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**Corporate ESG Policy Implementation and
Disclosure Strategies: Understanding the Choice of
Climate Policies and Practices**

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ABSTRACT:

We are living in an era of transitions. One of the most significant among them is the green transition, whose impacts reach across society, business, and institutions. The effects of climate change caused by human activity pose a threat to future generations, challenging people to change established ways of operating and to seek new solutions to replace them. In the business world, this requires solutions that maintain competitiveness. The ability to identify opportunities, seize them at the right time, and reconfigure assets and resources are the cornerstones of transformation. Strategic, administrative, technological, and financial dynamism and flexibility are key factors as companies strive to adopt new practices. The foundation of capabilities lies not only in organizational structure, stakeholder capital, and path dependency, but also in human capital, namely, the skills of leadership and employees as well as collaborative competencies. Foresight, the ability to recognize windows of opportunity, and timely action make it possible to operate in alignment with current trends. Still, it is important to recognize that the green transition is heavily guided by institutions. Various policies steer corporate behavior, whether they are mandatory or voluntary operational frameworks. The key question, then, is: What factors drive companies to adopt certain policies as part of their operations? This study seeks to answer that question by building a theoretical framework grounded in internal corporate capabilities, especially dynamic capabilities since change is at the core of the subject. In addition, attention is paid to external pressures faced by companies in the form of stakeholder expectations and political mandates. The findings of the study lead to outcomes that are strategically, and managerially significant. Relying on qualitative data, the research supports companies in leveraging their existing capabilities in the face of uncertainty and continuously developing them to become more adaptive and aligned with current trends. It also addresses gaps identified in previous studies and contributes to advancing research in support of the green transition.

KEYWORDS: Dynamic capabilities, ESG disclosure, policy mix

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1 Introduction

The urgency of addressing climate change has positioned the decarbonization of the power sector at the heart of sustainability strategies across the globe. The European Union has committed to reduce its greenhouse gas (GHG) emissions by 80–95% by 2050 compared to 1990 levels (Jägemann et al., 2013, p. 622). Achieving this goal requires action, especially from sectors that are responsible for a significant share of emissions. Such sectors include heat and electricity production which currently account for 25% of all GHG emissions (Pleißmann & Blechinger, 2016, p. 24-28). Targeting such emission cuts requires the adoption of transformative low-carbon strategies and technologies, particularly renewable energy and energy efficiency solutions, which are expected to contribute nearly 75% of future emission reductions (Pilpola et al., 2019, p. 1). However, the pathway to decarbonization is not linear. It involves a complex interplay of institutional policies, market forces, firm capabilities, and societal expectations (Brooks & Oikonomou, 2017, pp. 7-8; Alsayegh et al., 2020, p. 4).

Scholars, such as Lindberg and others (2019) emphasize that sustainability transitions are not only technologically driven but are also shaped by the strategies of key stakeholders and institutional frameworks. These transitions vary in pace and disruption; while some involve incremental changes, others require more radical and disruptive shifts that often face resistance, especially from incumbent firms accustomed to legacy systems. The level of disruption and speed of transition are decisive factors in determining the effectiveness of decarbonization pathways and the extent to which they reshape society, markets, and technological structures. (Lindberg et al., 2019, p. 2–3).

One of the critical gaps in the existing literature is the absence of a widely accepted theoretical framework explaining why firms choose to adopt specific sustainability policies and how these choices influence different stakeholder groups (Eccles et al., 2015, p. 2854; Brooks & Oikonomou, 2017, p. 3). At the same time, there is increasing evidence that adopting sustainability practices, such as transparent reporting and environmental, social, and governance (ESG) policies, can yield several benefits for firms. These include

enhanced reputation, stronger brand value, employee motivation, and improved internal control systems (Brooks & Oikonomou, 2017, p. 3). With heightened awareness of the financial risks posed by climate change, there is growing recognition of the link between climate risk management and long-term financial performance (Boffo & Patalano, 2020, p. 24).

Considering ESG practices, it is noteworthy that corporate responsibility has evolved from shareholder-driven value maximization to a stakeholder-oriented model of value creation, where social performance is increasingly integrated into strategic decision-making (Alsayegh et al., 2020, p. 3). ESG practices can include activities such as reducing carbon emissions, enhancing employee well-being, promoting diversity, ensuring product safety, and engaging in philanthropic efforts (Brooks & Oikonomou, 2017, pp. 7–8). These practices are not only instrumental for achieving sustainability goals but are also key to ensuring organizational legitimacy in an era where firms are expected to address global challenges.

Yet, the implementation of sustainability practices within existing organizational structures is not without friction. Firms face path dependencies implying historical choices and routines that constrain current decision-making (Teece, 2007; 1327). The ability to overcome these limitations and develop dynamic capabilities, that is, to sense, seize, and reconfigure resources and competencies in response to shifting environments, is essential for navigating the sustainability transition (Teece, 2007, p. 1319). This is particularly relevant in the power sector, where technology, regulation, and market conditions are undergoing rapid and concurrent transformations.

From a policy perspective, research increasingly emphasizes the importance of policy mixes. Policy mixes are combinations of regulatory, market-based, and soft instruments that jointly steer sustainability transitions (Kivimaa et al., 2017, p. 116). These policy mixes are particularly relevant for driving low-carbon innovation and scaling up renewable energy technologies (Pilpola et al., 2019, p. 1; Pleßmann & Blechinger, 2016, p. 24-

28). Successful transition pathways depend not only on technological feasibility and cost competitiveness but also on coherent and coordinated policy frameworks that lower investment risks and mobilize long-term infrastructure development (Golombek et al., 2022, pp. 12–13).

This study investigates the strategic responses of firms in the electric power sector to climate change and the decarbonization imperative. Specifically, it explores how firms choose among various ESG and sustainability policies, and how these choices are influenced by internal resources, organizational capabilities, and external policy pressures. Scholars (Teece et al., 1997; Eisenhardt & Martin 2000; Zollo & Winter, 2002 & Teece, 2007) refer to path dependency, which inevitably leads studies investigate the implications of firm resources and capabilities on chosen ESG policies a firm is integrating into its strategy and operations. Indeed, the ability of an organization to sense and seize opportunities in the sustainability landscape and the capability to reconfigure and deploy its resources and assets to serve and promote its sustainable development goals largely determines its ability to attain and sustain a competitive position.

The implementation of sustainability practices within an established organizational structure can be costly, and existing frictions and path dependencies may hinder the transition to sustainable operations. In their study, Eccles et al. (2015) raise two important question for future research avenues: why do organizations end up choosing certain sustainability policies and practices, and what is the optimal level of sustainability policy adoption? Should companies balance all elements equally within certain constraints, or can they excel in one area while giving less focus to others? Given that sustainability involves trade-offs, both between financial and non-financial goals, as well as among different non-financial objectives, these decisions must be carefully analyzed to guide effective corporate strategy. (Eccles et al., 2015, p. 2854).

The central research question guiding this study is: *How do firm capabilities shape the adoption of ESG policies within corporate strategy, and how does this, in turn, interact*

with climate policy compliance to influence decarbonization outcomes in the electric power sector?

Following Eccles and others, this research expands on existing studies that examine the persistence of core organizational traits while also investigating the way organizations evolve by adopting new practices that align with these traits. A valuable starting point is Zollo and Winter (2002), who propose a conceptual model outlining mechanisms of deliberate organizational learning that evolve over time. This model helps explain how organizations develop dynamic capabilities, as discussed by Teece and others (1997). This study bridges theory into practice by investigating the influence of firm resources and capabilities on organization's strategic response to the threats issued by growing CO₂ emissions in the atmosphere. By synthesizing perspectives from dynamic capabilities theory (Teece et al., 1997; Eisenhardt & Martin, 2000; Zollo & Winter, 2002; & Teece, 2007) and policy mix literature (Kivimaa & Kern, 2016), this study contributes to an improved understanding of how firms navigate the overlapping demands of environmental regulation, stakeholder expectations, and organizational inertia. It provides both theoretical and practical insights into how firms can build the capacity to innovate, adapt, and transform in alignment with the broader goals of a just and effective green transition.

Following the introduction of the topic and its contextual background, the structure of the thesis is outlined as follows: Section 2 provides a comprehensive literature review, synthesizing theories of dynamic capabilities, and the effect of these capabilities on firms' climate policies; Section 3 outlines the methods of the research design and data collection process. Section 4 presents empirical findings including the results of an interview with Sweco that is a leading company in engineering and architecture consultancy in Europe and a study of Fortum as a leading electricity company in the Nordics in comparison with and building on previous theory; and finally, Section 6 concludes with a discussion of the strategic and managerial implications while acknowledging limitations and proposing directions for future research.

2 Theoretical background

The theoretical background of this work is based on a central management theory, dynamic capabilities, which, according to the literature, act as significant determinants of the sustainable competitiveness of companies. There is a large body of literature and research on dynamic capabilities, which both reinforce each other and argue about the true origin of competitiveness. The purpose of this work is not to delve into the theory of dynamic capabilities in more depth, but to base the research question of this study on the capabilities that this theory emphasizes: strategic, managerial, learning-based, technological, economic, and administrative capabilities. Thus, the theory of dynamic capabilities guides research to seek answers from the company's internal competence-based, organizational and strategic assets and resources.

The theoretical background begins by defining dynamic capabilities briefly and concisely. After this, we will review the literature on policy mixes, after which we will proceed to examine capabilities. What makes capabilities dynamic focuses precisely on the ability of a firm to renew its internal capabilities in response to environmental changes created by external factors. The changing political landscape is pushing companies into a situation where they must either be able to see the new opportunities brought by environmental changes or persevere in the waves of change.

2.1 Dynamic Capabilities

The theory of dynamic capabilities is one of the most central theories of leadership. Its pioneers include Teece, Pisano, and Shuen (1997), Eisenhardt and Martin (2000), and Zollo and Winter (2002). They all highlight the importance of an organization's ability to respond promptly and adaptively to changes in a firm's external environment, particularly through fast and flexible product innovation. According to them, this responsiveness is made possible by management's skill in coordinating and reallocating both internal and external resources and capabilities (Teece, Pisano, and Shuen, 1997; Eisenhardt and Martin, 2000; and Zollo and Winter, 2002). Teece, Pisano, and Shuen view dynamic

capabilities as essential to sustaining firm's long-term success. In their view, dynamic capabilities represent an organization's capacity to develop new and innovative sources of competitive advantage (Teece, Pisano & Shuen, 1997, pp. 512). Dynamic capabilities are crucial for companies aiming to maintain a competitive advantage in fast-moving, innovation-driven global markets (Teece et al., 1997, p. 515; Teece, 2007, p. 1319). According to Teece (2007), these capabilities allow firms to generate, apply, and safeguard intangible assets that support sustained high performance over time. They help organizations adapt to change, pursue innovation, and thrive amid geographically dispersed sources of knowledge, production, and invention. (Teece, 2007, p. 1319).

At the heart of dynamic capabilities lie micro foundations that comprise specific skills, routines, organizational forms, decision-making protocols, and internal disciplines (Teece, 2007, pp. 1327). Dynamic capabilities are strategic and organizational activities, such as product development, forming partnerships, and making strategic decisions, that generate value for companies in constantly changing markets by reconfiguring resources into innovative and value-generating strategies (Eisenhardt and Martin, 2000, p. 1106). These elements form the basis for dynamic capabilities: a firm's ability to sense new opportunities, seize them effectively, and reconfigure resources in response to shifts in the environment (Teece, 2007, pp. 1327). However, developing these foundations is complex and resource intensive. According to research in the field, firms with strong dynamic capabilities are typically entrepreneurial in nature; they not only respond to ecosystem changes but also shape their environments through innovation and collaboration with other firms and institutions (Teece, 2007, pp. 1327-1328).

Zollo and Winter observe that organizations vary in their dynamic capabilities not only because they operate in environments with different levels of change, but also because they make different strategic assumptions either consciously or unconsciously about how important future change will be. Companies with a culture that embraces change, or with leadership that promotes continuous change practices, tend to gain more from learning efforts, as they are better at adapting their behavior to take advantage of new

insights. From a structural perspective, organizations with clear divisions between activities, such as multidivisional firms, may see greater benefits from intentional learning initiatives, since new knowledge tends to stay within the area where it was developed unless actively shared. Additionally, large and diversified firms, and those that are more open to change, are likely to gain more from systematic learning due to scale advantages in how information is used and codified. (Zollo and Winter, 2002, p. 346).

Teece highlights that to remain competitive, businesses must strategically plan investments by timing them well, leveraging increasing returns, and repurposing technologies or services across different uses. However, Teece reminds that the ability to consistently make sound, interrelated investment decisions in complex environments shaped by innovation and network effects is rare, especially given the commonality of decision-making errors and biases. (Teece, 2007, p. 1342). Capitalizing on opportunities requires companies to maintain and advance technological skills and complementary assets, and when the moment is right, to invest decisively in the most promising technologies and designs. In markets influenced by network externalities and increasing returns, early action and strategic commitment are essential. Those who establish early dominance often retain their lead. Thus, timing, commitment, and the ability to repurpose innovations across domains are central to long-term success. (Teece, 2007, p. 1319-1320).

Dynamic capabilities involve acquiring and reallocating resources. This includes routines for generating new knowledge, where managers and employees develop fresh insights within the organization (Eisenhardt and Martin, 2000, p. 1108). Teece emphasizes the responsibility of management to identify and create new combinations of value internally, between firms, or in partnership with external institutions. Many of firms' most important assets are knowledge-based and non-tradable, meaning their value emerges from how well they are integrated and coordinated. This gives management a distinct and irreplaceable role in driving economic value that markets cannot replicate. Managers must continually align and recombine cospecialized assets to exploit opportunities

and respond to change, allocating resources in ways that enable the business to sense, seize, and transform effectively. (Teece, 2007, p. 1327).

Dynamic capabilities reflect a company's ability not only to respond to market changes but also to influence and reshape its surrounding ecosystem, create new offerings, and develop and implement business models that sustain performance. Mastery in these orchestration capacities is thought to be vital for sustained innovation and long-term financial success. (Teece, 2007, p. 1323). In fast-changing, globally competitive settings, consumer preferences, technologies, and competitor strategies are constantly evolving. These shifts create risks and opportunities for both established companies and new entrants, often threatening the revenue streams of incumbents. (Teece, 2007, 1324).

Recognizing and acting on emerging opportunities depends on the individual and organizational capacity to learn, especially regarding customer needs and potential technological or product-based solutions (Teece, 2007, 1324). Indeed, Zollo and Winter emphasize how dynamic capabilities stem from organizational learning; they represent the structured ways in which a firm modifies its operational routines. Firms engage in a combination of learning behaviors that involve both the gradual accumulation of experience and intentional efforts to articulate and codify knowledge. (Zollo and Winter, 2002, p. 339-340). Organizations that have the knowledge base and learning capabilities to identify evolving market needs early are better positioned to innovate effectively (Teece, 2007, p. 1324). The non-tradable nature of knowledge-based assets means that value is often created not by acquiring these assets, but by orchestrating and integrating them internally. Such process underscores the unique role of management in generating sustainable competitive advantage (Teece, 2007, p. 1342).

2.2 Policy mixes

Policies play a crucial role in driving sustainability transitions by setting environmental targets, mandating emission reductions, funding R&D, and supporting emerging technologies (Lindberg et al., 2019, p. 1-2). Since multiple policies interact simultaneously,

scholars propose studying policy mixes to better understand their influence on transitions concerning social structures and technology (Lindberg et al., 2019, p. 1-2; Kivimaa and Kern, 2016, p. 206). Policy mixes refer to the combination of various policy instruments and their interactions (Lindberg et al., 2019, p. 1-2; Kivimaa and Kern, 2016, p. 206). Policy mixes span multiple administrative domains, including energy, climate, innovation, transport, environment, and fiscal policies (Kivimaa et al., 2017, p. 116). Researchers are unanimous that policy mixes should be designed carefully as contradictory policies may lead to suboptimal outcomes such as investment uncertainty and reduced innovation (Kivimaa & Kern, 2016, p. 206; Kivimaa et al., 2017, p. 117; Lindberg et al., 2019, p. 7-8; Rogge & Reichardt, 2016, p. 1626).

To begin with, coherence and consistency play a key role in developing policy mixes that disrupt existing systems by e.g., fostering low-carbon innovations. (Kivimaa and Kern, 2016, p. 206; Kivimaa et al., 2017, p. 117). According to Rogge and Reichardt, consistency refers to the alignment of policy mix goals and instruments. Being consistent ensures there are no contradictions between policy instruments and targets, which foster synergies within and between policies. Coherence refers to the synergistic and systematic nature of policymaking and implementation processes that contribute to achieving policy objectives. It also involves ensuring coherence across policy fields and administrative levels, as well as the capabilities of policymakers to accumulate knowledge, build networks, and engage stakeholders. (Rogge & Reichardt, 2015, p. 63-64). Conflicts in policy combinations, on the contrary, may be due to divergent targets, instruments or technologies (del Rio, 2014, p. 272).

Overall, corporate strategic responses to sustainability issues have been weak without regulatory compulsion. Indeed, institutional pressures significantly improve corporate engagement to climate change mitigation. (Majid et al., 2023, p. 18). Policies are designed from both a purpose-serving perspective and a company perspective. The design and implementation of policy instruments is based on their impact on equity, sociopolitical acceptability, dynamic efficiency, and local impacts (del Rio, 2014, p. 268). For

companies it is crucial to assess policies' impact on effectiveness, cost-effectiveness, and dynamic efficiency (Lindberg et al., 2019, p. 1-2). Considering innovations, the effectiveness of sustainability promoting policies is ultimately determined by how well they facilitate the adoption of renewable energy technologies (del Rio, 2014, p. 272).

The effectiveness of complex policy combinations depends on the interactions between policies at different administrative levels. Conflicts may arise between targets, instruments, or even technologies. Since governments pursue multiple objectives, they establish specific targets and implement instruments and design elements to achieve them. (del Rio, 2014, p. 272). It is of paramount importance to design policies with primarily long-term targets (Lindberg et al., 2019, p. 1-2). If a policy lacks a long-term focus on e.g., emission reduction costs but aims for short-term results, it may discourage industries and companies from investing in more expensive emerging technologies that would be essential for achieving long-term climate goals (del Rio, 2014, p. 277).

Scholars have highlighted the importance of a multi-criteria framework that considers both policy goals and instruments within policy mixes (del Rio, 2014; Geels et al., 2016). The need to consider policy processes, characteristics, and potential synergies or conflicts is crucial to ensure alignment with broader strategic objectives. Academic literature on policy mixes has generally focused on their evolution, interactions between instruments, and their impact on specific goals like renewable energy and innovation. (del Rio, 2014, p. 273). The practical implementation of these policies relies on a mix of targets, instruments, and design elements. Their effectiveness depends on their ability to stimulate technological development and diffusion. (del Rio, 2014, p. 273). However, the presence of different administrative levels complicates policy assessment, as overlapping goals may create conflicts or synergies. Multiple objectives often necessitate multiple policy instruments, as no single tool can address all challenges. (del Rio, 2014, p. 274). Policies are created to pursue diverse objectives, which is why specific targets, instruments, and design elements are established to achieve them. The ultimate efficiency

determinant is, however, their capacity to facilitate the adoption of renewable energy technologies. (del Rio, 2014, p. 272).

Kivimaa and Kern (2016) apply disruptive innovation to policy, where policies themselves can disrupt the existing institutional framework, and hence, weaken established practices and technologies. This disruption could generate momentum for transitions and potentially motivate incumbent firms to actively engage in the transformation process. (Kivimaa & Kern, 2016, p. 206). Kivimaa and Kern suggest creative destruction when designing policy mixes that target to stimulate transitions. (Kivimaa & Kern, 2016, p. 210). With creative destruction, Kivimaa and Kern refer to the need to include niche innovation targets and those that destabilize incumbent regimes. Replacing existing regimes would enable sensing and seizing opportunities for enhanced adoption and sustained growth of niche innovations that ultimately replace high energy technologies. (Kivimaa & Kern, 2016, p. 215). These align with concepts of 'transformative' innovation and economic policy that have implications for policy organization, direction, and assessment. (Kivimaa et al., 2017, p. 115; Geels et al., 2016, p. 898-899).

As new technologies become more competitive and widely adopted, the EU policy mix and industry preferences will likely adapt. Lindberg and others remind that current support for a centralized energy model may not be long-lasting, and the transition could accelerate faster than expected. Ongoing EU-level policy revisions, such as the Clean Energy Package, reflect the need to align regulatory frameworks with a rapidly evolving energy sector where decentralized solutions are becoming more viable. (Lindberg et al., 2019, p. 12). However, the presence of different administrative levels complicates policy assessment, as overlapping goals may create conflicts or synergies. Del Rio discusses how multiple objectives often necessitate multiple policy instruments, as no single tool can address all challenges. The situation becomes challenging by combining policies that require addressing different market failures and policy goals simultaneously (del Rio, 2014, p. 274). For instance, a CO₂ target alone is unlikely to drive investment in less mature renewable technologies unless it is set at an extremely ambitious level, resulting in

high carbon prices—an outcome that is politically unrealistic. Without deployment incentives, key learning effects and private-sector R&D investment may not occur, which slows down innovation. (del Rio, 2014, p. 282). For instance, del Rio notes that a common critique of combining CO₂ reduction policies is their negative effect on cost-effectiveness. However, this perspective overlooks the fact that these instruments aim to achieve multiple goals, not just CO₂ reduction. Effective coordination among agencies setting policy targets can enhance policy success, but inherent trade-offs between different objectives and instruments remain. (del Rio, 2014, p. 283).

Overlapping policies may seem problematic when analyzed in isolation but may be beneficial in a broader context that accounts for different goals and instruments. Given that no policy mix can fully satisfy all evaluation criteria, adopting a multi-criteria approach helps policymakers navigate trade-offs and optimize policy interactions to achieve sustainable energy and climate goals. (del Rio, 2014, p. 284). Indeed, improving one criterion may come at the expense of another, which makes it impossible to optimize all goals simultaneously. (del Rio, 2014, p. 283). A multi-criteria framework can help clarify these trade-offs and enable policymakers to weigh priorities and make informed decisions. Instead of evaluating individual instruments in isolation, policy assessments should consider the broader policy mix, recognizing conflicts and synergies across multiple objectives. (del Rio, 2014, p. 284).

2.3 Strategic and managerial capabilities and policy coherence

Prior studies have noticed a gap in longitudinal research on firms' strategic approaches to climate change mitigation, which highlights the critical role of regulatory enforcement and monitoring in strengthening corporate climate strategies (Majid et al., 2023, p. 2-18). Laws and policies are a significant part of both market and technological developments. While mandatory, they apply to all industries and companies operating in a given area, but voluntary efforts to promote ESG goals and thus development are shaped by a firm's internal resources and long-term goals. Majid et al. (2023) distinguished two groups of energy firms of which one continues with business-as-usual operations

without actively managing emissions whereas the other began tracking and reporting GHG emissions and setting reduction targets. (Majid et al., 2023, p. 16). According to Eccles et al. (2014), companies with high sustainability operations integrate sustainability into board responsibilities and executive compensation, prioritize stakeholder engagement, focus on long-term goals, and enhance nonfinancial disclosures (Eccles et al., 2014, p. 2835).

However, it is evident that some firms use ESG disclosures strategically to shape stakeholder perceptions about their financial prospects rather than to genuinely address environmental or social concerns. Such reporting is voluntary and typically highlights only favorable aspects of the firm's operations. (Brooks & Oikonomou, 2017, p. 3). Action undertaken without genuine intent and a clearly defined objective is unlikely to lead to meaningful progress. Furthermore, it has been shown that in addition to the positive correlation, there are also signs of negative or no correlation at all between firm financial performance and sustainability performance (Brooks & Oikonomou, 2017, p. 5). Such could occur if the financial and managerial resources dedicated to sustainability practices do not generate sufficient returns, leading to value destruction (Brooks & Oikonomou, 2017, p. 5).

Yet, companies seeking real impact with actions promoting sustainable development have the desire and conscious preparedness to sense and seize opportunities that green transition brings. As a result, studies claim how such companies consistently outperform their peers in both stock market and financial performance over time (Eccles et al., 2014, p. 2835). When the vision is clear and the strategy is designed with a long-term perspective in line with the possibilities of the green transition, resource allocation and simultaneous economic balancing are achievable. Eccles and others highlight that high-sustainability companies integrate sustainability into board oversight, executive compensation, and stakeholder engagement while maintaining a long-term focus (Eccles et al., 2014, p. 2836). They also measure and disclose more nonfinancial data. Auditing reinforces

credibility and indicates stakeholders a genuine institutional commitment. (Eccles et al., 2014, p. 2836).

According to Lindberg and others (2019), incumbent energy firms are increasingly adopting proactive strategies to maintain dominance in a renewable energy landscape, rather than outright resisting change. This suggests that the energy transition in the EU is evolving beyond the traditional pattern of incumbents blocking change, with some firms now embracing radical innovations (Lindberg et al., 2019, p. 12). Radical change can occur when misalignments arise, which is followed by emerging opportunities for transformative innovations. Discrepancies between policy goals, technological development, and market needs create such misalignments. These moments of instability, referred to as "windows of opportunity," enable new technologies to challenge established systems. (Geels, 2004, p. 914). Similarly, Gullberg (2013, p. 619) highlights that policy windows open unpredictably and remain open only for a limited time.

Geels and others (2016) found the dynamic interaction between firm internal factors and external institutional rules, and technological systems resemble strategic games, as actors respond to each other's decisions while possessing varying levels of resources. Firm capital, expertise, and influence over social structures affect the company's ability to transform. Geels and others describe transitions as broad systemic changes that happen through the alignment of developments across niches, regimes, and external pressures, or as sequences of events shaped by strategic actions and responses. Institutional change can occur incrementally through policy learning or be abruptly reshaped by external shocks, leading to rapid institutional replacement. In the technological substitution pathway, niche and mainstream technologies initially develop in isolation, supported by policies that shield emerging innovations. (Geels et al., 2016, p. 897-898).

The transformation processes in markets and technical systems result from the interactions and strategic actions of various actors. Social learning that occurs through imitation, knowledge sharing, and industry collaboration, maintain systems and evolve transitions.

However, power imbalances exist among actors, as they possess varying levels of resources, influence, and strategic capabilities. In response to emerging technologies, policymakers may introduce new regulations, while consumers may adapt their behaviors, which leads to a co-evolution of different system elements. (Geels, 2004, p. 907).

2.4 Organizational and knowledge-based capabilities and policy coherence

Firm's policy decisions and the selection of specific interpretative frameworks are influenced by its internal expertise. While external expertise can be acquired, such decisions may not be pursued if the potential benefits are not fully recognized. Nevertheless, it is important to acknowledge the role of internal capabilities in shaping the company's approach to climate-related policies. For instance, the adoption of a technology-oriented policy presupposes in-house expertise or, alternatively, collaboration with actors possessing the necessary competencies. Furthermore, internal expertise may play a critical role in policy selection, particularly in contexts involving complex policy mixes. In such cases, there is a risk that proprietary knowledge could diffuse beyond the firm's boundaries, posing a threat to its intangible assets and strategic advantage.

Bergek and others (2013) discuss how industry incumbents are significantly threatened by disruptive or competence-destroying innovations, which render their existing expertise and business models obsolete. This makes them vulnerable to competition from new market entrants. On the one hand, companies struggle when disruptive innovations eliminate the value of their established knowledge. On the other hand, shifts in customer and market dynamics create serious challenges when innovations introduce new performance criteria that a company has initially overlooked as insignificant. (Bergek et al., 2013, p. 1210). When considering the relationship between know-how and technological disruptions, studies (Dolata, 2009) urge industries and organizations to have the ability to identify, communicate, and incorporate new technologies while adapting existing strategies and expertise (Dolata, 2009, p. 1070).

Technological advancements can significantly alter a sector by reshaping its technological framework, affecting existing expertise and knowledge bases (Dolata, 2009, p. 1069). Bergek and others discuss how firms are continuously building upon existing knowledge rather than replacing it entirely. Competition within an industry is driven not just by price but by transformative changes that fundamentally reshape industries (Bergek et al., 2013, p. 1211). Firms should have the permeability of research, production, and market conditions to support innovation, foster new products, and create space for new market entrants. (Dolata, 2009, p. 1070). These are characterized by the flow of knowledge and expertise rather than traditional goods and services, forming dynamic networks of competence and information exchange. (Geels, 2004, p. 898).

Research suggests that investing in complementary capabilities and assets is crucial for sustaining innovation. (Bergek et al., 2013, p. 1211). In cases of competence-expanding innovation, incumbents must actively seek out new knowledge, form external partnerships, and develop multiple technological approaches simultaneously, integrating them over time. To continue competitive operations, Bergek and others urge companies to strategically invest in sourcing external expertise while also developing their internal capabilities to absorb and apply newly acquired knowledge. However, the effectiveness of this approach remains debatable in cases of firms being required to simultaneously develop internal expertise, seek external knowledge, and continuously integrate these different sources. (Bergek et al., 2013, p. 1222).

The interaction between technology and social competencies brought up by Dolata and Geels highlights the interaction between diverse social groups, including businesses, regulatory bodies, research institutions, and consumer organizations. (Geels, 2004, p. 900-904). Technological systems that rely on extensive infrastructure, such as the energy industry, comprise both tangible components (technology) and intangible elements (organizational competence and regulatory frameworks). According to Geels (2004), a technological system can be described as a network of interacting entities within a specific technological domain that functions under a particular institutional framework to create,

disseminate, and apply technology. The individuals responsible for shaping these systems operate across economic, political, technological, and social domains, integrating various aspects into a cohesive whole with cross-border interaction. (Geels, 2004, p. 898).

In addition to choosing policies, firms and industries can influence the development and design of policies. Industries follow policy developments, so companies must have flexibility and dynamism to revise regulatory frameworks, norms, and shared beliefs guiding industry practices (Dolata, 2009, p. 1070). According to Gullberg (2013), firms may influence policy through knowledge-sharing by providing expertise on economic, social, or environmental implications. Providing relevant data and insights is considered effective if it changes the beliefs of decision-makers and ultimately influences policy outcomes. However, for information to be impactful, it must be credible, relevant, and well-timed. Different types of information play distinct roles throughout the legislative process. Such expert knowledge is particularly valuable in the early drafting stages. (Gullberg, 2013, p. 613-614).

2.5 Technological capabilities and policy coherence

Only a couple of decades ago, studies on sustainability primarily focused on institutional reforms, often at the expense of exploring the potential of technological advancements. Freeman (1996), among others, took the approach in a different direction by emphasizing that addressing environmental challenges effectively will require a combination of regulatory measures, economic incentives, institutional changes, and continuous technological progress. A major breakthrough in renewable energy technologies, for example, could drastically alter the long-term sustainability outlook. (Freeman, 1996, p. 34-35)

Global energy transition from non-renewable natural resources to renewable resources-based production requires renewable energy technologies and energy efficiency. According to Pilpola and others (2019), it is estimated that nearly 75 % of emission cuts will come from these sources. Market trends show that falling costs have made solar and wind power increasingly competitive, which drives a surge in new investments in the

energy sector (Pilpola et al., 2019, p. 1). New technologies possess the potential to drive sector-specific transformation. Dolata (2009) emphasizes the power of technological changes to reshape the technological framework, affect existing knowledge bases, influence the whole value chain from research to market structures, encourage new forms of competition and collaboration, prompt regulatory adjustments, and expand or redefine industry boundaries (Dolata, 2009, p. 1068).

Indeed, while some innovations reinforce and sustain existing structures in certain economic sectors, they can be highly disruptive in others, leading to significant structural shifts and adaptation challenges (Dolata, 2009, p. 1067-1069). Studies show that certain sectors, such as energy, are characterized by high levels of innovation within their systems (Dolata, 2009; Geels et al., 2016). In these industries, technological advancements arise both from internal innovation efforts and from external influences (Dolata, 2009, p. 1068). Geels and others remind that companies invest in research and development not only to enhance existing products but also to explore disruptive innovations. While most R&D focuses on incremental improvements, some firms allocate resources to experimental projects with long-term potential (Geels et al., 2016, p. 898).

It is noteworthy that disruptive innovations may consist of different, complementary technologies. Such technologies include new information and communication technologies (ICT), which require specific competence as well. These external innovations often reshape sectoral operations, as seen in the energy sector, where decentralized and flexible energy production technologies, combined with digital innovations, enable enhanced centralized management of complex energy systems. (Dolata, 2009, p. 1068). Geels (2004) highlights that in cases where market conditions create favorable circumstances, these innovations can gain momentum and trigger widespread industry shifts and restructuring. This aligns with the concept of "creative destruction," where old systems are replaced by new, more efficient alternatives. (Geels, 2004, p. 914).

However, the adaptation to such emerging technologies may become an obstacle. Some industries may initially dismiss or underestimate the impact of technological advancements, while others have institutional mechanisms that actively facilitate transformative changes beyond traditional development paths (Dolata, 2009, p. 1067-1069). According to Bergek et al. (2013), incumbent firms might struggle to respond effectively to emerging threats despite their potential for innovation. They often end up with inadequate allocation of resources due to technological, organizational, and strategic inertia, which can be attributed to either the obsolescence of their existing competencies or the disruption of their competitive advantage due to new performance criteria becoming the industry standard. This highlights the challenges of sustaining long-term innovation, as successful innovation requires ongoing investment in resources and competencies (Bergek et al., 2013, p. 1222).

Conversely, if technological advancements are competence-enhancing, incumbents are expected to maintain their dominance, with few new competitors entering the market. (Bergek et al., 2013, p. 1212). A lack of new entrants indicates industry stability and the continued dominance of incumbents (Geels, 2004, p. 899; Bergek et al., 2013, p. 1220). Geels and others (2016) characterize both technology and industries by stability and resistance to change. Networks of interdependent organizations create structures that reinforce existing technologies and business models, making large-scale transitions challenging. Once a technological framework is established, it tends to persist due to sunk investments in infrastructure, expertise, and production systems. Furthermore, as technology becomes more widely adopted, continuous learning and incremental improvements reinforce its dominance. This path dependence fosters incremental innovation but poses obstacles to disruptive technological shifts. (Geels, 2004, p. 909-913).

The development of new technologies is closely linked to their operational environment. Naturally, interdependencies exist within related industries, as well as between technological advancements and evolving consumer demands. Geels proposes that these interconnections define the scope of a sectoral system that encompasses aspects such as

inputs, technological capabilities, and market requirements. Institutional factors also play a critical role in shaping technological development and influence both stability and transformation of systems. (Geels, 2004, p. 899). While the precise trajectory of future transitions remains uncertain, recognizing the mechanisms behind technological evolution can help guide strategic decisions and policy interventions toward more sustainable interaction between technology and social structures. (Geels, 2004, p. 916).

Researchers have identified four distinct pathways for transitions: technological substitution, transformation, reconfiguration, and de-alignment. Technological substitution happens when disruptive innovations emerge within niche markets and are ready for large-scale adoption when external pressures intensify. In transformation, existing actors adapt incrementally in response to external pressures, particularly when niche innovations remain underdeveloped. Reconfiguration implies a situation where niche innovations integrate within existing systems, which leads to structural modifications that are driven by external factors. This process frequently involves partnerships between established players and new entrants rather than direct competition. De-alignment and re-alignment occur when substantial external pressures destabilize the existing system, causing a period of uncertainty and competition among emerging innovations, eventually leading to a new dominant system. (Geels et al., 2016, p. 896-900).

2.6 Financial capabilities

Studies have shown that environmental and social performance positively correlate with economic performance, and that an effective corporate governance system is key when aiming towards stronger corporate sustainability performance (Alsayegh et al., 2020, pp. 6-8). ESG information disclosure represents valuable financial information for investors. However, investors might face the obstacle of lack of comparability across firms. According to research, the most significant reason investors give for the visibility of climate data is still financial information, but strategy and ethical practices have also sparked growing interest and new types of investment strategies (Amel-Zadef & Serafeim, 2018, p. 88). It has also been suggested that ESG information positively correlates with the economic

value of an investment by demonstrating the risks and opportunities of an investment. (Amel-Zadef & Serafeim, 2018, p. 92).

According to Liesen and others (2017), financial experts generally believe that markets are only beginning to grasp the full impact that the transition to a low-carbon economy will have on corporate competitiveness and long-term valuations. As a result, the financial risks associated with political and market-driven low-carbon initiatives may not yet be fully reflected in share prices. (Liesen et al., 2017, p. 36). Prior research indicates that stockbrokers and mainstream analysts often overlook environmental factors in their investment decisions, potentially leading to inefficiencies in how financial markets price carbon disclosure and performance. (Liesen et al., 2017, p. 40). This raises the question of whether markets properly account for carbon-related factors, which would be reflected in performance differences in risk-adjusted returns between companies with varying levels of carbon disclosure and performance.

Additionally, firms with strong environmental or social performance tend to exhibit lower systematic risk, further reinforcing the value relevance of sustainability-related factors in financial markets. (Liesen et al., 2017, p. 40-41). Firms that fully report their GHG emissions in line with frameworks like the GHG Protocol, GRI, and CDP tend to generate significant risk-adjusted abnormal returns. Conversely, companies with incomplete disclosures faced financial penalties from the market (Liesen et al., 2017, p. 56). Moreover, organizations that disclose ESG related opportunities are provided with guidance to identify and respond to environmental risks. Research shows that such actions can contribute to higher revenues, reduced financial and operational costs, enhanced competitive positioning and reputation, and greater access to capital. (Boffo and Patalano, 2020, p. 25).

Furthermore, markets also appear to value carbon performance (Liesen et al., 2017, p. 56). Liesen and others suggest that carbon disclosure and performance should not be overlooked in investors' investment decisions. Socially responsible investors (SRI) may

prioritize companies with comprehensive GHG reporting and strong climate performance for ethical reasons. Meanwhile, mainstream investors can also capitalize on financial market inefficiencies by investing in these companies, benefiting from the mispricing of the positive effects of complete emissions reporting and high GHG efficiency. (Liesen et al., 2017, p. 57).

Furthermore, instead of placing a significant financial burden on corporations as generally thought, financial reports combined with carbon disclosure reporting and management enhance transparency and stakeholder dialogue (Strand, 2024, p. 8). Delmas and Burbano see firms benefiting from transparent environmental performance with improved stakeholder perceptions, even with disclosed liabilities (Delmas & Burbano, 2011, pp. 80-81). An important argument for the relevance of corporate carbon disclosure lies in estimation and information risk. Moreover, stocks with limited available information tend to have higher estimation risk, whereas greater transparency allows for more accurate forecasts of future cash flows (Liesen et al., 2017, p. 39). Jägemann and others (2013) argue that excluding certain decarbonization options increases costs compared to a comprehensive strategy (Jägemann et al., 2013, p. 623).

Liesen and others encourage investors to consider carbon disclosure and performance as key factors in their investment decisions. Implementing mandatory and standardized carbon reporting would not only enhance market efficiency but also lead to a more effective allocation of capital in the economy. (Liesen et al., 2017, p. 35). To ensure realistic and legitimate environmental disclosure, firms may exploit shared best practices and collaboration with other firms, NGOs, and government entities. Shared information about internal structures, operational processes, and reward systems may improve firms' monitoring, improvement, and reporting of environmental performance (Delmas & Burbano, 2011, p. 81).

2.7 Collaborative capabilities

Brooks and Oikonomou (2017) have compiled a comprehensive review of remarkable studies about the impact of ESG disclosure and performance on firm value. Studies have shown that the evolution of stakeholder theory has provided a foundation for CSR advocates to argue that corporate social responsibility can foster and strengthen trust-based relationships with various key stakeholders who play a crucial role in the firm's long-term success and financial stability (Brooks & Oikonomou, 2017, p. 1). Indeed, Strand (2024) found firms achieving strong sustainability performance through effective stakeholder engagement and collaboration. According to Strand, the integration of financial, social, and environmental metrics within annual reporting, enables holistic corporate sustainability. (Strand 2024, p. 6).

Social disclosures have become increasingly mandatory requiring companies to provide specific information by law, yet voluntary disclosures are common providing varying scopes and detail of reporting between organizations. The United Nations recommends all large companies to be required to publish sustainability reports by 2030. Beyond these mandatory requirements, firms can take a proactive approach—voluntarily exceeding minimum stakeholder expectations—or a reactive approach, addressing social pressures only as they emerge and to the extent necessary. (Brooks & Oikonomou, 2017, p. 2).

In addition to recognizing overlooked stakeholders to identify business risks and opportunities and establishing a clear, purpose-driven vision, firms should start to collaborate with policymakers, investors, employees, customers, and suppliers to align goals and support a pro-renewables policy environment (Strand 2024, p. 12). However, since SDGs address complex global challenges, companies must embrace broad stakeholder cooperation to create effective solutions (Strand 2024, p. 17).

Research suggests that a firm's incentive structure and ethical climate play a key role for companies shifting towards sustainability, fostering a culture of collaboration is crucial.

Structural elements, such as tax policies, social programs, and corporate regulations, also play a role in guiding businesses toward sustainable practices (Strand 2024, p. 19). Notably, Finland pioneered the world's first carbon tax in 1990, highlighting the region's proactive climate strategies (Strand 2024, p. 21). Successful Nordic firms define clear long-term goals, ensure internal alignment, and take a proactive stance on sustainability challenges (Strand 2024, p. 25).

2.8 Capabilities for the governance of innovations and business model transformation

Recent recognition highlights that business model innovations, alongside technological advancements, play a crucial role in driving low-carbon transitions. According to Freeman (1996), the challenge of how the global economy can transition to a sustainable growth model is influenced by both regulatory strategies, economic incentives, and institutional reforms, as well as by advancements in technology. While significant attention has been given to policy incentives and institutional frameworks, the role of continuous technological innovation has often been overlooked. (Freeman, 1996, p. 27). Pilpola and others (2019) investigate the transition to clean energy that represents a radical transformation of the entire energy system affecting both security and risk factors. Traditionally, energy security has been defined by availability and affordability. However, new perspectives have started to also consider accessibility and acceptability (Pilpola et al., 2019, p. 2). A successful transition requires co-evolution across multiple systems, including technological, economic, social, and political. They must all be aligned to enable carbon neutrality (Pilpola et al., 2019, p. 3).

While much research has explored barriers to adaptability, Dolata (2009) found less attention having been given to the conditions that promote high adaptability. Sectors that successfully navigate transformation typically benefit from strong institutional frameworks that provide both stability and flexibility. This adaptability is further shaped by policy choices, such as innovation policies that prioritize strategic technology niches over protecting dominant industry players. (Dolata, 2009, p. 1072). The energy sector, for

example, faces critical challenges such as carbon emissions and resource reliability. Geels (2004) emphasizes that addressing these issues requires systemic transformation rather than incremental adjustments. Policymakers play a vital role in facilitating such transitions by fostering alternative technologies and creating conducive regulatory environments. However, these shifts are often complex and unpredictable, involving periods of experimentation and co-existence between competing solutions. Over time, dominant technologies emerge, solidifying into new socio-technical regimes. (Geels, 2004, p. 916).

Dolata notes that the introduction of new technological opportunities often challenges the alignment between existing technologies, structures, and institutions (Dolata, 2009, p. 1074). Despite notable advancements in renewable energy, a large-scale transition will be unfeasible without substantial increases in R&D funding from both public and private sectors, along with proactive policy measures to accelerate innovation and adoption. (Freeman, 1996, p. 38). The greater the technological disruption, the more pressure there is for a sector to undergo substantial transformation. This process requires industries to recognize and integrate these innovations, even when they diverge from established technological paths. (Dolata, 2009, p. 1069-1070). Technological evolution consistently introduces new opportunities, challenges, and uncertainties. It opens the market to new entrants, pressures existing players to adapt their strategies, reshapes competitive landscapes, demands regulatory revisions, and influences societal perceptions and consumer behaviors. Consequently, sectoral transformation is typically a gradual process, shaped by both internal and external actors who introduce new strategies and redefine industry trajectories. (Dolata, 2009, p. 1074).

Some sectors struggle with adaptability due to rigid institutional structures and deeply ingrained technological paths. Others, particularly those with established mechanisms of competition, innovation, and experimentation, are more equipped to embrace transformation. These industries incorporate flexibility into their existing systems, fostering open-mindedness and proactive engagement with disruptive technologies. (Dolata, 2009, p. 1071). Rather than resisting change, sectors that thrive on transformation foster

environments where new technologies are embraced early. This process, referred to as transformation-supportive path dependency, ensures that sectors can integrate disruptive technologies while proactively adjusting their structures and institutions. However, even in such cases, sectoral transformation is rarely smooth. Instead, it is a dynamic and competitive process, characterized by power struggles, selective adjustments, and continuous shifts in industry dynamics. (Dolata, 2009, p. 1073-1074).

Ultimately, for transformation to be successful, technological potential must be met with the adaptability of sectoral structures, institutions, and key stakeholders. A clear example of this is how a small number of dominant electric power companies have successfully leveraged decentralized and flexible energy production technologies to maintain their market influence. (Dolata, 2009, p. 1074).

2.9 Theoretical framework

The theoretical framework approaches the research question by considering the company's internal capabilities and external responsibilities towards stakeholders and binding policies. The capabilities to be considered are management's ability to strategic planning, identify and utilize existing expertise and competence development, technological capabilities, financial resilience, ability for transparent collaboration, as well as administrative capabilities and business model resilience. Accountability towards external commitments must also be considered. The law binds industries and companies to comply with certain policies, as do stakeholders who have their own obligations.

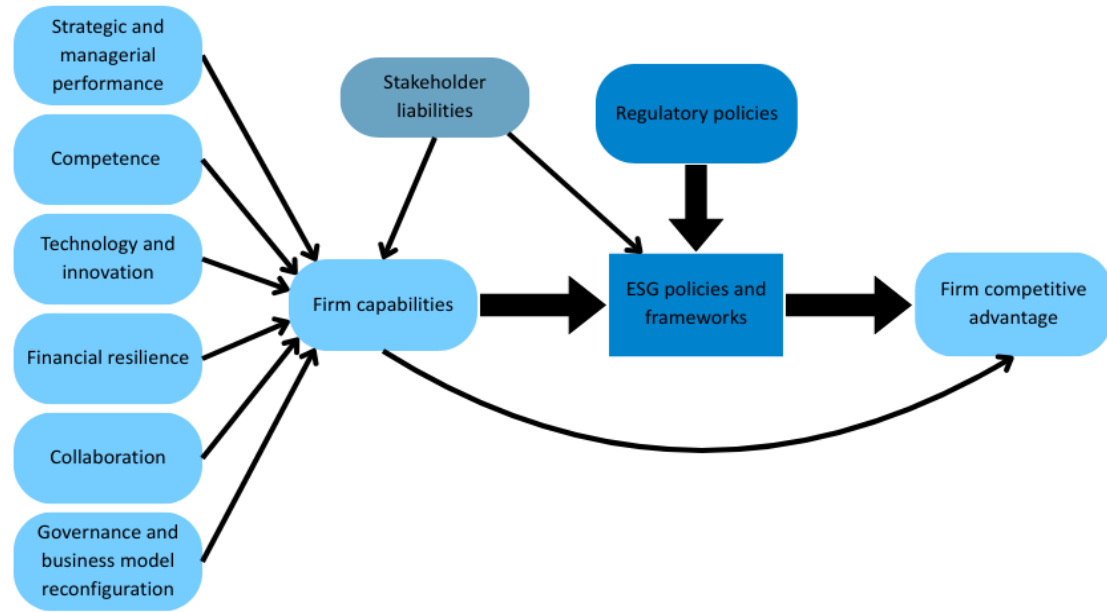


Figure 1 Theoretical framework

3 Methods

The empirical data for this study is based on qualitative methods. The research subject was the electrical industry, from which two companies were selected. Sweco is a consultancy company that specializes in assisting clients, such as companies in the electric sector in identifying market trends and emerging signals by shaping strategies for responsible development, and whose projects fall within the researched industry, among others. In addition, based on the results provided by Orbis, the leading electrical industry company in Finland, Fortum, was selected. Unfortunately, it was not possible to conduct an interview with Fortum for the research, so we had to rely on company reports. Fortunately, Fortum has comprehensive reports on its sustainable development activities.

To find out about the leading electric power generation company operating in Finland, a search was conducted in Orbis based on the following criteria:

Classification 1	Classification 2	Search
Location	World region, country or region in country	Finland
Activities and industry	Industry classification	351 - Electric power generation, transmission and distribution

Table 1 Data collection

In total, the software detected 11,067 active companies operating in the selected industry, led by Fortum with an operating revenue of 6,309,237 USD in 2024.

The interview was conducted with Mirka Lummaa, who serves as an Executive Director in Sustainable Development at Sweco. In this capacity, she oversees the integration of sustainability principles into corporate strategy, with particular expertise in sustainable finance. Prior to her tenure at Sweco, Lummaa held senior management positions within

the financial sector, including roles at a banking institution and various Finnish companies, providing her with a comprehensive background in both corporate sustainability and financial governance.

3.1 Sweco

Sweco is a leading company in engineering and architecture consultancy in Europe. One of Sweco's core missions is to enable businesses turn sustainability into a competitive advantage by offering end-to-end support with strategy and execution. As a trusted partner in the green transition, Sweco aims at guiding companies toward sustainable growth. Sweco assists clients in identifying market trends and emerging signals by shaping strategies for responsible development. In the built environment and industrial sectors, they capitalize on the financial opportunities of the green transition, factoring in natural resources, biodiversity, climate change, energy shifts, digitalization, and demographic trends. (Sweco, 2025a).

Sweco's sustainability consulting services support clients across a wide range of sustainability initiatives, including the following: the development of sustainability, biodiversity, and carbon strategies; conducting sustainability assessments; providing emissions trading guidance; advising the public sector on sustainability policies; assisting with sustainability certifications and reporting; managing carbon strategies and circular economy practices; conducting climate assessments and ESG impact evaluations; ensuring sustainable procurement and feasibility assessments; managing environmental impact assessments, permits, and remediation plans; and performing biodiversity and nature conservation studies. Sweco's consultants help businesses achieve real sustainability outcomes while maintaining a competitive advantage. They integrate sustainability into business operations and investment strategies and align them with long-term environmental and financial goals. (Sweco, 2025b).

Sweco ensures sustainability is embedded across all project phases, from planning to execution. Their approach connects key sustainability aspects, such as carbon footprints,

with financial outcomes. This integration applies to business operations, infrastructure projects, urban planning, and industrial development. Sweco provides solutions to minimize environmental risks and ensure regulatory compliance. Key areas include environmental impact assessments and monitoring; obtaining environmental permits; planning remediation for contaminated sites; conducting biodiversity and conservation studies; and managing emissions permits and environmental regulations. With deep expertise in industrial projects, Sweco streamlines environmental approval processes by reducing risks and ensuring project acceptance. Their integrated service approach ensures seamless coordination between sustainability experts and project planners, which facilitates efficient and compliant project execution. (Sweco, 2025c).

3.2 Fortum

Fortum aims to be a leading energy company in sustainability (Fortum, 2025a, p. 16). Currently, they rank as the third-largest electricity producer in the Nordic region and the company is recognized for having one of the lowest specific CO₂ emissions among European power generators. Fortum's overarching purpose is to enable a world where people, businesses, and nature can thrive in harmony. It does so by generating and delivering clean energy at scale and supporting industrial and societal decarbonization in line with climate targets and environmental sustainability. In the Nordics, Fortum's core operations focus on efficient, low-carbon energy production, primarily through hydropower and nuclear energy, as well as the dependable provision of electricity and district heating in Finland and Poland. (Fortum, 2025a, p. 34).

Fortum has set its carbon neutrality target to 2030, and all coal generation should stop by the end of 2027. Fortum's emission reduction targets are based on the Paris Agreement and climate science (SBTi 1.5°C). Technological advancements and internal competence are central solutions, and Fortum currently has several innovation projects underway. Fortum's ambitious sustainability targets reflect a strong sense of purpose. (Ulfves, 2023). Fortum's strategy is structured around three key priorities. First, they aim to deliver reliable clean energy by ensuring energy is available at scale when needed, while

continuing to enhance operational excellence, efficiency, and flexibility. Decarbonization and modernization efforts are ongoing, particularly in emission-generating segments, underpinned by clear environmental commitments. Second, they are driving industrial decarbonization and growth by forming strategic partnerships aimed at reducing emissions, expanding low-carbon energy production, and exploring opportunities in clean hydrogen and small modular nuclear reactors (SMRs). Third, they are transforming and developing the company to align with its strategic direction by reorganizing the corporate structure, optimizing operational models, and fostering a leadership culture that supports long-term strategic implementation. (Fortum, 2025a, p. 34).

4 Results

Scholars have identified strategic, governance, and cooperation-based capabilities to be key factors driving the long-term success of a company's sustainability (Eccles et al., 2014, p. 2836). Strategic capabilities refer to the decision-making time horizon and the incorporation of measurement and reporting tools to follow the development towards pre-defined goals. Cooperation means actively engaging pertinent stakeholders and transparently reporting on operational practices while also committing to stakeholders' sustainability practices. Governance implies the ability of management to actively measure and report sustainability related data and disclose that data to pertinent stakeholders. (Eccles et al., 2014, p. 2836-2846).

The literature review highlighted the importance of internal organizational capabilities as key drivers in the decision-making processes related to ESG policies. The focus was placed on strategic, managerial, knowledge-based, technological, financial, collaborative, and administrative capabilities. Consequently, the interview questions were specifically designed to address these capabilities. Fortum's reports were also examined with these categories in mind. The findings presented below demonstrate a clear alignment between literature and empirical investigation.

Each of the capabilities is analyzed by first presenting Lummaa's analysis and reflecting it on the literature. After the discussion, Fortum's reports are discussed from the same perspective, further reflecting on the literature and Lummaa's thoughts.

4.1 Strategic capabilities and carbon disclosure

The interview started by asking Lummaa about the importance of strategic capabilities behind ESG policies in energy projects. This was followed by a question about how ESG requirements and policies are considered in the strategic planning of projects. Below are Lummaa's thoughts followed by reflections to the literature and the case company:

Strategic capabilities should from the outset be grounded in strategic planning that is based on sustainable development. Companies should begin their strategy processes by identifying sustainability-related opportunities and risks, as well as by considering their long-term implications. Increasingly, companies are proactively identifying opportunities related to sustainable development. If these are not considered in the early phases of strategic planning, it becomes difficult—or even impossible—to identify them retrospectively. Therefore, strategy work should begin with the recognition of these opportunities and an assessment of their short- and long-term impacts.

Promoting ESG goals is not driven only by regulatory enforcement but even more important are business-oriented goals, which are guided by internal resources and strategic perspective. Strategic games between companies produce decisions and windows of opportunity that competitors try to seize (Geels et al., 2016, p. 897-898). As the literature and Lummaa's interview show, identifying and seizing opportunities at the right time is key to achieving change. Reconfiguring the necessary resources, stakeholders, and technology requires planning from the beginning of the project.

Fortum's strategy emphasizes sustainable growth. Carbon neutrality is set as a long-term goal, which is made possible by capability-based growth. Timely identification of opportunities and development projects with customers are key factors. In the short-term, Fortum considers financial stability important to protect against unpredictable risks including geopolitical tensions, general weaker economic outlook with higher inflation and interest rates, tightening regulation, and volatile commodity markets. (Ulfves, 2023)

Fortum employs time horizons that differ from conventional medium- and long-term definitions, where the medium term is considered to span one to three years, and the long term extends beyond three years (Fortum, 2025a, p. 39). Sustainability and low-carbon energy production are core components of Fortum's corporate strategy. The company's organisational structure is aligned with its primary value drivers: a portfolio focused on low-carbon generation, robust sales and trading operations, and a strong customer-centric approach. Fortum's near- and long-term emission reduction targets are aligned with the Science Based Targets initiative (SBTi), and these targets are integrated

into Fortum's overarching business strategy. In support of this, Fortum has developed a climate transition plan that outlines specific actions and resource allocations required to achieve net-zero emissions. This plan is grounded in Fortum's current operations and business model, while also accounting for future developments and potential changes in the external operating environment. (Fortum, 2025a, p. 40).

Additionally, Fortum has defined targets related to biodiversity, pollution, labor conditions within its own operations and supply chain, and responsible business conduct. The SBTi-aligned climate targets are designed to support a global warming limit of 1.5°C. These targets encompass reductions in greenhouse gas (GHG) emissions across Fortum's entire value chain, including emissions from power and heat production, emissions related to the sale of electricity, and emissions from the end-use of sold natural gas. Furthermore, Fortum has committed to reducing GHG emissions associated with fuel and energy-related activities in the sale of heat. (Fortum, 2025a, p. 35).

Lummaa emphasizes the importance of continuous environmental monitoring and adaptation to changes:

Communication must be transparent and continuously improved. Projects typically have predetermined communication plans about what will be reported. However, as the project progresses, circumstances and the environment may change, requiring new topics to be included in communication. When conditions change, decisions must also adapt accordingly. For project leadership, this demands both agility and precision.

Fortum's operations are in line with Lummaa's ideas and strategic preparedness for environmental risks is clear. Fortum fosters a transparent and ethically responsible corporate culture by upholding its core values Code of Conduct, and by putting these into practice through measures such as regular communication and employee training (Fortum, 2025a, p. 26). Key external risks related to climate policy and regulation include the possibility that national-level climate actions may surpass EU targets for reducing greenhouse gas emissions, increasing renewable energy output, and improving energy efficiency. Such measures could result in overlapping or inefficient policies, for instance, by

weakening the effectiveness of the EU Emissions Trading System (ETS), introducing stricter limits on incineration and fuel combustion, or increasing regulation of the electricity market. Fortum supports the establishment of clear criteria for capacity compensation if such regulatory frameworks are introduced. Furthermore, improved demand-side flexibility is needed to manage the growing share of variable renewable energy in the system. (Fortum, 2025a, p. 25).

The shift toward a low-carbon economy also carries risks from the emergence of disruptive technologies that could provide low-cost flexibility or storage options in the energy sector. A rapid drop in the cost of renewable energy could also reduce the value of existing conventional power and heat generation assets. Fortum addresses these risks by closely tracking technological advancements and investing selectively in innovative solutions. Another potential risk is heightened activism from NGOs, which could influence how key stakeholders perceive the company. To manage this, Fortum emphasizes the sustainability impacts of its strategic and operational choices, communicates transparently with stakeholders about its strategy execution, and maintains both a diverse investor base and flexibility in its financing arrangements. (Fortum, 2025a, p. 25).

The first mover advantage can also be a driver of ESG decisions:

One key factor behind ambitious pursuit of ESG goals can be an organization's own ambition to be a pioneer and shape the market. First movers often gain a competitive advantage, although this typically lasts only for a limited time before others follow. Sometimes the aim is purely to gain a competitive edge by being the first to act in a certain area. Competitive advantage can also be pursued by disrupting the entire value chain through fundamentally new ways of doing things. Another approach is to prioritize financial viability in implementing ESG actions.

Fortum strives to be a pioneer in clean energy, and decarbonization is central to Fortum's strategy. In addition to its existing operations, the company is actively identifying and developing new growth opportunities in clean energy solutions. Fortum aims to lead in the use of advanced energy technologies and in the development of innovative applications. (Fortum, 2025a, p. 16). To maintain its leadership in clean energy technologies, Fortum invests in innovation and commercialization. The company collaborates with

global suppliers, service providers, universities, and research institutions. Fortum also invests in start-ups that focus on decarbonization, flexibility, and sustainable economic transformation, and seeks technologies that enhance the efficiency of current assets or unlock new market opportunities. (Fortum, 2025a, p. 17).

ESG policies should be part of a company's operations from the beginning, and ideally, they are part of the company strategy:

ESG requirements and green transition goals must be integrated into project planning at the earliest possible stage. Sweco is actively involved in planning for the green transition. ESG goals and indicators are agreed upon at the start of the project, and progress toward these goals is discussed at every project meeting. Often, project developers themselves may not fully understand stakeholder expectations at the outset. Therefore, sustainability must be incorporated into both the planning process and the construction of project components from the beginning. If this is not done, the project will immediately fall behind, as investors have specific requirements and expectations that must be addressed early in the planning phase. ESG guidelines and broader sustainability reporting are thus considered from the very beginning and remain a significant part of the project throughout its lifecycle. Ideally, sustainability issues are already embedded in the company's overall strategic planning, but at the latest, they must be addressed during the project design phase.

Studies show how companies that continue with business-as-usual operations are consistently outperformed by companies that promote sustainable development in their operations and disclose ESG related data (Majid et al., 2023, p. 16). Such high sustainability companies have sustainable practices integrated into management responsibilities and stakeholder relations (Eccles et al., 2014, p. 2835). Additionally, their strategies rely on long-term goals, which improves the allocation of resources (Geels et al., 2016, p. 897-898). Internalizing ESG policies requires financial investment, internal organizational know-how, and flexible stakeholder collaboration.

However, many companies only include ESG reporting to promote their reputation and report data that favors their actions. Studies show that such greenwashing does not promote firms' transition towards the real opportunities that green transition brings (Brooks & Oikonomou, 2017, p. 3-5). Without a real desire to be part of the change, companies

miss out on sensing opportunities that could not only promote their operations but also society's transition towards more sustainable solutions. In line with the interview and literature, sustainability is embedded into the firm's strategy. Fortum's mission is to enable a world where people, businesses, and nature can thrive together. The company focuses on producing and consistently supplying clean energy at scale, supporting industrial decarbonization, and helping societies achieve their climate goals in harmony with the natural environment. The cornerstones of Fortum's strategy are delivering reliable clean energy, driving decarbonization in industries, and transforming and developing. (Fortum, 2025a, p. 34).

Fortum's operations are built around sustainable development, so financial preparation for investments is deeply embedded in the company's strategy work. However, it is worth mentioning that efforts towards sustainable business may also create a financial burden for companies. This can be explained by strategy work, where financial and management resources are not sufficiently committed to developing sustainable development activities, such as innovation (Brooks & Oikonomou, 2017, p. 5). As Lummaa notes, effective and sustainable change cannot be achieved by appeasing or action without direction but requires real desire and long-term action to be achieved successfully.

Preparing for environmental changes in a timely manner is important for the implementation of projects:

Sweco conducts scenario planning to identify significant sustainable development transitions. These scenarios are regularly reviewed and updated in response to emerging trends. The potential impact of these scenarios on projects is carefully analyzed and documented.

At Fortum, scenario work and risk preparedness are an ongoing part of operations and are reported regularly. Fortum operates in a global and politically sensitive environment, with its main operations in the Nordic countries and Poland. As such, it faces risks from geopolitical instability, changing macroeconomic conditions, and shifts in consumer behavior. The ongoing geopolitical uncertainty has increased nationalism and protectionism, which could potentially lead to trade restrictions or sanctions that could affect

Fortum's production, demand, asset values, and access to financing. To manage this, Fortum continuously monitors the political and economic landscape and updates its strategic scenarios accordingly. Fortum's operations are also subject to complex EU and national energy and climate policies. Regulatory risks are managed through continuous scenario planning and active engagement with policymakers to influence regulations in line with Fortum's strategic goals. (Fortum, 2025a, pp. 23-24).

Strategic risks are identified and assessed as part of Fortum's regular strategy reviews. The company actively evaluates its business portfolio and explores opportunities for acquisitions, investments, and divestments. Risks related to these activities are addressed through a structured investment process that includes risk identification, mitigation plans, and monitoring during implementation. Fortum also manages major investment risks through contract structures and insurance, and it conducts risk assessments of partners before entering significant agreements. Furthermore, Fortum's strategy includes investing in new and emerging clean energy technologies such as hydrogen and renewable solutions. While these carry inherent risks related to economic viability and intellectual property, Fortum mitigates them by carefully assessing technological readiness and investing selectively, often in collaboration with partners. (Fortum, 2025a, pp. 23-24).

4.2 Organizational and competence-based capabilities

Questions focused on competencies and the role of know-how in ESG projects. Consideration was also given to how ESG values can be embedded into the organizational culture. According to Lummaa, a company's internal expertise is a resource whose full potential is not always understood and used:

Employees represent a significant internal resource whose full potential may not always be fully recognized or utilized. -- It is essential to engage the entire organization by involving personnel. Employees are often an underutilized resource. Staff generally find ESG values important and meaningful, which increases their engagement with the organization. When making ESG-related decisions, it's wise to listen to employees' thoughts and opinions. "All the wisdom doesn't live in the boardroom."

Fortum's personnel are committed to adhering to the company's adopted ESG values. A strong system of internal controls helps prevent unauthorized actions and ensure adherence to company policies and guidelines. Raising awareness and fostering a culture of ethical behavior is supported through continuous training and communication. Mandatory e-learning modules ensure organization-wide participation, while additional engagement is encouraged through webinars and workshops at all levels. (Fortum, 2025a, p. 26). Training is a core element of Fortum's compliance efforts. All employees, including those in leadership, are required to complete training on ethical business conduct, anti-corruption, and anti-bribery as part of the Code of Conduct program. (Fortum, 2025a, p. 100). Furthermore, decisions are not only made by management, but also by Shareholders' Nomination Board that plays an active governance role by critically evaluating management decisions. Board members are selected for their high-level international business experience and deep expertise in sustainability, the energy sector, and digitalization. (Fortum, 2025a, p. 49).

The operations of companies are largely routine based, but sustainable development brings new issues into the picture that require continuous monitoring:

When considering the role of competence, it is important to understand that strategy work involves many routine and business-as-usual elements. However, sustainability and ESG-related issues introduce several new, constantly evolving and developing areas into strategic planning. Organizations must stay continuously updated on aspects related to taxonomy, technology, innovations, and stakeholder requirements. While internal expertise exists, it must be continuously developed and expanded.

The green transition that is shaking up industries threatens companies' existing knowledge base. Existing expertise and business models may become outdated or have shortcomings that new innovations require (Bergek et al., 2013, p. 1210). Significantly, companies compete on their ability to continuously build upon existing knowledge to adapt to transformative changes that reshape industries (Bergek et al., 2013, p. 1211). Staying up to date requires innovation supportive research, production, and market conditions. Dynamic competence and information exchange between and within industries is necessary (Geels, 2004, p. 898).

To maintain its competitiveness, Fortum relies on its asset and competence base. Maintaining efficient and flexible operations and decarbonizing and modernizing them are achieved through competencies in line with environmental targets (Ulfves, 2023). On the human capital side, Fortum acknowledges the risk of skill shortages, employee errors due to insufficient training, and challenges in retaining critical expertise. To mitigate these risks, Fortum invests in employee development, succession planning, and regularly updates its compensation systems. It also promotes job stability through permanent, full-time positions and supports continuous learning and career growth, fostering employee commitment. (Fortum, 2025a, p. 47).

In line with the literature, Lummaa also states that combining expertise between different departments in an organization is important (Geels, 2004, p. 898):

ESG policies must be integrated across the entire organization, making internal co-operation vital. In established organizations, departmental silos are typically low, which facilitates collaboration. The ability to collaborate effectively must be constantly developed. While external expertise can always be purchased, internal organizational knowledge is easier to leverage when the culture is well understood.

Prior literature (Bergek et al., 2013, p. 1222) sees simultaneous development of internal and external knowledge crucial for sustained innovation. Depending on the size of the organization, the planned innovations may exceed the company's know-how capital, making it necessary to acquire external expertise (Bergek et al., 2013, p. 1222). To boost innovation and speed up the commercialization of new solutions, Fortum enhances its internal innovation and venturing activities while forming partnerships with top global suppliers, tech and service providers, research institutions, and universities. The company invests—both directly and through partnerships—in start-ups offering promising innovations that support decarbonization, flexibility, and the shift to a sustainable economy. Fortum also targets technologies that improve the efficiency of its current assets or enable the development of new markets and products. It consistently seeks out emerging clean energy solutions and ways to improve system and resource efficiency. (Fortum, 2025a, p. 16).

4.3 Technological capabilities

In terms of technology, attention was focused on technological capabilities and on the benefits and challenges of adopting new innovations. Lummaa emphasizes technology as the foundation of development projects, which increases the need for risk management and balanced and adaptive innovation:

Technological development is ongoing, which compels companies to continuously innovate and to develop and scale technologies. In many projects, technological innovation forms the foundation—or at least a key component—of project advancement. For example, a new production facility may aim to minimize emissions. In such a facility, carbon capture technology might be a small part of the overall project, but a crucial one for its success. The role of technological innovations can vary greatly between projects, but their significance is often substantial. However, with new technologies, one must also consider the likelihood of technology-related risks. If a new technology fails to perform as expected, it can significantly impact project viability. The more mature the technology, the lower the risk. Scalability is also crucial in maximizing the benefits of new technology. Achieving ESG goals with technological innovation requires continuous balancing and adaptation.

Geels et al. (2004, p. 915) note that technological disruption requires understanding of technological ecosystems. The interview results show exactly the same mindset, where companies must constantly prepare for changes in production, distribution, and consumption in their operations. Like Dolata, Lummaa recognizes the power of technology being the driver of transformations. Indeed, technological innovations can be the cause of disruption leading to structural changes and adaptation challenges (Dolata, 2009, p. 1069). Success requires the ability to adapt to emerging technologies through resource allocation, ongoing competence-building, and understanding the long-term strategic potential of technologies (Bergek et al., 2013, p. 1212; Dolata, 2009, p. 1069). However, some industries are difficult to transform as the technological frameworks lie deep in existing institutional frameworks. Such industries rely heavily on certain policies that are difficult to change (Bergek et al., 2013, p. 1220). In such industries, the transition must occur across industry. Far-sighted strategic planning of policies and frameworks is important to achieve dynamic long-term change.

The electric power sector is one of the industries that require transition across industry. Continuous technological innovation is a significant part of business operations, as the transition to carbon-neutral energy specifically requires clean energy production, i.e. investment in technology. Fortum is among the cleanest energy production companies in Europe. They constantly innovate to increase energy efficiency and for cleaner energy production. Fortum's carbon-neutral energy production relies on nuclear, hydro and wind power, hydrogen, and solar energy. Fortum aims to accelerate society's transition to clean energy by investing in solar and wind power and exploring business opportunities in new nuclear power and clean hydrogen. (Fortum, 2025b).

Despite the opportunities, investing in new technologies entails risks such as uncertain profitability and intellectual property challenges. Fortum manages these by continuously evaluating the economic viability of technologies and by partnering selectively on development projects. The company remains alert to technological disruptions that could impact energy markets, such as the advent of inexpensive storage or flexible generation. Declining renewable energy costs could also affect the value of Fortum's conventional assets, which prompt ongoing monitoring and selective innovation investments. (Fortum, 2025a, p. 24).

Fortum's operations are designed to remain adaptable. The shift toward a low-carbon and more resilient economy will inevitably affect surrounding regions. Fortum recognizes that decarbonizing energy-intensive industries through electrification will increase electricity demand, requiring the power system to integrate more low-carbon, reliable, and flexible capacity. Although reduced reliance on fossil fuels lowers import dependency, the rise of variable renewable energy sources heightens the need for energy security. (Fortum, 2025a, p. 54).

As Dolata (2009) and Lummaa note, the energy industry is undergoing a dual transition, where digital solutions drive the adoption of carbon-neutral technology and increased production efficiency, thereby promoting the green transition (Dolata, 2009, p. 1068).

Economic policies have increasingly prioritized growth and competitiveness, leading to greater recognition of the interconnectedness between market demand, scientific progress, and technological innovation. Information and communication technology (ICT) has the potential to reduce energy consumption, material usage, and transportation costs. However, the extent to which these benefits are realized depends not only on technological capabilities but also on social, economic, and scientific policies. Therefore, the transition to a sustainable economic model requires both a shift in research and development (R&D) priorities, particularly in areas such as renewable energy and resource efficiency, and the implementation of regulatory mechanisms that support the widespread adoption of these innovations. (Freeman, 1996, p. 33).

One example of this is smart systems offered by Fortum, where energy consumption is optimized using digital technology. Fortum optimizes individual energy consumption by combining digital technology to enable consumer's understanding of the functioning of the energy system and enabling flexibility. Households can contribute to system-level flexibility by adopting smart technologies such as intelligent electric vehicle (EV) charging solutions and heat pumps. These technologies automatically optimize energy use while providing flexibility to the grid without compromising comfort or convenience. By actively managing consumption and utilizing smart solutions, households can ensure they only consume the energy they truly need. This, in turn, may also result in lower electricity costs. (Fortum, 2025c).

At Fortum technologies are also combined in other ways: combined heat and power generation, which is based on the combustion of fuels, enables decreased environmental impact as the largest impact is related to flue gas emissions. Environmental impacts have been reduced by using various flue gas cleaning methods and advanced combustion technologies. Carbon-neutral fuels have been added to the fuel range, which reduces sulfur emissions and nitrogen oxides. Combined heat and power generation also leaves behind ash, which, in Europe, is utilized in the building materials industry, civil engineering or mining. (Fortum, 2025a).

4.4 Financial capabilities and carbon disclosure

Financing is a significant part of green transition projects. In the interview, the target of interest was not only in financial profitability but also in the role of investors behind the projects. In the interview, Lummaa emphasized how companies are increasingly required to report ESG data to the public:

Financial and economic resources are strongly influenced by the price of emissions, which is often a key driver of project profitability. The more externalities are incorporated into profitability assessments, the more companies are inclined to consider sustainability factors. The EU Emissions Trading System (ETS) is operational in Europe, and through it, Sweco has significantly reduced emissions in sectors where it participates in projects. From a financing perspective, it is essential to consider the ESG reporting incentives set by both the public and private financial sectors. Both sectors increasingly demand transparent and continuous ESG reporting from projects. Additionally, EU-developed frameworks are being implemented under the EU taxonomy.

Considering climate actions, two groups of firms can be distinguished: the ones that continue with business-as-usual operations without actively managing emissions and the others who start tracking and reporting GHG emissions and setting reduction targets (Majid et al., 2023, p. 16). Mandatory GHG emissions reporting should be enforced more broadly to affect entire industries, thus also including smaller companies or companies that are otherwise outside the scope of reporting (Majid et al., 2023, p. 16-18). According to Lummaa, the number of reporting industries is increasing rather than decreasing, especially when looking at the long-term trend. Industries and companies subject to mandatory reporting should have more financial and policy incentives to encourage more ambitious GHG reduction plans and broader climate mitigation initiatives (Majid et al., 2023, p. 16-18). Lummaa highlights that the adoption of ESG policies and frameworks should be viewed as a way to sense and seize opportunities that increase economic profitability.

Lummaa emphasizes taking reporting seriously in companies. It is better to publish a comprehensive report than to leave stakeholders in the dark with undisclosed matters:

Once again, transparency and openness of information play a key role. When applying for financing, it is better to provide more rather than less information. A project may contain a great deal of relevant information of interest to investors, which the project developer might otherwise overlook. Therefore, openness and abundance of information are vital starting points for securing financing. Another key condition is the project's alignment with the EU Taxonomy. If the project falls under the EU Taxonomy, it must be communicated accordingly, as the taxonomy forms a shared classification system and language between the financial sector and project developers. Many investors are also required to report in line with the SFDR (Sustainable Finance Disclosure Regulation), so when applying for funding, it is important to understand their reporting obligations. Additionally, investors have their own sustainability frameworks, within which the project must remain to secure financing.

Engaging with ESG policies and transparently reporting actions enhance transparency, stakeholder dialogue, and future cash flow assessment (Strand, 2024, p. 8). Lummaa, being financial expert herself, agrees on the increasing awareness and attention towards sustainability reporting and the financial and operational benefits it can bring (Liesen et al., 2017, p. 36). Lummaa thinks it affects competitiveness and long-term valuation, especially in the eyes of stakeholders. Companies have sometimes been seen to use sustainability reporting only to attract investors without any real desire to impact environmental or social challenges (Majid et al., 2023, p. 2-18). Reporting based on real numbers nevertheless shows that companies are acting on challenges, whether it is their desire or not. According to Lummaa, reporting is required to be continuous and transparent throughout the project. In other words, it is not only to attract investors, but also to act within the framework of agreed criteria throughout the project.

Fortum's annual reporting follows CSRD (Corporate Sustainability Reporting Directive), implying that sustainability is integrated as a central part of annual reporting. Reporting combines the expertise of the company's internal departments: Board of Directors, President and CEO, Fortum Leadership Team, People and Remuneration Committee, Technology and Investment Committee, Audit and Risk Committee, and Internal Audit. Additionally, external expertise and assessment are part of the process covering a Shareholders' Nomination Board and an External Auditor. Fortum's GHG reporting includes direct emissions from its own operations, indirect emissions from purchased energy, and

emissions across the broader value chain. The company applies the GHG Protocol standards for accurate and comprehensive emissions accounting. (Fortum, 2025a, p. 61).

The EU Taxonomy Regulation provides the framework for classifying Fortum's environmentally sustainable activities. Fortum reports performance against defined KPIs for such activities, aligning with their six environmental objectives: climate change mitigation, climate change adaptation, sustainable use of water and marine resources, circular economy, pollution prevention, and biodiversity protection. (Fortum, 2025a, p. 75). In addition, as part of the EU ETS, Fortum factors the price of carbon emissions into its investment decisions. (Fortum, 2025a, p. 61).

Lummaa explains Sweco's methods of managing carbon emissions, which are based on a set carbon budget. Creating and sticking to this budget also requires preparing for changes in the external environment:

Sweco engages in carbon leadership, which involves setting a carbon budget at the start of a construction project, such as for a production facility. Staying within the carbon budget requires highly detailed planning and analysis during the design phase. Adherence to the budget is monitored both financially and in terms of CO₂ emissions. While planning provides the foundation, implementation must also be closely followed, as there will inevitably be disruptions or changes that impact the budget—such as raw material shortages or supplier changes. Resulting decisions and directions must always be assessed in relation to the budget. This process results in a full documentation trail throughout the construction project, enabling verification of low-emission outcomes for investors.

Carbon management can be used as a key metric. Balancing is achieved by monitoring the ESG goals and indicators in the same way as financial indicators. In profitability calculations, the price of carbon and emission allowances can be used as metrics. Considering the price of emission allowances has a significant impact on profitability analysis. Industries covered by the emissions trading scheme must continuously account for changing circumstances. Additionally, the number of sectors included in the scheme is expanding, so anticipation is crucial.

Liesen and others (2017, p. 39-40) highlight the importance of transparent and consistent communication. Reporting provides important data to both investors and the company itself regarding future prospects and the company's direction. Indeed, Lummaa

emphasized the paramount importance of transparency throughout the interview. Transparency between the company and its stakeholders in reporting and sharing information is particularly important. The company must act as previously agreed and if changes occur, they must be able to be discussed openly, whether they are positive or negative things. According to Lummaa, the role of pre-defined and consistently planned policies is evident in driving corporate sustainability. The organization must constantly operate within agreed frameworks and policies due to both internal and external pressures. For example, when embarking on projects, investors increasingly require sustainability reporting and carbon management. However, as noted in the interview and by prior research (Bergek et al., 2013), firms might struggle responding to emerging threats with insufficient resource allocation. (Bergek et al., 2013, p. 1212). Indeed, Lummaa emphasizes the need for companies to be flexible and dynamic when allocating resources to projects, as a variety of factors can cause deviations from pre-made plans.

During the planning phase of the study, the impact of ESG reporting on the company's competitive advantage was sought, but the study revealed that it is more about maintaining competitiveness:

Rather than a competitive advantage, it's more accurate to talk about maintaining competitiveness. For example, failure to report on agreed-upon ESG issues can harm a company's position. Here again, transparency and openness in reporting are critical—if, for example, emissions are higher than expected, this must be reflected in the reports. It must be possible to openly address negative developments as well. For many investors, ESG reporting is a baseline requirement for even considering financing.

Indeed, as Liesen and others (2017) discuss, investors are increasingly basing their decisions on sustainability-related performance. Consistent and extensive GHG reporting is a factor that investors consider when making decisions. (Liesen et al., 2017, p. 57). Studies have found significant benefits from environmental performance reporting even in cases where they have included disclosed liabilities (Delmas & Burbano, 2011, pp. 80-81). At Fortum, adopting ESG policies ensures that the company remains competitive, considering environmental, personnel and administrative, especially risk management, issues. (Fortum, 2025a, pp. 25, 50-51, 90).

4.5 Collaborative capabilities and carbon disclosure

A company's stakeholders play a significant role in achieving the company's sustainable development goals. Mutual commitment to the goals drives an effective transition. This also enables mutual maximization of benefits. In the interview, Lummaa emphasized active dialogue with relevant stakeholders:

It is especially important to recognize the shift in mindset away from creating value solely for shareholders, towards a broader stakeholder value perspective—which in turn also benefits shareholders. Active dialogue and communication with stakeholders are essential. NGOs and local communities are key stakeholders in Sweco's projects. Even when a green transition project is located on an existing industrial site, it is likely to involve processes that are new and therefore generate uncertainty. Engaging in early, active dialogue with local communities enhances the project's social acceptance. Discussing pre-defined goals with stakeholders early on facilitates communication and thus the implementation of objectives, metrics, and plans. In advancing projects and building trust, communication plays a critical role.

Fortum understands its role as a promoter of carbon neutrality in industries and societies. Close cooperation with customers and operating in line with their environmental goals are a priority for Fortum. Fortum aims to advance and construct new clean energy generation in collaboration with strategic customers, while actively cultivating a project pipeline to support long-term growth. Additionally, Fortum intends to gradually investigate opportunities in nuclear energy—such as small modular reactors (SMRs)—through partnerships with customers and stakeholders. To foster the development of clean hydrogen solutions in the Nordic region, Fortum will also pursue joint initiatives with industrial clients. (Ulfves, 2023).

Transparency of both reporting and communication was emphasized throughout the interview:

Open and transparent communication and ongoing dialogue are key to building trust. It must be possible to discuss both positive and difficult issues. Preparing a communication plan is part of project development, which should include action plans and schedules based on prior stakeholder interviews. Maintaining open dialogue and addressing both good and challenging topics helps prevent the spread of rumors—which, once in motion, are difficult to stop. In the worst case, rumors

can significantly influence municipal decision-making and ultimately block the project's implementation. Local presence in discussions and correcting misunderstandings at an early stage are essential.

Policy instruments are designed and implemented based on an analysis of how they reflect equity, sociopolitical acceptability, dynamic efficiency, and local impacts (del Rio, 2014, p. 268). Similarly, Lummaa highlights the importance of considering projects with a reflection to the environment and society. Fortum's Sustainability Policy outlines a commitment to responsible conduct through due diligence, aiming to prevent, address, and remedy both current and potential sustainability-related impacts. The company prioritizes transparent communication, constructive engagement, and collaboration with local communities. In its journey toward achieving net-zero emissions, Fortum emphasizes fairness and inclusivity, striving to understand and consider the effects of its actions on surrounding communities. (Fortum, 2025a, p. 98). Fortum's Supplier Code of Conduct, based on the UN Global Compact principles, sets expectations for sustainability, ethical conduct, human rights, and environmental responsibility among suppliers. As a major purchaser, Fortum aims to reach its sustainability goals through careful supplier selection and strong partnerships. Suppliers are also encouraged to evaluate and reduce their climate impact. (Fortum, 2025a, p. 54).

Fortum fosters open and regular communication with stakeholders, enabling it to understand and respond to their expectations. Surveys and other engagement tools help the company assess public perception and align its practices with stakeholder concerns. (Fortum, 2025, p. 41). Fortum engages directly with stakeholders affected by its operations to understand their concerns, including labor and human rights issues. Employee feedback, gathered via mechanisms such as the Employee Voice survey and the Fortum European Council (FEC), is incorporated into both operational and strategic planning. The views of workers across the value chain are collected through audits and external reports, influencing supplier choices. Input from local communities informs new project development and business model adaptations. (Fortum, 2025a, p. 42).

Furthermore, Fortum relies on input from suppliers to understand not only its direct operations but also broader value chain conditions. Insights from value chain workers support Fortum in improving supply chain practices. Membership in national and international associations allows the company to stay informed on sector-wide developments. Engagement with local communities contributes to Fortum's social responsibility and helps improve its public image. Regular interaction with investors and financial analysts ensures that Fortum aligns its strategy with capital market expectations and integrates investor feedback into its sustainability agenda. (Fortum, 2025a, p. 41).

Local and political presence are key in implicating ESG policies:

Authorities play a significant role in project permitting processes and public financing. In the interview, NGOs are equated with local communities, with whom it is very important to engage in dialogue. Green transition investments are often made in smaller municipalities, where involving local decision-makers and residents is crucial to the success of the project. Even though green transition projects are of national importance, they may not receive direct support from the state. In small municipalities, limited resources pose challenges, making it important to assist the local government. Investors are naturally key stakeholders. In particular, institutional and private equity investors impose strict reporting requirements, as they themselves are subject to regulations regarding the provision of financing. Sweco sees the requirements related to project financing continuing to grow. For example, the Danish Financial Supervisory Authority has proposed that the financial sector conduct a climate risk analysis and prepare a transition plan for their entire balance sheet, meaning that such requirements are also passed down to smaller companies.

The energy sector is being constantly challenged by carbon emissions and resource reliability, which require understanding and changing the entire system. Designing policies to ease such transformations is complex and unpredictable due to constant experimentation and the simultaneous dominance of competing frameworks and technologies. (Geels, 2004, p. 916). Therefore, Lummaa urges companies to engage in continuous dialogue with policymakers and to closely monitor events in their own industry and those of their stakeholder groups. In addition, combining financial and sustainability reporting has enabled holistic corporate sustainability and enhanced transparency and stakeholder dialogue (Strand 2024, p. 8). Fortum maintains close dialogue with policymakers

to anticipate regulatory developments and to contribute proactively to shaping energy and climate policies in alignment with its long-term strategic vision. (Fortum, 2025a, p. 24).

Fortum engages with various groups, such as customers, employees, NGOs, regulators, investors, suppliers, and local communities. Such interaction gives Fortum valuable insights into stakeholder expectations, which the company integrates into its strategy and operations. This engagement takes many forms: customer feedback helps refine products and services, discussions with authorities inform policy awareness, and employee surveys support internal development and retention. Dialogues with NGOs and trade unions provide external sustainability perspectives, while interactions with suppliers and value chain workers shed light on operational risks and working conditions. Fortum also monitors media and participates in public discussions in its operating countries. (Fortum, 2025a, p. 41-42)

Proactive work in the early stages of a project includes mapping possible scenarios not only for the company but also for stakeholders:

From an administrative standpoint, it is essential to demonstrate and verify the sustainability-related decisions made, particularly in the context of sustainability reporting. Stakeholders and shareholders must be able to continuously and transparently verify the implementation of plans and targets. A scenario analysis conducted in the planning phase of the project includes interviews with key stakeholders critical to project success. From the financial sector, banks, private equity investors, and institutional investors represent important stakeholder groups. Considering the value chain, it is also essential to account for customer needs and suppliers—particularly in terms of raw material dependencies.

Investor dialogue and feedback directly influence Fortum's decarbonization efforts and capital market strategy. In Finland, Fortum's Advisory Council comprises key stakeholder representatives, and the Council's role is to facilitate ongoing exchange between the company and its external environment. (Fortum, 2025a, p. 41-42). For instance, one emerging risk is the increasing involvement of non-governmental organisations (NGOs), which may influence stakeholder perceptions. To manage this, Fortum emphasizes

sustainability in its strategic and operational decisions and communicates openly about the execution of its strategy. This includes maintaining a diversified investor base and ensuring financial flexibility. (Fortum, 2025a, p. 25). Additionally, Fortum adheres to a range of international sustainability standards (both mandatory and voluntary) and discloses material risks and opportunities accordingly. The company conducts annual stakeholder engagement to determine the most relevant sustainability issues, works with NGOs, and enforces internal policies that promote ethical business practices. (Fortum, 2025a, p. 24).

4.6 Capabilities for the governance of innovations and business model transformation

In the interview, Lummaa emphasized risk management and decision-making process management as key administrative capabilities:

When selecting ESG guidelines, it is vital to determine how these will be integrated into the project's risk management and decision-making processes. This must occur at the earliest stage of the project, and the findings should inform both planning and management. For example, sustainability risks are a fundamental component of project risk management and, as such, are integral to overall project decision-making and monitoring. One illustrative case is the construction of production facilities, where verifying the sustainability of procurement is of utmost importance. Criteria for suppliers or raw material providers must be established, adhered to, and verified throughout the project.

As demonstrated in the strategic capabilities, integrating ESG policies into a project requires planning throughout the value chain. Production and raw material suppliers must be in line with the chosen sustainable development policy. For instance, in the energy sector, mere availability and affordability are not enough, but consumers and institutional decision-makers increasingly demand accessibility and acceptability (Pilpola et al., 2019, p. 2). As recognized in the literature, in order to be successful, long-term transition demands co-evolution across the whole system of technological, economic, social, and political sections (Freeman, 1996, p. 27; Pilpola et al., 2019, p. 3).

Operating in multiple jurisdictions, Fortum is subject to a complex landscape of laws and regulations. While it strives to remain compliant, potential changes in local legislation can present operational challenges. The company promotes a culture of integrity through its Code of Conduct, training initiatives, and specific anti-corruption measures. It also monitors global sanctions regimes and integrates compliance controls into its operations to mitigate legal and regulatory risks. (Fortum, 2025a, p. 26). The company's climate advocacy is guided by its Paris-Aligned Climate Advocacy Principles, which influence its policy positions and industry lobbying at both EU and national levels. (Fortum, 2025a, p. 54).

On the other hand, Lummaa also emphasized presence in political discussions:

The EU Green Deal and the Commission's Clean Industrial Deal play a significant role as drivers of the green transition. Instead of viewing regulation as merely a mandatory burden with compliance as the only goal, it should be seen as an opportunity to advance business and benefit significantly. Regulation in the EU evolves continuously, so it is particularly important for companies to monitor its development and the related background discussions. Industry associations are typically involved in and aware of these discussions.

Lummaa, like Liesen and others (2017, p. 36), highlights the uncertainty prevailing in politics due to environmental uncertainties caused by the world's turmoil. EU legislation is constantly developing and changing, due to which following the conversations in companies is of paramount importance, according to Lummaa. The changes must also be reflected in companies' decisions, actions and the policies and reference frameworks that guide them. The impacts can be seen in uncertain costs and the availability of raw materials or other resources in the supply chain, so cooperation with stakeholders must be flexible and dynamic. Adaptation to policies is necessary and the benefits from policies can be facilitated by chosen frameworks and policies. A policy that defends innovation helps to identify market niches and move the industry forward in development. In industries that revolve around heavy technology, transition throughout the industry is necessary, requiring internal and external cooperation and innovation (Dolata, 2009, p. 1074). The industry-specific transition occurs gradually, where new opportunities, challenges and uncertainties require flexibility. Industries with established mechanisms of

competition, innovation, and experimentation enable transformation-supportive path dependency (Dolata, 2009, p. 1074). The literature and Fortum's reports show that the electric power sector is incorporating flexibility into existing systems and fostering open-minded and proactive engagement, which enables the adoption of disruptive technologies. (Dolata, 2009, p. 1071).

Fortum (2025c) sees the urge for rapid transition toward a low-carbon future to combat climate change. According to Fortum, in order to secure availability and flexibility of future energy, innovative flexibility within the energy system must be adopted. As energy demand increases, the system must learn to utilize existing clean energy technologies in a more flexible and diverse manner. The rational integration of flexible energy sources enables the incorporation of clean energy, such as renewables and nuclear power, into the energy mix. On days with limited wind or solar generation, electricity can be supplied using hydropower in the Nordic countries or natural gas in Central Europe, ensuring a stable electricity supply at reasonable costs. (Fortum, 2025c)

Fortum aims to complement flexible energy generation with innovative solutions such as hydrogen utilization, carbon capture and storage (CCS), and virtual power plants. In the future, small modular reactors (SMRs) may also offer flexible electricity and heat generation for communities. (Fortum, 2025c).

Finally, Lummaa sums up what the literature on policy mix emphasizes: sustainable action is the sum of its parts. Administrative capabilities to manage a whole system are required:

ESG guidelines must be considered from the very beginning of the project. They should form a coherent whole that provides a foundation for initiating the project. If ESG considerations are assembled piecemeal throughout the project, the result will be inconsistent. Sustainable development itself consists of various individual elements that together form a broader whole. It requires continuous strategic planning and leadership. Naturally, in long-term projects, changes will occur. However, projects always have an agreed-upon decision-making structure. Set goals must be reflected against the current global context, which may require adjustments to the highest-level goals to better serve the situation. This might involve a minor earlier

decision that needs correction or, in rare cases, a major issue that requires a broader reassessment. Addressing issues as early as possible helps avoid crises.

According to Kivimaa and others (2017), there is a growing call for new evaluation processes that can better capture the interactive effects within complex policy systems. It is argued that evaluations focusing only on individual policies provide limited insights into how policies impact socio-technical systems and their components. (Kivimaa et al., 2017, p. 118). Kivimaa and others see the challenges in reducing the destabilizing and transformational effects of the policy mix arising from both incoherent policy processes and the absence of new policy processes that align with the updated policy goals and instruments. Therefore, it is crucial to conduct both ex-ante and ex-post evaluations of the instrument mix, as well as assess the associated policy processes, to better understand how real-world policy mixes will influence sustainability transitions. (Kivimaa et al., 2017, p. 123). According to Kivimaa et al., the destabilization of incumbent regimes depends heavily on the coherence of implementation processes within the policy mix and the interaction between destabilizing policies and niche creation policies (Kivimaa et al., 2017, p. 124).

According to del Rio (2014), policies should be planned with effective coordination between administrative levels and viewed as a whole (del Rio, 2014, p. 283). Lummaa considers the case similarly inside an organization and between different departments. There might be trade-offs between some areas but as a whole the combination should serve its purpose. If a company cannot view policy combinations through a multi-criteria framework, weighing priorities may be difficult and ending up with certain policy combinations might be rejected.

4.7 Empirical framework

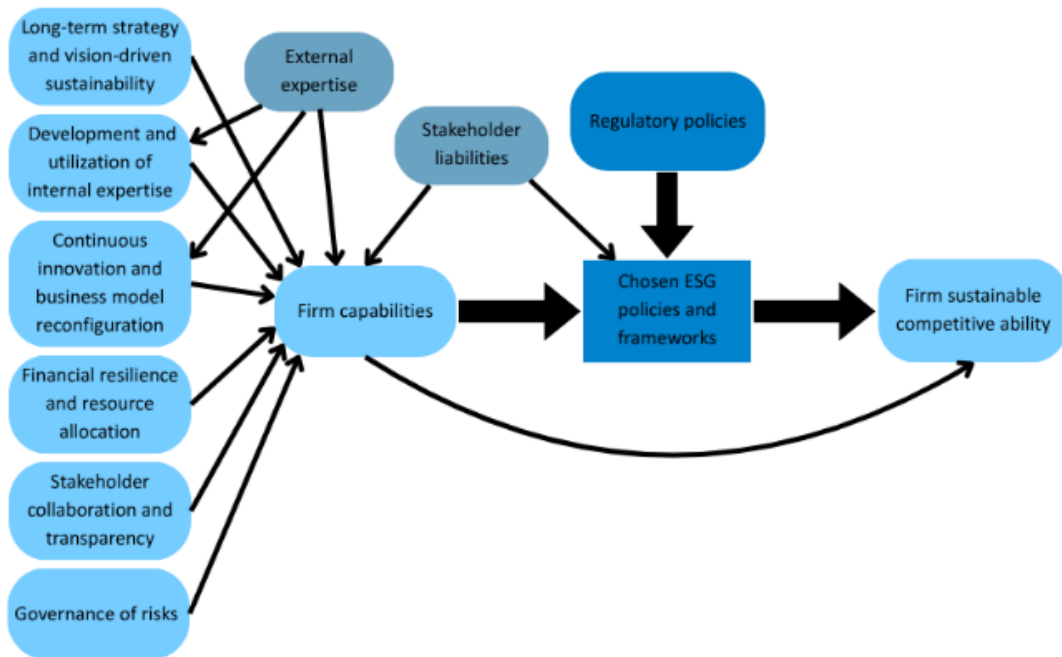


Figure 2 Empirical framework

5 Discussion

The literature, interview with Lummaa and the Fortum case illustrate how the adoption of ESG policies is strongly dependent on firm-level strategic capabilities, particularly on the ability to anticipate and integrate sustainability concerns into core strategic planning. As shown, effective ESG adoption requires identifying sustainability-related risks and opportunities at the outset of strategic planning, and not as retroactive considerations. The findings reflect the dynamic capabilities theory by emphasizing the firm's ability to sense, seize, and reconfigure resources in response to environmental challenges. In Fortum's case, this is reflected in long-term capability-based growth strategies aligned with sustainability and climate objectives. Scenario planning, risk preparedness, and proactive stakeholder engagement serve as crucial strategic capabilities that allow firms to align ESG integration with evolving climate policy landscapes and market shifts.

Firm-specific resources, particularly internal expertise and organizational know-how, play a pivotal role in shaping the adoption and implementation of ESG policies. In the case of Fortum, human capital is recognized as a critical yet sometimes underutilized asset in driving ESG integration. Employees' intrinsic motivation and values align with ESG objectives, which enhances organizational engagement and policy uptake when their perspectives are actively considered in strategic decision-making. This bottom-up involvement, complemented by strong internal governance structures and compliance training, supports a more deeply embedded ESG culture that extends beyond regulatory obligations. ESG values are operationalized through mandatory training, cross-level communication, and ethical codes of conduct, fostering a culture of responsibility and alignment with broader sustainability goals.

Moreover, the interaction between firm capabilities and climate policy compliance becomes evident in how organizations manage dynamic knowledge requirements. As ESG and sustainability frameworks evolve in response to external regulatory pressures and technological advancements, firms must continuously develop both internal and external capabilities. Strategic alignment involves not only leveraging existing routines but

also adapting to transformative pressures through innovation, cross-departmental collaboration, and partnerships with external actors. This dynamic capability-building process is essential for addressing knowledge gaps, mitigating risks related to skill shortages, and ensuring resilience in decarbonization strategies. The development and orchestration of competencies across departments and value chains allow firms to remain compliant with climate policies while progressing toward long-term environmental targets.

Being a transition, the results underscore the centrality of technological capabilities in the strategic adoption of ESG policies and their alignment with climate policy compliance. For Fortum, technological innovation is not only a facilitator of project-level advancement but also a core driver of systemic transformation toward decarbonization. Innovations such as carbon capture, smart grid technologies, and combined heat and power systems exemplify the integration of ESG objectives with operational efficiency and environmental performance. The adaptive use of both mature and emerging technologies illustrates a dynamic balancing act, mitigating risks while maximizing long-term sustainability benefits. The ability to scale and align these technologies with policy and market requirements is a critical determinant of successful ESG integration.

Furthermore, Fortum's approach reflects broader sectoral dynamics where the electric power industry is experiencing a dual transition: decarbonization and digitalization. The sector's high dependency on infrastructure and regulatory frameworks necessitates a strategic alignment between firm-level technological development and broader policy landscapes. As the findings show, Fortum navigates this complex environment through selective partnerships, continuous competence development, and proactive monitoring of technological disruptions. These dynamic technological capabilities enable the company to adapt its ESG strategies to shifting climate policy expectations while maintaining operational resilience and market competitiveness.

Financial capabilities were also a significant part of the study. The interview with Lummaa shows that firms with robust financial planning and resource allocation frameworks

are better positioned to integrate sustainability criteria into investment decisions, particularly when carbon pricing and emissions trading systems like the EU ETS directly affect project profitability. ESG adoption is not only driven by internal strategic motives but also by growing investor demands for transparent, continuous, and standardized sustainability reporting. Such reporting practices create dynamic capabilities that allow firms to track emissions, adapt to evolving regulatory expectations, and communicate environmental performance credibly. Moreover, companies like Sweco leverage carbon budgeting and ESG metrics as operational tools for both planning and post-implementation validation. These practices transform ESG compliance into an iterative and strategic process that enhances firms' responsiveness to climate policy and contributes to systemic decarbonization across the sector.

The role of stakeholders behind the adoption of policies should not be forgotten. Partnerships can be significantly more beneficial through stakeholder engagement mechanisms that extend beyond traditional shareholder value. Fortum's and Sweco's practices reveal that robust stakeholder communication, including early engagement with local communities, NGOs, and financial actors, serves as a dynamic capability that enables ESG integration into corporate strategy. This collaborative approach supports legitimacy, mitigates risks related to project acceptance, and enhances compliance with evolving climate policies. Transparent dialogue and scenario planning foster trust, which is essential when deploying green technologies and infrastructure in complex socio-political environments. Moreover, the coupling of sustainability and financial reporting, as well as engagement with regulatory bodies, illustrates how firms adapt internal processes to external policy pressures, and hence facilitate coherent decarbonization pathways.

The latest analysis considered administrative capabilities that are central to shaping the integration of ESG policies into corporate projects. Effective ESG adoption requires early incorporation into decision-making structures and risk management systems, with sustainability risks recognized as core project concerns. Strategic capabilities ensure ESG alignment across the value chain, including procurement and supplier selection.

Furthermore, Fortum's case demonstrates how administrative capabilities support climate policy compliance through proactive monitoring of regulatory developments and participation in policy discourse. This dynamic engagement reflects a broader systemic approach in which firms adjust their governance frameworks to navigate evolving EU climate regulations. Lummaa's emphasis on early and coherent ESG planning aligns with literature on policy mixes and socio-technical transitions. It underscores that decarbonization depends on firm-level flexibility, continuous strategic adaptation, and coherence across internal and external systems. Flexibility in energy production and innovative technologies complement ESG alignment and facilitate system-wide transitions toward low-carbon outcomes.

Finally, the findings show that ESG adoption is not only driven by regulatory compliance but is increasingly leveraged for maintaining competitiveness. Fortum demonstrates how first-mover strategies, innovation investments, and stakeholder partnerships can position ESG integration as a core business driver rather than a reactive obligation. However, the interview and literature also highlight the risk of superficial ESG practices when strategic alignment and organizational commitment are lacking. Long-term decarbonization outcomes are therefore shaped by the extent to which ESG considerations are embedded in firm strategy, supported by financial planning, internal know-how, and cross-sector collaboration. This intersection of strategic capabilities and climate policy engagement enables firms not only to comply with regulations but to lead in industrial decarbonization.

5.1 Managerial implications

For managers in the electric power sector, the findings underscore the need to embed ESG targets within corporate strategy from the earliest stages of project planning. Strategic foresight and environmental scanning should be integrated into decision-making processes to proactively address climate risks and policy developments. This includes building capabilities for scenario planning, stakeholder engagement, and continuous environmental monitoring. Managers must ensure that sustainability goals are not isolated

from financial and operational planning but are instead treated as key drivers of innovation and resilience. By institutionalizing ESG metrics into performance management systems and project evaluation criteria, companies can better align internal resources with external policy demands and decarbonization goals.

Firms should also view ESG compliance as a source of strategic opportunity rather than a constraint. Early adoption of low-carbon technologies, partnerships with research institutions, and investment in clean energy start-ups can help firms build innovation-driven competitiveness. However, realizing these benefits requires a genuine commitment to sustainability, supported by strong organizational capabilities and leadership. Avoiding symbolic ESG practices and instead fostering a culture of transparency and long-term value creation is essential. Managers must also remain agile in responding to evolving policy landscapes and disruptive technologies by ensuring that ESG strategy remains an integral part of corporate transformation in the green transition.

Moreover, the interview emphasizes the need to treat employee expertise as a strategic asset in ESG policy integration. Managers should actively involve personnel in ESG-related decision-making processes and recognize that valuable insights often reside outside the executive level. Creating structures that promote continuous training, ethical awareness, and internal collaboration is essential for embedding ESG values into the organizational fabric. Human resource strategies should prioritize long-term talent retention, continuous skill development, and succession planning to mitigate risks associated with decarbonization transitions and regulatory demands. Indeed, organizational leaders must foster a learning-oriented culture capable of responding to evolving sustainability standards and technological change. This entails investing in innovative ecosystems that combine internal competencies with external partnerships. By aligning ESG objectives with broader corporate strategy and innovation efforts, managers can position their firms to not only comply with current climate policies but also to shape future sustainability pathways. Ultimately, dynamic resource orchestration and a culture of cross-functional cooperation are indispensable for sustaining competitiveness.

As discussed, managers must view ESG reporting not as a compliance exercise but as a strategic communication tool that shapes stakeholder trust, financial access, and regulatory alignment. Effective ESG implementation requires cross-functional collaboration to ensure alignment with EU Taxonomy standards and climate regulations. Furthermore, the proactive use of ESG frameworks facilitates better anticipation of risks such as supply chain disruptions or regulatory tightening. Transparent reporting backed by real metrics strengthens investor relations and ensures firms are not penalized for environmental liabilities but rather gain credibility through accountability. Managerial adaptability and ongoing resource reallocation are crucial for sustaining ESG performance under volatile conditions. Additionally, proper stakeholder management enables better compliance. Managers must cultivate continuous, open dialogue with central stakeholders to identify concerns, co-develop solutions, and align project objectives with both corporate and societal sustainability goals. Structured communication plans, transparency in performance tracking, and stakeholder feedback mechanisms are essential tools for enabling responsiveness and adaptability. Furthermore, building internal capabilities for policy interpretation and compliance enhances managerial effectiveness in responding to regulatory shifts and expectations tied to financing and permitting of low-carbon projects.

Finally, administrative capabilities should be geared towards proactive risk assessment, regulatory compliance, and stakeholder engagement, while also fostering organizational adaptability in response to external policy shifts. Managers must view ESG not as a compliance checkbox but as a dynamic, integrated framework guiding procurement, operations, and cross-departmental coordination. A structured and strategic approach enables organizations to better navigate uncertainties related to climate policies, resource volatility, and regulatory transformation. Decision-makers must also cultivate institutional presence in policy dialogues to ensure their companies are prepared to capitalize on opportunities arising from evolving environmental governance frameworks.

5.2 Strategic implications

Strategically, the findings suggest that firms must position technological capabilities at the core of ESG implementation. Managers should recognize that technological innovation is not merely an operational tool but a strategic resource that shapes the feasibility, credibility, and scalability of ESG initiatives. In the electric power sector, investments in clean technologies, digital systems, and smart solutions should be aligned with climate regulations and future-proofed through adaptive planning and risk management. Fortum's example illustrates the value of combining internal technological assets with external collaborations to enhance both innovation and policy compliance capacity. Moreover, as regulatory environments and energy systems evolve, firms need to adopt a forward-looking perspective on capability development. This includes reorienting R&D efforts toward clean energy and resource-efficient technologies, and institutionalizing mechanisms for cross-functional knowledge integration. Fortum's success in aligning its ESG strategy with decarbonization outcomes highlights the importance of strategic agility. This implies the ability to reconfigure technological and organizational resources in response to emerging opportunities and policy shifts. In this context, firms that can bridge the gap between technological readiness and regulatory alignment are more likely to shape and lead the green transition.

Against what was pursued during the research design phase, ESG policy integration should be viewed as a capability that maintains competitiveness rather than increases competitive advantage. New innovations in the policy field can certainly create a market niche, where the first to seize the gap manages to create a competitive advantage for themselves, either by expanding the market or by creating something that is not yet available on the market. However, the study rather emphasized the coercion created by policies. The inability to meet evolving reporting obligations or align projects with sustainability criteria may lead to exclusion from financing opportunities and regulatory support. As carbon pricing and sector-wide emission obligations expand, ESG performance becomes embedded in the cost structures and strategic decisions of firms. Moreover, the adoption of EU-aligned ESG frameworks fosters coherence between internal

strategies and external policy expectations, enabling firms to act as legitimate partners in the energy transition. This alignment not only supports firm-level decarbonization outcomes but also contributes to broader policy effectiveness by ensuring private-sector accountability and innovation in low-carbon pathways.

Finally, engaging with climate policy not as a constraint but as a strategic horizon allows firms to align operations with long-term decarbonization trajectories. Firms operating in complex regulatory environments must develop capabilities that allow for real-time adaptation and learning across departments, thereby fostering coherence in policy implementation and innovation uptake. The case of Fortum illustrates how climate policy alignment enhances strategic agility and positions firms to lead in sustainability transitions. Organizations that successfully leverage their resources through innovation, stakeholder collaboration, and flexible infrastructure are better positioned to influence and adapt to policy environments, which makes them unlock new market opportunities while supporting systemic decarbonization objectives.

5.3 Research limitations and future research avenues

To begin with, the research was conducted using a small qualitative sample. In the interview with Sweco, a broader range of responses from representatives across various departments would have provided a more comprehensive understanding of how ESG principles are operationalized throughout the organization. Nonetheless, it is important to acknowledge that Lummaa's responses were fully consistent with the guiding principles publicly articulated on the company's website. Consequently, any potential variation in responses would likely reflect differences in operational focus rather than fundamental discrepancies in strategic orientation. Expanding the interview sample could therefore have enriched the analysis by offering diverse departmental perspectives on the implementation of ESG policies.

Secondly, the inclusion of an interview with Fortum would have enhanced the depth and comprehensiveness of the analysis. In this study, the examination of Fortum was limited

to a document analysis of publicly available company reports. However, this limitation did not significantly compromise the quality of the findings, as Fortum provides extensive and detailed reporting on its sustainability objectives and activities within its annual and sustainability reports. The case selection in this study focused intentionally on a single company operating within the relevant regional and sectoral context. While the research aimed to investigate the practices of a major industry actor, the inclusion of the second and third largest companies in the sector could have offered additional comparative insights. Nevertheless, Fortum was a suitable and reliable case selection, as it is among the leading electric power companies in both Finland and the Nordic region. The company is widely recognized as one of the most responsible electricity producers and distributors in Europe, with operations closely aligned with legislative and policy mandates, making it a representative and exemplary case for this study.

Thirdly, from a research standpoint, it would have been valuable to provide a more comprehensive overview of relevant EU legislation and policy frameworks addressing various dimensions of sustainable development. Additionally, a broader examination of global sustainability initiatives—such as the United Nations Sustainable Development Goals (SDGs) would have enriched the analysis by exploring the rationale through which companies incorporate selected goals into their corporate sustainability strategies. Furthermore, distinguishing between mandatory, binding ESG policies and voluntary initiatives would have allowed for a more nuanced understanding of corporate ESG adoption. An in-depth analysis of the internal reference frameworks established by the case companies themselves (those which guide strategic decision-making and operational conduct) would also have provided further insight into how firms navigate regulatory obligations and self-imposed sustainability commitments.

Finally, the aforementioned limitations also point to several potential directions for future research. One promising avenue would be to examine small and medium-sized enterprises (SMEs) instead of large corporations, or to explore ESG policy adoption within entirely different industrial sectors. Comparative studies involving firms from different

countries or across various industries could yield valuable insights into the contextual drivers of ESG integration and climate policy compliance. From a theoretical standpoint, alternative analytical lenses, such as the resource-based view (RBV) or theories of competitive advantage (Porter, 1980) could be applied to investigate how ESG strategies influence a firm's market positioning. In particular, future studies could explore the extent to which selected ESG policies contribute to the development of sustainable competitive advantage. These directions underscore the richness of the topic and affirm the need for continued empirical and theoretical exploration beyond the scope of a single study.

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Appendices

Appendix 1. Interview sheet

Implementation of ESG Policies and Guidelines in Green Transition Energy Projects

What types of

- Strategic
- Competence-based
- Technological
- Financial/ economic and collaborative
- Administrative

capabilities and resources are relied upon in green transition energy projects when agreeing on ESG guidelines? How do these capabilities influence the background of such guidelines?

Strategic and administrative capabilities

How should changing ESG requirements and green transition objectives be considered in the strategic planning of projects?

How are ESG guidelines integrated into project risk management and strategic decision-making?

Stakeholders and collaboration

What role do different stakeholders (e.g., authorities, investors, NGOs) play in shaping and implementing ESG policies?

How should trust be built with stakeholders around ESG goals?

Finance and funding

How do you attract responsible investors or green financing to your projects?

Has ESG commitment led to a competitive advantage in the financial markets?

Technology and innovation

How do technological innovations support the achievement of ESG goals in projects?

What challenges or obstacles do you face in adopting new technologies to achieve ESG goals?

Organizational Culture and Competence

What competencies are required for the successful implementation of ESG policies?

How do you ensure that ESG values become embedded in the organization's culture?

Implementation of ESG Policies and Guidelines

What factors influence decisions to pursue the implementation of specific ESG guidelines?

What legal obligations or policies influence ESG guidelines? How is their impact seen?

Monitoring and Reporting of Green Transition Energy Projects

How should the balance between ESG guidelines and project profitability be maintained?

What metrics can be used?

How is the achievement of ESG objectives monitored throughout a project's lifecycle?

How transparent is ESG communication at different stages of the project, and how is it developed?

How do you ensure consistency and coherence between different ESG guidelines when aiming for a specific goal?