators threaten action in response to misalignment. New norms and beliefs are set for industry behavior.	New regulation forces firms to decrease misalignment, creating a new equilibrium. Alternatively, innovation disruptions the industry leading to a new equilibrium. Either through regulation or innovation, the issue is integrated into the competitive landscape of the industry.
Hypothesis	Issues are more likely to become financially material in industries and countries with weaker norms and beliefs that societal and business interests should be aligned.	Issues are more likely to become financially material when it is easier for stakeholders to receive information about the true alignment between societal and business interests.	Issues are more likely to become financially material when media and NGOs have more power and when politicians are more responsive to this power. Issues will remain material for one (or several) companies if performance on the issue can be isolated from the rest of the industry or if it deviates significantly from industry norms.	Issues are more likely to become financially material when companies lack ability to self-regulate and truly address the issues of misalignment.	Issues more likely to become financially material when new regulations are enforced or when some companies develop an innovation that addresses the misalignment offering a differentiated service/product.
Misalignment	Misalignment is minimal or within a margin accepted by society. Moreover, misalignment is static.	Misalignment is increasing, either due to corporate actions or changing societal expectations.	Misalignment peaks. Diverging companies cease further misalignment increases and see if the negative public response continues or gains regulator attention.	Misalignment shrinks as companies, to a degree, walk back actions which drove misalignment. Degree of misalignment is still greater than what would exist in the presence of new regulation or disruptive innovation.	Regulation or disruptive innovation drives misalignment to a new equilibrium level. Misalignment again becomes static.
Price reaction and valuation effects	None	Diverging companies capturing rents may outperform other industry players.	Diverging companies specifically targeted by public response likely to experience negative price reaction.	Other companies in industry may also begin to experience negative stock reactions. Companies with relatively better performance on the issue in question may escape negative or could experience positive price reactions.	Performance on issue affects all industry firm's market valuation. Firms compete on relative performance of issue.

Figure 9.1: Pathways to materiality (Rogers & Serafeim, 2019)