

Kestävän kehityksen Kymenlaakso - raportti

GREEN AND CLEAN KYMENLAAKSO

Actions of Companies: Current Practices, Future Investments
and Regional Mapping

Abolfazl Moradian, Päivi Haapalainen, Marko Torkkeli
LUT Yliopisto, Kouvolan yksikkö

ALKUSANAT

Tässä raportissa kuvataan millaisia kestäväan kehitykseen liittyviä toimia yritykset ovat Kymenlaakson alueella jo tehneet ja millaisia suunnitelmia yrityksillä on tulevien vihreiden toimenpiteiden suhteen. Selvitys toteutettiin LUT yliopiston Kouvolan yksikössä osana tuotantotalouden (Innovation and Logistics -koulutusohjelma) opinnäytetyöprosessia Kymenlaakson kauppakamarin toimeksiannosta syksyn 2025 – talven 2026 aikana. Lisäksi laadittiin dynaaminen interaktiivinen kartta, jolla yritysten toteuttamia toimenpiteitä esitellään.

Tutkimuksessa selvisi, että lähes kaikki kyselyyn vastanneista yrityksistä ovat jo toteuttaneet erilaisia kestäväan kehitykseen ja ympäristöystävällisyyteen tähtääviä toimenpiteitä. Toimenpiteiden kirjo on laaja, mukana on esimerkiksi tekoja energiatehokkuuden kehittämiseksi niin toimitilojen kuin prosessienkin suhteen, vihreän sähkön hankintaa, sähköllä toimivien kulkuneuvojen käyttöä, työntekijöiden koulutusta, päästölaskentaa, ympäristösertifikaatteja, uusiutuvan energian tuotantoon tähtääviä asennuksia sekä jätteiden ja materiaalien kierrätykseen liittyviä toimenpiteitä. Erilaisia toimenpiteitä on tehty kaikenkokoisissa yrityksissä alle 10 hengen mikroyrityksistä suuriin yli 250 henkeä työllistäviin yrityksiin.

Tulevaisuuden suunnitelmista kysyttäessä useimmat yritykset kertoivat jatkavansa ja laajentavansa jo aloitettuja toimia. Monissa yrityksissä seurataan myös koko ajan oman alan teknologioiden kehitystä ja ollaan valmiita kehittämään omia prosesseja, kun uusia mahdollisuuksia siihen tarjoutuu. Suurimmat haasteet kestäväan kehitystä edistävien toimenpiteiden osalta liittyvät yritysten mukaan rahoituksen ja muiden kannustimien puuttumiseen sekä markkinaesteisiin.

Tässä raportissa esitellään aluksi lyhyesti aiheeseen liittyvää taustaa, minkä jälkeen kuvataan tutkimuksen käytännön toteutus ja esitellään tulokset. Raportin pääkieli on englanti.

ABSTRACT

Lappeenranta–Lahti University of Technology LUT

LUT School of Engineering Sciences

Industrial Engineering and Management

Green and Clean Actions of Companies in Kymenlaakso: Current Practices, Future Investments, and Regional Mapping

2026

The green transition is increasingly defined at regional level, where specific company decisions and local conditions directly shape sustainability outcomes. This study looks into the current state of green and clean actions taken by firms in the Kymenlaakso region of Finland, while also analyzing planned investments for 2028 and 2035. The research relies on primary survey data from 58 companies of various sizes and sectors. A mixed-methods approach was used, combining descriptive quantitative analysis with a qualitative content analysis.

Results show that most companies have already adopted practical, low-threshold measures, such as energy efficiency improvements, waste reduction, and purchasing renewable electricity. However, more advanced actions like environmental certifications, on-site renewable energy production, or full emissions accounting are less common. These more complex steps remain unevenly distributed across company sizes, with higher adoption concentrated among larger firms. Planned investments indicate a cautious shift toward more strategic practices by 2028. However, plans for the 2028–2035 period remain less defined and more uncertain, with financial constraints and capacity limitations continuing to restrict long-term commitment, particularly among SMEs.

Furthermore, the study shows how company-level data can be visualized through regional mapping to improve transparency and support regional marketing. By turning individual company actions into a visible spatial narrative, this mapping helps position Kymenlaakso as a credible green and clean region. This approach ensures the reputation is grounded in concrete evidence rather than just abstract claims. The study contributes empirically to literature on regional green transitions and offers practical insights for development organizations and policymakers.

Keywords: green transition, regional development, corporate green actions, green investments, regional mapping, Kymenlaakso

Abbreviations

CDP Carbon Disclosure Project

CO₂ Carbon Dioxide

CSR Corporate Social Responsibility

EIB European Investment Bank

EMAS Eco-Management and Audit Scheme

EMS Environmental Management System

EU European Union

EV Electric Vehicle

GHG Greenhouse Gas

GIS Geographic Information System

HVAC Heating, Ventilation, and Air Conditioning

ICT Information and Communication Technology

ISO International Organization for Standardization

LED Light-Emitting Diode

LCR Low-Carbon and Climate-Resilient

LUT Lappeenranta–Lahti University of Technology

OECD Organisation for Economic Co-operation and Development

R&D Research and Development

RETs Renewable Energy Technologies

SDGs Sustainable Development Goals

SME(s) Small and Medium-sized Enterprise(s)

WBCSD World Business Council for Sustainable Development

Table of contents

Abstract

Abbreviations

1	Introduction.....	9
2	Literature review	12
2.1	Definition of Green and Clean.....	12
2.2	Relevance of Green and Clean to Regional Branding	13
2.3	Green Actions of Finnish Companies.....	14
2.4	Green Actions of Companies in Nordic and European Countries	16
2.5	New Green Technologies Used by Companies in Finland.....	18
2.6	Green Cities and Regional Collaboration in the Nordic Context	20
2.7	Sustainable Investments Planned by Companies in the EU and Nordic Countries	21
2.8	Conceptual Frameworks for Mapping Green Actions and Investments.....	23
2.8.1	Framework for Green Growth Indicators.....	23
2.8.2	Urban Green Growth Framework.....	25
2.8.3	Green Investment Policy Framework.....	26
2.8.4	Framework for Value Chain Emissions: The GHG Protocol.....	27
2.8.5	Framework for SME Performance and Green Growth.....	28
2.8.6	Synthesis and Relevance to the Study.....	29
3	Methodology	31
3.1	Research Design	31
3.2	Data Collection.....	31
3.3	Sampling.....	32
3.4	Data cleaning	32
3.5	Data Analysis.....	32
3.5.1	Sub-question 1: Current Green and Clean Actions	33
3.5.2	Sub-question 2: Planned Green and Clean Investments for 2028 and 2035	33
3.5.3	Sub-question 3: Regional Mapping and Visualization.....	33
3.6	Ethical Considerations.....	34
4	Result and Analysis.....	35
4.1	Profile of Respondent Companies	35
4.1.1	Company Size Distribution	35
4.1.2	Sectoral Representation.....	36

4.1.3	Geographical Distribution	37
4.2	Current Green and Clean Actions Implemented.....	37
4.2.1	Overview of Implemented Actions	37
4.2.2	Qualitative Analysis of the Three Most Common Actions	39
4.2.3	Differences by Company Size.....	44
4.2.4	Adoption of Environmental Certifications and Standards.....	46
4.2.5	Share of Renewable Energy in Total Energy Use.....	47
4.2.6	Reported Barriers to Green Implementation	48
4.3	Planned Future Investments for 2028 and 2035	50
4.3.1	Planned Investments up to 2028.....	50
4.3.2	Qualitative Analysis of the Three Most Common Investments (up to 2028).....	52
4.3.3	Differences by Company Size (up to 2028).....	55
4.3.4	Environmental Certifications and Standards (up to 2028)	57
4.3.5	Planned Investments for 2028–2035	58
4.3.6	Qualitative Analysis of the Three Most Common Investments (2028-2035)	60
4.3.7	Differences by Company Size (2028-2035).....	61
4.3.8	Environmental Certifications and Standards (2028-2035).....	63
4.3.9	Comparison of Green and Clean Actions — Current vs. 2028 vs. 2035.....	64
4.3.10	Anticipated Challenges and Funding Needs	66
4.4	Visualization Opportunities for Regional-Level Communication.....	68
4.4.1	Mapping Current Actions (GIS-Inspired Approach).....	68
4.4.2	How Visualization Can Support Regional Branding & Public Communication.....	69
5	Conclusion	71
5.1	Current Situation of Companies	71
5.2	Planned Green and Clean Investments: Short-Term (2028) and Long-Term (2035)	73
5.2.1	Planned Investments up to 2028.....	74
5.2.2	Planned Investments for 2028–2035	74
5.2.3	Differences by Company Size.....	75
5.2.4	Planning Uncertainty and Investment Readiness	76
5.3	Implications of Mapping for Regional Development	76
5.3.1	Geographical concentration and visibility of green actions	76
5.3.2	Implications for regional-level communication and reputation building	77
5.3.3	Support for networking and regional cooperation.....	77
References	78

Appendices

Appendix 1. Survey

Figures

Figure 1 - Framework for green growth indicators (OECD, 2011).....	24
Figure 2 - Framework for urban green growth (Hammer, 2011)	25
Figure 3 - A Framework for a Green Economy Transition: A Policy Perspective	26
Figure 4 - Overview of GHG Protocol scopes and emissions across the value chain	28
Figure 5 - Conceptual Framework on SME Performance (Koirala, 2019)	29
Figure 6 - Company size	36
Figure 7 - Industry sector	36
Figure 8 - Location (municipality) of main operations	37
Figure 9 - Frequency of Implemented Green and Clean Actions.....	38
Figure 10 - Comparison of Implemented Actions by Company Size (Percentage of Respondents)	45
Figure 11 - Distribution of Environmental Certifications/Standards among Respondents	46
Figure 12 - Share of Renewable Energy in Total Energy Use.....	48
Figure 13 - Reported Barriers to Green Implementation	49
Figure 14 - Planned Green & Clean Investments up to 2028.....	51
Figure 15 - Distribution of Planned 2028 Investments by Company Size.....	56
Figure 16 - Planned Certifications to be Obtained by 2028	57
Figure 17 - Planned Green & Clean Investments for 2028–2035	59
Figure 18 - Distribution of Investments by Company Size for 2028–2035	62
Figure 19 - Planned Certifications to be Obtained by 2035	63
Figure 20 - Comparison of Green and Clean Actions — Current vs. 2028 vs. 2035	65
Figure 21 - Mapping Current Green Actions of companies in Kymenlaakso	69

Tables

Table 1 - Frequency of Implemented Green and Clean Actions	39
Table 2 - Summary Table: Energy Efficiency Upgrades	41
Table 3 - Summary Table: Waste Reduction and Circular Economy	42
Table 4 - Summary Table: Purchased Renewable Energy or Green Electricity Contracts.....	43
Table 5 - Distribution of Environmental Certifications/Standards among Respondents	46
Table 6 - Share of Renewable Energy in Total Energy Use	48

Table 7 - Reported Barriers to Green Implementation.....	49
Table 8 - Planned Green & Clean Investments up to 2028	51
Table 9 - Planned Energy Efficiency Upgrades by 2028	53
Table 10 - Planned Waste Reduction and Circular Economy Measures by 2028	54
Table 11 - Planned renewable energy purchase or green electricity	55
Table 12 -Planned Certifications to be Obtained by 2028	58
Table 13 - Planned Green & Clean Investments for 2028–2035.....	59
Table 14 - Planned Waste Reduction and Circular Economy (2028–2035).....	61
Table 15 - Planned Renewable Energy (2028–2035).....	61
Table 16 - Planned Certifications to be Obtained by 2035	64
Table 17 - Key Challenges for Future Green Investments	66
Table 18 - Anticipated Need for External Funding and Support for Green Investment.....	67

1 Introduction

Lately, green transition has shifted from being primarily a national policy ambition to process that increasingly unfolds at regional and local level. European Union climate and energy strategies set broad targets, but their success depends on firms' actions in specific regions and industries (OECD, 2011, Filipović et al., 2022). Consequently, regions are no longer just passive recipients of sustainability policies; they've become active arenas where corporate decisions, infrastructure conditions, and public support mechanisms interact. Knowing what companies actually do instead of just reading their official strategy papers, is central to checking if a region is truly ready for sustainable change.

At same time, the companies are increasingly required to implement environmentally friendly business practices due to legislation, consumer attitudes and increasing energy costs (Park, 2024, Kuosmanen and Pajarinen, 2025). Research indicates that the level of corporate engagement with sustainability issues varies significantly depending on the size of the company and the industry in which it operates. The majority of regional economies rely on small and medium-sized enterprises (SMEs), and these SMEs focus on incremental measures. SMEs prefer practical and incremental measures in preference to full strategies or advanced technology (Luetkenhorst, 2004, Koirala, 2019, Caha et al., 2024). This leads to a fragmented picture of green action which is difficult to capture using national level indicators. Small local businesses generally have a low profile; their positive impact is often masked from view by conventional statistical methods.

A significant body of academic research has provided us with insights into the principles of green growth and regional development. Research has looked at how companies can adopt circular economic practices and invest in the environment, as well as governmental policies which relate to the environment (Johannsdottir, 2015, Rodriguez-Anton et al., 2019). This can be at either the company or government level. Research has highlighted the significance of local authorities in the Nordic region in promoting sustainable development through local action and regional initiatives. In the Nordic context, research highlights role of cities and regions in supporting sustainability transitions through governance and collaboration (Aguiar Borges et al., 2017, Strand, 2024). There is still a significant gap between the current policy framework and the day-to-day realities of smaller companies. A great deal of work in

this field has focused on the frameworks or the large corporations. Data concerning the green actions of businesses as reported by these firms and their investment plans for future green activities at the regional level is scarce, especially when the businesses involved are small to medium in size.

The particular importance of filling this knowledge gap becomes even clearer when we look at regions that want to present themselves as “green” or “clean” and their claims to be verified through evidence. The local branding of regions frequently uses tales of green practices that could possibly not reflect the real situation on the ground. These tales may not necessarily reflect the way many of the region's businesses actually operate (Virant et al., 2024). Without a clear overview of a company's current activities, there is a risk that claims of its environmentally friendly practices may not be genuine. From a development standpoint, the lack of this information also restricts regional actors' ability to identify areas of difficulty and promote the exchange of knowledge amongst their peers.

Kymenlaakso provided a particularly relevant case for addressing these challenges. The region, which incorporates the sectors of production, transport and energy-related activities, is a microcosm of Finnish industrial areas that are experiencing a transition to sustainability. Kymenlaakso has the goal of enhancing its image as a region which is ecologically clean and friendly. In order to reach this target, it is necessary to have more than just a statement of policy; we require a visible company-wide programme. Much of the time this information is overlooked. Mapping these activities spatially makes regional sustainability efforts more transparent. This contributes to regional cohesion by helping companies to tell a cohesive story about their regional efforts.

In this study the goal is to present a summary of the green and clean activities of Kymenlaakso companies. Among the identified investment plans there are also green ones for the years 2028 and 2035. The research aimed at addressing a lack of data which prevents the promotion of the area.

The main research question guiding this study is:

What is the current state of green and clean actions and planned green investments among companies in Kymenlaakso, and how can these activities be presented through regional mapping to support regional marketing and reputation building?

This question is addressed through three sub-questions:

1. What green and clean actions have local companies already implemented?
2. What green and clean investments are planned for the years 2028 and 2035?
3. How can the collected company-level data be visualized through regional mapping to support regional marketing and reputation building?

By combining company-level survey data with spatial visualization, this study contributes empirically to literature on regional sustainability transitions. Practically, it offers regional stakeholders a transparent tool for communication and planning.

2 Literature review

2.1 Definition of Green and Clean

In order to lay the basis for this piece of research it is advisable to define what is meant by "green" and "clean." While often used synonymously, these expressions imply distinct focuses which can be influenced by the particular situation. The applications are diverse and cross various sectors including energy technology, urban planning and industrial processes. The term *green* is generally used to describe products and technologies that save natural resources and are sustainable for a long period of time (Sawchuk, 2008, Ashkin and Ellis, 2009).

Green energy is a type of renewable energy that cuts down on pollution by using solar, hydro and wind energy which does not emit CO₂. The overall impact on the environment is reduced as a result and companies are now working with microgrids to make the process more efficient (Ahmed et al., 2021).

Green technology is science and technology to improve the standard of living of humans through the conservation of the earth's natural resources. This practice of saving the environment is achieved by decreasing damage to it through the design of eco-friendly products and methods. Examples of the application of industrial technologies include clean energy production, waste recycling, water treatment and conservation of natural resources (Pratama, 2022, Mohammed, 2021, Singh and Kumar, 2017).

Green chemistry which is otherwise known as clean chemistry is a field of research which makes use of methodologies that reduce the hazards to health and for the environment by either eliminating or by minimising the usage and also the generation of the various harmful chemicals involved in the production of chemical products and chemical processes.

The term *clean* primarily relates to the lack of pollutants and contaminants, with a main emphasis on purity, safety and the impact on the immediate environment.

The use of clean energy sources helps reduce pollution by using energy that comes from the sun, water and wind. The term renewable energy is often used in place of clean energy, with

particular emphasis on the non-polluting aspect of these resources, (Ahmed et al., 2021, Keramitsoglou et al., 2016).

Clean technologies are emerging that can significantly cut pollution through their green impact. The various remediation techniques such as the removal of pollutants from soil and water by biological or technological methods are discussed by Jamunasri et al. (2025).

Cities of the Future Should be Clean and Green Urban Centres which Combine Economic and Social living with Environmental Considerations to provide a sustainable life. Overall, a comprehensive set of policies aims at improving people's quality of life, protecting the environment and public health (Promsaka Na Sakolnakorn, 2018).

In this study, the term “*green and clean actions*” refers to practical and implementable measures adopted by companies to reduce their environmental footprint and energy-related impacts within their current operational structures. These actions primarily include improvements in energy efficiency, the use of renewable electricity, resource and waste management practices, and other low-threshold operational measures. The focus is on actions that are relevant to regional sustainability transition.

2.2 Relevance of Green and Clean to Regional Branding

A region with a 'green and clean' brand identity is now more than just a marketing novelty, as it plays a key role in differentiating an area, attracting investment and helping it to compete in an increasingly sustainable world. Regional brands which make it known that they support the environment are proving that their commitment is beyond purely promotional purposes. It has a direct impact on the local ecosystem and economy, which could have positive outcomes in the future.

Regional products are now increasingly chosen by customers on the basis of sustainability. With more people wanting to maintain a distinct cultural heritage and reduce their carbon footprint, many consumers are looking for the opportunity to cut back on their reliance on international goods and lower their carbon emissions from transportation. Many also wish to aid the local economy (Haid et al., 2024). Green marketing efforts have a substantial impact on consumer perceptions of a company's brand and a customer's intention to purchase. The magnitude of this impact varies across different cultures and legal

environments. The potential of green technologies for the development of heritage sites was discussed by Sujanska and Nadanyiova (2024) and David et al. (2025).

While ecolabels do provide a benefit to buyers, they often give weaker brands a greater boost in sales than they do to stronger brands. For smaller organisations and brands, third party endorsements are crucial to build trust in the consumer. Stronger brands often obtain limited benefits from third party endorsements because their reputation is already secure. Beyond sales, sustainability builds a brand image based on warmth and competence, which increases consumer purchase intent (Gidaković et al., 2022).

In order for regional branding to prove effective, a strong partnership between local government and the business community is necessary. The partnerships between governments and businesses have contributed in bringing about the involvement of regional firms and giving credence to regional branding efforts (Fujii et al., 2024). The growth in the formation of cleantech clusters is another key factor. These clusters make economic growth and the environment go hand in hand by using local expertise and leadership that is strategic (Tvedt, 2019).

The use of green branding can be problematic, specifically in terms of establishing credibility. Because a company that is thriving tends to be at odds with the principles of environmentalism, major, prominent brands often find it difficult to appear authentic (Wallach and Popovich, 2023). Companies are still using "green" labels to deceive consumers regarding the environmental benefits of their products or services. The public loses trust in organisations when the latter downplay the negative environmental impact of their operations (Andersson and James, 2018).

2.3 Green Actions of Finnish Companies

There is rising action from Finnish companies in a number of sectors in terms of environmental issues and green actions. This is mainly due to growing public awareness and the requirements of new legislation. In various industries sustainable practices offer numerous benefits but they can also face significant difficulties. Companies which focus on the manufacture of environmentally friendly products generally display a better economic performance than their rivals which are not concerned with the environmental impact of their

products. This is in terms of higher revenue and employment. They have lower productivity and participate less strongly in export markets. Companies with these characteristics, including education levels of employees, size and product range, tend to be environmentally aware. Companies which are bigger appear to be more likely to incorporate environmental considerations into their business (Kuosmanen and Pajarinen, 2025).

In Finland the direction of change from an economy based on non-renewable resources to one which is primarily based on renewable resources happens primarily at the government level with a top-down approach. This policy focuses mainly on quicker economic benefits and the improvement of existing technologies. The approach aims to preserve present industrial system structures, however, it varies from the Netherlands type of long term, grassroots visions which intend to drastically alter the overall system (Bosman and Rotmans, 2016). Investments aimed at sustainability can also be found in the real estate sector. In Finland, owners of properties have started to use green bonds to support their energy efficient certified projects. These projects are both environmentally friendly and economically beneficial, along with promoting social benefits through communal facilities (Nenonen et al., 2019).

The ICT sector shows quite different adoption rates. While Finland's national policies aimed at reducing its impact on the climate, as outlined by the Ministry of Transport and Communications, help towards reducing the nation's environmental footprint, it appears that corporations and small enterprises differ in how they take this and put it into action. The Green ICT Project's findings suggest that there should be a greater level of involvement from all stakeholders and that there should be targeted promotional campaigns in order to increase the take up of green ICT (Porrás et al., 2025). Finnish non-life insurance companies will be driven by various forces including stakeholder pressures, customer requirements and official regulations to develop proactive environmental methods (Johannsdottir, 2015).

In sectors such as Finland's horse trade the issues are more nuanced. Companies which place significant importance on social and economic sustainability in their institutions show a greater willingness to invest in environmental innovations; on the other hand, those which only concentrate on environmental sustainability are less likely to invest in innovation - this supports the argument that a company needs to have a broad view of sustainability in order to encourage innovation spending (Saunila et al., 2018). Public procurement is another institution that offers assistance. The Nordic Swan environmental label simplifies

procedures ensuring that they still meet the environmental standards. This is a way in which a policy instrument may incorporate eco-friendly policies into the public sector (Gronow et al., 2017).

Undoubtedly, problems persist. In Finland, the regulation of industrial emissions is mainly based on permits issued by the government. However, this permit system often fails to prevent the release of pollutants into the atmosphere by industrial accident. Research indicates that utilising risk prevention techniques that take into account socio-technical variables could lead to enhanced regulatory outcomes (Wessberg and Molarius, 2008).

While corporate sustainability is often influenced by international standards, domestic policies also play a significant role. Finland has set the goal of becoming carbon neutral by 2035. The emphasis is on green technologies, carbon sinks and cutting back on emissions through innovation in this approach. This creates both market opportunities and regulatory requirements for companies. Initiatives support the adoption of hydrogen from renewable energy sources, along with energy efficient and circular economy methods. In particular, this strategy targets small and medium-sized enterprises by cutting costs through innovation and training and reducing the obstacles to the adoption of new technology; it also supports local partnerships and regional experiments (Huttunen et al., 2022).

2.4 Green Actions of Companies in Nordic and European Countries

In Europe and the Nordic countries there is an increasing trend among businesses to adopt environmentally friendly practices, mainly as a result of regulatory changes and the public's increasing awareness of environmental issues. In line with the EU's European Green Deal, corporate social responsibility business are moving in this direction.

Businesses in the Nordic region focus a lot on their strategy concerning a bioeconomy and circular economy. In industries which use wood, there has been a push to make use of renewable resources (Kaputa et al., 2023). A leading example is the wood-based industry. Progress has been similar in the insurance sector; Nordic firms offering non-life insurance have implemented proactive measures for environmental reasons due to a mix of high stakeholder expectations and regulatory pressures. Companies with large-scale operations tend to be pioneers in the green practices, while smaller companies in the market do not

actively support the principles of the European regulation (Johannsdottir, 2015, Johannsdottir and McInerney, 2018). The notable feature of the region's energy industry is its strong focus on corporate social responsibility (CSR) and being carbon neutral. Previous studies in areas similar to this one have been carried out by Latapí et al. (2021b).

The European Commission regards the European Green Deal as a key initiative in achieving a climate-neutral Europe by 2050. The approach taken in formulating this policy has significant implications for corporate planning, stock market activity and branding of goods (Lamenta and Grzybowska, 2023, Liberati, 2021). Today many businesses choose sustainability marketing, a process whereby businesses tell the public about their efforts in environmental issues (Kehris and Gaile-Sarkane, 2022). This is visible throughout Latvia as well as other European Union countries. Corporate social responsibility has now become a fundamental component of corporate strategy in Europe. Companies are involved in more practical aspects of environmental management, including recycling, reducing energy consumption and green construction. This contributes to improved efficiency as well as a cleaner environment (Metaxas and Tsavdaridou, 2014, Domínguez-Herrera et al., 2018, Jamshaid et al., 2024).

Across the continent, development has not been uniform. Corporate Social Responsibility (CSR) practices differ in terms of maturity in Germany and Croatia. Large German companies have CSR as part of their overall strategy. Croatian companies, however, have socio-cultural obstacles to overcome before they can begin to implement CSR practices (Bögel et al., 2018). A distinct strategy was pursued by Spain; it implemented a nationwide CSR policy across the private sector, public administration and smaller businesses (SMEs) to enhance economic competitiveness and promote sustainability (Reverte, 2015).

Transition to a green economy is identified by researchers as having a number of obstacles and drivers. Key factors which drive the success of a project are stakeholder support, long-term plans and the set of rules which are in place (Johannsdottir, 2015, Latapí et al., 2021a) (Strand, 2024). The lack of money and a consistent application of the law are significant difficulties in implementing this legislation (Latapí et al., 2021b, Bögel et al., 2018). While they pose significant problems, major companies act as a model of success for those seeking to replicate their achievements. Companies such as Novo Nordisk and Ørsted, both of Denmark, have the world's best corporate governance. They have maintained this position by ensuring that they work well with their stakeholders. Additionally, the programme found

that financial incentives played a role, since in Podravška, external assistance led to the initiation of environmental measures (Virant et al., 2024).

The passage of legislation has provided further support for these initiatives. Companies in the European Community have had to provide information on their environmental impact since the year 2000 (Luetkenhorst, 2004). This can also lead to better financial performance (Caha et al., 2024). The European Green Deal package has brought this into sharper focus and made the operationalisation of these rules essential for companies in order to achieve climate neutrality (Lamenta and Grzybowska, 2023). Essentially, EU-wide strategy now encourages both large corporations and SMEs to invest heavily in green tech (Matei et al., 2012).

Sustainability in Europe is promoted by businesses in the region through green investment and corporate social responsibility. Companies in Nordic countries are amongst the leaders worldwide when it comes to a focus on the circular economy. Barriers of a financial and cultural nature still exist. The Green Deal will ensure future sustainability by maintaining high levels of environmental responsibility.

2.5 New Green Technologies Used by Companies in Finland

New green technologies used by Finnish companies include ICT, energy, packaging, construction, and waste management. The use of biofuels is also becoming more common.

This nation has a variety of green technology products across numerous industries and this commitment to the environment is real. Finland's expertise in various technologies is demonstrated by its achievements in the fields of energy, ICT, biofuels, waste management, construction and packaging.

ICT Sector

Corporate organisations are currently placing a greater emphasis on sustainability in their strategies. The Green ICT project was launched in the year 2021. The programme's objective is to increase awareness of environmental concerns and promote the adoption of more environmentally friendly lifestyles and practices. Most substantial businesses are more likely to adopt and implement this process than small companies. The current lack of awareness

and coordination necessitates increased stakeholder engagement and capacity building efforts (Porrás et al., 2025).

Energy and Environmental Technology

CLEEN Ltd is a centre of energy and environmental expertise, coordinating international co-operation in the field. CLEEN, a Finnish partnership of industry, academia and government, has helped to speed up the development of more energy-efficient electric motors and variable speed drives by promoting collaboration between companies and research institutions (Tolvanen et al., 2011). Finland is at present trying to make commercial use of renewable energy technologies such as solar energy and biofuels. The commercialisation of eco-innovations often presents significant challenges, such that R&D support does not guarantee market acceptance. Further strategies to increase commercialisation are therefore required. Studies conducted by the year 2017 (Shakeel et al., 2017) (Nica et al., 2024).

Packaging Industry

Companies such as Walki and Wipak are involved in the production of packaging. These Finnish firms are working towards a more sustainable future. Researchers are working on sustainable materials, for example materials which can be recycled and fibres which come from renewable sources, thus cutting down emissions of greenhouse gases (Goldstein, 2010).

Biofuels

A biorefinery located in South Carelia, Finland, illustrates a sustainable production process of biofuels by green technology. The production of second generation biofuels relies on the use of Finnish forestry resources and the existing Finnish pulp mills (Slobodenyuk and Vakkilainen, 2012).

Construction Sector and waste management

The Finnish construction sector is making efforts to construct buildings that are environmentally friendly. In this industry, the Finnish government has enacted various regulations. These regulations are meant to encourage the construction of low-carbon buildings. As documented by Kuittinen and Häkkinen (2020), data on materials' carbon footprint assists in the implementation of carbon reduction targets at industrial level. Among other methods for waste disposal technologies for energy from waste are being developed to

help cut down on the usage of landfills. Large investment is needed in such systems, but they are developing with wider efforts to implement a circular economy as stated by Goldstein (2010).

Solar Energy

Finland, a country that does not have much sunlight during winter, uses a lot of the sunlight it does have during the summer months for solar energy. These initiatives are part of a National Energy Strategy which aims at a reduction in CO₂ emissions (Nica et al., 2024).

Finland has a wide-ranging strategy which involves education, the economy and the community. The construction and biofuels sectors concentrate on the practical application of technology while that of ICT is focused on raising public awareness. These regional experiences offer useful lessons for future regional development projects, for instance in Kymenlaakso.

2.6 Green Cities and Regional Collaboration in the Nordic Context

The Nordic region's approach to sustainability is deeply rooted in collaborative models of urban and regional cooperation. These collaborative models encompass sustainability. The transition to sustainable cities in the Nordic countries depends heavily on local authorities, businesses and citizens co-operating with one another. The approach of integrated spatial planning for economic development combines economic, social and environmental considerations in a holistic approach which can create synergies that strengthen regional attractiveness and environmental outcomes (Aguiar Borges et al., 2017). In the Nordic region urban sustainability is promoted through the high investment in green infrastructure, eco-friendly public transport and renewable energy sources. While they reduce consumption of resources and decrease emissions, these projects enhance the quality of life, thereby turning areas into hubs which are both competitive and sustainable.

It is clear that success in Nordic cities can be attributed to transparent data sharing and a long-term vision which was developed in collaboration with stakeholders and was accompanied by participatory governance. Research has demonstrated the value of the company's sustainability transition when it incorporates a variety of stakeholders and authorities. While the Nordic countries' welfare models have been cited as examples to be

exported, it is evident that such models must be adapted according to the local and regional socio-economic characteristics.

The experiences of Kymenlaakso have valuable lessons to offer. Finland's goal of a green and clean region can be achieved by going beyond mapping the sustainable actions of companies, it also involves fostering collaboration across the municipal sector, support organisations and local communities. In cities such as Aarhus and Helsinki, municipal authorities' co-operation with businesses was central to a successful positioning of these regions. It seems that their efforts to brand their cities were more effective when business action was combined with an emphasis on unique regional identities and engagement of interested parties (Aguiar Borges et al., 2017).

2.7 Sustainable Investments Planned by Companies in the EU and Nordic Countries

Investments in the EU and the Nordic countries are now becoming sustainable through various long-term strategies employed by the companies in these regions. The EU and the Nordic countries have the next few decades as a deadline to act on climate change and sustainable development. Companies have introduced comprehensive plans and organisational-wide initiatives to conform to international frameworks, particularly the Paris Agreement and the UN's sustainable development objectives.

The European Commission has proposed the European Green Deal as a programme for making the EU's economy net zero in respect of greenhouse gas emissions by 2050. A cornerstone of the EU's economic strategy for the next decade, the European Green Deal has the potential for long-term investment. The European Union has set goals for 2030, to achieve a reduction in net carbon dioxide emissions of 40%, along with a 32% contribution from renewable energy and a 32.5% improvement in energy efficiency (Filipović et al., 2022). Europe requires an investment of €260 billion each year in the fields of energy, transport, and the environment for the next ten years in order to meet these goals (Vara Prasad et al., 2023). This is roughly two percent of the 2020 GDP of the European Union. The EU's Green Deal is a blueprint which sets 2050 as the target year for reaching carbon neutrality, achieving zero pollution and conserving natural ecosystems. The European Investment Bank is key in this endeavour as it focuses on limiting the rise in temperature to

1.5 degrees Celsius, and also improving climate resilience and tackling social inequality (Morgado, 2024).

These plans aim to further the objectives of the EU by developing its sustainable finance plan and introducing the EU taxonomy regulation. The aim of these frameworks is to see investment directed towards projects that have environmental benefits by pension funds and other investments choosing their investments based on more than just financial return (Ridzak and Žigman, 2020, Dorendorf, 2020). Circular economy strategies also promote a decrease in waste and lengthen product lifetimes, which means that such practices are more in line with the Sustainable Development Goals (SDGs) (Rodriguez-Anton et al., 2019).

Finland has set a target to achieve a net zero emissions level by the year 2035 in the Nordic countries. Finland's strategy to reduce greenhouse gas emissions depends on a very considerable expansion of nuclear energy and a significant increase in the use of wind power. There will also be "sector coupling" allowing heating, transport and industrial processes to be powered from a low carbon source (Hyvönen et al., 2023). The development process is ambitious in scope, though, this pathway has to overcome various challenges. Major obstacles are the manufacturing process and access to the essential materials. These countries, Denmark, Finland and Sweden, differ in the way in which they operate in regional terms (Clement, 2004).

On a corporate level, several firms are driving these investments. Businesses such as Novo Nordisk and Ørsted get high marks for sustainability due to the incorporation of stakeholder engagement into their core business operations (Strand, 2024, Latapí et al., 2021b). Energy companies like Enel, Ørsted, Engie, Vattenfall and Iberdrola are now changing their business models to be in line with the EU Taxonomy. They are focusing on the use of renewable energy over fossil fuels (Hao and Dragomir, 2025). BlackRock, for example, puts the environment at the heart of its strategy; it considers the risk of climate change as financial risk (Scanlan, 2021).

Adapting to change is demonstrated by Finland's forestry sector. The companies have introduced sustainable practices into their businesses. These are mainly focused on reducing energy consumption and on recycling. These efforts are supported by national and EU policies which ensures that they are closely in line with current policy (Husgafvel et al., 2013).

The financing for such a change still remains a major problem. The EU's framework on finance for its low-carbon transition seeks to provide low carbon technology finance in a way that ensures its support is for businesses at different stages of development and one which promotes equitable change (Park, 2024). A number of large EU enterprises engage in activities which are geared towards the achievement of the UN's sustainable development goals (SDGs) with some of the European Union's member states having disparities in terms of contributions to those goals. However a number of the states are lagging behind in their contributions (Perevoznic and Dragomir, 2024).

A multi-faceted effort is required for a company to achieve climate neutrality, encompassing finance, corporate strategy and regulatory policy. These regions are laying a foundation for a more resilient future by using innovation and aligning with policy.

2.8 Conceptual Frameworks for Mapping Green Actions and Investments

Frameworks and approaches which are used to assess company ecological actions and future projects are reviewed here. Several guidelines offer different viewpoints; some focus on distinct indicators for measuring performance, others look at the dynamics of growth in urban and regional areas, and then there are the policies on financing and the tools used for counting emissions. Performance measurement frameworks are used by some to measure the efficiency of SMEs. The toolkit offers a step-by-step guide to help businesses monitor their current situation, find ways to support them and to identify which business lines to focus on for long-term success.

2.8.1 Framework for Green Growth Indicators

The OECD's framework for green growth indicators (OECD, 2011) provides a systematic approach for tracking and measuring green growth. The indicators are grouped into four related areas in the Figure 1, linking together economic activity, environmental performance and government policies.

The focus of the first area is on environmental and resource productivity - this is the efficient use of energy, natural resources and materials in order to produce outputs. The most common

indicators are energy intensity, material productivity and the pollution per GDP unit. Long-term well-being is supported by natural resources such as forests, land, water and biodiversity which constitute the natural asset base. In the third area, environmental quality is considered in relation to quality of life, encompassing pollution exposure, green areas available to residents and risk vulnerability. Among the four areas of emphasis is economic opportunities and policy responses regarding the environment. These include green jobs, green industries, innovation, and taxation or subsidisation.

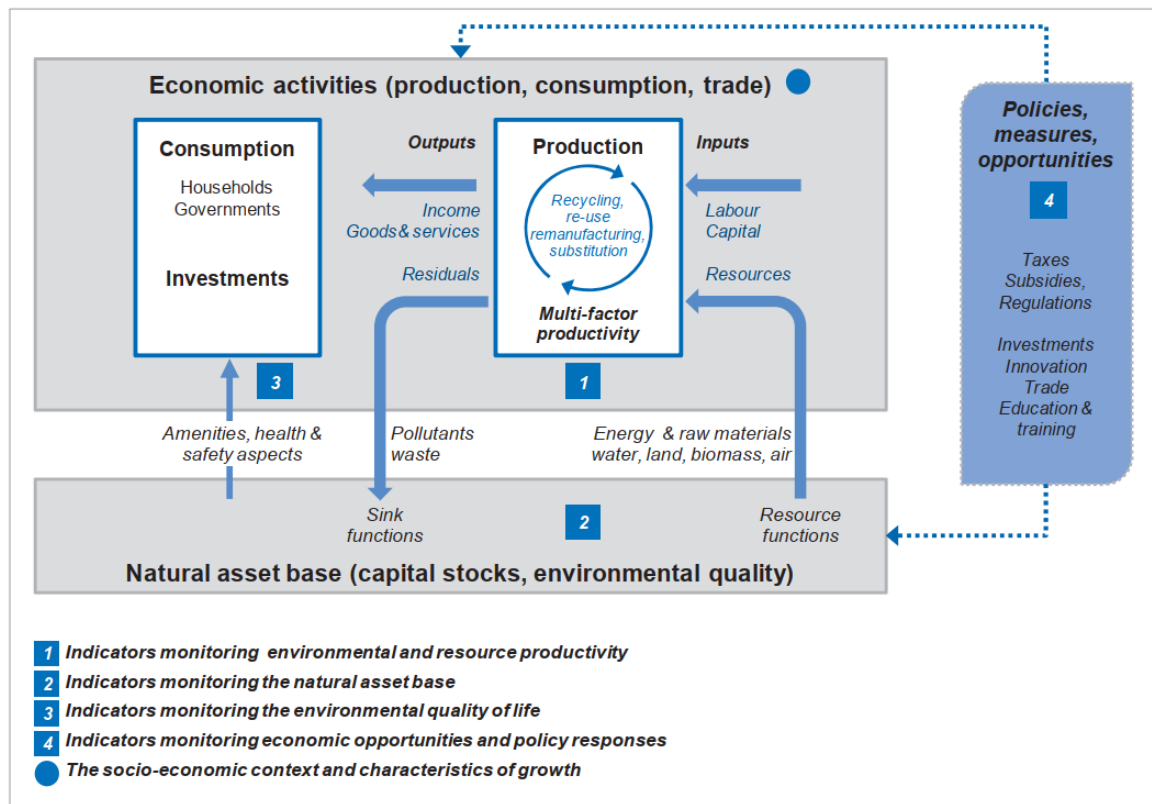


Figure 1 - Framework for green growth indicators (OECD, 2011)

In this study, the framework proves particularly useful, as it allows company action on a micro level to be placed in the context of local or national performance. This can be achieved by adopting an approach that bridges company-level environmental actions with indicators of sustainability on a larger scale. This allows researchers to evaluate sustainability projects more effectively.

2.8.2 Urban Green Growth Framework

Especially in urban areas, green growth is being looked at as a response to both economic and environmental challenges. A key contribution to this debate is the OECD report known as 'Cities and Green Growth: A Conceptual Framework' (Hammer, 2011). Urban areas are considered hotbeds of both innovation and economic development, with a particular emphasis on their contributions to global economic growth. However, it also stresses the key part cities play in the problem of global warming.

In the green growth paradigm (see Figure 2), conventional economic development strategies are combined with techniques that are specifically designed to tackle environmental degradation. These comprise investment in green infrastructure, innovation and education. These cover topics such as natural resource management, pollution prevention, buildings, energy, and mobility. A variety of policy tools are used to meet the aims of raising employment levels and making cities more attractive places to live. These include the use of regulations, public spending and the dissemination of information.

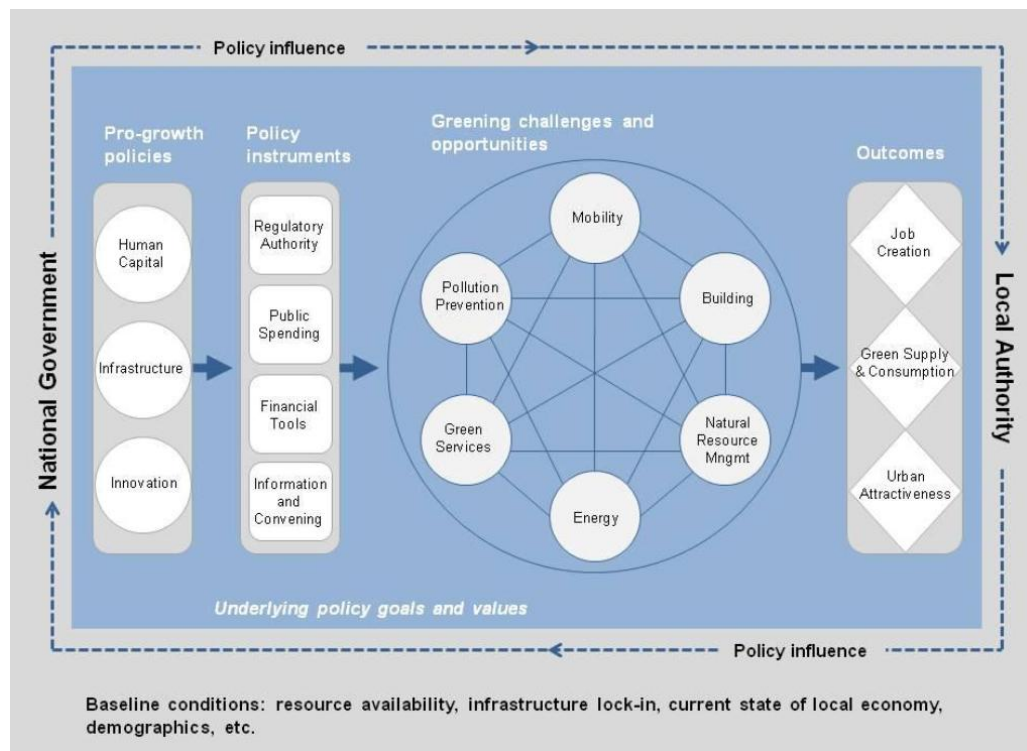


Figure 2 - Framework for urban green growth (Hammer, 2011)

This concept has been applied in places such as Kitakyushu, Japan, and Lahti, Finland. In such instances targeted policies combined with cleantech clusters produced economic and environmental benefits. Kymenlaakso is provided with a regional roadmap which incorporates low-carbon construction, circular economy and renewable energy.

2.8.3 Green Investment Policy Framework

A low-carbon, climate-resilient economy is going to necessitate a significant financial commitment in areas such as transport, water, energy and buildings. A framework for low-carbon, climate-resilient investment is proposed by the OECD report in order to drive private investment in such infrastructure (Corfee-Morlot, 2012).

A coherent policy framework for a green economy has five key elements. These are shown in Figure 3. These are, first, strategic goal setting. This includes making sure government policies support the objectives of a low-carbon economy. Second, enabling measures are necessary to encourage people to invest in a green economy. Examples of these measures include reforming subsidies. Third, financial instruments such as green bonds and guarantees can help with the transition to a green economy. Fourth, people's capacities have to be built upon and institutions strengthened. Lastly, green technologies have to be promoted by governments in order to encourage businesses and consumers to adopt sustainable practices.

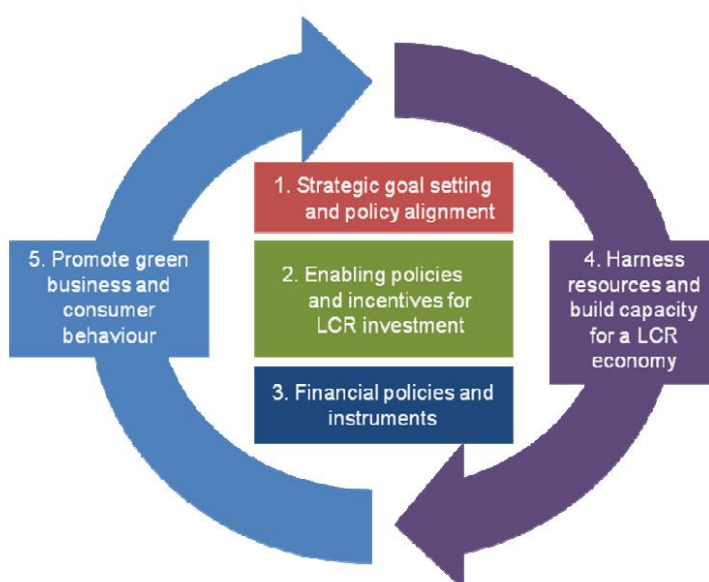


Figure 3 - A Framework for a Green Economy Transition: A Policy Perspective (Corfee-Morlot, 2012)

Private investment in infrastructure requires a supportive framework that minimises risks. This framework suggests that government funds alone will not be sufficient and so the government should establish policies which reduce the risks to private investment. In regions like Kymenlaakso, where SMEs are predominant, it is of particular significance. Smaller businesses are able to access the finance they need to invest in green technologies with instruments such as green local funds, blended finance or sustainability linked loans. Large financial institutions have traditionally found it difficult to accommodate the financing requirements of smaller companies.

2.8.4 Framework for Value Chain Emissions: The GHG Protocol

The Greenhouse Gas (GHG) Protocol, appears in Figure 4 provides the widely used method for accounting and reporting emissions across value chains (World Resources Institute and WBCSD, 2011). The GHG Protocol is essential for seeing where a company's carbon footprint sits. The GHG Protocol distinguishes, between three areas:

Scope 1: Direct emissions come from the sources the company owns or controls.

Scope 2: Indirect emissions from the purchase of electricity, heat, or cooling.

Scope 3: All other indirect emissions, occurring both upstream (suppliers and logistics) and downstream (product use and recycling).

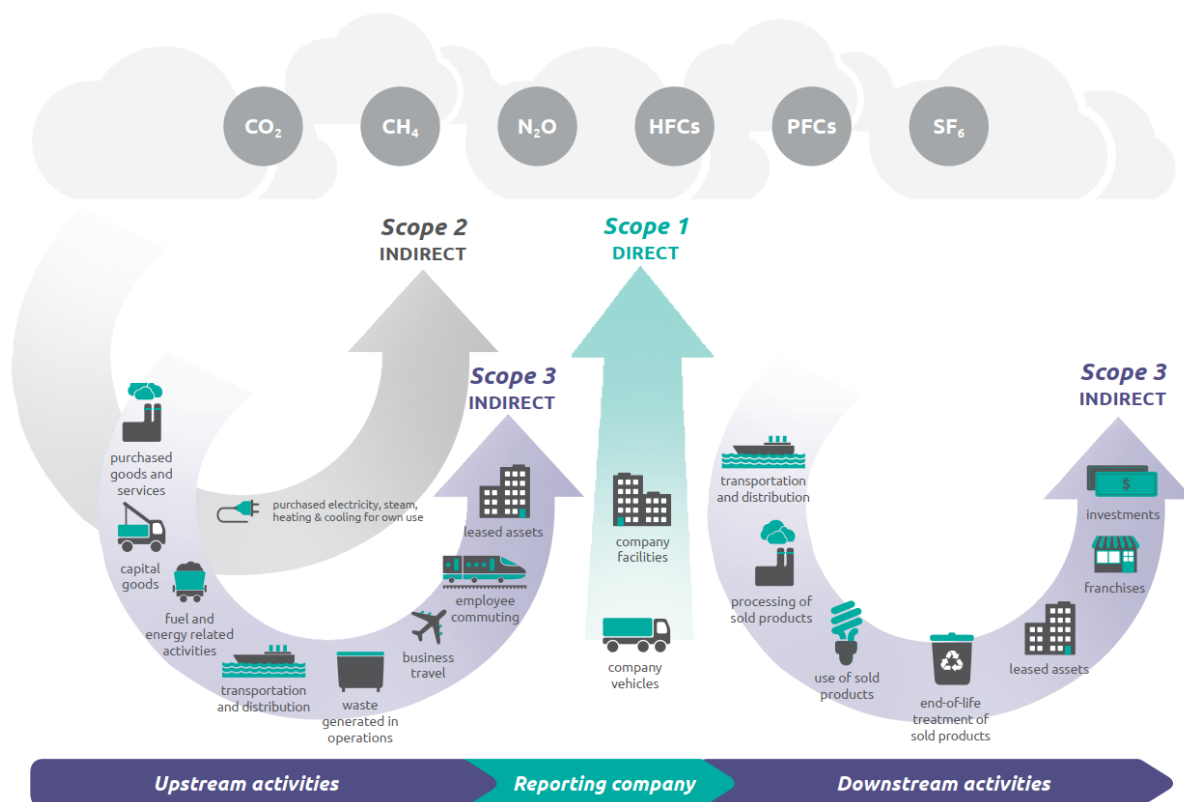


Figure 4 - Overview of GHG Protocol scopes and emissions across the value chain (World Resources Institute and WBCSD, 2011)

The framework matters because the framework has a scope across the value chain. In industries Scope 3 emissions make up most of a company's total footprint. When a business adopts the GHG Protocol the business gains a method to identify emissions hotspots. The GHG Protocol supports stakeholder engagement. Aligns the business with wider efforts such, as the EU Taxonomy. For strategies the framework helps map shared challenges. The framework highlights logistics emissions as a challenge. The framework shows that joint solutions work best for logistics emissions.

2.8.5 Framework for SME Performance and Green Growth

The OECD SME and Entrepreneurship Outlook gives a conceptual framework, for SME performance. The framework rests on six core pillars: the regulatory framework, the market conditions, the infrastructure, the finance, the skills and the knowledge assets (Koirala, 2019). The OECD SME and Entrepreneurship Outlook also makes clear that SME governance needs policy coherence and coordination. The SME governance must line up policy across the level the regional level and the national government level.

The framework shown in Figure 5 shows how the outside business world connects to the ability of SMEs to get resources. The policy toolboxes that come from this model highlight ways. One way is credit lines or innovation funds for finance. Another way is reskilling programs that focus on eco-innovation for skills. A third way is R&D partnerships for knowledge assets. From the perspective the framework points to things like regulatory simplification, eco-labeling and investments in digital or renewable infrastructure, as key helpers of SME performance.

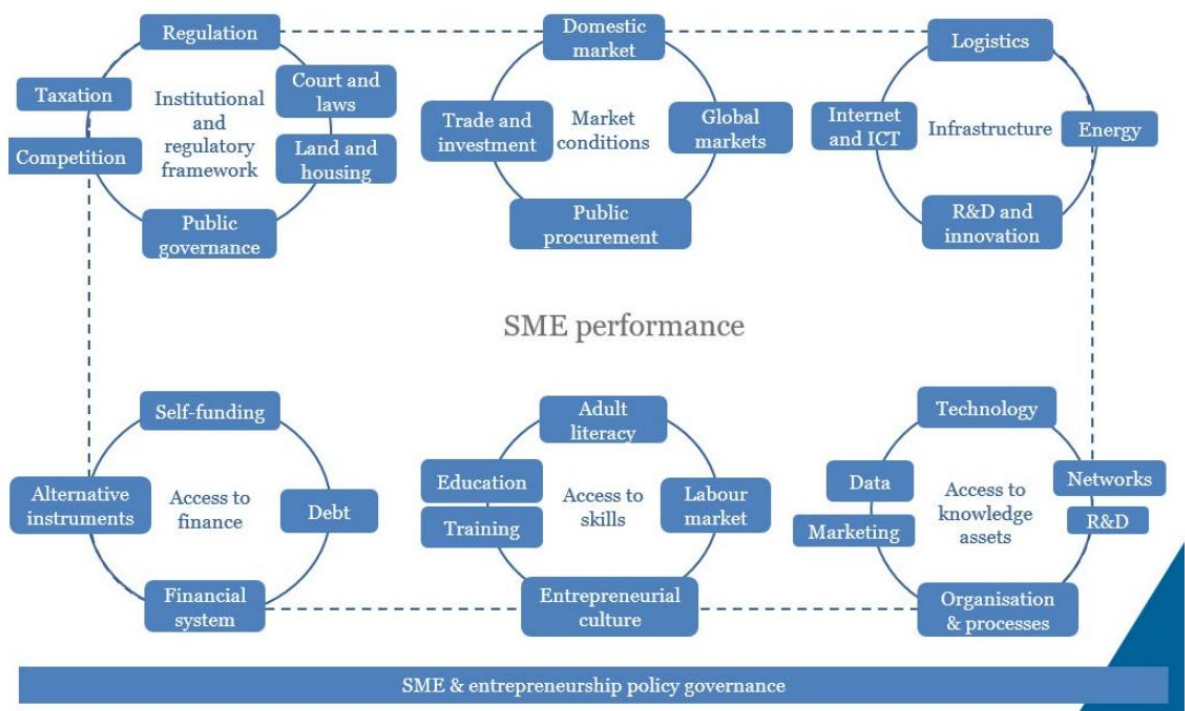


Figure 5 - Conceptual Framework on SME Performance (Koirala, 2019)

The framework is valuable, for Kymenlaakso because SMEs are the backbone of the economy. The framework helps assess how companies adopt practices. The framework also shows how rules and market conditions either enable or limit investments.

2.8.6 Synthesis and Relevance to the Study

These frameworks offer a layered understanding and move forward the green investments and actions by providing a composite perspective. A green growth indicator framework provides a framework for the systematic measurement of progress in green growth across

social, environmental and economic dimensions. By focusing on cities and regions, the Urban Green Growth strategy can create an environment where local policies promote both economic growth and environmental conservation. A green economy is given definition through the green investment policy framework which incorporates a necessary fiscal strategy in addition to the measures mentioned above. The framework also outlines how large-scale transitions are supported and finance in order to achieve this goal.

The GHG protocol aids companies in setting company-wide benchmarks by providing a basis for consistent measurement of the emissions across the entire value chain. This means that there is a consistent standard used across the company. This SME performance framework shows the contribution of SMEs to sustainable economic growth, by explaining how the right framework of institutions, finance and skills can bring them into economic growth more effectively.

In Kymenlaakso, environmental policy frameworks play a crucial role in the region's aim to be a "green and clean" area. The guides give business and community leaders the tools they need to implement strategies that will help to achieve regional objectives. This is achieved by linking company policies with local priorities and removing obstacles which may arise.

3 Methodology

This chapter presents the methodological framework used to examine green actions and planned investments in sustainability among Kymenlaakso's companies. The study outlines its methodology, describing data collection procedures and the sampling framework, as well as techniques used in data cleaning and preparation. Furthermore, the study addresses the statistical procedures it employed, along with any ethical issues and the study's limitations.

3.1 Research Design

The research made use of a mixed-methods design which combined both qualitative and quantitative approaches to gather data in order to answer the research questions in a more comprehensive manner (Koch, 2023). A company's investments and actions to reduce its impact on the environment are presented in quantitative component which displays the allocation of its investments and actions according to three main factors - its size, the branch of its business and the time it expects to take. This enables the examination of geographical trends and facilitates the recognition of common patterns. This provides depth and context through capturing the company's motivations and experiences via open-ended questions (Ramli and Yahya, 2025). This supports our explanation of why certain actions are adopted and others not, which in turn helps explain the results. This report combines both a detailed description of the area in question and analytical tools which are able to determine the dynamics of the region's development.

3.2 Data Collection

A survey was conducted through a web-based structured questionnaire (details in Appendix 1). This survey was conducted using the Webropol survey tool. Kymenlaakso Chamber of Commerce distributed the survey to member enterprises, and it was also circulated by the regional development companies Kinno and Cursor. In this way a diverse range of relevant regional actors was able to be accessed whilst maintaining the anonymity of the respondents. The survey comprised four key areas : details of the organisation profile, existing green and

clean business practices, planned investments and information such as the company's geographical location and permission to plot actions on a regional map. The research findings are based solely on the original survey.

3.3 Sampling

The target population comprises Kymenlaakso region operating businesses with the sampling frame being the membership list of the Kymenlaakso Chamber of Commerce, supplemented by distribution through the regional development companies Kinno and Cursor. The survey was voluntary and its participants were companies who chose to take part in the research therefore the study is based on a non-probability, self-selection sample.

3.4 Data cleaning

Initially a standard process of data cleaning was applied. The data was inspected for inaccuracies, duplication, as well as improperly format. No major errors in the data quality were found during testing. The data obtained from the survey was logically coherent and suitable for further analysis. In order to ensure consistency, we made some minor alterations to categorial data. This was done to guarantee that coding was uniform across the board for various sizes of businesses, different industries and types of action.

3.5 Data Analysis

The study applied various research techniques such as spatial visualisation (Kuckartz and Rädiker, 2023), comparative analysis, qualitative content analysis and descriptive statistics (Lee, 2009) to explore the questions it set out to address. The study focused on the comparison of the green activities of the Kymenlaakso companies currently and the investments they are planning to make. What is being investigated here is not the causes of any observed variations. The data was processed and analyzed using Excel, a Webropol report and Python.

3.5.1 Sub-question 1: Current Green and Clean Actions

A mixed methodology has been used in our research to review existing schemes which promote green and clean technology. Across companies of varying size, we compared the differing responses by determining the frequency and percentages of actions reported. Then, it moved to a qualitative analysis for the open-ended responses. Careful examination of the replies, which were coded, revealed typical trends in the methods used and the obstacles encountered.

3.5.2 Sub-question 2: Planned Green and Clean Investments for 2028 and 2035

The investment plan was divided into two sections, one for the near future up to the year 2028 and the other covering the period between 2028 and 2035. The study's quantitative elements involved a comparison of action distributions and an examination of planned actions in two different periods, along with an analysis of their size in relation to the companies involved. The open-ended comments were subjected to qualitative analysis. This allowed us to understand the investment objectives and, importantly, the uncertainty surrounding the planning. This paper outlines trends in the planning of such projects, rather than making specific predictions about their execution, a differentiation that is well understood.

3.5.3 Sub-question 3: Regional Mapping and Visualization

Using Python based tools, the company location data was manipulated into an interactive regional map. The study considers how effectively green and clean activities are communicated and concentrated in specific geographic areas and examines the contribution of cartographic tools in the promotion of green and clean activities and in creating a region's good image.

3.6 Ethical Considerations

Throughout the research we conducted, the principles of ethics were applied. The participation of all subjects in the survey was purely voluntary, and prior to the collection of any data the purpose of the research and how the data collected would be used was explained to the respondents. The survey included questions on the use of the company's location for mapping and consent for data publication. Companies which have given their consent to be included on a public map were the only ones included in the geographic map of the region. Companies which had not given their consent were excluded from visual output.

4 Result and Analysis

This chapter presents the results of the study and describes the analytical approach used to address the main research questions. In particular, it looks at (1) the green and clean actions that local companies in Kymenlaakso have already implemented, (2) the planned green and clean investments for 2028 and 2035, and (3) how the survey data can be visualized on a regional map to support public marketing and enhance regional reputation. A total of 58 valid responses were collected from local firms, and we applied a mixed-methods approach, combining quantitative analysis of the survey responses with qualitative interpretation of open-ended answers. This allows us to capture not only measurable trends but also the context and nuance behind companies' green practices and their future intentions — which sometimes revealed interesting variations across sectors and company sizes.

4.1 Profile of Respondent Companies

To situate the results, this section sketches the background of the companies that took part in the survey. The overview includes company size, industry sector, and geographical location within Kymenlaakso. These characteristics matter for interpreting the variation in green and clean actions; they also help in spotting patterns that arise from sector-specific conditions or differences in organisational scale.

4.1.1 Company Size Distribution

The participating firms represent a fairly balanced spectrum—from micro-enterprises with fewer than ten employees to large companies with more than 250. This spread mirrors the local economy, where SMEs dominate everyday business life, although several larger industrial players remain influential. A graphical summary (Figure 6) shows the relative shares of micro, small, medium, and large companies among the respondents.

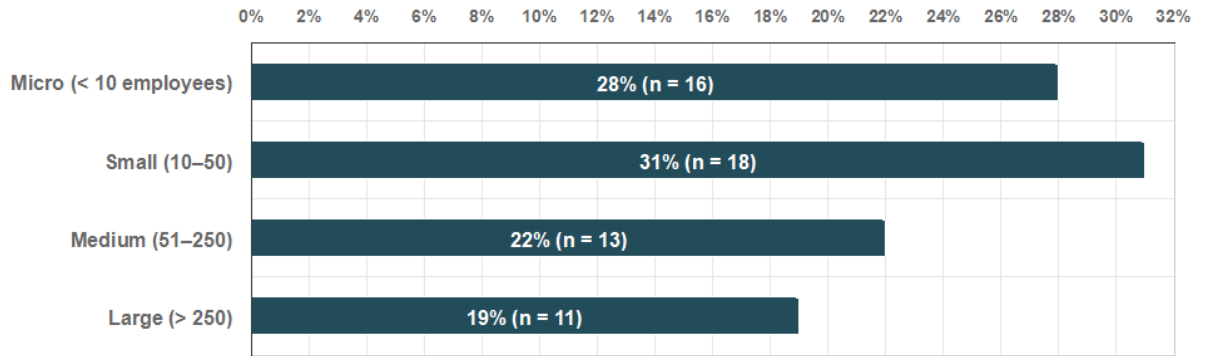


Figure 6 - Company size

4.1.2 Sectoral Representation

Respondents operate across a broad set of sectors, including manufacturing, transportation and storage, construction, professional and technical services, and activities linked to renewable energy. This variety underlines how green transitions in the region do not follow a single pathway but unfold differently depending on the sector. Figure 7 presents the sectoral distribution of participating companies, though the figure is quite simple in its design.

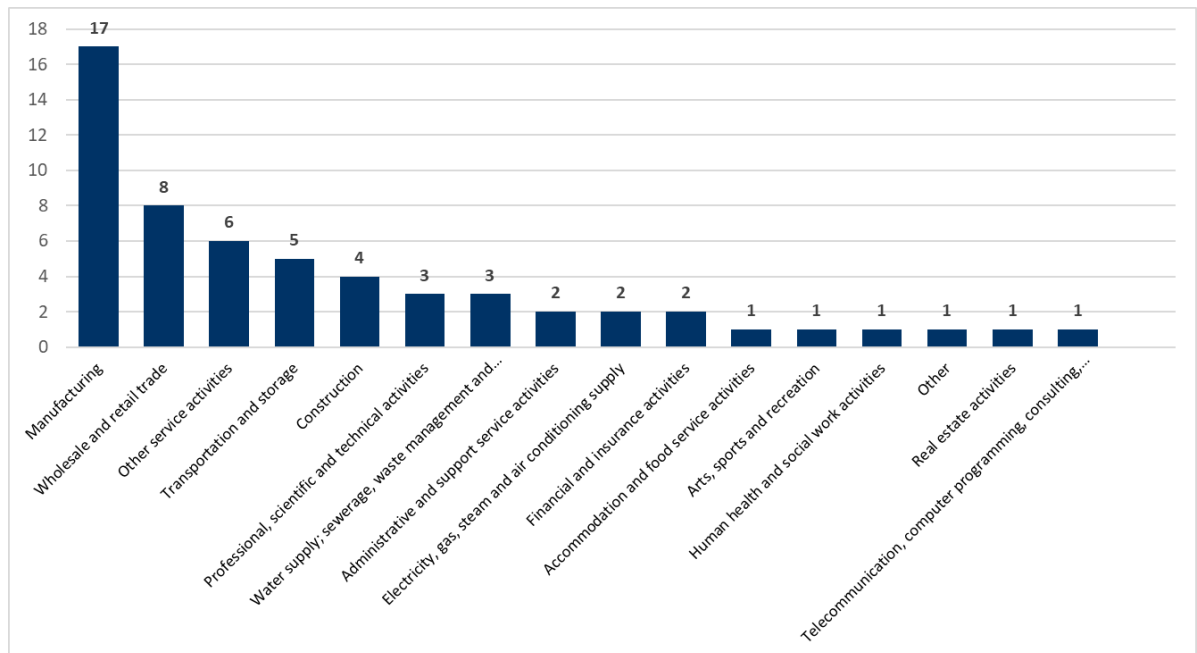


Figure 7 - Industry sector

4.1.3 Geographical Distribution

The majority of the businesses in the area are based in Kouvola, Kotka and Hamina, the key centres for industry and transport in the region. The data presented provides a broad understanding of the different areas within the region of Kymenlaakso that participate in sustainable development activities. The geographical distribution of the respondents can be visualised using a map or bar chart (Figure 8).

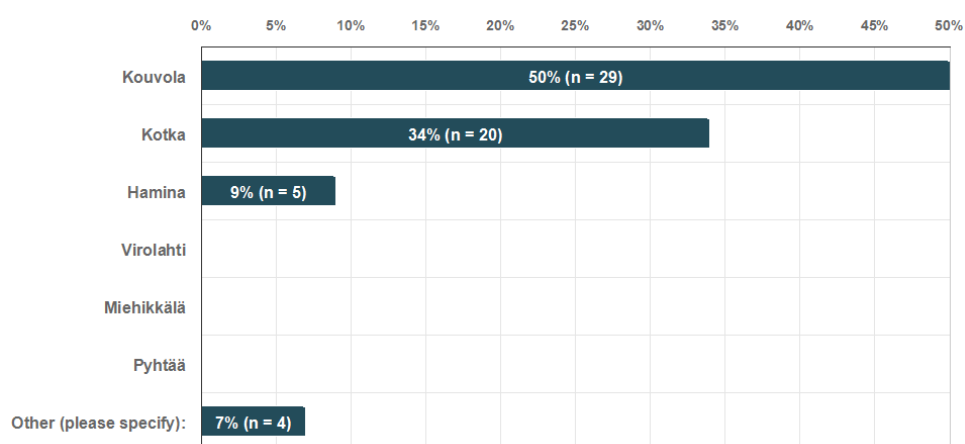


Figure 8 - Location (municipality) of main operations

The survey sample gives a fairly accurate idea of the local business community. Kymenlaakso's diverse size, sectors and geographical locations are reflected in the study's findings on current practices and future green investments, meaning the research isn't skewed towards the views of a single industry or company type.

4.2 Current Green and Clean Actions Implemented

This part of the analysis identifies the specific green and clean actions companies in Kymenlaakso have already put into practice. By looking at responses across various sizes and industries, we can get a clearer picture of the region's current sustainability landscape.

4.2.1 Overview of Implemented Actions

Based on survey results, local firms in Kymenlaakso have adopted a fairly broad spectrum of green practices. As shown in Table 1, with the same data visualised in Figure 9, energy

efficiency upgrades and waste reduction initiatives are the most common measures; 44 out of 58 companies (roughly 76%) reported actions in these two areas. The 62% of companies (36) purchased renewable energy or green electricity contracts while 57% of firms (33) implemented vehicle and equipment fleet electrification. The most common sustainability measures among companies include heat pump implementation at 48% and sustainability training for their employees at 47%. The data shows organizations are implementing both technological solutions and employee development programs for sustainability. The research indicates that most organizations take part in sustainability initiatives although their participation extent ranges between fundamental and sophisticated sustainability practices.

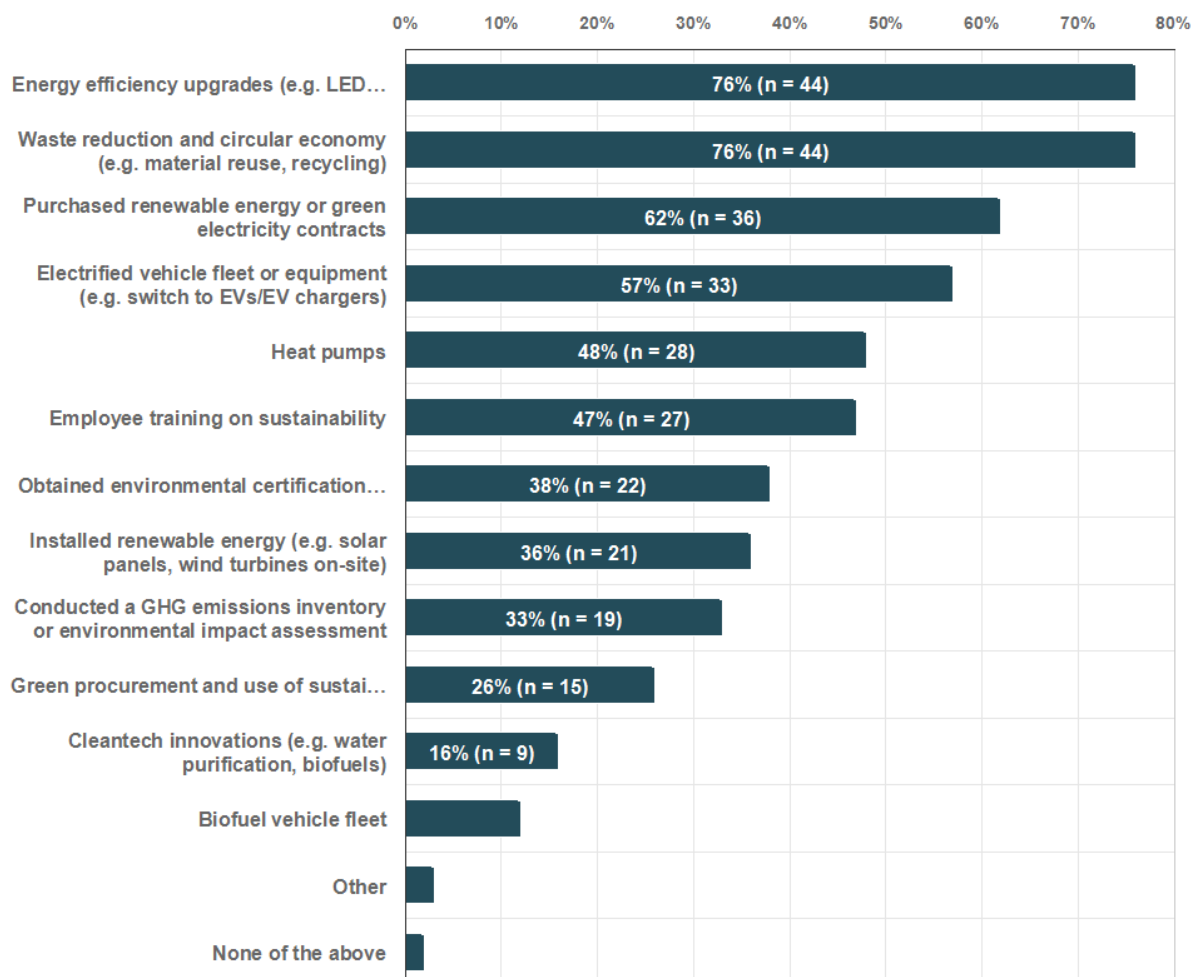


Figure 9 - Frequency of Implemented Green and Clean Actions

The study presents a frequency distribution of these actions which shows energy efficiency and circular economy initiatives lead all other initiatives. The numbers in Table 1 show exact values and percentage data which help researchers detect connections between different intervention methods. Cleantech innovation and biofuel vehicle use appear in few firms, at

15.5% and 12.1%. The research shows that these specific fields encounter either high costs or technological obstacles or they exist at a basic level of advancement.

Table 1 - Frequency of Implemented Green and Clean Actions

Implemented Green and Clean Actions	n	Percent
Energy efficiency upgrades (e.g. LED lighting, efficient machinery, building insulation)	44	75,9%
Waste reduction and circular economy (e.g. material reuse, recycling)	44	75,9%
Purchased renewable energy or green electricity contracts	36	62,1%
Electrified vehicle fleet or equipment (e.g. switch to EVs/EV chargers)	33	56,9%
Heat pumps	28	48,3%
Employee training on sustainability	27	46,6%
Obtained environmental certifications/standards (e.g. ISO 14001, etc.)	22	37,9%
Installed renewable energy (e.g. solar panels, wind turbines on-site)	21	36,2%
Conducted a GHG emissions inventory or environmental impact assessment	19	32,8%
Green procurement and use of sustainable materials (e.g. recycled inputs, eco-friendly materials, or green chemistry in products/processes)	15	25,9%
Cleantech innovations (e.g. water purification, biofuels)	9	15,5%
Biofuel vehicle fleet	7	12,1%
Other	2	3,4%
None of the above	1	1,7%

Overall, these results indicate that while the majority of companies are engaging in green practices, there is significant variation in the depth and type of actions implemented, offering a clear baseline for evaluating future investments and regional sustainability planning.

4.2.2 Qualitative Analysis of the Three Most Common Actions

This section delves into the qualitative follow-up responses from the survey, focusing on the three green and clean actions with the highest adoption rates. Among the 58 participating companies, energy efficiency upgrades, waste reduction and circular economy measures, and the purchase of renewable or green electricity contracts were reported most frequently. These actions therefore provide the richest textual data for a deeper look. The aim here is to uncover recurring themes, practical examples, tangible outcomes, and common challenges associated with these areas. Taken together, this analysis gives a realistic sense of the sustainability efforts currently underway in Kymenlaakso and offers insight into the environmental maturity of local firms.

A) Energy Efficiency Upgrades

Responses show that companies have concentrated heavily on lighting improvements, especially the shift to LED systems. This measure appeared far more often than any other. For many firms, old fluorescent units were replaced with LEDs across entire facilities—including offices, warehouses, and production halls. Several respondents also mentioned automatic lighting controls, such as motion sensors and timed shut-offs. These actions illustrate a pragmatic mindset: LED conversions are relatively inexpensive, fast to implement, and deliver immediate, measurable savings. For most companies, lighting upgrades appear to serve as a practical entry point into broader energy-efficiency initiatives.

Another set of measures targets heating, ventilation, and the building envelope. Heat-recovery units, heat pumps, renewed windows, and added insulation were among the improvements noted. These upgrades show efforts to reduce heating demand and modernize older buildings, many of which were not originally designed with current efficiency standards in mind. A few companies described participation in national programmes—for instance, Motiva energy-efficiency agreements—which suggests that external guidance and incentives are important drivers for these investments. This indicates that firms are not merely reacting to energy price increases but are beginning to embed efficiency thinking into long-term facility management.

A smaller yet technically significant category concerns process optimization within industrial operations. Most of these observations came from energy-intensive sectors. Examples include machinery upgrades, lower steam use, and ongoing tuning of pumps or ventilation systems. These steps are more complex than lighting changes, need technical skills, and can deliver large long-term energy savings. In some cases, companies explicitly connected these upgrades to broader energy-management systems, suggesting a shift toward systematic monitoring and tighter operational control. Taken together, the responses paint a picture of a region where firms pursue energy efficiency through a mix of immediate, easily implemented measures and more strategic, process-level improvements. Table 2 shows a detailed table summarizing the energy Efficiency upgrades based on the responses.

Table 2 - Summary Table: Energy Efficiency Upgrades

Category	Description / Example	Number of Mentions	Example Comment
LED Lighting Upgrades	Replacement of old lighting with LEDs, including automation and motion sensors	26	"Valaistusta on uusittu laajalti LED.käyttöiseksi."
Heat Recovery & HVAC	Installation of heat pumps, heat recovery units, improved ventilation, building envelope upgrades, insulation, window replacements	10	"Prosessien hukkalämpöjen hyödynys, lämpöpumppuja rakennusten lämmitykseen"
Process & Machinery Efficiency	Upgrading production machinery or optimizing production processes to reduce energy consumption per unit	4	"Esim. paperikoneen puristinosan uusinta, joka vähentää höyryn käyttöä tuotettua tonnia kohti ja sellutehtaan keittoprosessin höyryn ominaiskäytön vähentäminen."
Participation in Energy Efficiency Programs	Companies involved in Motiva or Business Finland programs, energy monitoring, systematic reporting, continuous improvement	5	"Kuulumme Motivan energiatehokkuussopimukseen, jonka myötä toteutamme ja raportoimme energiatehokkuustoimia säännöllisesti."
Building Renovation & Automation	Renovation of offices or facilities with upgraded lighting, automated controls, and improved energy systems	4	"Konttorimme on peruskorjattu. Valaistus ajanmukaistettu, katkeaa automaattisesti esim. toimistohuoneissa,. Automaatiota lisätty."

B) Waste Reduction and Circular Economy

In Kymenlaakso, companies show quite a range of approaches when it comes to waste management. At the simplest level most of them focus on sorting and recycling waste. Many respondents mentioned separating material like paper, metal, plastics, and packaging, often working with local recycling partners. It seems that for these companies even routine office or production waste is treated carefully, as something to be reused rather than just thrown away.

Beyond these basic steps, a more strategic approach is evident in the circular use of production by-products. A number of firms described ways they repurpose leftover materials—like sludge, surplus soil, or scrap—either within their own processes or by supplying them to other companies. Some of these initiatives have been ongoing for ten years or more, showing that circular economy thinking has become a routine part of operations, not just a one-off effort.

Another thing that comes up a lot is how companies try to reuse packaging and make better use of materials. For example, many said they use cardboard boxes more than once, cut down on plastic packaging or try out materials that are a bit friendlier to the environment. Some companies also mention running zero-waste or landfill-reduction programs, trying to keep as little as possible from going to dump. A few even talked about reducing food waste or making sure metals and hazardous stuff gets properly recycled. So basically, these circular practices cover a lot of different types of waste.

When you put it all together, you see a mix of small, easy steps—like sorting trash or reusing packaging—along with bigger more planned projects like reusing by-products or aiming for zero waste. The approach isn't perfect, sometimes things are still a bit scattered but it does show that companies are genuinely trying to be sustainable. You can tell that circular economy ideas are slowly becoming part of normal operations, even if there's still room to improve how everything is coordinated and scaled. Table 3 shows a detailed table summarizing the energy efficiency upgrades based on the responses.

Table 3 - Summary Table: Waste Reduction and Circular Economy

Category	Description / Example	Mentions	Example Comment
Waste Sorting & Recycling	General sorting of office and production waste, sending materials for recycling, use of recycling bins	20	"Kaikki jäte lajitellaan ja kierrätetään"
Circular Use of Production By-products	Using production side streams or leftover materials in other processes or as raw materials elsewhere	8	"Integraattimme tuotannon sivuvirtojen hyödyntäminen maanparannusaineena, joka on jatkunut jo kymmenen vuoden ajan."
Packaging Reuse & Material Optimization	Reusing boxes, reducing plastic use, using alternative materials in packaging	6	"Käytämme meille tulleista tavarantoimituksissa käytettyjä pahvilaatikoita uudelleen pakkaamalla asiakkaille lähtevät tuotteet niihin."
Zero Waste & Landfill Reduction Programs	Programs aiming at zero landfill, minimizing waste sent to disposal	5	"'Zero Waste to Landfill' ohjelma, eli kaatopaikkaajätteen määrä tehtaalta on 0 kg."
Food & Organic Waste Reduction	Reducing food waste or bio-waste through planning or reuse	3	"Ruokajätteen vähentäminen - oikeat tilausmäärät ja ylijäämäruoan hyödyntäminen"
Metals & Hazardous Materials Recycling	Recovery and recycling of metals, batteries, and other hazardous components	3	"Metalli , akut , renkaat ja käytetyt varaosat kierrätys yhteistyökumppaneiden kautta"

C) Purchased Renewable Energy or Green Electricity Contracts

The survey results show that Kymenlaakso businesses choose to buy environmentally friendly power because it represents their primary sustainability initiative. Multiple survey participants stated their electricity usage comes from renewable power sources which they prove through their support of certificate programs. It seems that for many, this is an easy way to show environmental commitment without making major infrastructure changes. Some businesses use their green electricity buying to support their internal energy efficiency programs which indicates their sustainability strategy operates through multiple stages instead of a single transaction.

Multiple companies have started developing energy programs to achieve their goal of operating with zero CO2 emissions and reaching complete zero-emission status. Businesses have implemented sustainable practices which extend past purchasing green electricity because they now use renewable heating systems and certified energy programs and make investments in decarbonized energy sources. The organization has implemented these changes through two different motivations which include company policies and requirements from regulatory bodies. Organizations in present times view their energy selection process as both an operational requirement and a strategic business decision.

The different areas of the region implemented their own distinct methods for their operations. Companies implement two different approaches to their sustainability initiatives because some organizations develop complete systems which address both procurement and operational enhancement but others concentrate on acquiring environmentally friendly power supplies. The organization demonstrates significant work but needs to develop better strategic alignment between its different initiatives to achieve maximum regional effects. Table 4 shows a detailed table summarizing the Purchased Renewable Energy based on the responses.

Table 4 - Summary Table: Purchased Renewable Energy or Green Electricity Contracts

Category	Description / Example	Mentions	Example Comment
Green electricity procurement	Companies purchase green or renewable electricity contracts for part or all of their operations.	14	"Ostamme vain vihreää sähköä."
CO2-free / Zero emission programs	Companies have adopted electricity and/or heating programs aiming at zero CO2 emissions or fully fossil-free energy, sometimes certified.	10	"In 2024, all electricity used in our factories was sourced from CO2-free energy."

Category	Description / Example	Mentions	Example Comment
Full renewable electricity adoption	Electricity comes entirely from renewable sources, often verified via origin certificates (hydro, wind, solar).	8	"Kaikki kohteen käyttämä energia on uusiutuvaa."
Participation in energy efficiency programs with green electricity	Some companies integrate energy efficiency projects with green electricity use for specific equipment or operations.	3	"Olemme mukana Motivan energiatehokkuusohjelmassa 2017-2025, johon asetetut tavoitteet on saavutettu. Työkoneissa (nosturit) käytettävä sähkö on ns. vihreää sähköä."
Heating or other energy systems shifted to fossil-free options	Heating systems or other energy-related processes switched to fossil-free or low-carbon options.	3	"Siirrytty kaasulämmityksestä kaukolämpöön."

4.2.3 Differences by Company Size

The chart (Figure 10) shows how different company sizes handle green and clean initiatives. Large companies tend to use methods tied to organized environmental planning more often. These include setting up renewable power sources right in the building - something almost 72 percent of large firms do. Medium businesses follow at about 46 percent, though smaller ones lag behind at 38.9 percent. On-site renewable energy appear never in the micro business records. Just like that, most bigger businesses buy renewable power - over 90 percent do it, whether medium or big.

Meanwhile, different steps taken at work seem to work well no matter the business size. Actions like efficient use of energy or cutting down waste happen widely - especially in smaller firms where nearly all do it (94.4%, then 77.8%). Larger and mid-sized businesses also join in strongly. Even though micro businesses take part less across everything, they still manage some level of involvement, especially when it comes to upgrading energy systems or handling trash efforts. On the flip side, things like clean technology breakthroughs and vehicles running on biofuels show up far less often, regardless of business scale. Put together, findings point toward a pattern where larger firms take on tougher environmental tasks - simply because handling complexity becomes more natural as organizations grow.

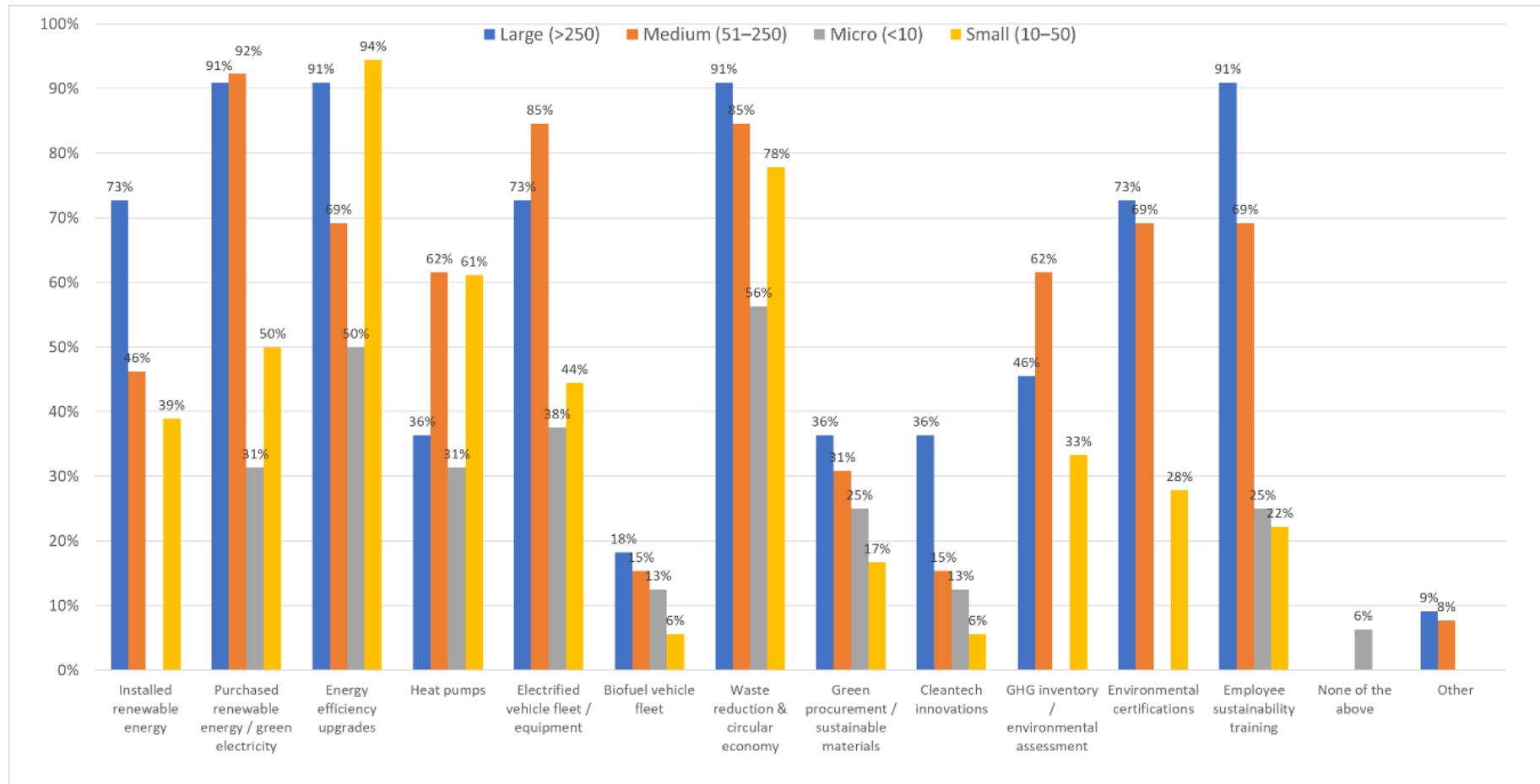


Figure 10 - Comparison of Implemented Actions by Company Size (Percentage of Respondents)

4.2.4 Adoption of Environmental Certifications and Standards

The distribution of environmental certifications among respondents shows a fairly uneven pattern, with ISO 14001 standing out as the dominant choice. Among the 22 companies that reported holding an environmental certification, 20 (90.9%) indicated ISO 14001, suggesting that it functions as the baseline environmental management framework within this group. Other systems such as ISO 50001 (22.7%) and the Nordic Swan eco-label (13.6%) are present but clearly less common, while EMAS remains rare at just two cases. The category of “Other” reveals a surprisingly diverse set of additional schemes—including EcoVadis (in some cases with Gold ratings), Responsible Care, Ekokompassi, and even Breeam Excellent—suggesting that a few companies pursue more specialized or sector-specific certifications.

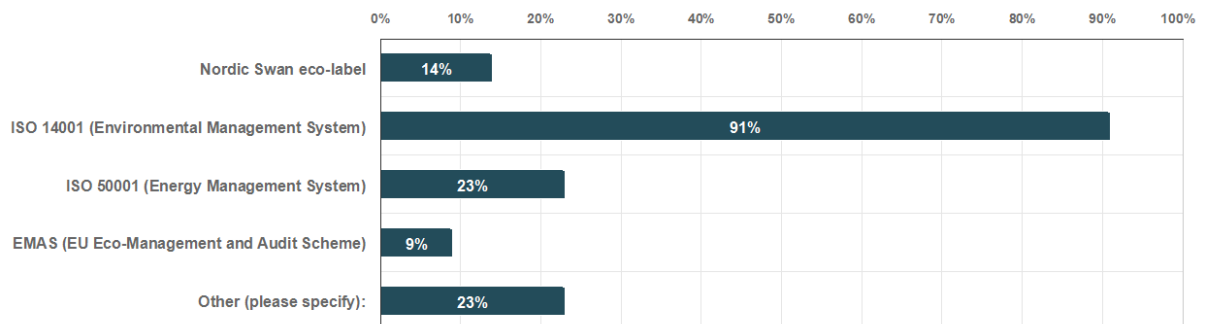


Figure 11 - Distribution of Environmental Certifications/Standards among Respondents

Looking at the Figure 11 and Table 5 together, the overall picture is that certification adoption is concentrated around a single widely recognized standard, while a smaller group of firms experiment with complementary tools depending on their industry or global customer requirements. Although the numbers are modest, this mix of mainstream and more advanced certifications hints that environmental management practices are steadily maturing, even if the pace varies quite a bit across firms.

Table 5 - Distribution of Environmental Certifications/Standards among Respondents

Environmental Certifications/Standards	n	Percent
Nordic Swan eco-label	3	13,6%
ISO 14001 (Environmental Management System)	20	90,9%
ISO 50001 (Energy Management System)	5	22,7%

Environmental Certifications/Standards	n	Percent
EMAS (EU Eco-Management and Audit Scheme)	2	9,1%
Other (please specify): Huom. Joutsenmerkki tietyille tuotteillemme. Lisäksi meillä on Eco Vadis, Gold rating (MM Group -konsernitasolla) sekä CDP Rating (MM Group -konernitasolla) Ekokompassi Ecovadis GOLD, Responsible Care ISO 9001 ja ISO 45001 Breeam Excellent	5	22,7%

4.2.5 Share of Renewable Energy in Total Energy Use

The results of the survey, shown in Table 6 and with the same data visualised in Figure 12, indicate difference in the amount of renewable energy actually used by the companies concerned. Of the companies questioned, a small proportion said that none of their energy came from renewable sources (5.2%) or said that the question did not apply (10.3%). While many organisations lie in the upper echelons, a considerable number are located in the middle, with notable groups of companies in both the 1–25% and 51–75% categories each having 20.7% of the total. Many firms are still in the process of making the shift towards renewable energy sources, even if they have started to incorporate some of these.

It should be noted that renewable energy and low-carbon energy are not synonymous. In the Finnish context, this distinction is particularly relevant for district heating systems. For example, heat produced from waste incineration is commonly classified as low-carbon or carbon-neutral in emission accounting frameworks, yet it does not constitute renewable energy. As the survey responses rely on self-reported estimates, some companies may perceive their energy use as low-carbon rather than strictly renewable.

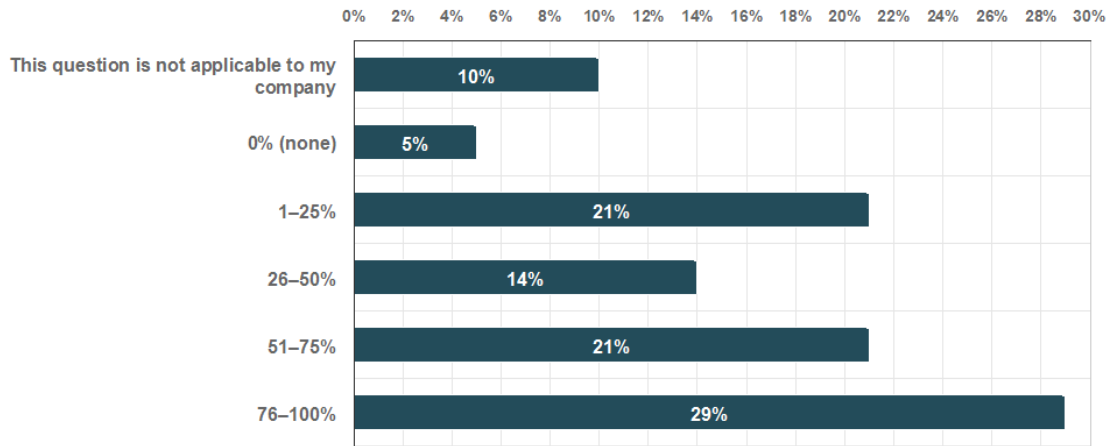


Figure 12 - Share of Renewable Energy in Total Energy Use

Just over a quarter of the respondents reported that 76–100% of their electricity comes from renewable sources, at 29.3%. A considerable number of regional businesses are already in the process of adopting lower carbon energy production methods. Across the region, the table and the figure show contrasting trends. On one hand, some companies are just starting out in the renewable energy field, while others are much further ahead. This results in a clear division in the level of maturity amongst renewable energy businesses in the region.

Table 6 - Share of Renewable Energy in Total Energy Use

Renewable Energy	n	Percent
This question is not applicable to my company	6	10,3%
0% (none)	3	5,2%
1-25%	12	20,7%
26-50%	8	13,8%
51-75%	12	20,7%
76-100%	17	29,3%

4.2.6 Reported Barriers to Green Implementation

The survey points to a fairly steady pattern of obstacles that slow or complicate green implementation. As shown in Table 1, with the same data visualised in Figure 9, financial limitations come through most strongly: 37.9% of firms reported insufficient funding or weak incentives, and this concern echoes across several open-ended responses. Market barriers follow at 32.8%, suggesting that low demand or price pressures still make some environmentally friendly options hard to justify in day-to-day business. Limited internal

knowledge or skills (22.4%) also appears as a practical constraint, especially for companies that haven't yet built much experience with technical sustainability work.

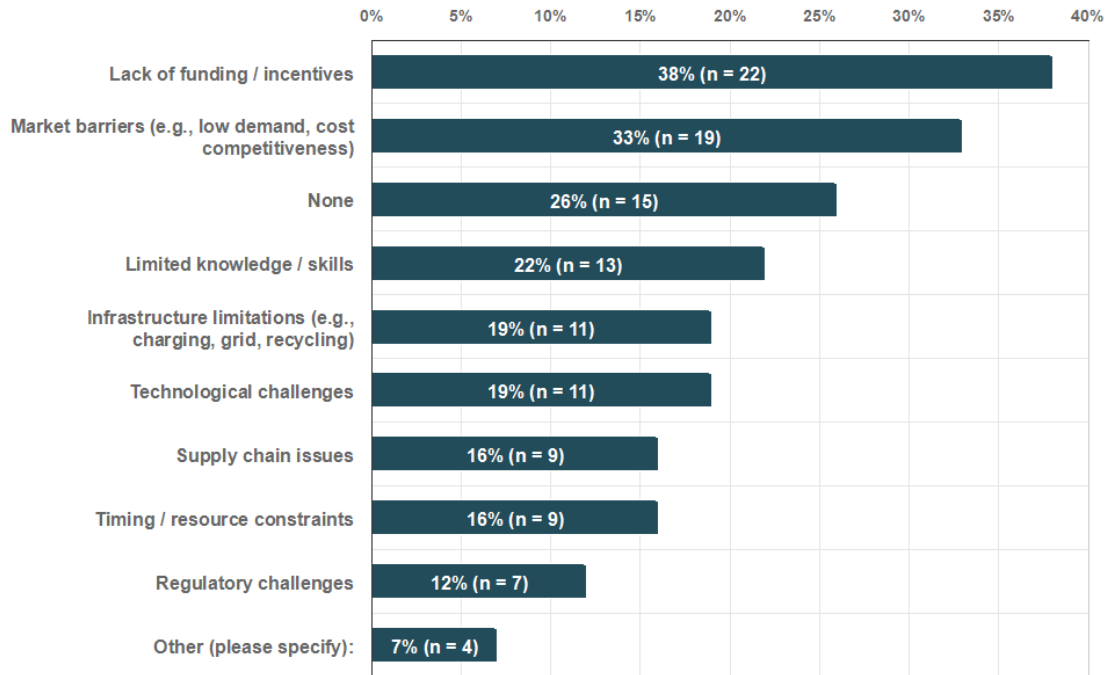


Figure 13 - Reported Barriers to Green Implementation

Infrastructure and technology issues sit close behind, both noted by 19.0% of respondents. Furthermore, 25.9% said they face no significant barriers at all. Taken together, the results suggest that while many companies are ready to move forward, financial and market realities still set the pace, with technical and regulatory hurdles shaping what is realistically possible (Figure 13 and Table 7).

Table 7 - Reported Barriers to Green Implementation

Barriers to Green Implementation	n	Percent
Lack of funding / incentives	22	37,9%
Limited knowledge / skills	13	22,4%
Regulatory challenges	7	12,1%
Supply chain issues	9	15,5%
Infrastructure limitations (e.g., charging, grid, recycling)	11	19,0%
Timing / resource constraints	9	15,5%
Market barriers (e.g., low demand, cost competitiveness)	19	32,8%
Technological challenges	11	19,0%
None	15	25,9%
Other (please specify):	4	6,9%

Barriers to Green Implementation	n	Percent
Huoltovarmuusnäkökulma		
Kustannustehokkuus		
Tuotannon materiaalit		
Sähkökatkoihin varautumisen tarve, jolloin osa toiminnoista on fossiilisten perässä		

4.3 Planned Future Investments for 2028 and 2035

This section examines companies' planned sustainability actions across two timelines: short-term (up to 2028) and medium-term (2028–2035). The goal is to understand what types of green and clean investments firms intend to pursue, how these plans vary by size or sector, and which kinds of support or constraints they anticipate along the way.

4.3.1 Planned Investments up to 2028

Respondents were asked to indicate which green and clean investments they expect to carry out by 2028. As shown in Table 8, with the same data visualised in Figure 14 the results point to a fairly pragmatic approach, with companies concentrating first on measures that are both cost-effective and operationally straightforward. Energy-efficiency upgrades (48.3%) and waste-reduction or circular-economy actions (also 48.3%) form the core of these plans. Notably, these planned investments largely mirror the three most commonly implemented actions identified in the current situation. It indicates continuity rather than a shift in companies' green strategies.

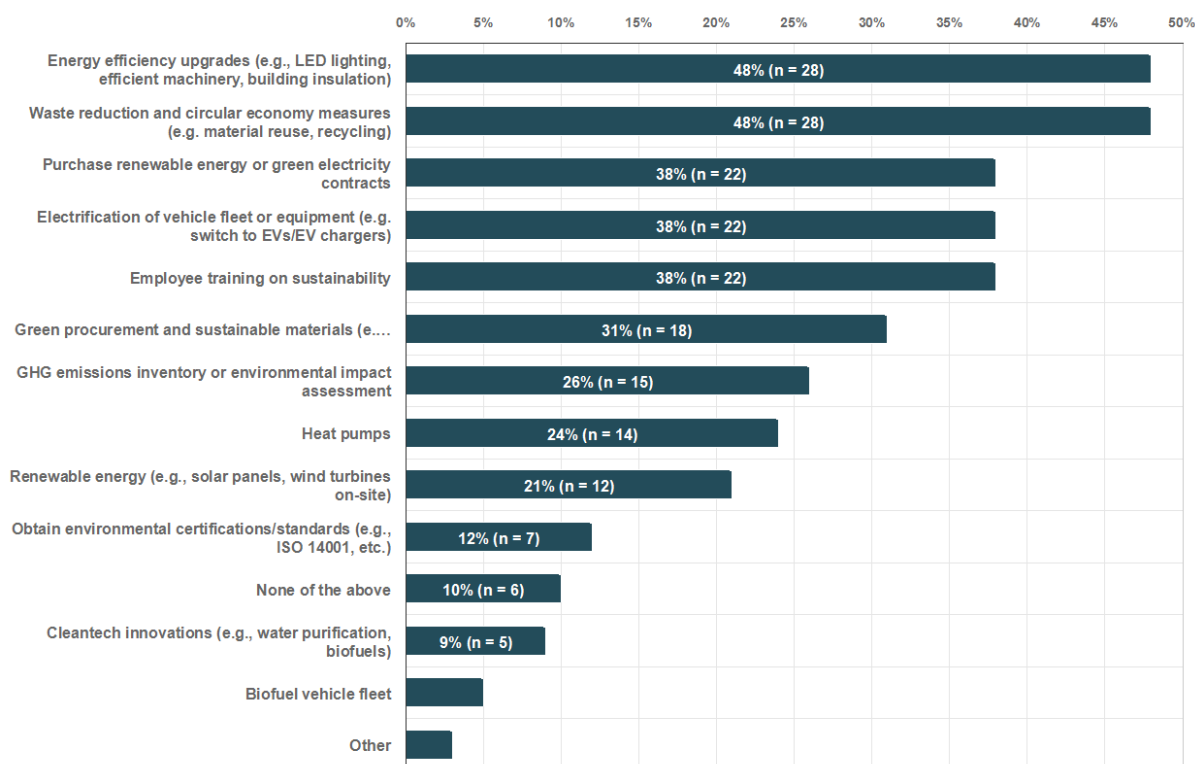


Figure 14 - Planned Green & Clean Investments up to 2028

A substantial share of firms also plan to purchase renewable or green-electricity contracts (37.9%) and to electrify vehicle fleets or equipment (37.9%). Taken together, these responses suggest that many companies prefer lowering their emissions through established market options rather than building on-site renewable capacity. Measures such as heat pumps (24.1%) and GHG inventories or environmental impact assessments (25.9%) indicate, at least to some extent, a shift toward more structured environmental management.

Table 8 - Planned Green & Clean Investments up to 2028

Planned investments	n	Percent
Energy efficiency upgrades (e.g., LED lighting, efficient machinery, building insulation)	28	48,3%
Waste reduction and circular economy measures (e.g. material reuse, recycling)	28	48,3%
Purchase renewable energy or green electricity contracts	22	37,9%
Electrification of vehicle fleet or equipment (e.g. switch to EVs/EV chargers)	22	37,9%
Employee training on sustainability	22	37,9%
Green procurement and sustainable materials (e.g., recycled inputs, eco-friendly materials, or green chemistry in products/processes)	18	31,0%
GHG emissions inventory or environmental impact assessment	15	25,9%
Heat pumps	14	24,1%
Renewable energy (e.g., solar panels, wind turbines on-site)	12	20,7%
Obtain environmental certifications/standards (e.g., ISO 14001, etc.)	7	12,1%

Planned investments	n	Percent
None of the above	6	10,3%
Cleantech innovations (e.g., water purification, biofuels)	5	8,6%
Biofuel vehicle fleet	3	5,2%
Other	2	3,4%

By contrast, interest in cleantech innovations (8.6%), biofuel fleets (5.2%), or environmental certifications (12.1%) remains limited. This pattern implies that most firms are still focusing on foundational improvements rather than stepping into more capital-intensive or technologically demanding areas. That 10.3% plan no investments and 3.4% chose “other actions” suggests firms mainly respond to rules and daily needs. Overall, data illustrate a landscape of incremental progress, some financial caution, and selective investment as firms map out their pathways toward 2028.

4.3.2 Qualitative Analysis of the Three Most Common Investments (up to 2028)

Three categories stand out as the most frequently anticipated by respondents: energy-efficiency upgrades, waste-reduction and circular-economy actions, and purchase renewable-energy or green-electricity contracts. The following discussion focuses on these three areas—exploring the types of projects companies intend to launch, the outcomes they expect, and challenges they already foresee. This narrower focus helps build a clearer picture of the practical steps firms plan to take in the near term.

A) Energy Efficiency Upgrades

Many of the companies that have responded to the planned energy-efficiency actions are continuing efforts already underway rather than introducing new initiatives in this area. The most common upgrade found is for LED lighting. While several companies are talking about office, factory or warehouse refurbishment plans, it seems a relatively straightforward refurbishment remains an easy way for them to make savings which are quantifiable. In spite of a smaller number of respondents compared to earlier project phases, the decision to fit LED lighting remains a priority for reducing energy consumption (Table 9).

Table 9 - Planned Energy Efficiency Upgrades by 2028

Category	Description / Example	Number of Mentions	Example Respondent Comment
LED lighting	Planned switch or continuation to LED lighting in offices, warehouses, or production areas	7	"Toimistomme valaistus on tarkoitus vaihtaa LED valaistukseen."
Heat recovery / waste heat utilization	Capture and reuse of heat from production processes, ovens, or buildings	4	"Suunnittelemme tuotantoprosessista tulevan hukkalämmön talteenottoa ja hyödyntämistä."
Building insulation / efficiency	Improving energy efficiency of buildings via insulation, renovations, or new efficient buildings	3	"Lisäämme prosesseissa eristyksiä lämpöhukkien vähentämiseksi, mahdollisesti lisää lämmöntalteenottosysteemejä."
Process improvements / equipment	More efficient machinery, improved evaporation or other process energy optimization	2	"Mahdollisesti investointi energiatehokkaampaan haihdutukseen."

Among improvements in lighting levels, several companies highlighted the necessity of other structural or technical measures. Various replies included proposals to harness and reutilise waste heat from industrial processes or ovens. Some also considered investing in upgraded insulation or more efficient building designs. Several companies mentioned that better methods of production, though these were less commonly raised. A gradual yet consistent approach to long-term energy management is formed by a mix of infrastructure-related strategic efforts and visible actions which are straightforward.

B) Waste Reduction and Circular Economy

Looking at the plans for waste reduction and circular-economy actions up to 2028, it becomes clear that many companies aim to tighten their basic recycling and material-reuse practices. Several respondents mentioned small but tangible steps, such as shifting to recycled office supplies or reusing pallets and packaging instead of buying new ones. One respondent noted, "Koko ajan mennään enemmän mm. paperittomaan toimistoon ja vältetään uusien huonekalujen ostamista, jos tarjolla on kierrätysvaihtoehto," which shows how everyday operational choices are already part of their thinking. Another wrote, "Jätehuolto osaksi säännöllisiä kierroksia. Toimenpiteiden seuranta ja vaikuttavuuden arviointi," highlighting a growing interest in monitoring what actually works and what doesn't (a point that came up in a few comments, too).

Beyond these day-to-day actions, some companies are planning more structured efforts. Updating environmental programs, preparing circular-economy roadmaps, and finding new uses for by-products were all mentioned in the responses. One firm explained, “Ympäristöohjelman päivitys tulevana vuonna, jossa tehdään kiertotalouden tiekartta tuleville vuosille,” pointing to a more long-term and organized approach. Taken together, the responses suggest that businesses are trying to blend simple operational improvements with broader strategic work, gradually making circular-economy thinking a normal part of how they operate.

Table 10 provides a detailed summary of the planned waste-reduction and circular-economy measures reported by respondents.

Table 10 - Planned Waste Reduction and Circular Economy Measures by 2028

Category	Description / Example	Number of Mentions	Example Respondent Comment
Recycling improvement	Enhancing recycling processes, expanding types of waste recycled, or improving material reuse	9	"Pyrimme entistä parempaan kierrätystasoon"
Paperless office / material reuse	Reducing paper use in offices, reusing furniture, or other materials	3	"Koko ajan mennään enemmän mm. paperittomaan toimistoon ja vältetään uusien huonekalujen ostamista, jos tarjolla on kierrätysvaihtoehto"
Waste tracking / monitoring	Monitoring waste streams, evaluating impact of actions, planning improvements	2	"Jätehuolto osaksi säännöllisiä kierroksia. Toimenpiteiden seuranta ja vaikuttavuuden arviointi."
Circular economy planning / roadmap	Developing circular economy plans, roadmaps, or strategic targets	2	"Ympäristöohjelman päivitys tulevana vuonna, jossa tehdään kiertotalouden tiekartta tuleville vuosille."

C) Renewable energy purchase or green electricity contracts

Most companies appear to focus on continuing their current practices, particularly the sourcing of CO₂-free electricity and keeping renewable contracts as the default option. A few are preparing more concrete changes—transitioning fully to green electricity by 2027 or evaluating biogas as an alternative to fossil fuels. These plans are not dramatic, but they do indicate a slow tightening of existing commitments.

Some respondents also mentioned actions that depend on wider cooperation, such as working with landlords to ensure renewable energy use in leased premises. This kind of

coordination isn't always simple, but it shows awareness that energy decisions sometimes sit beyond the company's direct control. Overall, the picture is one of continuity mixed with selective new investments in renewable solutions, though the scale of change is still somewhat modest compared to areas like energy efficiency or waste reduction. Table 11 summarizes the planned renewable-energy purchases and green-electricity contract measures identified in the responses.

Table 11 - Planned renewable energy purchase or green electricity

Category	Description / Example	Number of Mentions	Example Respondent Comment
Continuation of current green electricity use	Companies plan to maintain their ongoing green electricity sourcing	6	“Jatketaan CO2-vapaan sähköenergian käyttöä.”
Shift to 100% green or fossil-free energy	Planned switch to fully renewable electricity or energy sourced without fossil fuels	3	“Energia on tarkoitus ostaa 100 % vihreistä lähteistä vuodesta 2027 alkaen.”
Exploration of alternative renewable sources	Looking into biogas, solar panels, or other renewable options	3	“Tutkimme biokaasun käyttömahdollisuuksia korvaamaan fossiilista maakaasua.”
Engagement with landlords or suppliers	Requesting increased renewable energy share in leased facilities or supplier contracts	1	“Vaadimme vuokranantajilta uusiutuvan energian osuuden kasvattamista sähkössä ja kaukolämmössä/-jäähdytyksessä.”

4.3.3 Differences by Company Size (up to 2028)

Across all company sizes as shown in Figure 15, the setting targets by 2028, reveal that company size noticeably shapes investment choices. Those with more than 250 workers lean heavily into major initiatives such as heat pumps (55%). Other strategies include cutting waste through circular economy methods, applying green purchasing rules, preparing staff via dedicated sustainability training, and upgrading systems for better energy use across almost half their projects. When it comes to external certifications like environmental badges or detailed greenhouse gas tracking reports, about approximately 27% of their plans. Big companies seem less eager on building on-site renewables, placing them outside future plans entirely. Firms with around 51 to 250 workers often adapt in much the same way yet choose options like energy upgrades, clean power buys, or staff learning more often - 69%, 62%, and again 62% - hinting at planned efforts alongside day-to-day decisions taking hold.

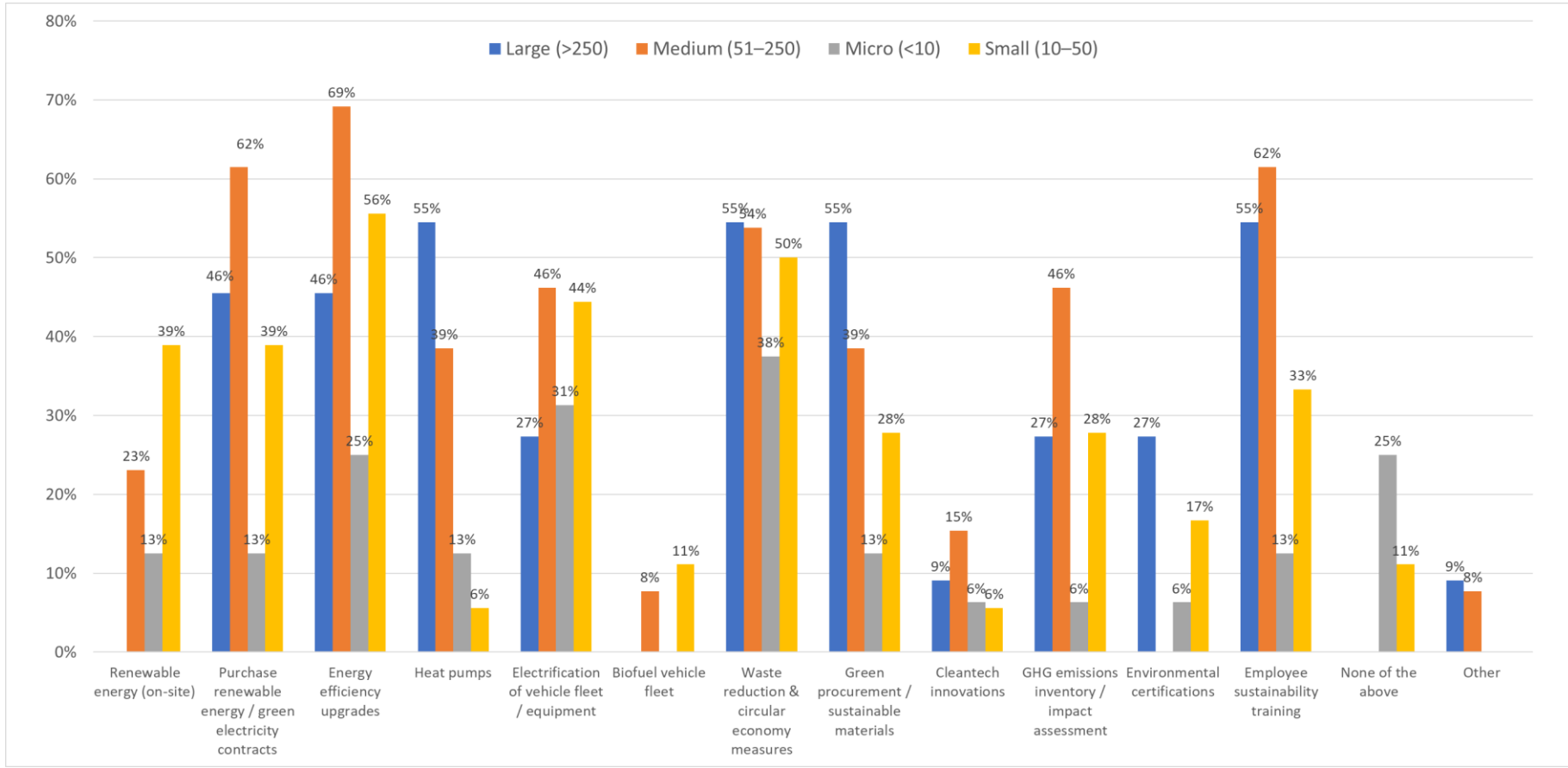


Figure 15 - Distribution of Planned 2028 Investments by Company Size

When it comes to smaller businesses, those with few workers tend to move slowly and carefully. For these micro-enterprises, cutting waste stands out as one of the few actions they plan, along with exploring circular ways of operating. About a third also look into electric vehicles for company use. But here's something striking - almost one in four said none of these options fit their situation. That number signals how limited their resources really are. Moving up the size ladder, businesses with ten to fifty staff do slightly more. Energy saving ranks highest among them at just over half. Buying power from renewable sources comes next near forty percent. Switching fleet vehicles to electric also gains ground, hitting around forty-four percent. Yet even here, deeper moves like green tech tools, local solar setups, or environmental certifications hardly appear on the map. Looking at it together, bigger companies often handle intricate, well-organized sustainability efforts, whereas smaller ones adopt gradual, cautious steps.

4.3.4 Environmental Certifications and Standards (up to 2028)

Companies, as indicated by the data presented in both Figure 16 and Table 12, prefer established international environmental standards to regional eco-labels. By 2028, the most widely adopted management system standard is ISO 14001, with 66.7% of the survey participants planning to be certified in it. Although a smaller percentage of respondents intend to adopt ISO 50001, they are still considerable - 33.3%. This suggests ongoing interest in an energy management system. Limited value or relevance is suggested by none of the firms involved planning to pursue either the Nordic Swan or EMAS certification.

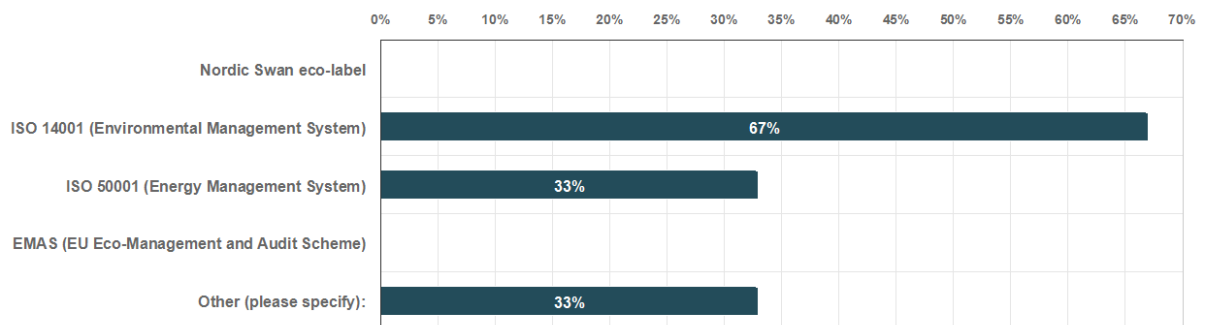


Figure 16 - Planned Certifications to be Obtained by 2028

Out of the respondents, 33 percent selected 'other' which comprised the renewal of BREEAM, as well as ongoing maintenance of existing management systems. In general, this

pattern suggests that companies tend to stick with ISO-based frameworks rather than pursuing broader or more locally focused schemes. The companies are adopting a fairly cautious approach which is in line with the main thrust of using tried and tested methods of compliance.

Table 12 -Planned Certifications to be Obtained by 2028

Planned Certifications	n	Percent
Nordic Swan eco-label	0	0,0%
ISO 14001 (Environmental Management System)	4	66,7%
ISO 50001 (Energy Management System)	2	33,3%
EMAS (EU Eco-Management and Audit Scheme)	0	0,0%
Other (please specify): Jatkamme olemassaolevien johtamisjärjestelmien mukaista toimintaa jatkuvan parantamisen hengessä. Breeam uusinta	2	33,3%

4.3.5 Planned Investments for 2028–2035

Table 13, with the same data visualised in Figure 17, points to a noticeably broader and somewhat more ambitious set of intentions for the period 2028–2035. Electrification of vehicle fleets and equipment remains the clear front-runner (32.8%), which hints that firms expect mobility-related decarbonisation to gain momentum once they have more stable finances and, frankly, more confidence in the technology. Waste-reduction and circular-economy measures (27.6%) also stay prominent, suggesting that companies see steady long-term benefits in reducing material use and closing resource loops. Renewable-energy installations (25.9%) and energy-efficiency upgrades (24.1%) form a pair of parallel priorities: on the one hand, generating cleaner energy on-site, and on the other hand keeping total demand down. Interest in green procurement (24.1%) and employee sustainability training (22.4%) shows that firms are beginning to push sustainability deeper into day-to-day operations and supply-chain decisions, rather than keeping it limited to a few technical upgrades.

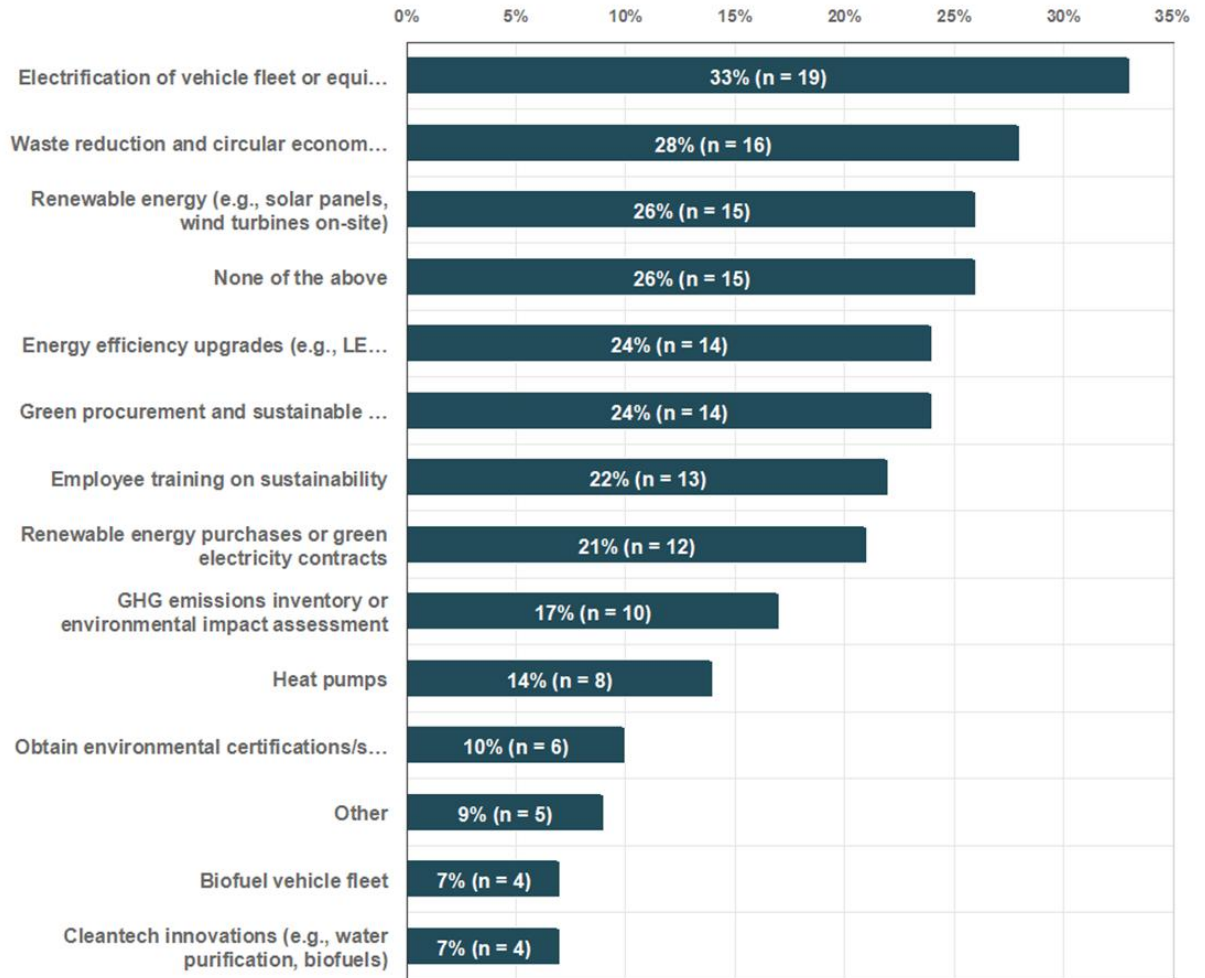


Figure 17 - Planned Green & Clean Investments for 2028–2035

Some areas, however, attract considerably less enthusiasm. Cleantech innovations and biofuel fleets both stand at 6.9%, pointing to an ongoing reluctance toward technologies that are still costly or not yet trusted. Environmental certifications also draw limited attention—only 10.3% plan new certifications—even though earlier results suggested strong interest in ISO frameworks; it’s possible that many firms aim to complete these certifications before 2028, or simply consider their current systems enough for now. A notable share of respondents (25.9%) chose “None of the above,” which underlines how difficult long-term planning can be when budgets are tight or strategies remain fluid.

Table 13 - Planned Green & Clean Investments for 2028–2035

Planned Investments	n	Percent
Electrification of vehicle fleet or equipment (e.g. switch to EVs/EV chargers)	19	32,8%
Waste reduction and circular economy measures (e.g. material reuse, recycling)	16	27,6%
Renewable energy (e.g., solar panels, wind turbines on-site)	15	25,9%

Planned Investments	n	Percent
None of the above	15	25,9%
Energy efficiency upgrades (e.g., LED lighting, efficient machinery, building insulation)	14	24,1%
Green procurement and sustainable materials (e.g., recycled inputs, eco-friendly materials, or green chemistry in products/processes)	14	24,1%
Employee training on sustainability	13	22,4%
Renewable energy purchases or green electricity contracts	12	20,7%
GHG emissions inventory or environmental impact assessment	10	17,2%
Heat pumps	8	13,8%
Obtain environmental certifications/standards (e.g., ISO 14001, etc.)	6	10,3%
Other	5	8,6%
Biofuel vehicle fleet	4	6,9%
Cleantech innovations (e.g., water purification, biofuels)	4	6,9%

Overall, Figure 17 and Table 13 together show a slow shift away from quick fixes and toward more structural, organisation-level investments, although companies move at quite different speeds.

4.3.6 Qualitative Analysis of the Three Most Common Investments (2028-2035)

For the deeper analysis that follows, the focus will shift from the full list to two categories where companies provided concrete follow-up details: waste-reduction and circular-economy measures, and on-site renewable energy production. Electrification of fleets was the most frequently selected option, but because no follow-up answers were collected for that item, it cannot be examined with the same level of detail. The next sections therefore concentrate on the two areas where respondents described actual plans, expectations, and development paths for the 2028–2035 period.

A) Waste Reduction and Circular Economy

Although the number of responses is small, the direction is fairly clear: companies are inching toward more specialised circular-economy work rather than relying only on basic waste sorting. A few respondents are aiming for full recovery of challenging streams such as industrial sludges, while others plan to tighten recycling of retired components or switch selectively to renewable materials when product quality is not compromised. Some firms are simply continuing their current routines or setting general waste-reduction goals, but even these reflect a steady, long-term orientation.

Table 14 - Planned Waste Reduction and Circular Economy (2028–2035)

Category	Description / Example	Mentions	Example Respondent Comment
Full or Improved Material Utilization	Industrial sludges, by-products, and used materials will be fully or better utilized	3	"Teolliset lietteet ja sakat pyritään saamaan 100 % hyötykäyttöön."
Exploring New Circular Opportunities	Looking for new ways to reuse materials such as wood or other waste streams	3	"Varmasti etsitään koko ajan uusia tapoja saada eri jakeita hyötykäyttöön - puujäte on seuraava."
Continuation of Ongoing Measures	Current circular economy practices will continue without major changes	2	"Jatketaan käynnissä olevia toimenpiteitä (kts. edellinen vastaus)."

B) Renewable Energy

The responses paint a cautious picture: most companies are interested in solar power, but only a few are ready to build anything. Several firms are stuck in evaluation mode, mapping suitable rooftops or revisiting earlier feasibility studies that have not yet justified an investment. Economic hesitation shows up clearly—long payback periods and seasonal load patterns continue to slow decisions. A couple of respondents refer only to strategic intentions without naming concrete projects, which reinforces sense that progress is steady but slow.

Table 15 - Planned Renewable Energy (2028–2035)

Category	Description / Example	Mentions	Example Respondent Comment
Solar Power Projects (Planning or Implementation)	Interest in installing solar panels or rooftop solar plants; some are actively assessing suitable sites.	4	"Kartoitetaan mahdollisuuksia aurinkovoimaloiden lisärakentamiselle"
Continuation of Ongoing Actions / Early-Stage Planning	Companies plan to maintain current activities or are still in preliminary planning without concrete targets.	2	"Jatketaan käynnissä olevia toimenpiteitä"

4.3.7 Differences by Company Size (2028-2035)

The distribution of responses from 2028 to 2035 as percentages in Figure 18 shows differences stand out depending on business scale. Medium businesses plan strong involvement in multiple areas like cutting waste and using circular economy methods. These include switching fleet vehicles to electric models along with training staff in sustainability. Purchasing power from renewable sources is also part of their strategy.

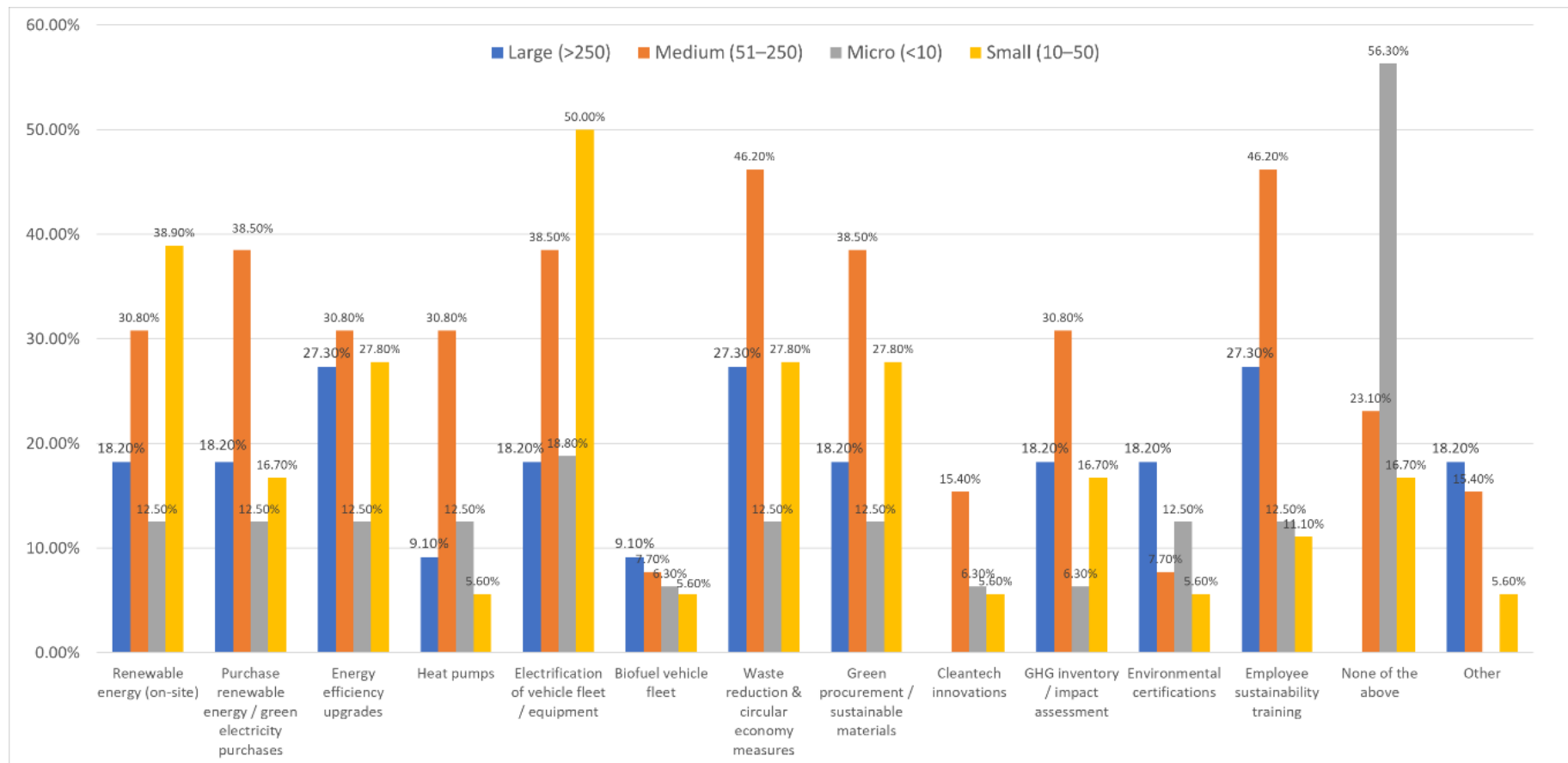


Figure 18 - Distribution of Investments by Company Size for 2028–2035

Larger firms intend similar moves - especially in saving energy and reducing waste. Yet their choices seem narrower than those made earlier during previous reporting period.

On the flip side, micro and small businesses often struggle with inconsistent planning. Even though smaller firms say they plan to adopt electric vehicles, their plans for bigger, costlier upgrades are limited. What stands out with micro businesses is how often answers reflect doing no planned actions - hinting at real hurdles when it comes to thinking ahead.

4.3.8 Environmental Certifications and Standards (2028-2035)

Figure 19 and Table 16 show a narrow certification outlook for 2028–2035, dominated almost entirely by established ISO systems. ISO 14001 accounts for 80.0% of all planned certifications, while ISO 50001 appears only in 20.0% of responses, suggesting that most firms prefer to strengthen broad environmental management practices rather than take on energy-specific certification unless necessary. None of the companies intend to pursue the Nordic Swan or EMAS, which continues the earlier pattern of low interest in region-specific or administratively heavier schemes.

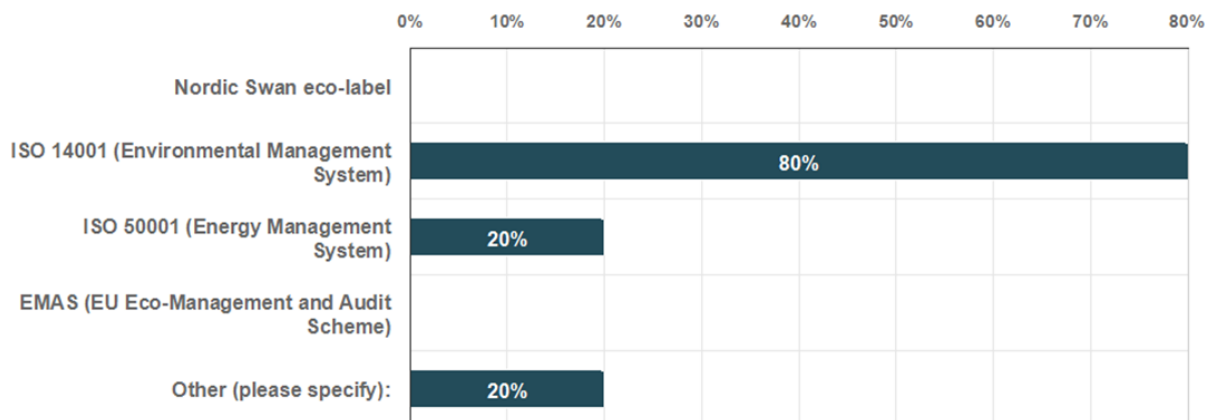


Figure 19 - Planned Certifications to be Obtained by 2035

The only “Other” response refers to Breeam Excellent-taso (20.0%), reflecting a niche focus on building-level sustainability rather than organization-wide systems. Overall, the pattern in Figure 19 and Table 16 signals consolidation rather than diversification in firms’ certification strategies.

Table 16 - Planned Certifications to be Obtained by 2035

Planned Certifications	n	Percent
Nordic Swan eco-label	0	0,0%
ISO 14001 (Environmental Management System)	4	80,0%
ISO 50001 (Energy Management System)	1	20,0%
EMAS (EU Eco-Management and Audit Scheme)	0	0,0%
Other (please specify):	1	20,0%
<ul style="list-style-type: none"> • Breeam Excellent- taso 		

4.3.9 Comparison of Green and Clean Actions — Current vs. 2028 vs. 2035

The chart Figure 20 shows a clear pattern: companies are already active in several practical sustainability areas, and most of these actions continue to gain traction through 2028 and into 2035. Energy-efficiency upgrades, waste reduction and circular-economy practices, and electrification of fleets or equipment stand out as the strongest pillars across all three time points. These measures are not only the most implemented today but also the most commonly planned for the near term and longer horizon, which hints that firms view them as both feasible and strategically safe investments. Renewable-energy installation and procurement follow a similar but slightly more modest trajectory, reflecting interest tempered by financial or spatial constraints. Even so, the gradual increase suggests that firms expect improved affordability or policy support over time.

Less familiar technologies—cleantech innovations, biofuel fleets, and advanced green procurement—remain on the fringe, with uptake growing slowly but not dramatically. Certifications and environmental assessments show a flatter profile: current implementation is moderate, but planned investments hold steady rather than accelerating, implying that many firms consider these as compliance-oriented steps rather than strategic priorities. What stands out most is the decline in “None of the above” responses from now to 2028 but a noticeable rise again by 2035, likely signalling uncertainty about long-term planning or resource capacity. Overall, the comparison suggests a business landscape that is willing to expand practical sustainability actions but still cautious about committing to more transformative or experimental pathways.

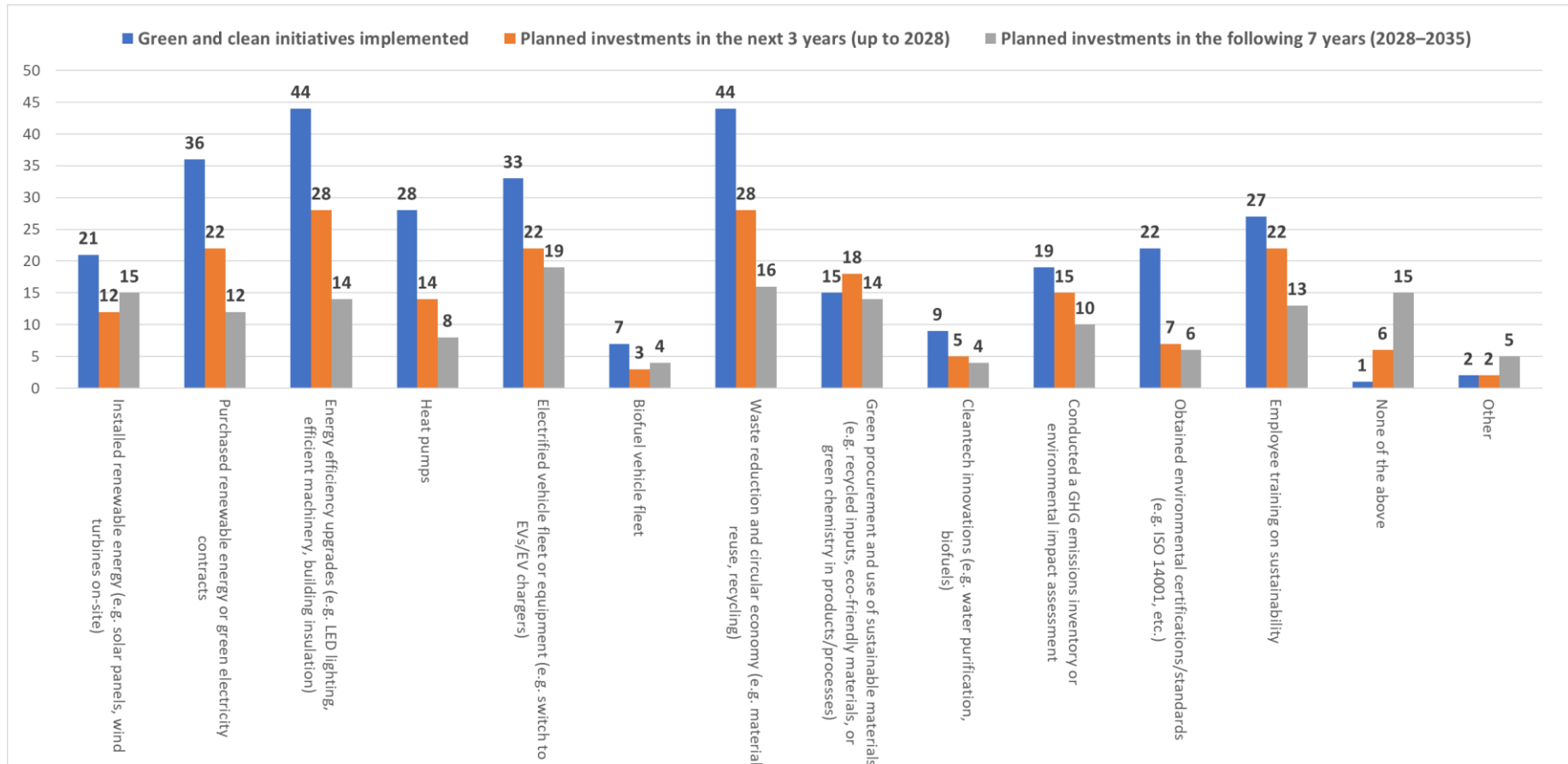


Figure 20 - Comparison of Green and Clean Actions — Current vs. 2028 vs. 2035

4.3.10 Anticipated Challenges and Funding Needs

Most companies describe funding as the central constraint, and the responses draw a fairly sharp line between what firms hope to do and what they can realistically afford. High upfront costs and slow payback periods make many green investments hard to justify, particularly when technologies are still maturing. Policy uncertainty only deepens this hesitation. Several firms note that regulations shift, feel inconsistent, or even work against material recovery or circular-economy measures; such unpredictability makes long-term planning tricky and, frankly, discourages risk-taking in areas that depend on stable rules. Limited technical expertise and doubts about the reliability of newer systems add another layer of challenge. Respondents point out that the skills needed to design and maintain modern energy solutions are not always available, and gaps in infrastructure—for instance inadequate charging for heavy machinery—create operational risks that slow down investment decisions. Taken together, the findings show a strong interest in environmental improvements, but companies still need clearer regulation, more predictable funding, and practical capacity-building support if these ambitions are going to translate into real action. Table 17 shows the summary of key challenges for future green investments.

Table 17 - Key Challenges for Future Green Investments

Category	Description / Example	Mentions	Example Respondent Comment
Financing & Cost Burden	Limited investment capacity, slow financing, weak profitability, high CAPEX in clean tech	15	“Rahoitus, yrityksen kantokyky (resurssit).”
Skills & Technical Expertise	Lack of competence for new energy systems, new tech operation, and maintenance	8	“Osaaminen on suurin haaste.”
Regulatory & Policy Uncertainty	Changing laws, unstable subsidies, strict environmental rules limiting material reuse	7	“Suurin haaste on regulaatio... sääntely muuttuu jatkuvasti.”
Technology Reliability & Maturity	Concerns about real-world performance, operational risk, system reliability	6	“Toimintavarmuuden ylläpitäminen voi tulla riskiksi.”
Market & Competitiveness Pressure	Customers unwilling to pay premium, competition from cheaper imports	3	“Kustannuskilpailukyky kilpailijoihin verrattuna (Kiinasta tulevat).”
Other / Sector-specific Constraints	Already maximized actions, declining local demand (e.g., water use), partner availability	3	“Lähes kaikki on jo tehty mitä tehtävissä on.”

Category	Description / Example	Mentions	Example Respondent Comment
Infrastructure Limitations	Lack of charging points and supporting infrastructure	2	"Infra... latauspisteet raskaille työkoneille."

When asked whether external funding or support would be needed for their planned green and clean investments, most respondents said yes. National and EU-level programmes—Business Finland, ELY centres, and TEM—were mentioned repeatedly as essential channels, with banks and private investors viewed as secondary but still relevant options. Many also emphasised that funding alone is not enough; guidance, regulatory clarity, and lighter administrative processes would help ensure their projects move from planning to implementation. A smaller group reported that internal resources might suffice, or that they had not yet identified specific funding sources. Some admitted they were unsure which programmes or partners to approach, since the landscape of support schemes can be difficult to navigate.

Table 18 - Anticipated Need for External Funding and Support for Green Investment

Category	Description / Example	Mentions	Example Respondent Comment
Yes – Government / Public Support	External funding sought from national or EU-level programs (e.g., Business Finland, ELY, TEM, EU grants)	13	"Kyllä. Business Finlandilta saa tukea kestävän kehityksen investointeihin. Paperityö on aika raskas."
No / Internal Only / Unknown	No external funding needed, relying on internal resources, or source unknown	6	"Oma rahoitus riittävä"
Yes – Combination / Unspecified	External funding important but source unspecified or mixed	5	"Ulkopuolinen rahoitus ja tuki on tärkeää ympäristöystävällisten investointien kilpailukyvyn varmistamiseksi."
Yes – Private / Bank Financing	Funding via banks or private investors	4	"Tarvitaan rahoitusta, pankista haetaan."

Overall, the replies reinforce the message that accessible financial resources are key enablers of green investment, while gaps in experience or technical know-how may slow adoption if they're not addressed. Table 18 shows the summary of anticipated need for external funding and support.

4.4 Visualization Opportunities for Regional-Level Communication

4.4.1 Mapping Current Actions (GIS-Inspired Approach)

To answer third research question, the data collected in the survey was visualized using an interactive regional map (see Figure 21), which was created with the Leaflet JavaScript library. The location of each company was shown on the map using its latitude and longitude co-ordinates. A pop-up box, linked to each marker, provided basic information about the company in question, including its location, the sector in which it operated, its size and details of any green actions already in place. The information is presented in a spatial format, rather than as a table, which facilitates understanding by non-specialists. This map shows the location of companies in the Kymenlaakso region, Finland. It includes information on the number of companies in the region by the type of industry in which they operate.

Currently, the map displays points for a total of 43 companies: 27 that agreed to show their information openly, and 16 whose actions are displayed anonymously, without revealing their names or precise locations. The map is linked to an Excel file and will be continuously updated as new data become available or additional companies are added.

The interactive map is available online as supplementary material to this report, while a static screenshot is included in this section to illustrate the visual structure and regional distribution of companies across Kymenlaakso¹.

¹ The interactive map can be accessed at: <https://moradian-ilia.github.io/Green-Kymenlaakso-Map>

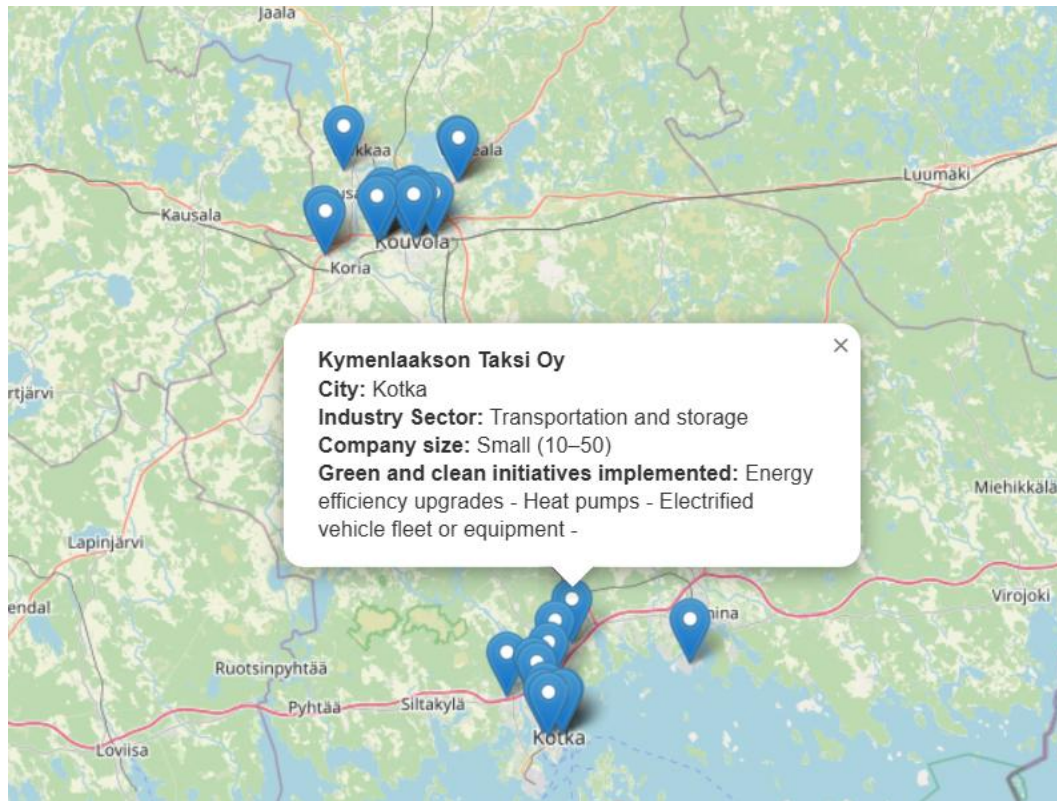


Figure 21 - Mapping Current Green Actions of companies in Kymenlaakso

4.4.2 How Visualization Can Support Regional Branding & Public Communication

The value of the map is rooted in its ease of use and its effectiveness in conveying information. Instantly, by clicking on or zooming in on a specific location, users are able to view details on the actions taken by local businesses to be environmentally friendly. This offers a clearer view of the general movement in the region; whether activity is concentrated in certain localities, the range of actions involved, and the different sectors contributing to the region's transition to environmentally friendly energy. The map offers a clearer and quicker visual impression of the district's evolution in comparison to written descriptions.

It allows businesses to visually represent the company's location, supporting local and online marketing and corporate reputation management. The region of Kymenlaakso, in Finland, has made its environmental commitment and achievements available to view on the internet. Community, business and government groups can use the map in presentations and public displays to show the real progress that is being made. The project highlights participating companies, thus raising their profiles. This helps to convey to all stakeholders a clear and a visually attractive message about the region's efforts in the area of sustainability. When

turning raw responses to surveys into a narrative displayed on a map, the map is transformed into a very useful tool to increase regional identity and engagement amongst stakeholders.

5 Conclusion

In the region of Kymenlaakso the aim of the research project was to identify the actions at present being taken by companies in the region to preserve the environment and also to find out what green investments these companies plan to make by the years 2035 and 2028. The goal was to understand the readiness of the region and showing the commitment of companies to sustainability.

5.1 Current Situation of Companies

To answer “*What green actions have local companies in Kymenlaakso already implemented?*”, this section summarizes surveyed firms’ current sustainability practices. The aim is to provide a clear baseline for understanding current efforts before looking at planned future investments.

In the region of Kymenlaakso, companies undertake a diverse assortment of clean and green activities. These projects reflect their individual sets of priorities, resources, sectors and operations. Common practices include nearly three-quarters of companies employing initiatives focusing on waste reduction or energy efficiency improvements. In many cases, these targets can be met through low-cost, practical actions, such as the installation of LED lighting, replacing old machinery, insulating buildings and recycling materials. Companies are increasingly turning to renewable energy in their operations, by purchasing renewable electricity and also in the electrification of their fleets and equipment. Companies are taking steps to ensure their operational procedures are sustainable through internal programs. These actions include installing heat pumps. They also have employee sustainability training. Moreover, firms are opting for sustainability certifications. While widespread initiatives such as carbon capture and storage and renewable energy deployment are progressing in the region, other less widespread initiatives are also taking place. These include cleantech innovations, the adoption of biofuel fleets and the conducting of greenhouse gas inventories (see Section 4.2 and Tables 1–6 for detailed figures).

5.1.1 Qualitative Insights into Most Common Measures

Primarily energy efficiency upgrades consist of lighting, heating, ventilation and air conditioning and machinery modifications. While many companies are simultaneously upgrading their energy management processes and addressing quick energy savings, other firms have adopted this strategy. National programmes demonstrating the government's commitment to low carbon technologies include the Motiva energy efficiency agreements.

From basic actions like separating waste to advanced tactics such as giving items new purposes, reusing materials and aiming for complete waste elimination, businesses pursue waste reduction and a circular economy. As companies continue to experiment with the circular economy model its thinking is increasingly reflected in operational procedures though this may vary across different industries.

Companies are increasingly choosing to purchase green electricity to obtain a clear, low-cost path to reducing their ecological footprint. Various ones integrate it with a wide range of CO₂-free power systems. It reflects a commitment to long-term strategic planning that goes beyond day-to-day operational requirements.

5.1.2 Differences by Company Size

In Kymenlaakso, how green and clean practices are applied differs a lot depending on business scale and industry type. Bigger firms tend to use organized methods backed by dedicated resources - things like on-site renewable setups, environmental certifications, or official carbon footprint reviews. These larger operations often participate more heavily because they possess better team structure, defined workflows, and sparser hurdles when securing funding or support. Firms of medium scale tend to take part actively - especially when buying power from renewable sources, cutting energy waste, and managing waste more carefully. This effort suggests a mindset ready to aim high, yet stay within realistic limits.

Smaller and micro enterprises display a different pattern. Their current actions are concentrated on low-cost, operational measures such as energy efficiency upgrades and basic waste management, while more complex initiatives remain rare. In several categories,

especially among micro firms, participation levels are uneven and occasionally absent, highlighting constraints related to scale, expertise, and investment capacity. Overall, the findings suggest that present sustainability engagement is shaped less by willingness and more by organizational and sector-specific capacity.

5.1.3 Barriers to Implementation

Companies point out several obstacles despite the fairly widespread adoption of these practices. The main obstacles to the diffusion of new technologies in industry are weak economic incentives and technical or financial limitations. Market pressures are also influential in this context, being characterised by low demand or intense competition on price. Adoption is being further slowed down by internal knowledge, technological constraints and infrastructure gaps. A quarter of the companies surveyed said they encountered no significant barriers. Though there are various obstacles, many companies are indeed ready to do more on sustainability issues. For detailed statistics and examples, please refer to sections 4.2.6 and Table 7.

Overall, there is evidence in the area of Kymenlaakso of businesses that are environmentally active. Businesses are primarily focusing on actual steps such as recycling or the implementation of circular economies and cutting back on waste. As companies become increasingly environmentally aware, there is a growing trend towards charging vehicles with electricity, and purchasing renewable energy.

Fewer sophisticated projects which would include things such as full carbon footprint assessments or biofuel fleets are undertaken. While smaller organisations typically focus on low-cost and quick improvements, the bigger companies invest in formal quality programs and certifications.

5.2 Planned Green and Clean Investments: Short-Term (2028) and Long-Term (2035)

In this part we look at our second research question, which is about *What specific green and clean investments are companies in Kymenlaakso planning for the short term (up to 2028)*

and the medium term (2028–2035)? Based on the findings detailed in Section 4.3, we focus here on pinpointing the dominant investment patterns, how priorities shift across the time horizons, and observed differences in overall investment readiness.

Firms from different periods prefer an approach which is practical and incremental in its pursuit of sustainability. As shown in figures 14 to 17, short term plans, which go up to the year 2028, are centred around low risk measures which are not complicated and so are easier to put into action. While specific objectives running up to 2028 are fairly detailed, the long term goals of 2035 are of a more general nature but are also accompanied by greater uncertainty. The larger the time horizon for the business in question, the less certain firms appear to be about their future operations. This trend is exemplified by the rising number of 'None of the above' responses in the 2035 scenario. It appears to be harder for firms to make a decision the further ahead they are looking.

5.2.1 Planned Investments up to 2028

By 2028, a primary focus of investment plans is expected to be on reducing waste, improving energy efficiency and the purchase of renewable electricity. This will be particularly true in three areas: energy-efficiency upgrades, the development of a circular economy and the purchasing of renewable electricity. This implies a clear preference for improvements which offer direct operational benefits, while at the same time supporting the cuts in emissions. On-site installations in the form of capital-intensive renewable energy plants aren't as attractive as market-based renewable energy contracts - something that isn't surprising given companies' reluctance to take on high upfront costs.

Fleet electrification is an area of major importance within the 2028 goals. Acceptance of electric cars is rising, with many seeing them as a suitable option. These plans, though, are detailed to a limited extent, indicating their tentative nature and possible dependence on the development of infrastructure elsewhere.

5.2.2 Planned Investments for 2028–2035

For the period between 2028 and 2035, a noticeable shift occurred, with a preference for long-term investments of a structural nature. The most frequently mentioned strategy to

reduce greenhouse gas emissions is to electrify vehicles and equipment, signaling clear expectations that technology will mature and supporting conditions will improve. Key elements of these plans include a focus on waste reduction and a circular economy. Additionally, these plans put more emphasis on renewable energy sources than had been anticipated in the short term.

Limited interest has been observed in new environmental certifications, cleantech innovations and biofuel fleets. Businesses are continuing to avoid technologies regarded as too complicated or financially uncertain. Many companies chose the option of “None of the above” answers, indicating investment planning problems over a period of years.

5.2.3 Differences by Company Size

Looking at Figure 18, how company size is determines where it puts green investments across both time horizons. Most of the efforts being tracked come from Small and medium-sized businesses, especially steps like cutting energy, switching fleets to electric, and trimming waste. These kinds of actions tend to be gradual, require little risk, and fit easily into daily operations, so they work well regardless of company size. Medium-sized businesses show the strongest planning habits across years like 2028 to 2035. Their strategies often blend day-to-day upgrades with internal steps - worker training links to purchasing renewable power. This points to better readiness compared to others. Bigger companies, while less common, tend to launch more organized efforts. Efforts might include green accreditation, checking pollution levels, or setting up dedicated sustainability teams - despite picking fewer long-range goals.

Still, micro businesses often lack clear long-term plans. A noticeable trend is how often micro firms pick "None of the above" - especially later on - pointing to hurdles around funding, strategy skills, and unstable forecasts. Seen together, findings hint that sustainability engagement becomes increasingly shaped by organizational capacity rather than participation volume as the planning horizon extends.

5.2.4 Planning Uncertainty and Investment Readiness

The major uncertainties experienced in investments with long and short time horizons are essentially the same. The majority of responses indicated that financial constraints, the uncertainty of regulatory frameworks and worries regarding the readiness of technology were the major influences on the decisions. Generally, companies understand the importance of sustainable development but the long term commitment to it is conditional on clear signals from government and external support.

By 2028, investment strategies should encompass low-carbon technologies with a strong focus on energy efficiency and circular economy principles, as well as on low-risk energy solutions. A gradual move toward electrification and more structural changes. Readiness to invest appears to be unevenly distributed across the regional business environment due to clear disparities by company size and increasing uncertainty over the longer term. Evidence shows that in order to translate intentions into action, businesses may need specific support.

5.3 Implications of Mapping for Regional Development

The third research question explored how the collected data could be visualized through regional mapping to support regional marketing and reputation building. The interactive regional map in Figure 21 illustrates the green and clean activities of companies in the region of Kymenlaakso.

5.3.1 Geographical concentration and visibility of green actions

In Figure 21, green and clean actions do not appear throughout the region uniformly but instead they cluster around industrial and urban centres such as Kouvola and Kotka. At a glance it is clear from the map how areas of the city are concentrated in particular ways, a pattern which is much harder to determine from tables or written reports alone. This clustering supports the view from a communication perspective that Kymenlaakson is a region of action where the main economic centres have sustainability efforts rather than as isolated pilot projects existing.

5.3.2 Implications for regional-level communication and reputation building

The results of these surveys are ultimately presented in a way that highlights regional trends. Viewing interactive maps which are zoomable allows users to see on-the-ground examples of implemented climate actions - such as renewable energy, increased energy efficiency and electrified vehicle fleets - thus increasing transparency and trust. The approach highlighted here involves a shift in focus from sustainability statements to site-specific data. Thus the region can communicate its achievements to outside parties in a way that is both accessible and verifiable - such as to investors, governments and other partners.

5.3.3 Support for networking and regional cooperation

The map also performs a role in informal networking opportunities. Amongst companies adopting similar methods to reduce their impact on the environment, opportunities for them to share their knowledge, work together and have common facilities emerge. In the same industrial estate or municipality companies can discover those which are working on renewable energy or energy efficiency and this can encourage unaided cooperation. By facilitating a shared understanding of the region, the map encourages and enables cooperation. It is not the map that sparks collaboration, but it does make the information that previously was either not available or not accessible now more visible. This increased visibility is a prerequisite for regional networking to happen.

The Figure 21 provides a visualisation that supports the conclusion that map-based interactive visualisation is a very effective tool in building transparency, marketing and a good public reputation. The map illustrates the distribution of environmentally friendly actions and operations throughout the region of Kymenlaakso. This gives a stronger reputation to the region as one which is environmentally friendly and clean. It is also a useful tool for use in communicating with regional groups.

References

- AGUIAR BORGES, L., NILSSON, K., TUNSTRÖM, M., TEPECIK DIŞ, A., PERJO, L., BERLINA, A., OLIVEIRA E COSTA, S., FREDRICSSON, C., JOHNSEN, I. H. & GRUNFELDER, J. 2017. White paper on Nordic sustainable cities. Nordregio.
- AHMED, M., FAROOQ, M. S., IBRAR-UL-HAQUE, M., AHMED, M., MAQBOOL, H. & YOUSAF, A. Application of Blockchain in Green Energy for Sustainable Future. 7th International Conference on Engineering and Emerging Technologies, ICEET 2021, 2021.
- ANDERSSON, I. & JAMES, L. 2018. Altruism or entrepreneurialism? The co-evolution of green place branding and policy tourism in Växjö, Sweden. *Urban Studies*, 55, 3437-3453.
- ASHKIN, S. & ELLIS, R. 2009. Cleaning Materials and Methods. *Safe and Healthy School Environments*.
- BÖGEL, P. M., LOVRIĆ, I. B., BEKMEIER-FEUERHAHN, S. & SIPPEL, C. S. 2018. Socio-cultural differences in understanding and development of corporate social responsibility in Germany and Croatia. *Critical Studies on Corporate Responsibility, Governance and Sustainability*.
- BOSMAN, R. & ROTMANS, J. 2016. Transition governance towards a bioeconomy: A comparison of Finland and The Netherlands. *Sustainability (Switzerland)*, 8.
- CAHA, Z., SKÝPALOVÁ, R. & MRHÁLEK, T. 2024. CSR as a framework for sustainability in SMEs: The relationship between company size, industrial sector, and triple bottom line activities. *Asia Pacific Management Review*, 29, 451-461.
- CLEMENT, K. 2004. Structural fund programmes as instruments for sustainable regional development: A review of Nordic effectiveness. *Innovation*, 17, 43-60.
- CORFEE-MORLOT, J. M., VIRGINIE; KAUFFMANN, CÉLINE; KENNEDY, CHRISTOPHER; STEWART, FIONA; KAMINKER, CHRISTOPHER; ANG, GERALDINE 2012. Towards a Green Investment Policy Framework: The Case of Low-Carbon, Climate-Resilient Infrastructure. *OECD Environment Working Papers*. Paris.
- DAVID, L. K., WANG, J., CISSE, I. I. & ANGEL, V. 2025. Exploring the role of environmental regulations in green marketing success. *Corporate Social Responsibility and Environmental Management*, 32, 2491-2513.
- DE JONG, M., HAN, M. & LU, H. 2019. City Branding in Chinese Cities: From Tactical Greenwashing to Successful Industrial Transformation. *Remaking Sustainable Urbanism: Space, Scale and Governance in the New Urban Era*.
- DOMÍNGUEZ-HERRERA, M. M., GONZÁLEZ-MORALES, O. & GONZÁLEZ-DÍAZ, E. 2018. Corporate social responsibility of the construction sector in Spain. *Corporate Social Responsibility (CSR): Practices, Issues and Global Perspectives*.
- DORENDORF, B. EU Taxonomy on sustainable economic activities – preliminary assessment of the implications for corporate energy efficiency investments. Eceee Industrial Summer Study Proceedings, 2020. 371-379.
- FILIPOVIĆ, S., LIOR, N. & RADOVANOVIĆ, M. 2022. The green deal – just transition and sustainable development goals Nexus. *Renewable and Sustainable Energy Reviews*, 168.
- FUJII, Y., NONAKA, T., OURA, F. & SHIRASAKA, S. Covariance Structure Analysis of the Collaboration Between Local Enterprises and Local Governments for the Creation and Communication of Value in Local Brands. *IFIP Advances in Information and Communication Technology*, 2024. 410-424.
- GIDAKOVIĆ, P., KOKLIČ, M. K., ZEČEVIĆ, M. & ŽABKAR, V. 2022. The influence of brand sustainability on purchase intentions: the mediating role of brand impressions and brand attitudes. *Journal of Brand Management*, 29, 556-568.
- GOLDSTEIN, S. 2010. A smart approach to green. *Packaging News*, 22-23.

- GRONOW, T., PENTO, T. & RAJOTTE, A. 2017. Nordic countries' green public procurement of paper. *Greener Purchasing: Opportunities and Innovations*.
- HAID, M., ALBRECHT, J. N., TANGL, P. & PLAICKNER, A. 2024. Regional Products and Sustainability. *Sustainability (Switzerland)*, 16.
- HAMMER, S. K.-C., LAMIA; ROBERT, ALEXIS; PLOUIN, MARISSA 2011. Cities and Green Growth: A Conceptual Framework. In: PAPERS, O. R. D. W. (ed.). Paris.
- HAO, N. & DRAGOMIR, V. D. 2025. Renewable Energy, Sustainable Business Models, and Decarbonization in the European Union: Comparative Analysis of Corporate Sustainability Reports. *Sustainability (Switzerland)*, 17.
- HUSGAFVEL, R., WATKINS, G., LINKOSALMI, L. & DAHL, O. 2013. Review of sustainability management initiatives within Finnish forest products industry companies - Translating Eu level steering into proactive initiatives. *Resources, Conservation and Recycling*, 76, 1-11.
- HUTTUNEN, R., KUUVUVA, P., KINNUNEN, M., LEMSTRÖM, B. & HIRVONEN, P. 2022. Carbon neutral Finland 2035—national climate and energy strategy. Ministry of Economic Affairs and Employment of Finland.
- HYVÖNEN, J., KOIVUNEN, T. & SYRI, S. 2023. Possible bottlenecks in clean energy transitions: Overview and modelled effects – Case Finland. *Journal of Cleaner Production*, 410.
- JAMSHAD, S., KHAN, K. S., ALI, S. & KISHWER, R. 2024. Role of Green Corporate Social Responsibility and Corporate Social Responsibility in Enterprises: Evidence From Europe. *AI, Corporate Social Responsibility, and Marketing in Modern Organizations*.
- JAMUNASRI, N., RAI, R. S., CHANDRAPRAGASAM, V., GOMEZ, L. A., SHEPHERD, R. & THATHAPUDI, J. J. 2025. Green Revolution to Restore Contaminated Soil for a Sustainable Future. *Environmental Science and Engineering*.
- JOHANNSDOTTIR, L. 2015. Drives of proactive environmental actions of small, medium and large Nordic non-life insurance companies - And insurers as a driving force of actions. *Journal of Cleaner Production*, 108, 685-698.
- JOHANNSDOTTIR, L. & MCINERNEY, C. 2018. Developing and using a Five C framework for implementing environmental sustainability strategies: A case study of Nordic insurers. *Journal of Cleaner Production*, 183, 1252-1264.
- KAPUTA, V., TÁBORECKÁ, J. & MAŤOVÁ, H. MARKETING STRATEGIES OF THE WOOD-BASED SECTOR COMPANIES. Proceedings of Scientific Papers - Current Trends and Challenges for Forest-Based Sector: Carbon Neutrality and Bioeconomy, WoodEMA 2023, 2023. 241-245.
- KEHRIS, E. & GAILE-SARKANE, E. Sustainability Marketing in Organization Strategy: Case of Latvia. Proceedings of World Multi-Conference on Systemics, Cybernetics and Informatics, WMSCI, 2022. 98-103.
- KERAMITSOGLU, K. M., MELLON, R. C., TSAGKARAKI, M. I. & TSAGARAKIS, K. P. 2016. Clean, not green: The effective representation of renewable energy. *Renewable and Sustainable Energy Reviews*, 59, 1332-1337.
- KOCH, C. 2023. Mixed methods in concussion research. *Translational Sports Medicine*.
- KOIRALA, S. 2019. SMEs: Key drivers of green and inclusive growth. *OECD Green Growth Papers, No. 2019/03*. Paris.
- KUCKARTZ, U. & RÄDIKER, S. 2023. Teaching Qualitative Content Analysis. *The Handbook of Teaching Qualitative and Mixed Research Methods: a Step-by-Step Guide for Instructors*.
- KUITTINEN, M. & HÄKKINEN, T. 2020. Reduced carbon footprints of buildings: new Finnish standards and assessments. *Buildings and Cities*, 1, 182-197.
- KUOSMANEN, N. & PAJARINEN, M. 2025. Do green products pay off? Register-based evidence on Finland's manufacturing firms. *Journal of Environmental Management*, 384.
- LAMENTA, Z. A. & GRZYBOWSKA, K. 2023. Impact of the European Green Deal on Business Operations—Preliminary Benchmarking. *Sustainability (Switzerland)*, 15.
- LATAPÍ, M., JÓHANNSDÓTTIR, L. & DAVIDSDÓTTIR, B. 2021a. The energy company of the future: Drivers and characteristics for a responsible business framework. *Journal of Cleaner Production*, 288.

- LATAPÍ, M., JÓHANNSDÓTTIR, L., DAVÍÐSDÓTTIR, B. & MORSING, M. 2021b. The barriers to corporate social responsibility in the nordic energy sector. *Sustainability (Switzerland)*, 13.
- LEE, J. 2009. Statistics, Descriptive. *International Encyclopedia of Human Geography: Volume 1-12*.
- LIBERATI, E. B. 2021. Decarbonisation, Green Industrial Policy, European Economic Constitution and Governance. *Diritto Pubblico*, 27, 415-442.
- LUETKENHORST, W. 2004. Corporate social responsibility and the development agenda - The case for actively involving small and medium enterprises. *Intereconomics*, 39, 157-166.
- MATEI, M., POPESCU, C. & ENESCU, G. Promoting corporate social responsibility by public authorities in the european union. Innovation and Sustainable Competitive Advantage: From Regional Development to World Economies - Proceedings of the 18th International Business Information Management Association Conference, 2012. 1998-2008.
- METAXAS, T. & TSAVDARIDOU, M. 2014. Green CSR practices: A European approach. *International Journal of Environment and Sustainable Development*, 13, 261-283.
- MOHAMMED, S. I. Advantages of Green Technology to Mitigate the Environment Problems. IOP Conference Series: Earth and Environmental Science, 2021.
- MORGADO, M. 2024. EIB Group Climate Bank Roadmap 2021–2025. *Economic Analysis of Law in European Legal Scholarship*.
- NENONEN, S., KOSKI, A., LASSILA, A. P. & LEHIKONEN, S. Towards low carbon economy - Green bond and asset development. IOP Conference Series: Earth and Environmental Science, 2019.
- NICA, I., GEORGESCU, I. & KINNUNEN, J. 2024. Evaluating Renewable Energy's Role in Mitigating CO2 Emissions: A Case Study of Solar Power in Finland Using the ARDL Approach. *Energies*, 17.
- OECD 2011. *Towards Green Growth*, Paris, OECD Publishing.
- PARK, S. W. 2024. Carbon Neutrality and the Transition to a Circular Economy: EU Sustainable Finance Policy and ESG-Related Legislation Trends. *Journal of Korea Society of Waste Management*, 41, 136-154.
- PEREVOZNIC, F. M. & DRAGOMIR, V. D. 2024. Achieving the 2030 Agenda: Mapping the Landscape of Corporate Sustainability Goals and Policies in the European Union. *Sustainability (Switzerland)*, 16.
- PORRAS, J., ABDULLAI, L., PARTANEN, L. & SIPILÄ, A. 2025. Towards an Ecosystem Model in Enabling Sustainability Transition: The Case of Finnish Government Sustainability Strategy for the ICT Sector. *World Sustainability Series*.
- PRATAMA, F. Green Technology in Food Processing: Creating a Better Future for the Next Generation. IOP Conference Series: Earth and Environmental Science, 2022.
- PROMSAKA NA SAKOLNAKORN, T. 2018. Moving from policy to the implementation and management of government organizations for clean and green city concepts in Malaysia. *International Journal of Sustainability Policy and Practice*, 14, 17-32.
- RAMLI, H. & YAHYA, N. A. 2025. Mixed-Methods Research. *Introduction to Public Health and Research: Essential Concepts*.
- REVERTE, C. 2015. The new Spanish corporate social responsibility strategy 2014-2020: A crucial step forward with new challenges ahead. *Journal of Cleaner Production*, 91, 327-336.
- RIDZAK, T. & ŽIGMAN, A. 2020. Green finance for sustainable growth, the case of Croatia. *InterEULawEast*, 7, 131-150.
- RODRIGUEZ-ANTON, J. M., RUBIO-ANDRADA, L., CELEMÍN-PEDROCHE, M. S. & ALONSO-ALMEIDA, M. D. M. 2019. Analysis of the relations between circular economy and sustainable development goals. *International Journal of Sustainable Development and World Ecology*, 26, 708-720.
- SAUNILA, M., UKKO, J. & RANTALA, T. 2018. Sustainability as a driver of green innovation investment and exploitation. *Journal of Cleaner Production*, 179, 631-641.
- SAWCHUK, M. 2008. Understanding how to sell green cleaning. *Paper and Packaging*, 49, 32-35.

- SCANLAN, M. K. 2021. Climate Risk Is Investment Risk. *Journal of Environmental Law and Litigation*, 36, 1-37.
- SHAKEEL, S. R., TAKALA, J. & ZHU, L. D. 2017. Commercialization of renewable energy technologies: A ladder building approach. *Renewable and Sustainable Energy Reviews*, 78, 855-867.
- SINGH, R. & KUMAR, S. 2017. *Green technologies and environmental sustainability*.
- SLOBODENYUK, A. & VAKKILAINEN, E. Biorefinery and energy savings. NWBC 2012 - 4th Nordic Wood Biorefinery Conference, 2012. 318-319.
- STRAND, R. 2024. Global Sustainability Frontrunners: Lessons from the Nordics. *California Management Review*, 66, 5-26.
- SUJANSKA, L. & NADANYIOVA, M. Green Marketing and Brand Perception: Unveiling the Consumer Perspective. Springer Proceedings in Business and Economics, 2024. 951-962.
- TOLVANEN, J., AHONEN, T. & VIHOLAINEN, J. 2011. Cleen innovations: How collaboration is supporting ABB's research and development work. *ABB Review*, 12-15.
- TVEDT, H. L. 2019. The formation and structure of cleantech clusters: Insights from San Diego, Dublin, and Graz. *Norsk Geografisk Tidsskrift*, 73, 53-64.
- VARA PRASAD, M. N., SMOL, M. & FREITAS, H. 2023. Achieving sustainable development goals via green deal strategies. *Sustainable and Circular Management of Resources and Waste Towards a Green Deal*.
- VIRANT, Z., OSOJNIK, J. & KOZMUS, A. 2024. Environmental responsibility and communication in selected companies in the Podravska statistical region. *Acta Geographica Slovenica*, 64, 97-109.
- WALLACH, K. A. & POPOVICH, D. 2023. When Big Is Less than Small: Why dominant brands lack authenticity in their sustainability initiatives. *Journal of Business Research*, 158.
- WESSBERG, N. & MOLARIUS, R. 2008. Governance challenges and the prevention of industrial environmental accidents: The case of Finland. *European Environment*, 18, 371-386.
- WORLD RESOURCES INSTITUTE & WBCSD 2011. Corporate Value Chain (Scope 3) Accounting and Reporting Standard: Supplement to the GHG Protocol Corporate Accounting and Reporting Standard. Washington, DC.
- YALÇIN, D. 2022. Green Branding Implementations in Hard-Discount, Low-Cost Turkish Textile Brands. *Palgrave Studies of Marketing in Emerging Economies*.

Appendix 1. Survey

Green and Clean Actions & Investments in Kymenlaakso

Introduction

Thank you for participating in this study. This questionnaire is part of a research project at LUT University (Kouvola Unit), conducted in cooperation with the Kymenlaakso Chamber of Commerce and supervised by Professor Marko Torkkeli.

The purpose of the project is to collect information on the green and clean actions already taken by companies in Kymenlaakso, as well as future investment plans.

The collected data on current actions will be presented on a regional map that highlights the diverse efforts of local companies. This map will serve as a tool for regional marketing and reputation building, showing the strong commitment of companies in Kymenlaakso to sustainability.

Your input is highly valuable, as it will help make visible the good work already being done and inspire further cooperation and opportunities for both SMEs and larger companies. All responses are confidential and will be used only for aggregated analysis. Completing the survey will take approximately 15–20 minutes.

Section 1 - Company Profile

1. Company size (number of employees):*

- Micro (< 10 employees)
- Small (10–50)
- Medium (51–250)
- Large (> 250)

2. Industry sector (select one):

- Agriculture, forestry and fishing
- Mining and quarrying
- Manufacturing
- Electricity, gas, steam and air conditioning supply
- Water supply; sewerage, waste management and remediation activities
- Construction
- Wholesale and retail trade
- Transportation and storage

- Accommodation and food service activities
- Publishing, broadcasting, and content production and distribution activities
- Telecommunication, computer programming, consulting, computing infrastructure and other information service activities
- Financial and insurance activities
- Real estate activities
- Professional, scientific and technical activities
- Administrative and support service activities
- Public administration and defence; compulsory social security
- Education
- Human health and social work activities
- Arts, sports and recreation
- Other service activities
- Activities of households as employers and undifferentiated goods – and service-producing activities of households for own use
- Activities of extraterritorial organisations and bodies
- Other

3. Location (municipality) of main operations:*

- Kouvola
- Kotka
- Hamina
- Virolahti
- Miehikkälä
- Pyhtää
- Other (please specify) _____

Section 2 - Current Green & Clean Practices

In this section, we ask about the actions your company has already implemented. Later, in the next sections, you will be asked about your future plans (2028 and 2035).

4. Green and clean initiatives implemented:*

Which of the following actions has your company taken in the past?

- Installed renewable energy (e.g. solar panels, wind turbines on-site)
- Purchased renewable energy or green electricity contracts
- Energy efficiency upgrades (e.g. LED lighting, efficient machinery, building insulation)
- Heat pumps
- Electrified vehicle fleet or equipment (e.g. switch to EVs/EV chargers)
- Biofuel vehicle fleet
- Waste reduction and circular economy (e.g. material reuse, recycling)
- Green procurement and use of sustainable materials (e.g. recycled inputs, eco-friendly materials, or green chemistry in products/processes)
- Cleantech innovations (e.g. water purification, biofuels)
- Conducted a GHG emissions inventory or environmental impact assessment
- Obtained environmental certifications/standards (e.g. ISO 14001, etc.)
- Employee training on sustainability
- None of the above
- Other

Follow-up questions: For each selected option, please describe one or two specific examples (projects carried out, outcomes achieved, or challenges overcome).

5. follow-up question:

For the option you selected — “*Obtained environmental certifications/standards*” — please specify which certifications your company has obtained.

- Nordic Swan eco-label
- ISO 14001 (Environmental Management System)
- ISO 50001 (Energy Management System)
- EMAS (EU Eco-Management and Audit Scheme)
- Other (please specify): _____

6. Would you be willing to have your company's green actions visualized on a public regional map (interactive online map showing locations and initiatives)?*

- Yes (with company name)

7. Please provide the address and coordinates of your company's main facility in Kymenlaakso. (This will be used only for mapping purposes)

- Street address _____
- Postal code _____
- City _____
- Latitude/Longitude (optional) _____
- Yes (anonymously)
- No

8. Share Energy use: What percentage of your company's total energy (electricity, heating) currently comes from renewable sources?*

- This question is not applicable to my company
- 0% (none)
- 1–25%
- 26–50%
- 51–75%
- 76–100%

9. What barriers have you faced in implementing green and clean actions? (select all that apply)*

- Lack of funding / incentives
- Limited knowledge / skills
- Regulatory challenges
- Supply chain issues
- Infrastructure limitations (e.g., charging, grid, recycling)
- Timing / resource constraints
- Market barriers (e.g., low demand, cost competitiveness)
- Technological challenges
- None
- Other (please specify): _____

Optional follow-up: If you wish, please describe your experience in more detail (e.g., specific challenges or examples).

Section 3 - Future Green & Clean Investments (up to 2028)

The following section focuses on future green and clean investments. Please note:

- These responses will not be shown on the map for individual companies.
- Instead, they will be combined anonymously to create an overall picture of the region's future green development (e.g., total planned solar capacity, number of companies planning energy efficiency projects, etc.).

10. Planned investments by 2028:*

Planned investments in the next 3 years (up to 2028):

Which of the following green and clean projects does your company **plan to implement or expand** by 2028?

- Renewable energy (e.g., solar panels, wind turbines on-site)
- Purchase renewable energy or green electricity contracts
- Energy efficiency upgrades (e.g., LED lighting, efficient machinery, building insulation)
- Heat pumps
- Electrification of vehicle fleet or equipment (e.g. switch to EVs/EV chargers)
- Biofuel vehicle fleet
- Waste reduction and circular economy measures (e.g. material reuse, recycling)
- Green procurement and sustainable materials (e.g., recycled inputs, eco-friendly materials, or green chemistry in products/processes)
- Cleantech innovations (e.g., water purification, biofuels)
- GHG emissions inventory or environmental impact assessment
- Obtain environmental certifications/standards (e.g., ISO 14001, etc.)
- Employee training on sustainability
- None of the above
- Other

Follow-up questions: For each selected option, please briefly describe your planned project, expected outcomes, or targets by 2028.

11. Follow-up question:

For the option you selected — “Obtain environmental certifications/standards” — please specify which certifications your company plans to obtain by 2028.

- Nordic Swan eco-label
- ISO 14001 (Environmental Management System)
- ISO 50001 (Energy Management System)
- EMAS (EU Eco-Management and Audit Scheme)
- Other (please specify): _____

Section 4 - Future Green & Clean Investments (2028–2035)

Please note:

- These responses will not be shown on the map for individual companies.
- Instead, they will be combined anonymously to create an overall picture of the region's future green development (e.g., total planned solar capacity, number of companies planning energy efficiency projects, etc.).

12. Planned investments in the following 7 years (2028–2035):

Which of the following green and clean projects does your company plan to implement or expand between 2028 and 2035?

- Renewable energy (e.g., solar panels, wind turbines on-site)
- Renewable energy purchases or green electricity contracts
- Energy efficiency upgrades (e.g., LED lighting, efficient machinery, building insulation)
- Heat pumps
- Electrification of vehicle fleet or equipment (e.g. switch to EVs/EV chargers)
- Biofuel vehicle fleet
- Waste reduction and circular economy measures (e.g. material reuse, recycling)
- Green procurement and sustainable materials (e.g., recycled inputs, eco-friendly materials, or green chemistry in products/processes)
- Cleantech innovations (e.g., water purification, biofuels)
- GHG emissions inventory or environmental impact assessment
- Obtain environmental certifications/standards (e.g., ISO 14001, etc.)
- Employee training on sustainability
- None of the above
- Other

Follow-up questions: For each selected option, please briefly describe your planned project, expected outcomes, or targets between 2028 and 2035.

13. Follow-up question:

For the option you selected — “*Obtain environmental certifications/standards*” — please specify which certifications your company plans to obtain between 2028 and 2035.

- Nordic Swan eco-label
- ISO 14001 (Environmental Management System)
- ISO 50001 (Energy Management System)
- EMAS (EU Eco-Management and Audit Scheme)

- Other (please specify): _____

14. What challenges do you anticipate in making these future investments?

(Open text)

15. Funding and resources:

Do you anticipate needing external funding or support for these planned investments? If yes, which sources might you seek?

Section 5 - Final Questions

16. Additional comments (optional):

(Open text)

17. Contact for follow-up (optional):

- Name
- Email

Thank You Page

Thank you for your participation!

If you have additional comments or would like to share documents, please email:

Abolfazl.Moradian@student.lut.fi