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THE ROLE OF GREEN FINANCE IN SUSTAINABLE ENERGY INITIATIVES IN FINNISH COMPANIES

MBA – International Business Management

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ABSTRACT

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Finland is on the cusp of some transformational changes when it comes to sustainability, while many others prefer profitability. It is well known that climate change, environmental degradation, and scarcity of traditional energy resources have been a growing concern globally. This thesis intends to highlight the immense potential green finance has in Finland and Europe by making a few improvements in policies.

While the study primarily focuses on the theoretical framework, direct feedback from various stakeholders has helped influence recommendations. This work has primarily examined the symbiotic connection between eco-friendly finance and sustainability, considering the roles of governments, financial institutions, corporates, and consumers, as well as the specific impact on SME's. Key instruments analysed are eco-green bonds, eco-green credit, and climate-neutral energy investment. This research employs a qualitative approach, delving into the perspectives, environmental values, and financial decision-making processes through in-depth interviews.

The findings demonstrate that green finance makes a significant impact on entities, especially SMEs, by cutting carbon emissions and accelerating the shift to sustainable energy. The study concludes that while green finance is a vital incentive for Finnish companies, SME's could have a significant impact if they are better supported by providing access to sustainable funding, simplified processes, and policy support. The study also highlights that Finnish companies are already leading the way and can significantly catapult the impact by having more inclusive policies and schemes. A lot of the current practices and frameworks are fit for best practice adoption worldwide.

Keywords Sustainable and Renewable Energy, Low-carbon economy, Green Investment, Green Finance, Policy frameworks, Inclusive economic growth

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ABBREVIATIONS

AI	Artificial Intelligence
BESS	Battery Energy Storage Systems
EKC	Environmental Kuznets Curve
ENI	Energy Innovation
Fintech	Financial Technology
GF	Green Finance
GT	Green Technology
GIN	Green Investments
REDD	Reducing emissions from deforestation and forest degradation
SMEs	Small and medium-sized enterprises

1 INTRODUCTION

Climate crises is a critical problem, driven by carbon footprint and harmful emissions due to the extensive usage of conventional fuels, causing to global warming and extreme climatic weather conditions. The pollution caused, the limited nature of non-renewable fuels, and the rising cost of extraction have led to the urgent focus on the need for renewable or more sustainable energy alternatives. The increasingly extreme weather conditions and environmental pollution have turned green transition and sustainable finance to the forefront of global market and political agendas (Bhattacharyya, 2021). Companies are recognizing the urgent need to blend environmental considerations into their core business strategies, compelled by mounting pressure from stakeholders, evolving regulatory landscapes, and a rising cognizance of the long-term risks linked with unsustainable practices (Bhattacharyya, 2021).

Green finance is funds and investments directed to projects that have sustainability at the core of their activities and includes various development schemes, projects, initiatives, green goods, as well as environmental policies in favour of transitioning into a more sustainable economy. Green Finance is fundamental in bridging the green move to the eco-friendly economy, using capital invested in green technology as well as green practices. Even though knowledge about the importance of green finance is gaining momentum, there are still significant knowledge gaps in the ways businesses perceive, interpret, and respond to green transition and green finance from the daily business operations, customers as well as from partner's perspectives. Furthermore, the length to which green finance impacts the acceptance of ecologically safe energy solutions within specific national contexts, such as Finnish companies, also needs further investigation. Understanding the drivers and challenges linked to implementing sustainable energy solutions, along with responsible investing are also critical for accelerating the

move headed for a more carbon-neutral fiscal environment. (Jiu et al., 2024)

1.1 Need and Relevance of Sustainable Energy Initiatives

Climate change from fossil fuel use has caused extreme weather and global warming, while pollution from traditional energy sources damages ecosystems and public health. The rising extractions costs and the depleting supply of fossil fuels combined with technological innovation in clean energy are driving the transition towards the use of sustainable energy. International agreements and policy targets are also pushing the governments and corporate sectors to transition towards sustainable energy.

A central part of human well-being and development is energy and it affects air, food, water, and habitability of the earth (Bierbaum & Matson, 2013). Extensive consumption of fossil fuels has pushed greenhouse gas emissions to dangerous levels, necessitating the shift in the generation and use of energy (Uriarte-Gallastegi et al., 2024). The depleting carbon-intensive fuel supplies and the need to save the environment, has made the way towards sustainable energy systems (Indira et al., 2019).

Sustainable energy development finds ways to balance economic development without compromising on environment. Conservation of energy efficiency reduces resource use as well as pollution, while advanced technologies in generation, storage, and distribution allows the transition to renewable energy (Omer, 2007) (Al-Obaidi & NguyenHuynh, 2018). Integration into the power systems requires smart grids as well as storage solutions for dependability. Transition is crucial for especially for developing countries, with low-cost, clean energy as well as potential economic growth, job creation, and energy security (Lv, 2023).

Beside economic and environmental benefits, sustainable energy also improves public health and social equity by bringing down pollution and expanding access to clean energy (Wang & Lo, 2021). Internet and smart grid technologies also promote innovation in addition to productivity (Yandri et al., 2020). The universal embracing of sustainable energy technologies requires well-informed decision-making processes at all levels, from individual consumers to governments as well as international bodies.

Additionally, sustainable energy is leading the curbing climate change requiring policy reforms, investment in infrastructure, as well as technology (Owusu & Sarkodie, 2016). As it is a difficult transition and is challenging, growing green finance, public awareness, and policy incentives are making sustainable energy a global necessity as well as priority. Additionally, investors are shifting towards green finance, as public concern especially from younger generations, brings a shift in consumer behavior in addition to corporate responsibility. Thus sustainable energy has not only become a preference but also world-wide necessity due to a combination of these elements.

1.2 Green Finance – The Catalyst

Impactful financing is designating funding avenues and resources to ventures that focusses on finding solutions to imperative challenges faced world-wide like climate change, pollution, and sinking levels in resources (Bhattacharyya, 2021). Green finance plays a catalytic part in making this changeover towards clean energy systems and this specially dedicated segment of the financial system directs capital, offering financial instruments tailored for green investments for environmentally conscious projects. (Xu et al., 2020). Across the globe governments have understood the need and are formulating policies that favour green energy sources and discourage dependence on traditional fuels, which has increased the demand for green finance

(Mansour, 2023). These policies have various schemes such as standard tariff rates, which assures a fixed rate for electricity produced from renewable sources, in addition, there are renewable portfolio standards, which mandates a certain portion of electricity to be generated from renewables (Sreenu & Mishra, 2023). There are further incentives such mechanisms for carbon pricing and disincentives such as pollution taxes, emission taxes, emission trading systems, those redirect and motivate investments in clean energy. By levying a cost on carbon emissions can deter the usage of energy that are from fossil fuels. (Bhattacharyya, 2021). Green finance has many offers for eco-friendly technologies, projects, and industries while also confirming it's a practical concept for balancing ecological deterioration while it is being integrated (Rawat & Anu, 2020).

Green finance instruments, in the form of bonds and investment funds are attractive choices for private investors who are interested in investing in eco-friendly projects. These instruments are not only avenues for investment but also are transparent as they have environmental reporting which are very strict. While there are massive challenges which needs to be streamlined around data protection and security, green finance still offers substantial opportunities for growth and adoption in the wider sense (Jiu et al., 2024). Environmental finance is thus a vital enabler and driving force towards investments in sustainable energy initiatives and enables polluting industries in their transition journey towards environmentally sustainable practices (Ma & Fei, 2024).

Digital finance is the most recent addition and it has a wide range of innovations that are technological, that includes mobile banking, online payment systems, block-chain technology, AI, and data-driven analytics (Alqararah et al., 2025). These technologies are applied across various financial activities, such as payments, lending, investment management, and risk assessment (Zhang, 2023). In enterprises the shortcomings of the traditional systems can be overcome by Digital

finance, thus improving the financial environment and reducing financing issues (Fan et al., 2022).

1.3 Scope and Justification of this study

This analysis emphases on the limited understanding of the surroundings, the environment-friendly switch, and responsible finance. The perceptions, in addition to the approaches of companies, and also the magnitude to which green finance influences the implementation of eco-friendly energy solutions, particularly within the context of Finnish companies. Further, light is shed on opportunities, challenges and lack of research in the implementation of clean energy solutions (Sreenu & Mishra, 2023). Insights into the obstacles, potential, and practical learnings in embracing non-conventional energy solutions will be highlighted in the findings, which will benefit companies as well as a variety of other stakeholders, as this will enable them to take decisions being fully informed and helping them enhance their performance in the sustainability front. In addition, policymakers can leverage the significant implications and insights gained for effective policies to be designed which are more effective policies and also provide incentives that promote green investments and sustainable business practices. Financial institutions can understand in a much better way the perspectives and needs companies seeking green finance, which helps them design their financial offerings which can be tailored to suit the requirements of the borrowers.

This study is important as it addresses brings to light a greater understanding of the character that clean energy finance plays in driving the adoption of eco-friendly energy initiatives that is a key element in mitigating climate change and accomplishing long-term eco-conscious goals. Joining forces with the rest of the world in the fight for efficiently allocating resources and development in the sustainability sector, this thesis stress on the importance of green finance system (Fu & Irfan,

2022). Although there are repercussions, several nations have made it their to target and goal to mitigate emissions (Zhang, 2023). The entities are at an advantage to make informed decisions as well as enhance their sustainability performance, as the findings will focus on providing insights into best practices, obstacles and possibilities in implementing environmentally responsible investments and clean energy alternatives.

1.4 Research Objectives

The key research objective is identifying the factors prompting the implementation of environmentally conscious capital and renewable energy resources by ascertaining the key enablers and road-blocks influencing the adoption of clean energy (Zournatzidou, 2025). The objective of this study is in addressing various cracks in the role of sustainable finance as an accelerator to drive eco-conscious energy by exploring the perspectives of Finnish companies on green funding and environmentally friendly transition, identify the impediments and possibilities that comes with the implementation. This study investigates the existing practices, the frameworks that has been successfully implemented and offer practical insights into pathways for broader adoption. This study examines how businesses in Finland approach green finance, exploring whether they see it as a genuine driver of value or just another requirement to fulfill. It also investigates their level of understanding of different green finance instruments and how this knowledge impacts their investment decisions. This is also to see the magnitude to which Finnish entities see eco-finance as a systematic imperative for creating long-term value, rather than merely a compliance obligation or a public relations exercise.

Moreover, despite the green finance concept facing big data protection and security maintenance challenges, it has several opportunities to be improved and widely applied (Jiu et al., 2024). It highlights the

fundamental part of environment-friendly finance in fostering ecologically sustainable improvement, offering valuable insights for key stakeholder. For instance, policymakers can utilize the findings to craft targeted policies and incentives that promote environmentally responsible investments as well as sustainable business practices. Financial institutions, with the knowledge of the corporative perspectives on green finance, can develop tailored financial products that support businesses in their transition to sustainable practices. Additionally, banks will benefit from a clearer framework for adopting, developing, and granting green finance, ensuring alignment with industry needs and regulatory standards (Akomea-Frimpong et al., 2021). This study will be useful for formulating more effective policies to support green transition and attaining a sustainable future.

1.5 Research Gap, Methodology, and Questions

This study investigates the knowledge gap surrounding how companies view and undertake green transition and eco-finance, particularly in the Finnish industry landscape. It examines the application of carbon-neutral finance to guarantee the implementation of non-conventional energy solutions while addressing the overall deficiency of research on the obstacles and prospects that companies encounter when embarking on such practices (Sreenu & Mishra, 2023). Most studies look at the theory behind green finance or how sustainable energy policies affect the economy as a whole, but they often lack knowledge about what individual companies think or experience (Kwong et al., 2023).

This thesis uses research by way of qualitative methods to deeply understand the topic by focusing on what participants think and experience. Information is gathered through semi-structured interviews, which ensure a free-flowing and detailed answers. The analysis is used to identify the various patterns and themes within the transcribed data, allowing for an iterative and reflective interpretation process. This

approach is chosen to capture the complexity and nuance of the subject, providing insights on the landscape with respect to sustainable energy and green finance, while maintaining ethical standards such as voluntary agreement and privacy protection.

This research is centered to focus on answering the following research questions to understand the role ecological finance plays in the industry and how Finnish companies choose eco-friendly energy initiatives:

1. How do companies view green transition and green finance
    a) From a business standpoint?
    b) Concerning customers and partners (vendors and suppliers)?
2. What part does eco-green finance play in business, and how significantly does it influence the acceptance of sustainable energy in Finnish companies? What factors drive green financing?

3. What obstacles and potentials exist in implementing green finance and sustainable eco-friendly energy solutions?

4. What frameworks have been successfully applied to drive the acceptance of green finance and sustainable energy?

1.6 Use of AI in This Thesis

In this thesis, I have used Chat GPT and Microsoft Copilot for ideation, information retrieval and language checking. I have edited the text several times using AI, to make the text clearer and easier to understand but so that it would convey matters according to my original purpose. In information retrieval, I have used AI for forming search words and search statements.

I have ensured the authenticity of the contents and also, respected copy-rights. If AI has produced new ideas for the text, I have always checked them from the original sources and cited them accordingly. I

have used all cited sources myself and they are not produced by AI. This can be verified from my notes and from the referencing management software I have used.

For English language I have used Grammarly for correct language. I have used all AI applications responsibly and ensured the data protection. I have not used AI for writing this Section 1.6.

2 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Green finance is becoming a bigger and more important part of the global financial system, and it's now a important driver helping sustainable energy projects grow and develop (Bhattacharyya, 2021). In this literature review the focus is on how environment-concious finance and carbon-neutral energy are connected. It explains how financial tools and products help start, support, and grow green energy projects and technologies Green finance includes many types of financing options that helps to keep safe environment, by supporting non-conventional energy, using energy more efficiently, and funding other projects that are good for the climate (Bhattacharyya, 2021). As the world works harder to fight climate crisis and move towards a green economy, environment-friendly finance is a critical enabler which provides the necessary capital to support this change (Ziolo et al., 2019). Because extreme changes in climate is a serious problem that that needs attention, sustainable energy is top on the agendas for government bodies worldwide. There is now a clear need to lower the carbon released through emissions and lessen the harmful effects due to the disproportionate reliance on fossil fuels (Lapinskienė et al., 2025). The goals set on sustainable development by the United Nations especially SDG 7 which is on low-cost and sustainable energy and SDG 13 which necessitates climate resilience activities, which brings out the importance of non-conventional and eco-friendly energy and climate action are. This shows that new financial solutions are needed to support these goals (Kwong et al., 2023). There are ethical advantages as well as business justifications in bringing green finance to the clean energy sector. It helps create new ideas, opens up new markets, and supports long-term economic growth (Guo et al., 2022).

This thesis reviews how eco-concious finance and green energy are linked, including what drives it, what challenges it faces, and its impacts.

It will also examine how new technologies, especially in financial technology, are changing the landscape of environmentally-conscious finance and the effects on sustainable energy initiatives, addressing the critical need for increased transparency and participation from private sector in eco-friendly investments (Taghizadeh-Hesary & Yoshino, 2019) (Sreenu & Mishra, 2023).

2.1 Definitions and Concepts

Green finance means investing money in projects that help the environment and support sustainable development. It covers many different environmental areas, with the goal of reducing harm to nature and improving the health of our planet. Green finance makes sure that environmental concerns are part of financial decisions, directing funding to environmentally-conscious activities, which helps to build a greener economy. (Xu et al., 2020). Unlike regular finance, which usually does not focus on environmental or social justice issues, green finance puts importance on investing in ways that protect the environment and climate. It aims to bring down the ill effects of using energy and natural repositories (Akomea-Frimpong et al., 2021) (Sreenu & Mishra, 2023) . Green finance helps move towards an eco-friendly and climate-conscious economy by investing in instruments like clean energy, smart energy storage, sustainable transportation, recycling and numerous other technological options that are good for the environment (Ma & Fei, 2024). Green finance mechanisms include many different types of tools related to financing, such as eco-bonds, eco-loans, environment-conscious funds, and carbon markets. These instruments are designed to fundraise from both public and private sources to lend a hand to projects that benefit the environment. Eco-bonds and Eco-loans, for example, provide funding for sustainable energy, energy efficiency, various climate-friendly projects, while environmental funds and carbon markets help channel investments into sustainable development and climate goals (Lindenberg, 2014).

Figure 1. The various types of Eco Finance Instruments

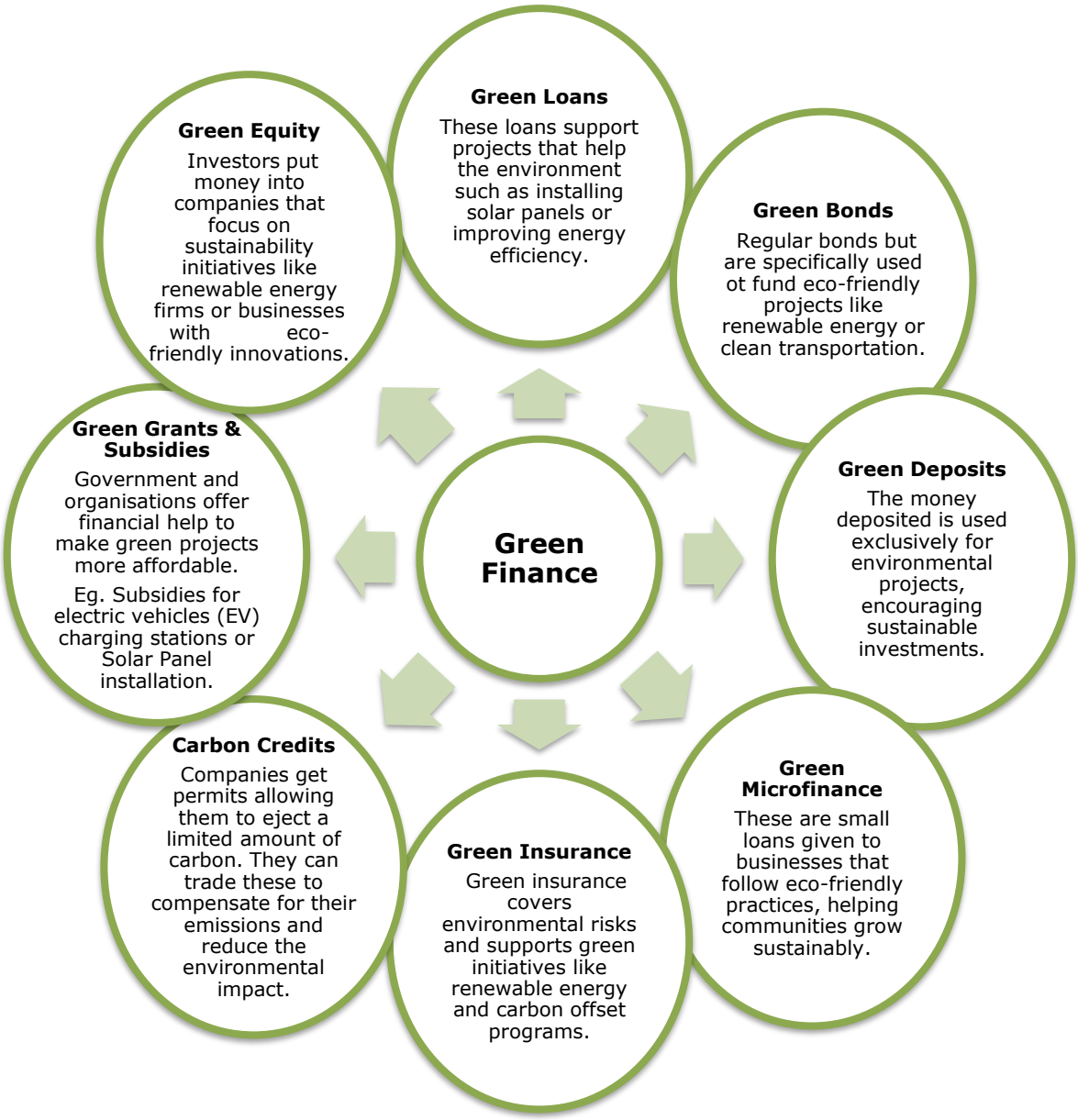


Figure 1. above shows the different types of green finance tools. These financial tools encourage people and businesses to act in environmentally friendly ways, support new ideas, and help more sectors use sustainable practices (Rawat & Anu, 2020). Responsible investments is also critical in endorsing the growth and distribution of environment-friendly energy technologies, infrastructure, and projects (Zhang, 2023). Moreover, distributed ledger technologies provide opportunities for enhancing transparency in eco-finance and

investments (Taghizadeh-Hesary & Yoshino, 2019). The expansion of an economy that is carbon-free can be achieved through eco-friendly financing which is an emerging and important element (Zhang, 2023). Green finance helps people and communities find practical ways to protect the environment without compromising on economic growth. It inspires communities, businesses, and individuals to make choices that are good for both their livelihoods and the planet, making it easier for everyone to live in balance with nature(D. P. Rawat, 2021);(Rawat & Anu, 2020);(Zhang, 2023).

Sustainable energy constitutes a cornerstone of green finance, entailing energy sources and technologies that minimize environmental impact, conserve natural resources, and ensure long-term energy security (Anderson, 2016). This paradigm shift imposes a changeover away from carbon-based energies towards eco-friendly energy sources, in the form of solar, wind, hydro, geothermal, and biomass, each offering distinct advantages in environmental performance and availability of reserves. Figure 2. Types of Sustainable Energybelow show the various sustainable energy initiatives at a glance. Sustainable energy systems must be reliable, affordable, and accessible for all. Beyond renewables, sustainability also includes energy efficiency, demand-side management, and smart grids to reduce consumption and optimize distribution. Successful integration requires supportive policies, incentives, and innovative financing (e.g., feed-in tariffs, tax credits, power purchase agreements). While long-term investments and challenges like technology maturity and public acceptance exist, sustainable energy is vital for climate change mitigation, cleaner air, energy security, economic growth, and public health. Adopting sustainable strategies helps minimize negative impacts on industry, technology, and society during the transition to green energy. (Midilli et al. 2005)

Sustainable development, as conceptualised and defined by the United Nations, stresses on the fact that today’s needs should not jeopardize

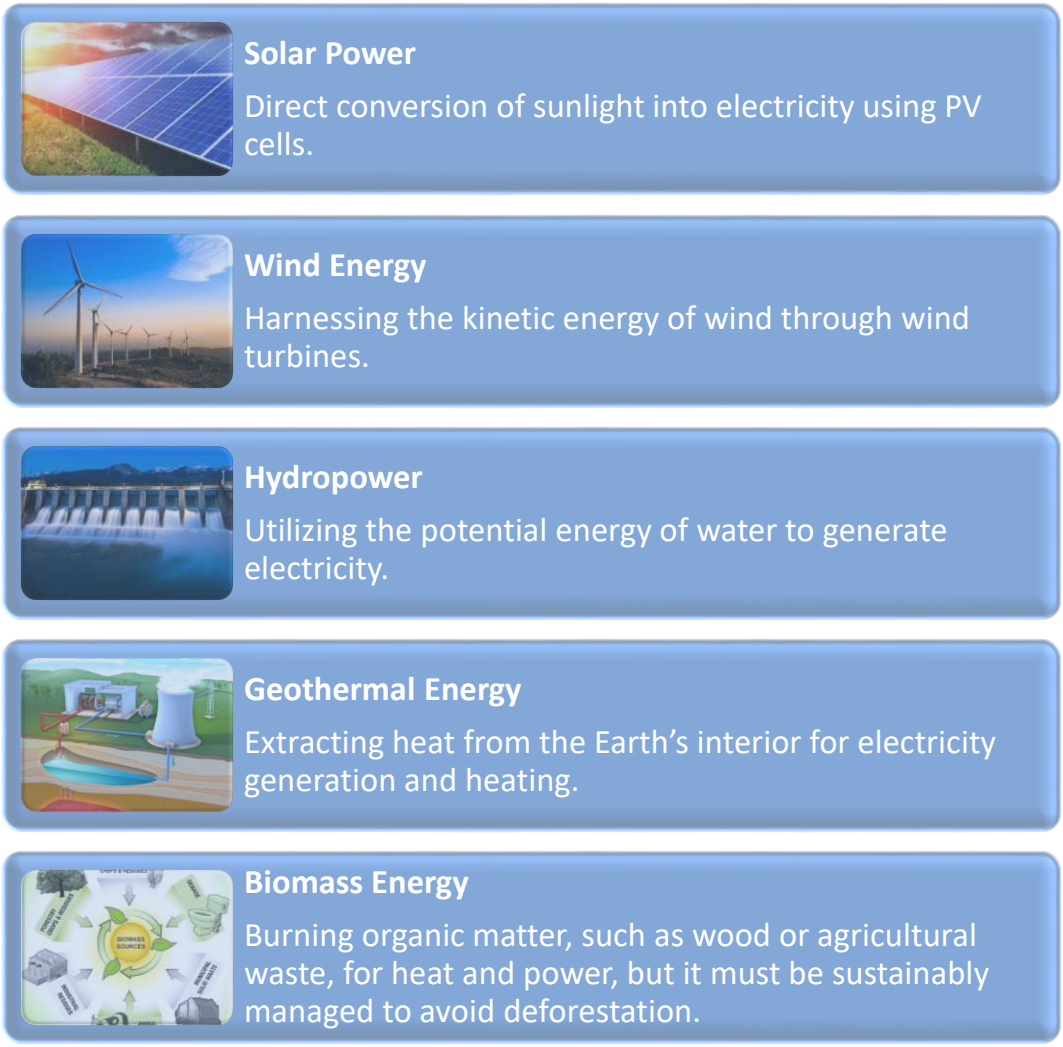
the capability of the upcoming generations in future to fulfill their basic survival requirements (Al-Obaidi & NguyenHuynh, 2018). This overall approach integrates all dimensions in the form of economic, social as well as environmental, recognizing that innovative eco-friendly solutions must address all tri-pillars simultaneously. Eco-friendly progress guides formulation of policies and strategies across various sectors, promoting responsible resource management, social equity, and economic prosperity.

Responsible financing in eco-energy sources are a pathway for an enterprise's balanced-growth development (Poszwa, 2021). The energy sector plays a central role in achieving developmental goals on the sustainability front, as energy is fundamental to economic activity, community well-being, and a green environment (Omer, 2007). Enhancements in the efficient use of energy, alternate energy deployment, and transportation systems that are sustainable are essential components to create a sustainable energy roadmap for the future (Matias et al., 2020). These efforts include energy access, poverty reduction, and accelerating the clean move to a Green economy (Diale et al., 2021). Future energy policies should draw attention to making clean energy sources the main part of the global energy system (Bassam, 2001).

To meet the energy needs as well as reduce harm to the climate, there is a need to focus on two main things: use better, energy-saving technologies and develop new sources of renewable energy. Energy transition plans usually focus on three big changes: saving energy when we use it, making energy production more efficient, and replacing conventional fuels with carbon-neutral energy and nuclear power which is low in carbon (Kabeyi & Olanrewaju, 2022). New policies to guide the world’s shift to a sustainable energy system are needed. When using more renewable energy on a large scale, work needs to be done on making existing non-renewable energy sources more efficient (Kabeyi & Olanrewaju, 2022). Good energy plans and new technology are

important for building cities that are sustainable and ready for the future (Anwajler, 2024). Moreover, sustainable consumption and production involve using resources and energy wisely, developing eco-friendly infrastructure, ensuring everyone can access basic services, creating environmentally friendly jobs, and enhancing people's quality of life (Loizidou & Argyri, 2020). The Sustainable Development Goals, created by the United Nations, offer a clear plan for countries to work hand in hand towards building an eco-freiendly and resilient future globally (Gielen et al., 2019). These goals focus on many important global issues like poverty, hunger, health, literacy, gender equality, extreme weather change, and damage to the environment.

Figure 2. Types of Sustainable Energy



2.2 Eco-friendly Finance and Non-Conventional Energy Initiatives

The intangible outline relaying the correlation between carbon-free investments and non-conventional energy is based on key ideas like sustainable development, environmental economics, and how money moves through the financial system. Sustainable development is about making choices today that allow us and future generations to thrive. It serves as a reminder that our well-being, the health of our communities, and a strong economy all depend on a healthy environment, showing how closely our lives are connected to the world around us (Xu et al., 2020). Environmental economics helps us understand how environmental problems affect the economy. It looks at the costs and benefits of protecting the environment and explains how tools like taxes or trading systems can support environmental sustainability (Sreenu & Mishra, 2023). Financial intermediation theory explains that banks and other financial institutions help move money from people who save to people who need loans, which supports investment and economic growth. In green finance, this means these institutions help direct money to sustainable energy projects, connecting investors who want to support the environment with developers who need funds for ecologically viable energy initiatives (Wang, Y., & Zhi, Q. (2016).

One prominent theory is the **Environmental Kuznets Curve (EKC)**, which says a country's fiscal growth, pollution, and ecology deteriorates first but later improves as people become richer and care more about the environment (Özcan, B., & Öztürk, I. (2019). However, some research shows that pollution can keep rising along with economic growth. Green finance can help break this link by providing money for cleaner energy, which can speed up the move to a stage where economic growth does not harm the environment as much (Sreenu & Mishra, 2023).

The **Porter Hypothesis** says that tough environmental rules can actually help companies become more creative and competitive. This is because these rules force companies to use cleaner and more efficient technologies, which can make them stronger in the market (Hadi et. al., 2023). This idea, which might seem surprising, says that good environmental policies can push companies to find more innovating adn creative ways to make things, discover and design new goods and services, and become more competitive in the market (Wang et. al., 2021). These rules make companies rethink how they work and what technologies they use, which helps them use resources more efficiently and find new business opportunities (Xing et. al., 2020).

The Porter Hypothesis goes against the usual belief that environmental rules always cost companies money and hurt their profits (Xing et. al., 2020). The Porter Hypothesis has three versions: the weak, narrow, and strong versions. The weak version says environmental rules can lead to new ideas and inventions. The narrow version says that well-designed rules can lead to innovations that cover the costs of following the rules. The strong version says that these innovations can actually help companies gain more benefits than the costs they pay to follow the rules (Ouyang et. al., 2020). Studies on the Porter Hypothesis show mixed results—some support it, while others do not. Whether it works depends on how well the new technology improves production and if there are other problems in the market, like lack of information or outside effects (Wang & Chen, 2023). Whether the Porter Hypothesis is correct depends on how effective the new technology is in improving production and whether there are other market problems, like companies not having enough information or outside impacts that are not included in prices (Chowdhury & Das, 2011). The influence of environmental rules affect a company's ability to innovate is closely tied to how competitive the company is and how the local economy grows, but research does not always agree on the results (Shao et. al., 2020). Some studies say that these rules can make it harder for resources to move between companies, which might cause shortages. Others believe that limits on

materials can push companies to find new and better ways to produce goods, helping them stay ahead through innovation (Xing et. al., 2020). There is also evidence that environmental rules can encourage companies to use cleaner technologies and improve both productivity and environmental quality, supporting the Porter Hypothesis (Sadeghzadeh, 2014). However, some research finds that these rules do not lead to many more green patents (Shan & Shan, 2020). Also, if companies raise their prices to cover the extra costs of following environmental rules, it could make them less competitive in international markets (Dechezleprêtre & Sato, 2017).

Stakeholder theory believes that when companies make decisions, they should consider how their actions impact everyone—not just those who own shares, but also the people who work for them, the customers who rely on them, the suppliers they partner with, the communities they're part of, and the environment we all share. This idea expands corporate responsibility to include all groups with an interest in what the company does, not just those who own shares. Stakeholder theory challenges the traditional view that companies should only focus on making money for shareholders. Instead, it argues that businesses can create lasting value by meeting the needs of all stakeholders. By listening to and working with these groups, companies can build trust, improve their reputation, and support long-term success. As more people want businesses to act responsibly and sustainably, involving stakeholders has become even more important for connecting business success with social and environmental awareness (Awa et al., 2024). This means handling many different environmental, social, and management issues while meeting the needs of different groups. Using stakeholder theory can be difficult because companies have to figure out who their stakeholders are, deal with conflicting interests, and measure how their actions affect these groups.

Stakeholder theory says that companies that care about all their stakeholders usually do better over time (Demiraj et al., 2025). This

means building and upholding strong relationships with all stakeholders as well as paying attention to what they need and want (Demiraj et. al., 2025). When a company focuses on sustainability in how it operates, it adds value. (Bashir, I., Hassan, M., & Arif, M. (2022). Retailers and companies that make fast-moving consumer goods need to work harder toward environmental and social goals (Shaikh & Shaikh, 2021). By carefully balancing the needs of all groups, companies can find new opportunities, reduce risks, and create value from a long-term perspective for both the society and industries (Freeman et. al., 2010).

Agency theory looks at possible conflicts between different groups involved in green finance, like investors, project developers, and banks. It highlights the requirement for good rules and oversight to make sure sustainable investments really help the environment and society as planned. These ideas help to gain understanding on how eco-friendly investments and non-conventional energy work together guiding the creation of better policies and financial tools for a cleaner energy future (Zhao et. al., 2024).

This theory says that managers sometimes make decisions that benefit themselves instead of the shareholders, which can hamper company's prosperity and growth (Hamed et al., 2023). The main issue in agency theory is figuring out how to make sure managers (agents) looks after the requirements of the owners (principals). To solve this, this theory suggests things like supervision, rewards, and rules to keep everyone's goals aligned. In real life, there are often many different relationships like this in a company, which can make things complicated, especially if managers and owners want different things (Bridoux & Stoelhorst, 2022). Agency theory is used to study topics like how companies are run, how top managers are paid, and how organizations are set up (Affes & Jarboui, 2023). It shows that managers and owners may have different goals, leading to conflicts. Companies that act responsibly and ethically are more likely to follow stakeholder theory, which focuses on

all groups involved, rather than just agency theory (Ampofo & Barkhi, 2023).

Theoretical frameworks help us understand what affects how SMEs can access green finance by giving us a clear way to study these factors. The unique resources and skills in a company are seen as tools that can be used to set it apart from competitors and help it succeed, according to the resource-based view. This perspective highlights how each business's strengths can be recognized and put to work to pave a way for its path to success (Rodrigues & Franco, 2023). In the context of green finance, SMEs an improve their chances of getting funding by building their own knowledge about sustainability and showing that they care about protecting the environment.

Signalling theory says that SMEs can show investors they care about the environment by getting certifications, publishing environmental reports, and sharing other information. This helps make them more appealing to those looking to invest in green finance (Ozili, PK).

Institutional theory highlights how outside forces like laws, social norms, and what stakeholders expect can influence how organizations behave. Because of these pressures, SMEs may need to use more sustainable practices and look for green finance.

Together, these theories show that a mix of strong internal skills, clear signals to investors, good incentives, and outside pressures all shape how easily SMEs can get green finance. Comprehending these parameters, Decision-makers and banking institutions can create better ways to help SMEs access green finance and support a more sustainable business environment.

In developing countries, getting both local and international funding is especially important for helping SMEs become more innovative and sustainable (Ullah et al., 2021). SMEs can also improve their access to money and knowledge by joining supply chain events that focuses on

sustainable practices, thereby showcasing their commitment to eco-friendly practices.

Banks and funding bodies play a key role in supporting environmental projects to help achieve sustainable development (Arinal et. al., 2018). They can encourage banks and other lenders to think about the needs of all stakeholders when making decisions (Arinal et. al., 2018). Green finance includes various tools and methods to direct money toward projects that benefit the environment. For example, green bonds are loans raised specifically for green projects, allowing investors to support environmental causes while earning returns. Green loans provide funding for projects that meet certain environmental standards, often with better terms to encourage such investments. Environmental funds pool money from different sources to put their monies in renewable energy, energy-saving initiatives, and conservation efforts (Anderson, 2016). Carbon finance, including carbon trading and offsets, creates a market that rewards companies for reducing their carbon emissions.

These concepts show how green finance can support clean energy and other environmental goals. By factoring environmental protection into their investment choices, financial institutions help channel funds into green industries, promoting a more sustainable economy (Sreenu & Mishra, 2023).

2.3 Eco-Green Finance Driving Eco-Green Energy

Environmental finance helps make sustainable power generation projects such as solar, biomass, wind, geo-thermal and hydro-power possible by solving money problems that often hold them back. It gives these projects the funding they need and offers benefits like lower interest rates, longer time to pay back loans, and sharing risks, which makes them more appealing to investors. Green finance also helps bring green technologies to developing countries, making it easier for more places around the world to use clean energy solutions (Jiu et al.,2024).

Green finance helps create new ideas in sustainable energy by paying for conducting research and the developing better eco-friendly technologies. This leads to improvements in things like energy storage, how renewables connect to the power grid, and how efficiently they work. As a result, renewables become cheaper and can compete better with fossil fuels. Green finance also pays for projects that make buildings, transport, and industry use less energy, which cuts emissions and saves money by helping both the fiscal environment and the surroundings. Tools like eco-bonds and green loans send money to clean energy, energy-saving, and eco-friendly transport projects, making it easier for people to use green technologies. Green finance also makes investors and companies think about the environmental effects of their actions when making financial decisions (Ma & Fei, 2024).

Green finance helps attract private investment to sustainable energy by making these projects seem less risky. It does this by offering things like guarantees and insurance, which makes private investors more willing to put their money into green energy projects. This increases the total amount of money available for sustainable investments (Rawat & Anu, 2020). Green finance helps developing countries grow their sustainable energy by giving them money for projects that usually have trouble getting regular funding. This support closes the funding gap, making it easier for these countries to switch to cleaner energy and use less non-renewable energy sources (He et al., 2020). Eco-finance supports the growth of non-conventional energy by making things fairer between renewables and fossil fuels. It does this by including the environmental costs of fossil fuels in their price and giving financial rewards for using renewable energy. This helps fix problems in the market and creates a more environmental friendly energy system.

2.4 Trends in Eco-Green Finance Instruments

The upsurge of eco-bonds at such a fast pace shows that more people want to connect financial rewards with helping the environment (Anderson, 2016) (Haas & Popov, 2019). Green bonds primarily funded eco-friendly projects, and their use has soared to $509 billion in 2021 from just $37 million in 2014 (Li et. al., 2023). These financial instruments direct money twards eco-conscious projects like carbon-neutral energy, smart grids for energy storage and efficiency, and green infrastructure, showing how financial markets can help drive environmental progress. Green bonds, for example, have significantly contributed to funding solar, wind, and hydroelectric power projects, supporting the global shift toward cleaner energy sources. By channeling capital into these areas, green finance demonstrates the power of markets to support sustainability and address environmental challenges (Monk & Perkins, 2020). Recent studies show that companies that use green bonds often do better for the environment and improve their sustainability efforts. These companies usually reduce their pollution, get better environmental ratings, and improve how they handle social and governance issues after using green bonds. This happens in many industries, and things like company size and management also affect how much they improve. This means green bonds encourage companies to take better care of the environment while it also helps in raising money for green projects (Ning et. al., 2022). The International Capital Markets Association, has made ”the Green Bond Principles” that give clear guidelines to keep the green bond market honest and transparent (Reboredo & Ugolini, 2019).

Research shows that green bonds help create new green ideas by sending money to research and development, especially in places with weak climate rules (Dong et. al., 2024). Green bonds are not all the same—their results depend on the projects they support, how trustworthy the company or government is, and current market conditions (Gianfrate & Peri, 2019) (Löffler et. al., 2021). The extra

benefits from green bonds usually go to big, strong companies in wealthy countries. This makes it difficult for smaller companies and those in poorer countries to get green finance. So, there needs to be special rules to help smaller businesses and developing countries get money from green bonds (Caramichael & Rapp, 2022). By focusing on these areas, green bonds help fund projects that fight climate change (Dorfleitner et. al., 2021).

Global spending on green finance is growing quickly, with trillions of dollars going into environmental funds, green bonds, and clean energy projects. Big banks and investors are interested because they see chances to make money and want to manage climate risks, while governments are helping with new rules and funding. This growth is making renewable energy cheaper and encouraging new ideas, but money is still being invested in fossil fuels too. Experts say even more investment is needed to reach climate targets, but the fast rise of green finance is helping clean energy become more common and speeding up the move away from fossil fuels. (Green Finance Goes Mainstream, 2021)

A potential path that can be explored in future is to see how well different green finance tools work in different places and what helps them succeed. New ideas like blended finance and carbon pricing could help green finance fast-track the move to a carbon-neutral fiscal environment. Blended finance mixes public and private money to pay for sustainable projects. Standard tariffs for carbon, taxes on carbon-emissions and emission trading pressures companies to lower their carbon footprint. Blockchain technology is also starting to change green finance by making investments clearer, easier to track, and more efficient.(Naderi & Tian, 2022)

2.5 Impact – Eco-Green Finance and Energy Initiatives

Climate finance contributes positively to achievement of carbon-free development goals was concluded by many scholars (Li & Zhang, 2023) (Bhattacharyya, 2022) (Taskın, et al., 2020) (Ibrahim et al., 2022) (Kumar et al., 2022) (Li et al., 2023) (Lund, 2007) (Schwerhoff & Sy, 2017). Funding sustainable energy projects has increased, and the shift to energy-efficient technologies has been encouraged due to green finance (Sulistiono & Mursitama, 2023). Green finance helps bring clean energy technologies to developing countries, letting them skip over old fossil fuel methods. It is important because it attracts private money, which is needed to grow sustainable energy investments and reach global climate targets (Zhang, 2023). Responsible investments support the creation and use of sustainable energy through different ways, like venture capital, project funding, and partnerships between public and private groups.

Green finance helps spread the use of carbon-free energy like solar, wind, and hydropower by giving money for building projects and upgrading infrastructure. It also encourages people and businesses to put their investments in energy-saving technologies and better practices in buildings, transportation, and industry, making everything more energy efficient (Semieniuk & Mazzucato, 2019). Empirical Research shows that green finance policies like feed-in tariffs and tax credits which really do help more renewable energy projects get off the ground in many countries. But how well green finance works often depends on having strong rules, good government support, and organizations that know what they’re doing. Green finance is also sparking creative new ways to fundraise for renewable energy, including things like green bonds and crowdfunding. These tools make it stress-free for people and companies to direct their capital in non-conventional power projects. In short, when there are solid policies and the right support in place, green finance can make a big metamorphosis in growing viable energy and improving energy productivity around the world.

Carbon-free investments can really help boost clean energy, but it works best when there are clear rules, strong laws, and organizations that know what they're doing. It's not just about money having the right support systems in place makes a big difference. Green finance is also opening up creative ways to fund sustainable energy, like green bonds and crowdfunding. These tools support people and companies to invest in environmental projects. Indonesia's experience shows that even if there's a lot of interest in green bonds, the way institutions are set up can either help or hold back green finance efforts. So, having good policies and strong organizations is key. Getting private investors involved is especially important. Their support helps bring in the money needed to grow clean energy and meet global climate goals. Green finance also encourages the use of new energy technologies through venture capital, project funding, and partnerships between governments and businesses. In short, green finance has huge potential to expand sustainable energy, but it needs the right rules, support, and teamwork to really make a difference. (Semieniuk & Mazzucato, 2019)

2.6 Impacts of Implementations

Policies related to finance policies help reduce carbon emissions and support sustainable development (Zhao et al., 2024). For example, green credit policies, where banks give better loans to eco-friendly projects, work well to cut emissions, especially when environmental rules are strong (Wu, 2023). Additionally, studies also show that green finance and new ideas are important for reaching sustainability goals and protecting the environment. Policies like green taxes, buying green products, and green credit help solve environmental problems (Umar & Safi, 2023). Green credit has been especially strong even during hard economic times (Huang & Zhang, 2021). Green finance also encourages people to endow funds in non-conventional and environmetally safe technology and facilities, which support both the market as well as the ecosystem (Zournatzidou, 2025). The growth of green finance shows

that more people and companies are including environmental concerns when making financial decisions. This change is happening because people are becoming increasingly conscious of the threats and prospects related to climate crisis and other environmental problems.

As more people and companies want to act responsibly and protect the environment, green finance tools are being created and used around the world. This growing demand for sustainability is driving the spread of environmental finance everywhere (Xu et al., 2020). Impact finance tools help pay for projects that protect the environment and support sustainable growth. For example, green bonds are loans made to raise money for green projects, letting investors help support environmental efforts (Zakari & Khan, 2021). Green loans work much like green bonds they give money to projects that meet certain environmental standards, often with better terms to encourage eco-friendly actions. Other tools include environmental funds, which collect money from different sources to invest in projects related to sustainability, and carbon credits, which show a downward trend in carbon emissions and can be bought or sold. Other tools include environmental funds, which collect money from different sources to invest in green projects, and carbon credits, which show a reduction in carbon footprint and can be traded. Debt-for-Nature swaps, REDD/REDD+ products (REDD+ is taking care of forests, using them responsibly, and finding ways to increase the amount of carbon they can store, to help developing countries protect nature and fight climate crises. REDD+ activities include: Farmer training on sustainable land management and biodiversity conservation. Non-timber forest product cooperatives like fruits, nuts, honey and cocoa) , and exchange traded funds focusing on renewable energy also contribute to environmental finance (Anderson, 2016) (Butarbutar, 2016). The developments in the eco-bond market reflects a growth, with issuance reaching $48 billion in the first quarter of 2019, exemplifies the increasing interest in alignment of environmental goals with the fiscal market (Anderson, 2016) (Jin & Zhang, 2022). People can trust the eco-bond market more now, owing credit to Green Bond Principles published

in 2014 by the International Capital Markets Association. These guidelines help make sure that information is clear and honest, giving everyone from investors to communities greater confidence that green bonds are truly supporting environmental projects (Reboredo & Ugolini, 2019).

Within the context of Finnish companies and eco-friendly energy initiatives, eco-finance has a vital role in supporting the nation's ambitious environmental goals and adopting a shift toward a green economy. Finland has established itself as a frontrunner in sustainable development, demonstrating a commitment to reducing carbon gas emissions, promoting fossil-free energy sources, and enhancing resource efficiency. The nation aims to be free of carbon emissions by 2035 and has brought into action a variety of policies and strategies to support this goal; this commitment necessitates substantial funding in clean technologies, eco-friendly infrastructure, and innovative solutions, where green finance mechanisms become essential instruments for mobilizing the necessary capital. Finnish companies are increasingly cognizant of the significance of integrating ecological considerations into their business models, seeking opportunities to develop and implement sustainable practices across their operations. The vital shift to a zero-waste economy, in which assets are used more efficiently and waste is minimized, is also gaining momentum in Finland, driven by both environmental concerns and economic opportunities. (MENA Report,2022) (MENA Report-2, 2022)

Green finance in Finland shows a positive correlation with Green Technical Innovation(GTI) which means green finance significantly supports GT innovations (Yuan et. al., 2024). Given Finland's limited endowment of hydrocarbon resources, the country is actively increasing their stake in renewable energy generation (Shakeel et al., 2017).

The apportionment of funds towards ecologically viable production methods and the implementation of environmental governance within

corporate entities are primary aims of eco-friendly financial policies (Wu et al., 2024). Eco-friendly financial instruments, like climate bonds, eco-loans, and incentive-based loans, offer Finnish companies access to capital at favourable terms, incentivizing investments in environmental projects and technologies. Such instruments can be applied towards financing a wide array of enterprises, including the building new wind farms, the modernization of existing power plants to improve energy conservation, and development of sustainable transportation systems. Transition finance is important because it provides loans to companies that currently pollute but are slowly changing their activities to become more environmentally friendly (Lapinskienė et al., 2025).

2.7 Worldwide acceptance and Integration

Europe is a world leader in green finance because the European Union has set big climate goals and made strong rules to support them. The EU's Green Deal is an ambitious plan to make Europe climate-neutral by 2050, leading to lots of investment in green projects (Sulistiono & Mursitama, 2023). The European Investment Bank helps by lending money to support these projects. Countries like France, the Netherlands, and Germany have also started their own plans to move more oney into sustainable investments (Arner et. al., 2020). They are making clear rules and labels to help people understand what counts as sustainable (Li et. al., 2023).

Green bonds, which are special bonds for environmental projects, have grown quickly in Europe, reaching record levels in recent years. Stock exchanges in cities like London, Luxembourg, and Shanghai have set up special markets for green bonds, making the market more open and organized. Green bonds help raise money for things like renewable energy and protecting the environment (Reboredo, 2018). Green bonds, a subcategory of bonds earmarked for environmental projects, have gained traction as it finances activities like non-conventional energy and

energy optimization (Monk & Perkins, 2020) (Gianfrate & Peri, 2019). The approval of the Paris Climate Agreement in 2015 inspired countries and investors around the world to step up their efforts against climate change, helping the eco-green market grow (Löffler et. al., 2021). The growth of the bond market was a massive increase from $37 billion in 2014 to $509 billion in 2021. This shows that green finance is becoming a major way to fight erratic climate conditions and support sustainability. Climate bonds are used to provide capital projects that protect nature and the environment.(Li et. al., 2023). Climate-bonds facilitate raising capital to support green industries or projects related to ecological protection, ecological construction, and environmental protection (Fu & Ng, 2021). These bonds are used to protect and shape the natural environment (Laskowska, 2018). The green bond market has a significant role to play in bringing capital for environmentally beneficial infrastructure, contributing to efforts put in worldwide to condense the carbon footprint and encourage the improvement of a safe environment (Rawat & Anu, 2020).

In Finland, green finance is still new but growing fast, thanks to the country's strong focus on clean energy and environmental protection. The Finnish government has set high climate targets and is working to encourage green investments in many areas. The Finnish government has set ambitious climate targets and is actively promoting green investments across various sectors. Finland had set up a national working group to develop proposals for financing the green transition in a way that is economically, ecologically, and socially sustainable Finland : Green Transition Finance Task Force seeks ways to promote climate and environmental goals and sustainable growth. (2022, Jan 28). MENA Report . VR-Group Plc, a government-owned railway company in Finland has launched a Green Finance Framework to align its funding with its sustainability goals. This framework supports responsible funding initiatives in eco-friendly transportation, renewable energy, and climate-responsive buildings, aiming to bring down considerably the carbon footprint and endorse power savings. Through this initiative, VR Group

seeks to lead the green transition in Nordic transportation by encouraging climate-friendly rail and public transport. The company has set ambitious environmental targets for 2021–2025, including emission reductions and increased efficiency, and is committed to Finland's goal of carbon neutrality by 2035. Nordea advised on the framework, and CICERO Shades of Green provided an independent review (MENA Report -2, 2022).

Finland can emerge as a frontrunner in green finance by combining its technological proficiency with green finance instruments. Moreover, Finland is actively participating in international collaborations to develop and implement green finance initiatives (Ministry for Foreign Affairs of Finland) (Finnish Government, 2022) (International Finance Corporation, n.d.).

However, despite the increasing popularity of green bonds, challenges persist in accurately defining and classifying eco-friendly projects (Pawłowski, 2018). The Climate Bonds Initiative says that at least 95% of the capital from green bonds should go to collaborations that help the environment (Pawłowski, 2018). One big challenge is making sure these projects are truly green and not just pretending to be, which is called "greenwashing." To solve this, independent checks and certifications are needed so investors can trust that their money is really helping the environment. Creating clear rules and standards for what counts as a green project also makes it easier to compare investments (Freeburn & Ramsay, 2020). The EU Commission wants to set common rules for green bonds in Europe to protect investors and help green investments grow (Boscia et al., 2019). Green bonds are important, but it's necessary to make sure they are actually used for real environmental projects (Boscia et al., 2019) (Freeburn & Ramsay, 2020).

Government and organizations have a big impact on how well clean energy projects grow and succeed. When countries make promises to fight extreme weather conditions under the Paris Agreement, called

Nationally Determined Contributions (NDCs), these promises help increase investments in green bonds. This support helps more money flow into green projects and speeds up the use of clean energy worldwide (Löffler et al., 2021). Government rules and policies are very important for helping clean energy projects happen. Experts say that green bond money should only be used for projects inside the country that issues the bonds, even if the money is used to pay off old projects. This way, the benefits stay in the country and help local clean energy grow (Ning et al., 2022). When these supportive conditions are in place, more investors want to buy green securities, which increases demand. As a result, it becomes cheaper for companies and projects to raise money, because the cost of capital goes down. This makes it easier for sustainable projects to get the funding they need to grow.

When governments make economic policies that focus on sustainability, it becomes easier to buy and sell sustainable financial products, like green bonds and other eco-friendly investments. These kinds of policies can help move more money into projects that favourably supporting the environment by making the market for sustainable investments bigger and more active. This helps support long-term growth that is better for both the economy and the planet (Braga & Ernst, 2023). Carbon tariffs mechanisms, taxes on carbon emissions and emissions trading schemes, can incentivize investments in eco-energy and smart-grid technologies by making polluting activities more expensive.

Furthermore, government support, like credits for tax, subsidies, and standard tariffs, can help reduce the financial barriers. Sharing ideas between countries and strong enforcement strengthen the adherence to environmental laws. A central role is engaged by the commercial sector in accelerating and mobilizing financial flows toward sustainable companies by acting as a "change maker" and enhance eco-friendly innovation (Rossolini et al., 2021). Eco-Green financial advancement is fundamental for attaining high-quality fiscal growth by refining the

efficiency of resource allocation and technological innovation (Fitrah & Soemitra, 2022)(Mansour, 2023) .

The combination of green finance with other areas like GT and innovation has shown to be very effective in creating new environmental solutions (Ting-ting, 2023). For example, the use of digitally advanced technologies in eco-capital can help financial and banking institutions to see the impact of ecological benefits of their portfolio of companies and ventures at a much affordable cost (Mansour, 2023). Green finance is used to promote environmentally sustainable activities by designating financial resources to various projects that are socially responsible. Fintech evolving into green-tech has improved the possibility of environmental sustainability (Zournatizidou, 2025).

In many developed countries, banks and other financial organizations are increasingly embracing green finance strategies like reducing waste, reusing resources, and recycling as part of their broader commitment to sustainability and environmental responsibility (Zhang, 2023). Responsible investments aid in the eco-green upgrading of industries by the commercial sector. Decision-makers and field specialists are also focusing on green finance due to the negative impacts of climate crises and other geological issues (He et al., 2020). Climate finance also refers to any commercial activity that supports eco-conservation and the creation of new renewable energy sources (Rawat & Anu, 2020). This includes directing capital to eco-friendly products, clean energy, and technological innovations that endorse environmental sustainability (Khan et al., 2022). The significance of eco-green finance is being recognized in both scholarly work and practice (Zhang, 2023). Green finance is also key to encouraging GT innovation, though more research is needed on its specific impacts (Ting-ting, 2023). Green finance is a way to help the economy become cleaner and stronger against climate change. It does this by providing money for projects that protect the environment, like solar power, wind energy, and power-saving buildings.

This money makes it easier for companies and governments to start and grow green projects.

Green finance also encourages people and businesses to invest in these projects, which is important because we need a lot of money to fight climate change. In short, green finance helps build a cleaner, safer world by supporting projects that reduce pollution and prepare us for climate challenges (Umar & Safi, 2023).

Fintech (financial technology), which means using new technology for financial services, is very important for green finance. It helps green finance grow by making green financial products and services faster, clearer, and easier for more people to use. (Sreenu & Mishra, 2023). Fintech innovations, New tools like block-chain, AI, and data analytics can make eco-green finance work even better by improving how information is shared and checked.

For example, block-chain technology is widely used to make clear and secure systems to track green investments, so people know the money is really being used for green projects (Addy et al., 2024). AI and analytics using big data can help check the environmental risks and results of projects, so investors can make better choices (He et al., 2020). Fintech also helps create new eco-green financial products like bonds, loans in the eco-green category , and crowdfunding, and makes it easier for people and small entities to participate. For example, China's ANT Group gives rewards to people for making eco-friendly choices (Sreenu & Mishra, 2023). Fintech also helps lower pollution and supports more investment in environmental protection (Muganyi et al., 2021). Together, fintech and eco-green finance help the fiscal growth of the economy in a greener, more sustainable way (Zhang, 2023).

Fintech can help get money to support power and eco-friendly projects much faster, support building non-conventional energy and eco-friendly infrastructure, and help the environment by making it cheaper and easier to get financing (Deng et al., 2019). However, the fintech industry

also uses a lot of electricity and energy, which can harm the environment. Also, many fintech companies do not do deep research on the impacts on the environmental front due to their activities (Muhammad et al., 2022). It is notable fact that the environmental activities of Fintech companies are not accompanied by in-depth research.

Bringing together new financial technologies and caring for the environment is becoming more important than ever. Finding ways to support both a strong economy and a healthy planet helps everyone (Manta et al., 2025). Countries around the world are setting goals to cut pollution and deal with climate change. They are creating programs that help people and businesses grow in ways that are conducive for both people and surroundings. This means working toward a future where economic progress and protecting nature go hand in hand (Zhang, 2023).

2.8 Overview of Regulatory Frameworks

Environmental rules around the world are changing quickly because the climate crisis needs urgent attention and focus is on supporting sustainable growth (Hummel & Jobst, 2024). Old ways of making rules are no longer enough to handle today's complex environmental problems, so new and flexible approaches are needed (Ribeiro & Kruglianskas, 2014). These new frameworks help guide businesses, governments, and investors to make environment-friendly choices (McPhearson et al., 2021). The rules now impact the stance in shaping how companies plan for the future and build green skills, not just in meeting basic environmental laws (Rugman & Verbeke, 1998). As these changes happen, being open and involving all stakeholders has become very important (Bednárová et al., 2019). International standards for company reporting are also being reviewed, driven by climate worries

and the need for more input from everyone involved (Tettamanzi et al., 2022).

The EU Taxonomy is an considerable aspect of the European Union's plan for climate finance. It is a mechanism to help in making decisions on the economic activities are conducive for the fiscal environment (Sonnerfeldt & Pontoppidan, 2020). This system gives investors, companies, financial institutions and policymakers a common way to talk about and choose projects that support the EU's environmental goals (Zetzsche & Anker-Sørensen, 2022). By setting clear rules for different types of activities, the EU Taxonomy helps stop "greenwashing" and makes sure money goes to projects that really help the environment. It covers many areas like energy, transport, farming, and manufacturing, and gives specific guidelines for each sector (MacNeil & Esser, 2022). The EU Taxonomy is not a list of required investments, but a tool to help people make better choices and be more open about where money is going. This focus seeks to reshape investment practices by directing capital flows towards initiatives genuinely aligned with environmental sustainability. Importantly, the EU Taxonomy is not a mandatory list of investments but rather a tool to guide investment decisions and promote transparency. The Corporate Sustainability Reporting Directive works with the taxonomy by requiring companies to share information about how their work matches these environmental standards (Poulle et al., 2024).

The Paris Agreement, 2015, is a pact made by countries around the world to protect the planet together. It calls for a collective effort to join forces to keep global warming well below 2 degrees Celsius and, if possible, to limit it to 1.5 degrees so that people everywhere can look forward to a safer, more stable climate. The agreement focuses on cutting carbon emissions and helps countries to deal with the effects of adverse climatic conditions. Each country sets its own goals and plans for reducing emissions, based on what they can do. This way, every country can help in a way that fits their situation, but everyone is

working toward the same big goal (Al-Noaimi et A l., 2023). The agreement also asks countries to work together and share technology to help developing nations take action on climate change. It understands that poorer countries need financial help to move to cleaner energy and deal with climate crises effects. The Paris Agreement is important because it brings all countries together for the first time to take strong steps to fight and adapt to extreme weather conditions (Abbass et al., 2022). The Paris Agreement's long-term mitigation goals will require substantial investments, estimated to be in the trillions of dollars annually (Puschmann et al., 2020).

Besides the EU Taxonomy and the Paris Agreement, there are many other rules and programs around the world that help protect the environment. These include national laws, international deals about protecting nature, fighting pollution, and using resources wisely. These rules and promises help countries and companies move toward sustainability and let them share their climate goals with the public (Helppi et al., 2023). Many countries use methods such as levying financial implications to curb carbon emissions to encourage less pollution and support cleaner technology. Sustainable capital and financial tools, such as bonds and loans in the eco-green section, are also gaining more popularity for raising money for environmental projects (De et al., 2014). More and more, people are turning to sustainable finance tools bonds and loans in the eco-green section to help raise capital for environmental ventures. These options are making it easier for private investors to support a cleaner, greener future. These tools help raise funds from investors to support things like clean energy, pollution control, and other green initiatives. At the same time, climate action is being driven by international efforts, where governments, businesses, and organizations from different countries work together to solve specific environmental problems. This teamwork helps make climate solutions stronger and more effective. (Michaelowa & Michaelowa, 2016). International groups like the United Nations Environment Programme (UNEP) and the World Bank help countries

work together to protect the environment. UNEP leads efforts to fight issues like extreme weather changes and pollution by giving advice, sharing information, and helping make rules. The World Bank helps by giving money and support for projects that protect nature and build cleaner, safer communities. These organizations are important because they bring people and countries together to take care of the planet

In summary, rules and systems for protecting the environment are changing quickly and come in many forms. The EU Taxonomy, the Paris Agreement, and other programs show that the world is serious about fighting climate change and supporting sustainable growth. These rules help businesses, governments, and investors make choices that match environmental goals. By making things clearer, holding people accountable, and encouraging teamwork, these frameworks help us move toward a more sustainable future (Albayrak & Bostancı, 2018).

The European Union has played a fundamental role in creating the 2030 Global Agenda, making sure it matches European goals and showing how important banks are in helping organizations become more sustainable (Cosma et al., 2020). Since 1972, the EU's commitment to protecting the environment has grown, turning it into a leading force internationally (Ion & Carmen-Eugenia, 1981). Directing a stronger focus now on development goals that are sustainable and urgent action on ecological conditions, there is a greater need for a complete plan to help move toward a sustainable economy free of carbon emissions (Clark et al., 2017).

2.9 Catalyzing SME Sustainability with Green Finance

SMEs are a crucial aspect of the economy and new innovative ideas. However, they often find it hard to get green finance, which is money to help them do projects that protect the environment. Many SMEs have to pay for these projects themselves because it is difficult to get loans or investments. When they try to get green loans, they face problems like

high minimum loan amounts, complicated rules, and not enough information about green finance. Also, some green finance rules are made for big companies and are hard for small businesses to follow. Because of these challenges, many SMEs have trouble proving that their projects are truly green, making it even harder for them to get the money they need. (Bawakyillenuo) (Fetter, 2019). Green finance includes loans, investments, and other ways of providing money for activities that help to maintain the ecological balance. This kind of finance is very important for SMEs that want to use more eco-friendly practices, lower their contribution to the ill effects on the ecological imbalance, and take advantage of new green business opportunities. By getting access to green finance, SMEs can make changes that are conducive for both their business and the planet (MSME Finance Gap, 2017). It is not always easy to know what helps or stops SMEs from getting green finance. We need to study this carefully. Research shows it is important to fathom how SMEs can use responsible investments to make their business more eco-friendly. This will help them protect the environment and grow stronger in business. We need to look at all the information we have to learn more about these challenges and find ways to help more SMEs get green finance and support a greener economy. (OECD Report, 2022) (International Finance Corporation report, 2023) (G20 Sustainable Finance Working Group, 2024).

SMEs often face many challenges when trying to use environmentally friendly practices, especially because they have limited access to money made for green projects. These businesses make up a large part of the world's economy, but they often do not have enough funds to invest in green technologies, energy-saving buildings, or more sustainable ways of working (Prashar & M, 2019). SMEs often struggle to secure green financing due to several challenges. Many lack awareness of available funding options and find the eligibility criteria set by financial institutions too stringent or complex. Additionally, lenders perceive smaller-scale

green projects as higher risk, leading to stricter loan conditions or rejections. The application processes can be a lengthy, time-consuming and labour-intensive affair, which is difficult for SMEs working in a resource-constrained set-up with limited expertise. These barriers prevent many SMEs from accessing the capital needed to invest in sustainable initiatives. To support SMEs overcome these obstacles, efforts must be made to simplify requirements, raise awareness, and provide tailored support which will empower them to contribute more effectively to the green transition. (Rizos et al., 2016). To help more SMEs use green practices, it's important to make financial information easier to understand (Ye & Kulathunga, 2019), create green finance products that fit their needs, and simplify how they apply for green funding. Many SMEs also struggle with sustainability tools because these tools are often designed for bigger companies. To solve these problems, stakeholders can support SMEs by promoting sustainable practices, sharing useful information and resources, and encouraging cooperation and knowledge sharing among businesses.

Recent studies show that SMEs with strong finances and valuable assets are more likely to create environmentally friendly innovations. This means that being financially healthy helps businesses take better care of the environment (Przychodzeń & Przychodzeń, 2014). This shows that it's important to have policies that help small and medium-sized businesses stay financially stable so they can invest in green projects. Research also shows that when these businesses follow environmental rules and standards, they can reach more customers, work more efficiently, and make more profit (Naruetharadhol et al., 2024). This means that being environmentally friendly can assist SMEs to stand out and attract customers and investors who are concerned about the safety of the environment. Adding sustainability to their business can also improve their reputation, brand, and financial success. This shows why it is important to encourage sustainability to help these businesses do better overall. Also, when SMEs are open to new ideas and have access to outside funding, they can perform even better in the market (Sidek

et al., 2019). Government rules and policies are very important for encouraging SMEs to use environmentally friendly practices. These rules can help SMEs become more sustainable. However, there are still things we don't know. For example, we need more research on what stops SMEs in developing countries from getting green funding. We also need to learn which government actions work best to help SMEs get green finance. More studies should look at how green finance helps SMEs succeed in the long run. We also need to understand how digital tools, like online platforms, can help SMEs find green funding. Lastly, there is a call for more research to ascertain the fact that eco-green capital is fair and benefits everyone. (Bianchini & Lasheras, 2025) (OECD Report, 2022) (OECD Report, 2024) (OECD Report, 2025). Filling these research gaps will help governments, banks, and small businesses learn how to better support green finance. This will make it easier to create good plans for a greener, fairer economy.

3 RESEARCH METHODOLOGY

This section explains how the study was designed, how data was collected, and which methods were used to analyze the information. It also outlines the ethical measures taken to ensure the research remained honest and confidential.

3.1 Research Design

This study uses a qualitative approach by conducting in-depth interviews, which is well-suited for understanding complex issues like eco-finance and sustainability that rely on people's opinions and experiences. This approach focusses on the views and awareness of people. A diverse group like managers, researchers, consultants, and government officials from various geographies, have been reached out to understand the bigger picture with respect to sustainable energy initiatives and green finance. The primary focus was on SMEs in Finland and how green capital can be a catalyst for the adoption of sustainable energy initiatives. This helps to identify main ideas and gives a clear picture of current practices, challenges, and ways to improve.

3.2 Population and sample

Responses were collated via in-depth interviews from respondents who provided insights from various perspectives, and diverse backgrounds. A test interview was conducted and based on the feedback, the questions were modified for better responses. This research follows a sampling strategy to select participants who can provide valuable insights for the research questions.

Primarily interviews were conducted with senior members of companies related to energy sector, consulting, Universities, financial institutions etc., such as Directors, Senior managers and Researchers. The insights

gathered would help policymakers, investors, and businesses understand what drives people and whether they prioritize environmental impact while making business decisions. Similarly, it can reveal the purpose of eco-capital as catalyst in the transformation of faster adoption of initiatives and work towards making the planet greener.

To truly understand the experience faced by entities, there is a need to look more closely at their experiences and listen to the stories of Finnish SMEs and bigger corporations that work with SMEs, with green finance and sustainable energy adoption. The size of the sample for this study will be guided by the principle of data saturation. After conducting initial interviews with 10 participants, and stopped after taking another 10 more interviews were conducted as no new insights were emerging regarding their challenges, needs, and perspectives on green finance solutions. It is anticipated that the size of the sample of 15 to 20 participants is sufficient to achieve data saturation within this specific context.

3.3 Methods of Collection of Data

To gather valuable and reliable data on eco-green finance and non-conventional sustainable energy initiatives, this study gathered insights by having guided conversations, where we asked open-ended questions but also allowed people to share their thoughts and experiences in their own way. This flexible approach helps in getting answers to both planned and follow-up questions, helping to uncover participants' personal experiences and in-depth views on green finance policies and sustainable energy practices.

Key informants, such as green finance specialists, sustainability managers, energy consultants, and government officials have been shortlisted and reached out ensuring that participants have relevant

expertise in the field. This targeted selection assured that the insights collected directly support the study's goals.

Interview questions are open-ended, encouraging participants to share their honest perspectives, challenges faced by them, by the stakeholders they work with and also share life experiences. Topics include the effectiveness of current green finance policies, challenges in implementing sustainable energy projects, and how financial mechanisms influence decision-making in the sector. With participants' consent, some interviews are audio-recorded and transcribed for precise analysis. For those participants who chose not to record their conversation, detailed notes were taken at the time of the interview. All responses are anonymized and securely stored to protect privacy.

The primary interview questions were arrived at through a combination of literature review, theoretical frameworks and nature of the current situation. These questions were specifically crafted to speak about the critical issues highlighted in the literature. The four main focus questions were:

1. **How do companies view green transition and green finance**
   A - From a business standpoint?
   B - considering their customers and partners?

This question mainly focuses on how businesses in general perceive and approach green transition and green finances both as a challenge and opportunity, balancing both sustainability goals and without compromising on business growth. While adapting to eco-friendly practices requires huge capital, it fosters innovation, strengthens the brand and reputation as well as unlocks new avenues of business growth and diversification. A significant role is played by financial institutions in any entity by facilitating funding and incentives for sustainable transformation, they ensure that companies can navigate through the changing regulatory landscapes while meeting customer and partner expectations. Understanding these perspectives helps to shape policies,

strategies, investment decisions and future of sustainable business strategies.

2. **What role does green finance play in business, and how significantly does it influence the adoption of sustainable energy in Finnish companies? What factors drive green financing?**

This question focuses on bringing out the crucial role of Green Finance to enable Finnish companies to adopt sustainable energy by providing funding options such as subsidies, loans at lower rate of interest and guarantees. To understand the impact and role played by financial institutions and government backed initiatives have in pushing the transition to renewable energy, energy efficiency and low-emission technologies. In addition, also understand whether the key drivers of green financing include regulatory incentives, investor demand for sustainability, and the long-term cost benefits of adopting greener practices

3. **What challenges and opportunities exist in implementing green finance and sustainable energy solutions?**

This question is to understand both the challenges with respect to regulatory uncertainties, financial risks, and the high initial costs of shifting to carbon-free energy, as well as the opportunities where green finance also accelerates the shift to a no-carbon economy by providing capital for sustainable projects, fostering innovation, and creating economic growth.

4. **What frameworks have been successfully implemented to drive the adoption of green finance and sustainable energy?**

This aims to comprehend the landscape and correlate the various existing schemes already in place, in order to replicate them to help in understanding the dynamics that assist businesses, policymakers, and

investors in navigating the evolving landscape of sustainable finance and energy transition. It explores how governments and financial institutions implement mechanisms like eco-green bonds, carbon pricing, and ESG-linked loans to channel funding toward carbon-free energy and technologies focussing on low-carbon emissions. These frameworks support businesses in transitioning to greener practices while ensuring financial viability and long-term environmental benefits.

3.4 Data Analysis Methods

The interview responses were collated and organized win an Excel sheet. To analyze the data, thematic analysis was which is a method that involves carefully reading interview transcripts and identifying common ideas or patterns in what people say. These main ideas were categorised under themes and some of the crucial challenges and opportunities stood out naturally from the interview answers. This approach ensured that the findings truly reflect participants' thoughts and experiences about green finance and sustainable energy.

To make the results more reliable, the study compared answers from different groups, like consultants and government officials, helping in consistency check and reducing personal or group bias. During the interviews notes are recorded in excel sheets and post the interviews, audio recordings are transcribed and cross verified. The transcripts were thoroughly read, important points highlighted, and grouped into categories through a process called coding. These categories were then combined into broader themes as a vertical, showing shared concerns or opinions from the interviews. For example, themes included a lack of awareness about green finance options for small businesses, complex compliance requirements, and the need for administrative and technical support to access sustainability benefits.

The study also identified the various connections between different perspectives—for instance, how managers and government officials view

green financing differently as compared to the SMEs. These patterns were linked to the main research questions. The findings presented in clear summaries, using anonymized quotes from participants (unless written consent is obtained from the participant) to give real-world examples. This process helped in explaining how people in Finland perceived the use green finance and the move to sustainable energy initiatives, particularly in small businesses.

3.5 Ethical Considerations

This study takes ethics seriously and every participant is informed and briefed about the study and how their interview data will be used before commencing the interviews. People who were willing to participate were only involved and checked if they fully understood what their stakes are.

Keeping information confidential is crucial, information like the participant's names and personal details will not be included in the thesis without their written consent. All data is stored safely and only the researcher has access to the information. Participants were given the choice to leave the study without citing any reason and if they want, their information were deleted.

These steps ensured the study is fair, respected everyone's privacy and follows the rules for responsible research on the role of green finance and sustainable energy initiatives.

3.6 Limitations

This study has certain limitations that need to be noted and acknowledged when considering the role of green finance in sustainable energy initiatives.

Limited Time for Research: The time available for conducting research was limited and it may affect the how much data has been

collated and analysed. This means that the study provides valuable data and insights, however a longer research period could have allowed for a deeper understanding of the obstacles as well as possibilities that affects adoption of sustainable energy initiatives.

Specific Scope: This study focuses on the energy cluster which is fairly a small part of the larger subset of sustainable initiatives and the finding may or may not be directly applicable across industries. Green finance is a broader term and sustainability challenges varies from industry to industry. A broader research would help in capturing a more comprehensive bigger picture.

Regional Constraints: Since the research is primarily focussed on a particular area and country which is Finland, it may not accurately reflect the challenges and experiences of companies across the globe. The availability of green finance, government policies and market scenario vary from country to country as well as region to region which influence the adoption of policies and financial mechanisms in a specific region or country.

Despite the limitations, the study provides meaningful insights into the role of eco-green finance in supporting and fostering sustainable energy adoption. It highlights the numerous barriers businesses face and how eco-green finance can be effectively used to facilitate the adoption of sustainable energy practices. The key challenges for businesses were identified and provided a basis for understanding how financial strategies can promote environmentally responsible actions. Future research should broaden its scope to include diverse industries, regions, and policy environments to gain a more comprehensive understanding of eco-green finance's global influence on sustainability.

4 RESULTS AND FINDINGS

This section showcases the empirical finding and interprets the relation to the previously established research objectives and theoretical framework of the study. The results offer a comprehensive perspective on the challenges, opportunities and strategies that can be introduced in the market to focus on green finance being a catalyst in accelerating the use of sustainable energy. The data gathered through in-depth interviews, and secondary sources has been systematically analysed to identify key patterns, themes, and insights.

4.1 Population and Data Diversity

A mixed group of industries such as companies related to renewable energy, financial institutions, Universities and banks were interviewed for data collection. Figure 3 below is a word cloud of the various entities that have been part of the study.

Figure 3. Entities at a glance

The sample size comprised of entities of varied sizes and diverse fields for better comprehension of the various challenges and potential avenues in the green transition and adoption of green finance.

Figure 4. Size of the below summaries the sample size considered for the study. Figure 5. Types of Industries below summarises the various types of industries included in this study.

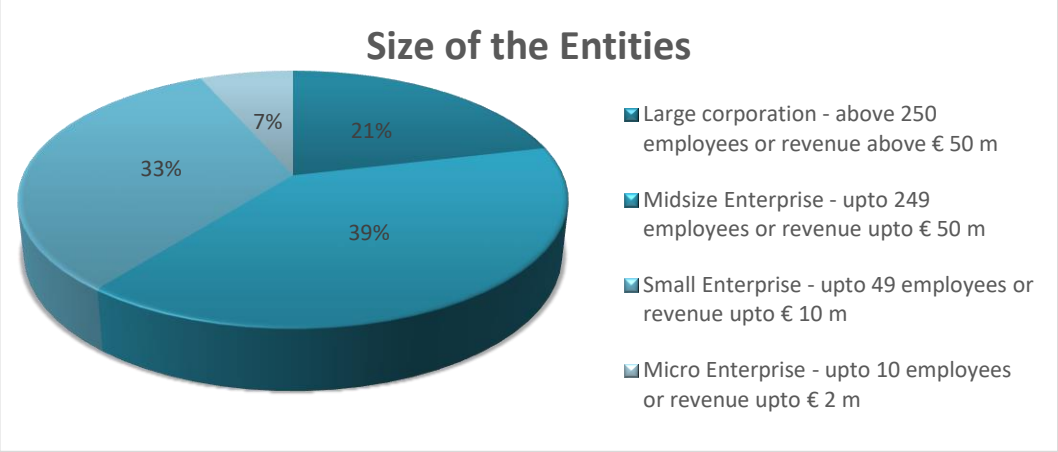


Figure 4. Size of the entities

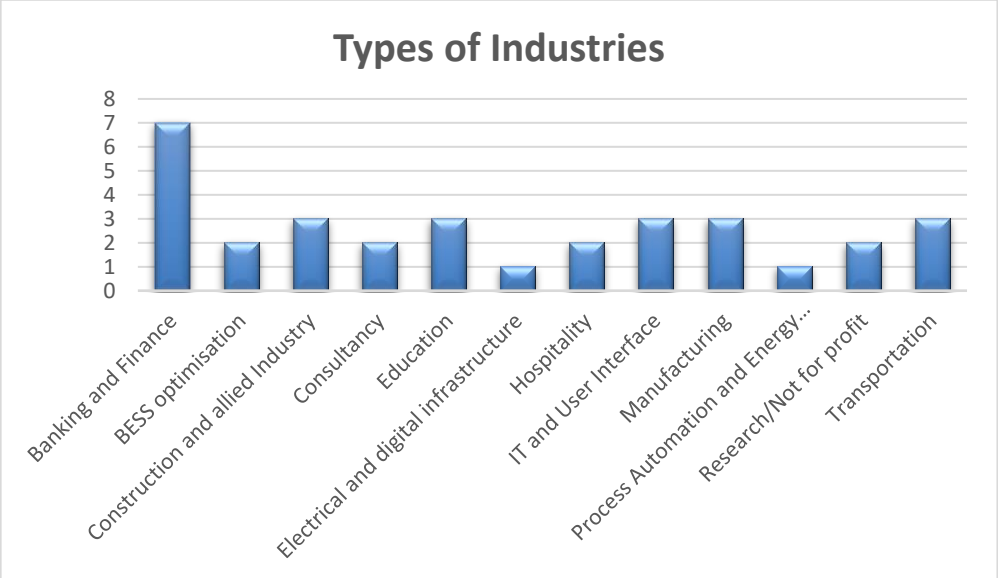


Figure 5. Types of Industries

4.2 Key Challenges and Opportunities

The investigation into the role of green finance and sustainable energy initiatives in the Finnish SME landscape reveals multifaceted interplay of opportunities as well as challenges. Finnish SMEs, are increasingly

recognized as pivotal actors in the epic shift towards a carbon-free economy, possessing the agility and innovative potential to drive sustainable solutions across various sectors. Some of the key challenges and opportunities are as follows:

4.2.1 Key Challenges

Awareness: There are many organisations to support SMEs like some of the Finnish banks, including Aktia, Danske Bank, Nordea, Oma Savings Bank, OP Cooperative, POP Bank, and Ålandsbanken, offer loans to SMEs. Apart from these banks, other financial institutions provide various forms of financing structures for SMEs. **Finnvera,** for example, has the SME Guarantee and green finance incentives, while the **Nordic Investment Bank (NIB)** focuses on funding private sector investment programs with environmental value. **Nefco** engages in financing and management of funds for Nordic green solutions, while **SME Finance** is a fintech business offering growth funding for SMEs. Moreover, the **European Investment Fund (EIF)** offers various financing products, such as guarantees to fund sustainable investment, and the **European Investment Bank (EIB)** invests in projects serving Eupolicy objectives, including climate action and sustainable development.

However, many SMEs do not have the capacity to fully embrace green initiatives and are often constrained by limited awareness with respect to the various schemes available and access to suitable financing mechanisms. Access to green credit from financial institutions continues to be a significant challenge for SMEs.

Preferences: Most banks and financial institutions that offer specialized green credit lines often prioritize larger clients, who have a greater loan amounts that exceed the quantum needed by an SME.

Complex Process: The complexity of navigating environmental regulations, the bureaucracy, the application process, compliances, processing time and the perceived high costs associated with adopting

sustainable technologies can deter SMEs from actively pursuing green opportunities as their main focus is on survival and profit making to ensure that business is thriving.

4.2.2 Opportunities

Scope for developments: Lack of awareness in the SME sector is a huge opportunity for not-for-profit and government to consider and to develop targeted educational programs and awareness campaigns. By increasing SMEs' understanding of green finance options and the benefits of sustainable energy initiatives, SMEs can be empowered to make informed decisions and actively pursue green opportunities as it is beneficial in the long-term. Collaboration with research institutions and industry associations should be focussed to facilitate the sharing of best practices and knowledge related to green finance and sustainable energy, turning a lack of awareness into a collaborative learning experience. In addition, schools and Universities are a great start point to create awareness, it would be essential to integrate environmental and sustainability studies to be part of the curriculum to ensure that sustainability is at the core when beginning any venture. Government and financial institutions must promote finance literacy programs and public awareness focused on sustainable energy and green finance.

Preferences: The preference of financial institutions for larger clients presents an opportunity for innovative financial solutions tailored to SMEs. This could include creating special green loan programs for SMEs, offering smaller loan amounts and making the application process simpler. Public and private sector partnerships, as well as guarantee schemes, can also reduce the risks of green investments for SMEs, encouraging more banks and lenders to support them.

Process Optimisation: Hassle-free access to green finance for SMEs can help them deal with complicated environmental rules and high costs. Streamlining the application process for green loans and grants, lowering collateral requirements, and offering technical support can help

SMEs submit better funding proposals and make the whole process more efficient over time. Having clear and consistent rules that support sustainability while reducing paperwork is important for everyone involved. This also opens up chances for new solutions that make compliance easier and cheaper. Digital tools and online platforms can help SMEs understand regulations and track their progress, making the process simpler and less overwhelming.

4.3 Summary of Key Findings

The study shows that Finnish SMEs need green finance options that fit their specific needs and challenges. This could include new types of financial instruments like eco-friendly loans and bonds, or green venture capital funds, all designed to help SMEs invest in things like eco-energy, energy efficiency, and sustainable resource management. The research also highlights the importance of improving financial literacy among SME owners and managers so they can better understand green finance choices and manage sustainable projects more effectively. While many SMEs recognize environmental issues, they often lack detailed knowledge about sustainability and green finance. Raising awareness, providing education, and making it easier to access green finance are key steps to help address these problems.

Table 1. Synopsis of Key Findings below summarises the findings from this research.

Themes	Key Insights
Awareness	- Many SMEs know of environmental problems but do not have full knowledge of sustainability and green finance. - Lack of awareness of the various financing options, schemes and subsidies available for SMEs.

Challenges	- SMEs face challenges in accessing green finance due to stringent eligibility criteria, complex application processes, and limited collateral. - Time constraints and budgetary constraints, - Lack of trust in new technology, not hands-on with available digital tools, - Primary focus on survival and revenue generation. - Financing schemes are process oriented, cumbersome and time consuming process. Long wait period circa 10-12 months.
Resource Constraints	- Due to financial constraints, it is tough to bear the high initial costs of implementing sustainable measures - Multi-tasking is common in SMEs - one person handles various roles and often there is very little bandwidth to take on more activities, - SMEs do not have the technical expertise or resource person to overlook the compliances and the processes of application for the various schemes.
Support for Transition	- Government funding for SMEs will be hugely beneficial - Educating the SMEs on the various schemes and processes will be helpful - Mandates to be created such that financial institutions can cater to SMEs rather than only focussing on large corporations. - Policies to be created such that larger corporations to support their stakeholders for the green transition along with themselves. - Support for SMEs with digitalisation both in terms of education and implementation.

Strategies	- Digitalisation of the various schemes available - Advertising the various products available where it is freely accessible to SMEs and individuals, Online platforms where applications can be made and the benefits can be availed improving accessibility. - Platforms or forums for SMEs for knowledge sharing which helps them to learn from experiences, foster a community of common interests and build networks.
Drivers of Sustainable Initiatives	- SMEs are primarily motivated to adopt sustainable practices due to regulatory compliance and the potential for cost savings. - The study also found that environmental sustainability is related to energy management, water conservation, and waste management. - Larger companies usually have greater resources to put towards these initiatives, allowing them to stay sustainable - The research highlights the need for additional research on sustainable practices used by SMEs. - Biggest barriers are lack of resources, high initial costs, and a lack of expertise to implement sustainable practices for SMEs.

Table 1. Synopsis of Key Findings

5 SUMMARY AND DISCUSSION

5.1 Study Relevance

This study is complex and significant, particularly in the context of global sustainability goals and the role of SMEs, particularly within the interdisciplinary domains of green finance and sustainable energy initiatives, demanding a comprehensive articulation of the research's potential contributions to both academic discourse and practical applications. Some of the crucial points explaining the importance of this study are as follows:

Addresses a Critical Need: The study directly addresses the potential and obstacles faced by SMEs in accessing and utilizing green finance and sustainable energy. This is crucial because SMEs often lack the staff and experts who can help them navigate the complexities of green initiatives, hindering their ability to contribute to a low-carbon economy.

Supports Global Sustainability Goals: By focusing on green finance and sustainable energy, the study aligns with the broader societal goals of environmental sustainability, economic prosperity, and social equity. It directly contributes to the accomplishment of the goals and objectives of the Paris Agreement.

Offers Practical Insights: The study generates findings that are not only academically sound but also readily accessible and applicable to a broader audience, including practitioners, policymakers, and community stakeholders. It shows how to empower individuals and organizations to become active participants in the transition toward a low-carbon economy.

Contributes to Knowledge Transfer and Capacity Building: The research builds local expertise and capacity in green finance and

sustainable energy. This study brings out valuable insights for promoting inclusive and equitable access to green finance and sustainable energy.

Informs Financial Institutions: The study acknowledges the growing awareness among financial institutions regarding their responsibility to contribute to sustainable development. However, the results of the study provide ways to assist banks and financial institutions on key challenges that needs to considered in adopting, coming up with innovative plans, and granting green finance

5.2 Addressing the Research Questions

How do companies view green transition and green finance;

- **From a business standpoint?**

From a business standpoint, the transition towards sustainable practices is increasingly viewed as a strategic imperative, driven by factors such as evolving environmental policies, decreasing costs of low-carbon technologies, and changing customer expectations for environmentally friendly goods and services. Many organizations now recognize that adopting green initiatives can lead to improved operational efficiencies, reduced resource consumption, and enhanced brand reputation, ultimately contributing to long-term profitability and competitiveness. As quoted by a senior officer from Merinova, that even their logo is green and that is how much they value environmental sustainability.

- **Concerning customers and partners (vendors and suppliers)?**

Concerning customers and partners, businesses are becoming more attuned to the growing expectations for environmental responsibility and transparency. Customers are increasingly demanding products and services that are produced in an environmentally sustainable manner, and they are willing to pay a premium for green alternatives. This was

also confirmed by a researcher, leading the Veturi Project. Companies now expect their partners, like vendors and suppliers, to follow stricter environmental rules as they try to lower emissions and use more sustainable practices throughout their supply chains. Because of this, businesses are creating new ways to buy materials responsibly and are using systems to check that suppliers meet certain environmental standards. There is also a growing need for companies to be open about their environmental actions and social impact, so customers and partners can make better choices. As people become more aware of environmental issues, topics like recycling products (reverse logistics), buying eco-friendly goods, and green manufacturing are becoming more important in managing supply chains

What role does green finance play in business, and how significantly does it influence the adoption of sustainable energy in Finnish companies? What factors drive green financing?

Green finance is very important for helping Finnish companies use more sustainable energy. It gives businesses the money and motivation they need to invest in things like renewable energy, energy-saving projects, and other green activities. By making green funding available, it becomes easier and cheaper for companies to use new, clean energy technologies. Green finance includes special loans and bonds made for projects that help the environment. Besides just giving money, green finance also encourages companies to think about the environment when making business decisions and helps them develop new, eco-friendly ideas.

Green finance doesn’t just help with funding—it also raises awareness about sustainable energy and pushes companies to act more responsibly. As environmental rules become stricter, more businesses look for green finance to meet these new standards and avoid penalties. Other reasons companies use green finance include government rules, financial rewards like tax breaks or grants, customer demand, and the

chance to improve their reputation. All these factors make green investments more appealing and help businesses move toward a greener future.

What challenges and opportunities exist in implementing green finance and sustainable energy solutions?

Using green finance and sustainable energy solutions brings both difficulties and benefits for businesses. One big challenge is the high upfront cost of green technologies, which can be hard for companies with limited budgets. Other problems include not knowing about available programs, lack of time, digital challenges, and focusing more on making money and staying in business than on sustainability.

Subsequently, carbon-free finance and fossil-free energy offer many opportunities. Investing in green projects can help businesses save money by using energy more efficiently and creating less waste. It can also improve a company's brand image and attract customers and investors who care about the environment. As the world progresses towards a greener economy, new markets are opening up for businesses that create and sell innovative green products and solutions, helping to protect the environment, save energy, and promote renewable energy.

What frameworks have been successfully implemented to drive the adoption of green finance and sustainable energy?

To help businesses use clean-finance and sustainable energy, different approaches have been put in place. These include government rewards like tax breaks, subsidies, and special payments for using carbon-neutral energy, which make it easier for companies to invest in clean energy and energy-saving projects. Rules like building codes and limits on pollution also encourage businesses to use green technologies by setting clear standards for everyone. There are also voluntary programs, such as global reporting guidelines, Global Reporting Initiative, ESG reporting and the Sustainability Accounting Standard Board which help companies

measure and share their environmental actions, making them more open and responsible. In addition, long-term funding is often provided by public financial institutions, especially for bigger companies, to support green projects.

5.3 Alignment with the theoretical framework

SMEs face many challenges when trying to go green, such as not knowing about available programs, having different priorities, and dealing with complicated processes. These issues can be understood using several well-known theories.

First, many economic models assume everyone has perfect information, but SMEs often don’t know about green funding or support programs. Institutional Theory helps explain this, as it shows that SMEs usually lack the resources and knowledge that bigger companies have, making it hard for them to understand and follow environmental rules or find the right help. The Environmental Kuznets Curve says that as there is growth and development in economies, the environment first gets worse but then improves. However, because SMEs have trouble getting green funding and adopting sustainable practices, they may keep harming the environment, especially in the early stages of growth.

The Porter Hypothesis says that strict environmental rules and stipulations can encourage creative innovations and drives competition among companies. But in reality, the complicated rules and high costs often discourage SMEs from trying new green ideas, which goes against this theory. Stakeholder Theory says businesses should consider everyone affected by their actions, like workers, customers, and the community. When SMEs focus only on short-term profits, they might ignore environmental concerns, which can hurt their reputation and future business.

Agency Theory looks at the relationship between business owners and managers. In SMEs, owners might care more about their own profits than about the environment, so they don't invest in green projects. Signalling Theory suggests that companies can show their environmental care and concerns to attract investors and other stakeholders. But if SMEs struggle to adopt green practices, they can't send this positive message and may miss out on new opportunities.

Finally, being creative and resourceful, key ideas in entrepreneurial marketing, can help SMEs become more sustainable. However, because SMEs often aren't included in planning and decision-making, they face more paperwork and higher costs, making it even harder to go green. Overall, these theories show that there's a big gap between the benefits promised by environmental policies and what SMEs can actually do in practice

5.4 Effective Strategies

Finland is working towards a roadmap for a sustainable future and follows international agreements like the Paris Agreement and the EU's goals for sustainable development. SMEs are very key players in Finland, making up almost 59% of the country's value added and providing 65% of jobs (European Commission. (2019). SMEs can help protect the environment by using green finance to support things like clean energy in farming, electric vehicles, solar power, and eco-friendly transport. However, as the study shows, SMEs often struggle to go green because they don't always know about their options, face complicated processes, and have trouble finding the right kind of funding. To mitigate these challenges , the following strategies can be implemented.

1. **Targeted Education and Awareness Programs:** Many SMEs are aware of environmental challenges but lack detailed knowledge of sustainability and green finance thus fail to see the bigger picture from a long-term perspective. Developing

programs that increase SMEs' understanding of green finance options, sustainable energy initiatives, and the specific benefits for their businesses from a short-term and long-term perspective will be useful. Collaborating with research institutions and industry associations to share best practices and practical knowledge should address the awareness and knowledge gaps that can hinder the adoption of green practices.

2. **Streamlined Access to Green Finance:** Simplify the application processes for green loans and grants, reduce collateral requirements, and provide technical assistance to help SMEs prepare successful funding proposals. Financial institutions often prioritize larger clients, so specialized green credit lines designed specifically for SMEs, with lower loan amounts and streamlined application processes, are needed. Action Energy Finance is a forum which is making investing into assets possible by digitizing the investment process.

3. **Promote Collaboration and Knowledge Sharing:** Promote collaboration among SMEs, institutions that are research-based, and industry associations to facilitate the sharing of best practices and knowledge related to green finance and sustainable energy. SMEs often struggle due to a lack of know-how and resources to implement sustainable initiatives. Facilitating networks and platforms where SMEs can study from each other's know-hows, access expert advice, and find partners for green projects can significantly accelerate the adoption of sustainable practices.

By focusing on these three strategies – education, finance, and collaboration – Finnish SMEs can overcome the difficulties and capitalize on the prospects presented by the green economy. By addressing the barriers to green finance and promoting sustainable energy initiatives, Finland can foster a stronger and environmental-conscious SME sector, contributing to the country's broader sustainability goals.

5.5 Implementation and Frameworks

Several frameworks can guide the implementation of these strategies:

- **EU Green Deal:** Aligning with the EU Green Deal (Hao, N., & Dragomir, V. D. (2025). provides a comprehensive roadmap for sustainable development, including specific targets and initiatives for SMEs.
- **Nordic Sustainability Reporting Standard:** The NSRS (Nordic Sustainability Reporting Standard for SMEs, 2023) helps SMEs get started with their sustainable transition, providing a framework for sustainability reporting and performance measurement.
- **ESG Frameworks:** Implementing ESG principles can enhance SMEs' attractiveness to investors and stakeholders, promoting responsible business practices. esgResilience is a collaborative platform for SMEs and financial institutions to assess ESG performance in alignment with sustainable finance regulations and standards. (esgResilience, 2025)
- **Paris Agreement:** Integrate the goals of the Paris Agreement (Fitrah & Soemitra, 2022) into SME strategies, focusing on decreasing carbon emissions and promoting ecologically safe energy sources (Reboredo, 2018). By adopting these implementation strategies and frameworks, Finnish SMEs can effectively embrace green initiatives, contribute to a sustainable future, and enhance their competitiveness in the global market.

The key implementation strategies are summarised in the below table:

Solution Category	Action/ Initiative to be taken	Key Implementing Stakeholders
Education & Awareness	- Integrate sustainability and green finance in education - Public campaigns, - Sustainability Town Hall (Informal event where all entities can showcase their sustainable practices – for encouragement, adopting or adapt existing practices) - Platforms or Event for SMEs for knowledge sharing and networking.	Educational institutions (universities, vocational schools), public agencies, NGOs, private sector partners
Regulatory Streamlining	- Expedite permits, - Designate acceleration areas, - Stock taking on implementation failures and learnings from them. - One-stop Support (a commission or authority where all complex administrative processes can be streamlined under one roof)	Finnish Government, Ministry of Economic Affairs and Employment, upcoming Finnish Supervisory Agency, regional administrative units, municipalities.
National Roadmap & Coordination	- Implement SDG finance roadmap, - Scale pilot ecosystems, - Set timelines and milestones for SMEs	Ministry of Economic Affairs and Employment, Finnish Government, public and private sector partners, roadmap task forces.
Green Bonds & Finance	- Expand green bond issuance, - Offer margin discounts, - Transparent impact reporting	MuniFin (Municipality Finance Plc), Finnish municipalities, State of Finland, public sector pension funds, ARA-nominated housing organizations, Municipal Guarantee Board.

EU & International Funding	- Maximize RENEWFM participation by extending participation at a micro-level to be contributors (SMEs and individuals), - Cross-border co-financing (invest as well as host various projects) - Explore new avenues of cleaner energy such as green hydrogen.	European Commission, Finnish project developers, cross-border EU partners, local authorities.
Private Sector & Blended Finance	- Support blended finance, - Export green tech, - Leverage carbon pricing	Private companies, financial institutions, public sector agencies, blended finance consortia.
Carbon Pricing	- Maintain/expand carbon taxes - Support EU ETS.(EU Emissions Trading System)	Finnish Government, Ministry of Finance, regulators, participating industries

Table 2. Key Implementation Strategies

5.6 Further Research Avenues

While this thesis addressed some crucial objectives, several new avenues of research emerged from the process which are listed as follows:

Further research into the thesis of the part played by responsible investments in driving environmentally-safe energy initiatives can explore several crucial dimensions to enhance our understanding and effectiveness in promoting ecological balance. One potential area for exploration involves delving deeper into the specific mechanisms through which green financial instruments interact with technological and institutional factors to drive energy transition. This could involve detailed case studies of successful and unsuccessful green energy projects, analyzing the impact of policy interventions, and assessing how public-private partnerships can help in mobilizing green finance for

sustainable energy. Further research is needed to see how green finance can be better designed for different industries and regions, taking into account things like technology, local rules, and economic conditions. It's also essential to look at the problems with current finance practices, such as unclear definitions, the risk of companies pretending to be green (greenwashing), and not enough long-term funding for clean energy projects. Future studies should work on better ways to measure the real environmental and social effects of green finance and find new ways to manage risks.

Researchers should also check if green finance and energy policies are fair for everyone, making sure all groups benefit and that vulnerable people are not left out. It would help to create common standards and ways to measure green finance.

Another key area is studying how new technology can help green finance and clean energy. This includes looking at how financial technology (FinTech) and digital tools like block-chain can make green investments more efficient and transparent, and how artificial intelligence (AI) could help change banking for the better. Research should also explore how digital platforms can make it easier for small enterprises and individuals to access green finance. Finally, it's important to see how new technologies—like carbon capture, advanced batteries, and smart grids—can affect the need for and success of responsible financing systems.

6 CONCLUSION

Green finance is necessary for supporting sustainable energy by directing money into renewable energy projects and other activities that help the environment. Tools like green bonds, special funds available for investments, and loans with better terms make it smooth for private investors to put their money into green projects. These tools also help keep things open and honest in the industry. This support has a catalytic effect on the shift to a carbon-neutral economy, cuts down on pollution, and helps reach global climate goals

Small businesses, especially in developing countries, face big challenges when trying to go green. They often don't know about the help available, banks usually prefer bigger clients, and environmental rules can be hard to understand and follow. To help SMEs overcome these problems, it's important to provide training and information, create financial products that fit their needs, share risks, and make rules easier to follow. Governments and banks should work together to give technical support, offer lower interest rates, and allow flexible repayment, so it's easier for small businesses to invest in sustainability.

By giving SMEs the knowledge, resources, and support they need, we can help them become leaders in protecting the environment and staying competitive in future.

6.1 Overview of the study

This research delved into the multifaceted role of green finance in fostering sustainable energy initiatives, recognizing the firmness of addressing ecological imbalances and promoting environmentally conscious investments. The central aim was to comprehensively analyze the current state of green finance mechanisms and their effectiveness in channelling resources towards renewable energy projects and other sustainable ventures. By exploring the intricate relationship between

financial markets and environmental sustainability, the study sought to detect key catalysts, constraints, and advantages for scaling up green finance and accelerating the transition to a low-carbon economy. A comprehensive literature review was undertaken, coupled with bibliometric analysis, to pinpoint the primary characteristics of the convergence between green finance and circular economy principles, confirming the potential of green finance in bolstering societal well-being, sustainability, and climate change moderation through investments in circular economy models. The research extended its scope to examine the specific instruments and policies that incentivize environmentally-safe investments, such as green bonds, carbon-tariff mechanisms, and regulatory frameworks promoting renewable energy adoption.

The study also explored the role of financial institutions, governments, and international organizations in influencing the green finance landscape and fostering collaboration towards shared sustainability goals. The investigation was anchored on the premise that green finance is not merely a niche area of capital investment but a fundamental pillar for achieving broader sustainable development objectives, necessitating a holistic approach that incorporates ecological, societal, and monetary considerations. Rising spending on the environment by countries and global financial organizations shows that the world is serious about fighting climate change, meeting market demands, and protecting natural resources. By carefully studying what’s already known and looking at real-world data, this research aims to offer helpful guidance for policymakers, investors, and anyone else interested in green finance. The objective is to make it easier to understand the challenges and opportunities in this area and help everyone work together for a more sustainable future.

6.2 Key findings

This study found several important things about how green finance can help move us toward more sustainable energy. One key takeaway is that more people now see green finance as a way to spark new, cleaner ideas—especially in industries that pollute the most. Making this shift work well means governments, banks, and businesses need to team up to speed up the use of clean technologies and sustainable ways of working.

The research also showed how important it is to have clear rules and definitions for what counts as green finance. Without this, there's a risk that companies might pretend to be greener than they are (greenwashing), which could slow real progress. Another big point is that many people—including consumers, investors, and especially small businesses have limited knowledge about green finance options. Even though lots of people who pay attention about the environment, they often don't have a nuanced understanding of green financial products, which makes it harder for them to make choices that support sustainability.

The study also pointed out some ongoing challenges, like keeping data safe and secure, which is important for building trust and getting more people involved. It was also noted that the United States and China are leading the way in research on green finance and energy policy, showing that there's a lot to learn from international cooperation. While awareness of green finance is growing, there are still big hurdles to overcome, like putting policies into action, building the right financial systems, and making investors feel confident.

6.3 Practical contributions

This research gives useful ideas that can help shape policies and real-world actions in sustainable finance and renewable energy. It lays out a

clear way to understand what makes a strong green finance system, such as having clear definitions, standard ways to measure progress, helpful policies, and good ways to handle risks. The study highlights on the importance of governments and private companies to work together, combining their money and knowledge to support green projects.

For banks and financial institutions, the research offers practical advice on how to build and use green finance strategies. It helps them figure out what to focus on—like checking how their investments affect the environment, creating green financial products, and managing environmental risks in their portfolios. Policymakers can use these findings to design better rules and incentives that make it easier for green finance to grow, such as encouraging green investments, making information more transparent, and setting up supportive regulations.

6.4 Limitations of the study

While this research provides significant insights in the role played by green finance and sustainable energy initiatives, it is important to acknowledge its limitations. One limitation of the study is its reliance on existing literature and data, which may be subject to biases and limitations. The conclusions drawn might be impacted by the quality and accessibility of the data that was examined, particularly in areas where information on green finance initiatives is still scarce or inconsistent. Another limitation is the scope of the research, which focuses primarily on the financial aspects of sustainable energy.

The study might not fully capture the complex interplay of technical, social, and political causes that influence the adoption of sustainable energy technologies. Furthermore, the study's findings may not be fit to all solution for all countries or regions, as the specific context and conditions of each location can significantly impact the usefulness of green finance initiatives. It is also crucial to acknowledge the possible restrictions of the research in terms of methodology, such as the use of

specific models or assumptions that might affect the outcomes and interpretations. Future research could address these limitations by employing a mixed-methods approach combined with quantitative data analysis with qualitative case studies, and by expanding the scope of the study to take into account a wider range of stakeholders and perspectives.

In essence, while green finance is gaining traction, its understanding and practical application, especially among consumers, remains limited. This necessitates a concerted effort to raise awareness and improve knowledge about green financial products. Current discussions often emphasize the economic and environmental aspects, but it's crucial to also consider the social implications, such as the impact of green finance on employment and community development. To effectively address complex environmental and social challenges, there's a need for innovative financial instruments and a better understanding of green financing mechanisms to guide investments toward a more ecologically balanced direction. Integrating environmental, social, and governance factors into financial decisions can drive significant investment in sustainable projects. As technology advances and policies support a greener economy, the world is shifting away from fossil fuels. To fully harness the potential of green finance, governments, financial institutions, and corporations must collaborate to create a supportive ecosystem for green investments. Finally, robust regulatory frameworks and standardized definitions are essential to prevent greenwashing and ensure the integrity of green financial product, fostering investor confidence and growth in the green finance market, with banks playing a key role by considering environmental policies, social inclusion, and relevant regulations, alongside policy interventions that incentivize green investments and limiting environmentally harmful activities.

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