

Implementing Sustainability Reporting at the Project Level: Current Practices and Customer Requirements in ABB Automation and Electrification Projects

Salli-Sylvia Nyström

Department of Accounting and Commercial Law

Hanken School of Economics

Vaasa

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HANKEN SCHOOL OF ECONOMICS

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Abstract:

This thesis examines project-level sustainability reporting within industrial automation and electrification sector. The purpose is to investigate current sustainability reporting practices at the project level and to analyse the sustainability and carbon-related information requested by customers across different industries.

The study was conducted as an exploratory qualitative single-case study of ABB Automation Energy Industries (AUEN) in Finland. The empirical material consists of project documentation, customer sustainability information requests, and interviews with internal and external participants.

The findings show that project-level sustainability reporting is largely embedded in existing technical, safety, and compliance documentation. However, reporting practices remain fragmented and are primarily driven by customer-specific requirements. While current project documentation contains limited environmental and carbon-related information, customers are increasingly requesting more comprehensive sustainability data, including Scope 3 emissions, product carbon footprints, Environmental Product Declarations (EPDs), supplier emissions, and lifecycle information.

The study identifies a gap between established corporate sustainability reporting and its practical implementation at the project level. The findings highlight the need for greater standardization, improved availability of sustainability-related data, and stronger integration of sustainability information into existing project processes.

Keywords:

Sustainability reporting, project-level reporting, carbon accounting, customer requirements, industrial automation, sustainability data

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Avhandlingens rubrik:
Implementering av hållbarhetsraportering på projektnivå: nuvarande praxis och kundkrav i ABB:s automations- och elektrifieringsprojekt

Sammandrag:
Denna avhandling behandlar hållbarhetsrapportering på projektnivå inom industriell automation och elektrifiering. Syfte är att undersöka nuvarande praxis för hållbarhetsrapporterings på projektnivå samt att analysera vilken hållbarhets- och koldioxidrelaterad information kunder efterfrågar inom olika branscher.

Studie genomfördes som en explorativ kvalitativ fallstudie av ABB Automation Energy Industries (AUEN) i Finland. Det empiriska materialet består av projektdokumentation, kundernas hållbarhetsrelaterade informationsförfrågningar samt intervjuer med interna och externa deltagare.

Resultaten visar att hållbarhetsrapportering på projektnivå i stor utsträckning är integrerad i befintlig teknisk dokumentation, säkerhetsdokumentation och efterlevnadsrelaterad dokumentation. Rapportering är emellertid fortfarande fragmenterad och i hög grad driven av kundspecifika krav. Trots att den befintliga projektdokumentationen endast innehåller begränsad miljö- och koldioxidrelaterad information efterfrågar kunder i allt högre utsträckning mer detaljerade uppgifter, såsom utsläpp inom Scope 3, produkters koldioxidavtryck, miljövarudeklarationer (EPD), leverantörers utsläpp samt livscyckelrelaterad information.

Studien identifierar ett gap mellan etablerad hållbarhetsrapportering på företagsnivå och dess praktiska tillämpning på projektnivå. Resultaten belyser behovet av ökad standardisering, förbättrad tillgång till hållbarhetsdata samt en starkare integration av hållbarhetsrelaterad information i befintliga projektprocesser.

Nyckelord:
Hållbarhetsrapportering, rapportering på projektnivå, koldioxidredovisning, kundkrav, industriell automation, hållbarhetsdata

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ABBREVIATIONS

CSRD	Corporate Sustainability Reporting Directive
ESRS	European Sustainability Reporting Standard
GRI	Global Reporting Initiative
ISSB	International Sustainability Standards Board
EPDs	Environmental Product Declarations
LCAs	Life Cycle Assessments
GHG	Greenhouse Gas
ESG	Environmental, Social, Governance
KPI	Key Performance Indicators
FIAUEN	Automation Energy Industries Finland
SBTi	Sustainability Based Target Initiatives

1 INTRODUCTION

Sustainability has become a central concept of organizational management and accountability. The growing understanding of environmental challenges and increased stakeholder expectations have led to stricter sustainability reporting requirements. International agreements and EU initiatives have played a key role in shaping these requirements. In particular, the Paris Agreement, together with the European Green Deal and Corporate Sustainability Reporting Directive (CSRD), has contributed to companies being expected to report reliable, comparable, and relevant sustainability information. To support this, organizations are expected to prepare sustainability reports in accordance with standardized reporting frameworks, such as the European Sustainability Reporting Standards (ESRS). (Bebbington, O'Dwyer, & Unerman, 2014).

As sustainability reporting has become more detailed, organizations face increasing challenges in translating corporate reporting requirements into operational practices. Although sustainability disclosures are presented at the organizational level, much of the information reported originates from operational activities, supply chains, business units, and individual projects. Consequently, effective sustainability reporting depends on the organization's ability to capture, manage, and report sustainability information throughout its operations. (Adams & Frost, 2008)

Despite growing importance of sustainability reporting, comparatively little attention has been devoted to how sustainability information is captured, managed and reported at the project-level. This is particularly relevant in project-based automation environments, where much of the information supporting corporate sustainability reporting originates from individual projects, suppliers, and operational activities. Furthermore, increasing customer demand for project-specific sustainability and carbon-related information highlights the need for a better understanding of project-level reporting practices.

1.1 Problem description

Previous research has primarily examined sustainability reporting from a corporate perspective, focusing on sustainability implementation, stakeholder value creation, reporting quality, and regulatory compliance (Adams & Frost, 2008; Du Toit, 2024). Collectively these studies demonstrate that sustainability reporting can improve corporate transparent, accountability and stakeholder trust.

These challenges are particularly relevant within industrial automation and electrification projects, where complex engineering progresses and long project lifecycles generate large

amounts of operational information. Previous research has identified data collection, organizational integration, and the management of sustainability information as key challenges in sustainability reporting implementation (Adams & Frost, 2008; Maione, 2023).

ABB is a leading supplier of industrial automation and electrification solutions operating in industries where sustainability requirements are becoming increasingly important. As customers request more detailed sustainability and carbon-related information, ABB faces growing demands for reporting at both the corporate and project level. (ABB Ltd, 2025).

Despite the growing demand for project-specific sustainability information, there is to my knowledge no guidance on how sustainability information should be systematically captured, managed, and reported at the project level within automation and electrification projects. Existing research has examined sustainability reporting implementation and organizational reporting practices (Adams & Frost, 2008; Maione, 2023), but comparatively little attention has been devoted to project-level sustainability reporting processes (Du Toit, 2024).

In response to these challenges, this thesis investigates how sustainability information is currently captured and reported at the project level within ABB Automation Energy Industries in Northern Europe and examines the sustainability and carbon-related information requested by customers across different industries. By combining document analysis, customer request data, and interviews, the study seeks to increase understanding of how corporate sustainability reporting requirements can be translated into practical project-level reporting.

1.2 Purpose and research questions

The purpose of this thesis is to examine operational project-level reporting in a single-case study company Asea Brown Boveri (ABB) Ltd. As an exploratory case study, this thesis seeks to develop an understanding of how sustainability information is currently captured and reported at the project level, as well as the sustainability and carbon-related information requested by customers.

The focus lies of this study is ABB Automation Energy Industries Finland's (FIAUEN) automation and electrification projects within industrial powerplants in Northern Europe. Furthermore, a thematic categorization about what sustainability and carbon-related information is requested by customers is made by dividing customers into industry-specific sections.

To fulfill this purpose, this thesis addresses the following research questions:

RQ 1: How is sustainability information currently collected and reported at the project level within ABB FIAUENs automation projects?

RQ 2: What sustainability and carbon-related information do customers request at the project level across different industries?

1.3 Scope and limitations

This thesis examines sustainability reporting at the project level within ABB's automation project environment, with particular focus on how sustainability information is currently captured and reported internally, and what sustainability and carbon-related information customers request across different industries.

The study is limited to an explorative qualitative single-case study of ABB's Automation Energy Industries (AUEN). This study centers around project environment and does not seek to evaluate sustainability performance, verify environmental impacts, or perform greenhouse gas emissions calculations. Rather than assessing the accuracy of reported sustainability outcomes, the thesis focuses on reporting practices, information flows, and current state outlook on project-level sustainability reporting.

The empirical analysis draws on regulatory and reporting frameworks, publicly available sustainability information, internal project documentation, customer sustainability and carbon information requests, and interview data. Internal materials are limited to non-confidential or permission-based sources and are used solely for academic purpose.

The study does not examine ABB's commercial performance, financial outcomes or strategic decision-making processes beyond what is relevant for understanding sustainability reporting practices. Furthermore, the findings are context-specific to ABB FIAUEN's automation and electrification project environment and the customer industries included in the study, which may limit direct generalizability to other organizations or industrial settings.

The contribution of the study lies in increasing understanding of how sustainability information is reported at the project-level, and how customer requirements might impact the divisions reporting practices in the future.

1.4 Structure

This thesis consists of seven chapters. Chapter 1 introduces the research topic, outlines the problem, and presents the purpose, research questions, and delimitations. Chapter 2 provides the theoretical background. Chapter 3 reviews previous research and identifies the research gap. Chapter 4 describes the methodological approach adopted in the study. Chapter 5 present the empirical findings, which are discussed in Chapter 6 in relation to previous research, followed by the practical and theoretical implications, limitations, and future research. Finally, chapter 7 concludes the thesis.

1.5 AI usage

In this thesis, AI tools have been applied in accordance with Hanken's guidelines for the use of AI-assisted tools. The primary tool used was ChatGPT (OpenAI 2026). AI assistance was mainly used for language-related purposes, including grammar checking, improving sentence structure and phrasing, and translating individual words, expression, and passages between Swedish, Finnish, and English. Additionally, I utilized Microsoft Teams Ai, which generated an initial version of the interview transcripts that I subsequently reviewed and corrected where necessary.

The use of AI was limited to supporting writing and research process. All suggested references were independently reviewed and verified before being included in the thesis, and AI-generated suggestions were evaluated and revised by the author. The final content, analysis, interpretation, and conclusion of the thesis are the author's own and reflect the author's understanding of the research material and subject.

2 THEORETICAL BACKGROUND

This chapter presents the theoretical and conceptual background relevant to this study. It begins by introducing sustainability reporting. The chapter presents the regulatory frameworks relevant to this study, namely the Corporate Sustainability Reporting Directive (CSRD) and the European Sustainability Reporting Standards (ESRS). After that, this chapter highlights the theoretical perspectives that explain organizational sustainability reporting practices, including stakeholder, institutional, and legitimacy theory.

Finally, the chapter addresses carbon accounting at the project-level, including the Greenhouse Gas Protocol, system boundaries, data requirements, and reporting challenges. Together, these theories, frameworks, and concepts provide the foundation for the subsequent analysis of this thesis.

2.1 Sustainability reporting and underlying theories

Sustainability reporting has become an increasingly important component of corporate reporting as organizations face growing expectations regarding environmental, social, and governance (ESG) performance. While traditional corporate reporting focused on financial information, sustainability reporting extends organizational accountability by disclosing information related to environmental performance, social responsibility, and governance practices. Its purpose is to enhance transparency and provide stakeholders with information on how organizations create long-term value while managing sustainability-related challenges. (Bebbington et al., 2014; Rimmel, 2020).

As sustainability has become integrated into corporate strategy, reporting has evolved beyond voluntary environmental disclosures to encompasses a broader range of sustainability-related information. Today organizations are expected to communicate not only their sustainability performance, but also how their sustainability considerations are integrated into strategic and operational decision-making. (Rezaee, 2025).

To improve consistency, comparability and credibility of sustainability disclosures, regulatory initiatives such as the Corporate Sustainability Reporting Directive (CSRD) and the European Sustainability Reporting Standards (ESRS) have established more comprehensive and standardized reporting requirements for a growing number of companies. (European Union, 2023).

The growing importance of sustainability reporting has attracted considerable academic attention. While regulatory requirements play an important role of reporting practices, they do not fully explain why organizations disclose sustainability information. Organizations also respond to stakeholder expectations, institutional pressure, industry norms, and the need to maintain organizational legitimacy. (Bebbington, O'Dwyer, & Unerman, 2014).

2.1.1 Corporate Sustainability Reporting Directive (CSRD)

The Corporate Sustainability Reporting Directive (CSRD), adopted by the European Union in 2022, represents a significant expansion of the earlier Non-Financial Reporting Directive (NFRD). While the NFRD introduced mandatory sustainability disclosures, its flexibility resulted in reporting practices that were often inconsistent and lacked comparability. The CSRD was therefore introduced to improve quality, consistency, and reliability of sustainability information disclosed by companies operating within the European Union. (European Union, 2023).

The directive requires companies to disclose information regarding sustainability-related impacts, risks, and opportunities, covering environmental, social and governance (ESG) matters. In addition, organizations must report sustainability targets, policies, governance structure, and performance indicators, including greenhouse emission and climate-related objectives. A central objective of the CSRD is to enhance transparency and accountability by ensuring that sustainability information is reported alongside financial information and made available to a broad range of stakeholders. (European Union, 2023).

As part of the Europea Green Deal, the CSRD supports the European Union's transition towards a more sustainable economy by improving the availability and quality of sustainability information. This objective is aligned with the ambitions of the European Climate Law and the Paris Agreement to reduce greenhouse gas emissions and limit global warming. By strengthening sustainability disclosures requirements, the directive aims to support informed decision-making and facilitate the transition towards a climate-neutral economy. (European Commission, n.d.; United Nations, n.d.).

The CSRD further requires companies to explain their business model, how sustainability considerations are integrated into strategy and decision-making, and how sustainability objectives are implemented in practice. Companies must also disclose forward-looking information, including transition plans, financial and investment plans, and the extent to which their strategy aligns with the objective of limiting global warming. Furthermore, organizations are

required to explain how stakeholder interest and sustainability impact are considered in strategic decision-making. (European Union, 2023).

While the CSRD establishes the legal obligations to reporting sustainability information, the detailed reporting requirements are defined through the European Sustainability Reporting Standards (ESRS). Together, the CSRD and ESRS constitute the foundation of the European sustainability reporting framework. (European Union, 2023).

Although the CSRD focuses primarily on corporate-level disclosures, compliance with its requirements depends on availability of reliable sustainability data throughout the organization. Consequently, companies must establish processes for collecting, managing, and verifying sustainability information from business units, operations, supply chains, and individual projects. This presents challenges for project-based organizations, where sustainability information is often generated at the project level but consolidated and reported at the corporate level. As a result, the availability, consistency, and quality of project-level sustainability reporting data increasingly important for effective corporate sustainability reporting. (European Union, 2023).

2.1.2 European Sustainability Reporting Standards (ESRS)

The European Sustainability Reporting Standard (ESRS) constitutes the reporting framework developed by the European Financial Reporting Advisory Group (EFRAG) under the Corporate Sustainability Reporting Directive (CSRD). The standards establish a standardized framework for sustainability disclosures within the European Union with the objective of improving transparency, comparability and reliability of sustainability disclosures. ESRS significantly expands both the scope and level of detail of sustainability information that companies are required to disclose. (European Union, 2023).

The ESRS consists of two cross-cutting standards (ESRS 1 and ESRS 2) and ten topical standards covering environmental (ESRS E1-E5), social (ESRS S1-S4), and governance (ESRS G1) matters. ESRS 1 establishes the general principles and reporting requirements applicable to all sustainability disclosures, whereas ESRS 2 specific the general disclosures that all reporting entities are required to provide, regardless of materiality. The topical standards contain disclosure requirements that apply when the relevant sustainability matters are considered material. The ESRS 2 organizes mandatory disclosures into four reporting areas: governance, strategy, impacts, risks and opportunities, and metrics and targets. Tabel 1 below presents the structure of ESRS. Together, these disclosures explain how sustainability is governed, integrated into strategy, managed within the organization, and measured overtime. (European Union, 2023).

Table 1 Structure of the European Sustainability Reporting Standards (ESRS)

European Sustainability Reporting Standards (ESRS)	
ESRS 1	General requirements
ESRS 2	General disclosures
ESRS E1	Climate change
ESRS E2	Pollution
ESRS E3	Water and marine resources
ESRS E4	Biodiversity and ecosystems
ESRS E5	Resource use and circular economy
ESRS S1	Own workforce
ESRS S2	Workers in the value chain
ESRS S3	Affected communities
ESRS S4	Consumers and end-users
ESRS G1	Business conduct

The fundamental principle of ESRS is double materiality, which requires companies to assess sustainability matters from both an impact and a financial perspective. Impact materiality considers the actual and potential impacts of the company's activities on the people, environment and society, whereas financial materiality focuses on sustainability-related risks and opportunities that may affect the company's financial performance, cash flows, or enterprise value. A sustainability matter is considered material if it meets either or both perspectives. (European Union, 2023).

In addition to specifying disclosure requirements, the ESRS establish several procedural requirements. Sustainability information must be included in the management report, prepared in a digital machine-readable format, and subject to mandatory external assurance. These

requirements further strengthen the consistency, reliability, and credibility of sustainability reporting. (European Union, 2023).

2.1.3 Stakeholder theory

Stakeholder theory explains why organizations disclose sustainability information and how reporting practices are influenced by the expectations of different stakeholder groups. According to the theory, organizations are accountable not only to shareholders but also to a broader range of stakeholders who can affect, or are affected by, the organization's activities (Rimmel, 2020). These stakeholders include customers, employees, suppliers, investors, regulators, local communities, and other groups with an interest in organizational operations.

From a stakeholder perspective, accounting and reporting serve as important mechanisms for managing stakeholder relationships and responding to information needs. Sustainability reporting enables organizations use to communicate their environmental, social and governance (ESG) performance demonstrating accountability and maintaining a trusting bond with their stakeholders (Rimmel, 2020). Since different stakeholder groups possess different expectations and information requirements, organizations must identify and prioritize the stakeholders that are most influential to their operations and decision-making. Stakeholder mapping therefore plays an important role in determining which sustainability information should be communicated and to whom. (Rimmel, 2020).

Clarkson (1995) distinguishes between primary and secondary stakeholders. Primary stakeholder, including customers, employees, suppliers, and shareholders, are essential for organizational survival because maintain directly relationship with the organization. Secondary stakeholders, such as environmental organizations, activist groups, and the media, may influence organizational activities but are not directly involved in the organizations core operations. (Clarkson, 1995).

Stakeholder theory provides a theoretical foundation for examining how stakeholder expectations influence organizational reporting practices. In particular, the theory helps explain why increasing customer demands for project-specific sustainability and carbon-related information encourage organizations to collect and disclose more detailed sustainability information at the project-level.

2.1.4 Institutional theory

Institutional theory is frequently applied in sustainability reporting research to explain why organizations adopt similar reporting practices, standards, and disclosure frameworks. The theory suggests that organizational structures and practices are shaped not only by economic considerations but also by the institutional environment in which organizations operate. (Scott, 2013) Organizations therefore adapt to widely accepted norms, values, rules, and expectations to gain legitimacy within society and their respective industries. (Bebbington et al., 2014; Rimmel, 2020).

Institutions can be understood as socially constructed systems of norms, values, beliefs, and practices that become established over time and regarded as appropriate way of operating. According to institutional theory, organizations continuously respond to institutional pressure arising from regulatory requirements, stakeholder expectations, industry norms, and professional practices. As organizations face similar pressure, organizational structures and reporting practices gradually become more standardized and aligned across industries. (Rimmel, 2020) (Scott, 2013).

The theory helps explain why sustainability- and carbon-related information requests are becoming increasingly common at the project level. Customer requirements, industry expectations, and emerging sustainability regulations create pressures that encourage organizations to collect, manage, and disclose sustainability information beyond traditional corporate-level reporting. Therefore, project-level sustainability reporting can be understood as part of a broader institutional development toward greater transparency, accountability, and consistency in sustainability.

2.1.5 Legitimacy theory

Legitimacy theory originates from political economy theory and views accounting and reporting not merely as technical or economic activities, but as social and political processes through which organizations communicate with society (Rimmel, 2020). From this perspective, organizational disclosures are regarded as mechanisms for demonstrating that an organization's activities are consistent with prevailing societal norms, values, and expectations. (Suchman, 1995).

A central assumption of legitimacy theory is that organizations depend on societal acceptance to maintain their operations, access resources, and ensure long-term survival. This relationship is often described as a social contract, whereby society grants organizations the right to operate provided their activities generate benefits that outweigh their associated economic, social, and

environmental costs. Because societal expectations evolve over time, organizations must continuously adapt their practices and disclosure to maintain legitimacy. Consequently, changes in stakeholder expectations may create a legitimacy gap if organizational activities are no longer perceived as aligned with accepted societal values. (Suchman, 1995).

From legitimacy perspective, sustainability reporting represents an important mechanism through which organizations establish, maintain, and reinforce legitimacy. By disclosing information on environmental, social, and governance (ESG) performance, organizations demonstrate accountability, transparency, and responsiveness to societal expectations. Sustainability reporting therefore serves not only an informational purpose but also a legitimizing function by communicating that the organization recognizes and addresses sustainability-related concerns. (Suchman, 1995; Bebbington et al., 2014).

Legitimacy theory provides a useful perspective for understanding the increasing demand for sustainability and carbon-related information at both the corporate and project-level. Growing customer requests for project-specific sustainability information can be viewed as part of broader societal expectations for transparency and accountability throughout the value chain. Hence, project-level sustainability reporting may contribute to maintaining organizational legitimacy by demonstrating responsiveness to evolving stakeholder expectations. (Suchman, 1995).

2.2 Case company

This section introduces the case company examined in this thesis and provides the organizational context for the empirical study. It begins with a brief overview of ABB as a global technology company before presenting the company's sustainability strategy and governance. The section then narrows its focus to ABB's Automation Energy Industries Finland's (FIAUEN) business, describing its project-based operations and the industrial project environment in which the study is conducted

2.2.1 ABB Ltd.

Asea Brown Boveri, or ABB Ltd. is a Swiss Swedish multinational technology company specializing in electrification, automation, and industrial digitalization. Headquartered in Zurich, Switzerland, the company operates in more than 100 countries and employs approximately 110,000 people. ABB serves a wide range of industries through its business areas Electrification, Motion, and Automation. The company combines engineering expertise with digital technologies to improve productivity, energy efficiency, and sustainability across industrial operations (ABB Ltd, n.d.).

2.2.2 Sustainability at ABB

Sustainability constitutes a central component of ABB's corporate strategy and business operations. Guided by its purpose of enabling a more sustainable and resource-efficient future, the company has established sustainability ambitions related to climate action, resource efficiency, circularity, operational health and safety, and responsible business conduct. As a large multinational company operating within the European Union, ABB is subject to the Corporate Sustainability Reporting Directive (CSRD) and reports its sustainability performance in accordance with the European Sustainability Reporting Standards (ESRS). These reporting requirements have further strengthened the company's focus on collecting, managing, and reporting reliable sustainability information throughout its operations and value chain. (European Union, 2023; ABB Ltd, 2025).

ABB has committed to achieving net-zero emissions by 2050 and has established both short-term and long-term greenhouse gas reduction targets that were validated by the Science Based Targets initiatives (SBTi) in 2024. These targets include operational emissions (Scope 1 and 2) as well as value chain emissions (Scope 3), reflecting the company's ambitions to reduce its environmental impact across the entire value chain. In addition, ABB participates in several external sustainability assessments, including EcoVadis, MSCI ESG Ratings, S&P Global Corporate Sustainability Assessment (CSA), and Sustainalytics, which provide independent evaluations of the company's sustainability performance. Table 2 summarizes ABB's sustainability ratings. (ABB Ltd, 2025).

Table 2 Explanation of ABBs Sustainability Ratings from different agencies

Agency	**Rating**	**Measure**
EcoVadis	84	Platinum
MSCI ESG	AAA	Leader
S&P Global CSA	58/100	Top 15%
Sustainalytics ESG Risk	17,40	Low risk level

ABB's sustainability strategy is supported by its Code of Conduct, which establishes the ethical principles and standards that guide business conduct throughout the organization. The Code emphasizes integrity, transparency, occupational health and safety, environmental responsibility,

compliance with applicable legislation, and responsible decision-making. These principles are further extended through ABB's Supplier Code of Conduct, which requires supplier to operate in accordance with internationally recognized standards relating to human rights, labor conditions, business ethics, and environmental management. Suppliers are also expected to provide sustainability-related information, including greenhouse gas emissions and Environmental Product Declarations (EPDs), when requested. (ABB Ltd, 2023; ABB Ltd, 2023).

Together, ABB's sustainability strategy, reporting obligations, and governance framework establish the organizational foundation for sustainability management across the company and its value chain. These principles are particularly relevant in project-based operations, where sustainability information must be collected from multiple organizational functions and external suppliers to meet both corporate reporting requirements and increasingly detailed customer requests.

2.2.3 Automation Energy Industries (FIAUEN)

ABB Automation Energy Industries Finland (FIAUEN) is a division within ABB's Process Automation business area, employing approximately 80 people. The unit specializes in the design and delivery of integrated electrical, automation, instrumentation, and control systems for power generation facilities, complemented by lifecycle support services. Its operations combine engineering expertise with project execution capabilities, enabling the delivery of customer-specific automation solutions throughout the different stages of a project's lifecycle. (ABB Ltd, n.d.).

Unlike manufacturing units, FIAUEN does not produce physical products but instead delivers project-based solutions tailored to individual customer requirements. Project execution typically comprises engineering, procurement, implementation, commissioning, documentation, and final handover activities. Projects vary considerable in size, duration, technical complexity, and customer requirements depending on the industry and operational environment in which they are delivered. AUEN's customer base spans several industrial sectors, such as engine power, nuclear, power and heat, hydrogen, food and beverage and life science. These sectors are increasingly influenced by sustainability-related regulation, decarbonization initiatives, and growing customer expectations regarding environmental, social and governance (ESG) performance. As a result, customers are requesting more detailed sustainability- and carbon-related information throughout project execution. (ABB Ltd, n.d.).

2.2.4 Projects at FIAUEN

AUEN Finland delivers automation projects for a wide range of power generation facilities, including gas engine, gas turbine, hydropower, thermal power, and nuclear power plants. Projects are executed for both domestic and international customers and typically involve power plant automation, electrification, turbine control systems, excitation, process optimization, and integrated control solutions. (ABB Ltd, n.d.).

The business can broadly be divided into solution projects and service projects. Solution projects involve the implementation of new automation systems and are categorized as either greenfield or brownfield projects. Greenfield projects refer to the design and construction of new facilities, whereas brownfield projects involve upgrades, modernization, or expansion of existing plants and automation systems. In FIAUEN the focus is on brownfield projects and to be a proven partner in energy transition areas. (ABB Ltd, n.d.).

Service projects focus on supporting installed systems throughout their operational lifecycle through activities such as commissioning, maintenance, modernization, system upgrades, spare parts delivery, and technical support. In addition, AUEN offers long-term service agreements that provide ongoing maintenance, technical expertise, and lifecycle support to ensure reliable and efficient operations of installed systems. Although service agreements are outside the scope of this thesis, they represent an important part of ABB's lifecycle approach by extending the operational lifetime of existing installations and reducing the need for replacement investments. (ABB Ltd, n.d.).

2.3 Carbon accounting at the project level

Carbon accounting refers to the process of measuring, monitoring and reporting the greenhouse gas (GHG) emissions associated with the activities of an organization, project, system or product. As a core component of sustainability accounting, it provides a structured framework for quantifying emissions, evaluating climate-related performance, and supporting informed decision-making. By identifying emissions sources and measuring their environmental impact, organizations can monitor progress over time, identify opportunities for emissions reductions, and support long-term decarbonization strategies. While sustainability reporting provides a broader overview of an organization's environmental, social and governance (ESG) performance, carbon accounting focuses specially on greenhouse gas emissions and supplies the emissions data required for climate-related disclosures. A carbon footprint refers to the total amount of

greenhouse gas emissions generated directly or indirectly by an organization, project, or product throughout its lifecycle. (Di Vaio & Ali, 2025).

To ensure comparability and consistency greenhouse gas emissions are typically expressed as carbon dioxide equivalents (CO_2e) allowing different greenhouse gases, including carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), to be reported using a common unit based on their global warming potential. This enables organizations to compare emissions across activities, project and reporting periods while supporting alignment with internationally recognized reporting frameworks. (Laine & Tregidga, 2025).

Unlike traditional environmental reporting, carbon accounting often adopts a life-cycle perspective by considering emissions generated not only within an organization's direct operations but also throughout upstream and downstream value-chain activities. Consequently, emissions associated with suppliers, purchased materials, transportation, product use, and end-of-life treatment may all contribute to an organization's footprint. This perspective becomes particularly important in project-based industries, where sustainability information is generated throughout multiple project phases and across complex supply chains. (Di Vaio & Ali, 2025).

Although carbon accounting has traditionally been applied at the organizational level, increasing customer expectations and regulatory requirements have created a growing need for project-level emissions information. Project-level carbon accounting refers to the systematic identification, measurement, and reporting of greenhouse gas emissions associated with a specific project throughout its lifecycle. Compared with organizational carbon accounting, the focus shifts from aggregated corporate emissions to project-specific activities, resources and deliverables, thereby supporting both internal decision-making and customer-specific sustainability reporting. (WRI & WBCSD, 2005).

Within industrial automation projects, sustainability information is generated throughout all phases of the project lifecycle. As customer increasingly requests project-specific sustainability and carbon-related information, organizations require systematic processes for collecting, managing, and reporting project-level emissions data. Consequently, project-level carbon accounting has become increasingly important for supporting customer communication while providing the information required for corporate sustainability reporting. (WRI & WBCSD, 2004; Di Vaio & Ali, 2025; Laine & Tregidga, 2025).

2.3.1 The Greenhouse Gas Protocol

The Greenhouse Gas (GHG) Protocol is the most widely adopted international framework for measuring and reporting greenhouse gas emissions. Developed by the World Resource Institute (WRI) and the World Business Council for Sustainability Development (WBCSD), it provides standardized principles and guidance for greenhouse gas accounting at the organizational level. Although voluntary, the GHG Protocol has become the foundation for many national regulations and sustainability reporting frameworks, including CSRD and ESRS. (WRI & WBCSD, 2004).

The growing importance of standardized greenhouse gas accounting reporting has also been reinforced by international agreements, including the Kyoto Protocol and the Paris agreement, which have increased the need for consistent emissions measurement and reporting. In response to these developments, the GHG Protocol provides a common framework that enhances the consistency and comparability of greenhouse gas disclosures across organizations. (WRI & WBCSD, 2004).

The GHG Protocol classifies greenhouse gas emissions into three categories based on where they occur. Scope 1 comprises direct emissions from sources owned or controlled by the organization, such as fuel combustion, industrial processes, or company-owned vehicles. Scope 2 includes indirect emissions associated with the generation of purchased electricity, heating, or cooling consumed by the organization. Scope 3 encompasses all other indirect emissions occurring throughout the value chain, including emissions from purchased goods and services, transportation, product use, business travel and end-of-life treatment. (WRI & WBCSD, 2004).

Among these categories, Scope 3 typically represent the largest share of an organization's total greenhouse gas emissions while also being the most challenging to quantify. Unlike Scope 1 and Scope 2, Scope 3 emissions originate from activities that often fall outside an organization's direct operational control, requiring collaboration with suppliers, customers, and other stakeholders throughout the value chain. In project-based industrial environments, Scope 3 emissions commonly arise from purchased equipment, component manufacturing, transportation, subcontractors, and end-of-life treatment. Consequently, reliable Scope 3 reporting depends on the availability of high-quality supplier data and clearly defined reporting boundaries. (Laine & Tregidga, 2025).

2.3.2 System boundaries

A critical aspect of carbon accounting is the definition of system boundaries, which determine which emission sources and activities are included in an emissions assessment. System

boundaries define the scope of measurement and directly influence the completeness, comparability, and reliability of reported greenhouse gas emissions. Before emissions can be quantified, organizations must determine where the assessed system begins and ends, thereby defining which processes and activities should be included or excluded. (WRI & WBCSD, 2004).

System boundaries can be defined at several levels depending on the purpose of the assessment. Organizational boundaries determine which legal entities, business units, or operational facilities are included in the greenhouse gas inventory. Operational boundaries, as defined by the Greenhouse Gas Protocol, classify emissions into Scope 1, Scope 2, and Scope 3 according to the organization's level of control and responsibility. At the project level, project boundaries specify which activities, resources, suppliers, and lifecycle stages are considered part of a specific project. (WRI & WBCSD, 2004).

In project-based industries, establishing appropriate system boundaries is particularly important because projects typically involve multiple stakeholder, suppliers, and lifecycle phases. Depending on the selected boundary, an emissions assessment may include only activities performed during project execution or extend to encompass upstream and downstream value chain activities. As a result, different boundary definitions can result in substantially different estimates of a project's carbon footprint.

System boundaries are commonly defined using life-cycle boundaries, which determine the stage of a product or project including in the assessment. For example, a cradle-to-gate assessment includes emissions from raw material extraction, component manufacturing, and production until the product leaves the manufacturing facility. A cradle-to-site assessment extends these boundaries to include transportation and delivery to the project site. A cradle-to-grave assessment considers the product's entire life cycle, including installation, operation, maintenance, and end-of-life treatment, where as a gate-to-gate assessment focuses only on emissions generated during a specific stage of the production process. In contrast, a cradle-to-cradle assessment extends the cradle-to-grave boundaries by including a closed-loop recovery phase, where end-of-life waste is fully repurposed into new raw materials to endlessly restart the production cycle. Table 3 summarizes the most common life-cycle boundary approaches. (WRI & WBCSD, 2004).

Table 3 Summary of boundary approaches

Boundary approaches	**Scope**
Cradle-to-Gate	Production phase
Cradle-to-Site	Production and delivery
Gate-to-Gate	Specific production process
Cradle-to-Grave	Full life cycle
Cradle-to-Cradle	Circular life cycle

The choice of system boundaries is particularly relevant in industrial automation and electrification projects. Depending on the objective of the assessment, organizations must determine whether the emissions inventory should include only the delivered automation system or also associated components, cabling, transportation, installation activities, maintenance, electricity consumption during operation, and supplier-related emissions. Consequently, different boundary definitions include different sources of emissions, they directly affect the reported carbon footprint and the comparability of results between projects.

Clearly defined and consistently applied system boundaries are essential for reliable carbon accounting and standardized project-level sustainability reporting. Without consistent boundary definitions, emissions data become difficult to compare across projects, reporting periods, and organizations, reducing both the credibility and decision-making value of sustainability reporting. (WRI & WBCSD, 2004).

2.3.3 Data requirements

Reliable carbon accounting depends on the availability of accurate, complete, and consistent carbon data. Since greenhouse gas (GHG) emissions cannot be measured directly for most activities, they are estimated by combining activity data with appropriate emissions factors. As a result, the quality of emissions calculations depends on the quality of the underlying data, making systematic data collection and management fundamental components of carbon accounting and sustainability reporting. To ensure reliable reporting, organizations must establish structured processes for collecting, documenting, and verifying carbon-related information. (Xu & MacAskill, 2024).

The specific data required depends on the reporting objective, organizational activities, and the defined system boundaries. Nevertheless, most carbon accounting methodologies rely on activity data, which describes the physical activities responsible for generating emissions. Examples include energy consumption, fuel use, material quantities, waste generation, transport distance. These data are combined carbon dioxide equivalents (CO_2e). Emission factors represent the amount of greenhouse gas emissions associated with a specific activity or unit of consumption and are typically obtained from national and international databases or product-specific documentation, such as Environmental Product Declarations (EPDs). (Xu & MacAskill, 2024).

To improve the accuracy of greenhouse gas inventories, organizations increasingly rely on supplier-specific environmental information. Product-level documentation, including EPDs and Product Carbon Footprints (PCFs), provides standardized information on the environmental impacts and greenhouse gas emissions associated with individual products throughout their lifecycle. Such information enables organizations to replace generic emissions factors with product-specific data, thereby improving the accuracy and transparency of emissions calculations. (Xu & MacAskill, 2024).

The quality of carbon accounting also depends on the type of data used. Primary data consist of information collected directly from the reporting organizations or its suppliers, such as measured electricity consumption, material quantities, or supplier-specific emissions data. Secondary data, refers to generic or average information obtained from external databases, published studies, or industry averages. Although secondary data are often necessary when primary data are unavailable current standards consistently recommend prioritizing primary data, whenever possible, as they more accurately reflect the environmental performance of the assessed system. (Xu & MacAskill, 2024).

Besides data availability, data quality is a critical for reliable carbon accounting. International standards emphasize that data should be relevant, reliable, verifiable, transparent, verifiable, and traceable. Consequently, organizations should establish procedures for quality assurance, validation, and documentation to ensure that emission data can be consistently applied, independently verified, and integrated into broader sustainability reporting and decision-making. These challenges are particularly evident in project-based organizations, where carbon-related information is often distributed across multiple suppliers, stakeholders, and information systems. (Xu & MacAskill, 2024).

2.3.4 Reporting challenges and interpretation risk

Despite the availability of internationally recognized standards for carbon accounting and sustainability reporting, organizations continue to face significant challenges when implementing these requirements in practice. These challenges are particularly evident at the project-based environments, where reporting often involves multiple stakeholders, project-specific conditions, and sustainability information distributed across several organizational functions and external suppliers.

One of the most frequently identified challenges relates to data availability and data quality. Reliable carbon accounting depends on complete and consistent activity data, supplier information, and emission factors. However, such information is often incomplete, inconsistent, or unavailable, particularly for Scope 3 emissions. As a result, organizations may be required to rely on generic assumptions or secondary data, increasing uncertainty and reducing the accuracy of reported emissions. (Xu & MacAskill, 2024).

In addition to data-related challenges, methodological differences may significantly influence reported emissions. Organizations must determine appropriate system boundaries, allocation methods, emissions factors, and reporting assumptions, all of which affect the resulting carbon footprint. Because sustainability reporting frameworks primarily define what should be reported rather than how project-level data should be collected and managed, organizations frequently develop their own reporting methodologies. Consequently, reporting practices may differ both between projects and across organizations, reducing comparability and consistency. (WRI & WBCSD, 2004).

These methodological differences contribute to interpretation risk, referring to the possibility that carbon accounting principles are interpreted and applied inconsistently. Interpretation risk may arise from differing definitions of project scope, alternative system boundaries, variations in the selection of emissions factors, or different approaches to estimating indirect emissions (Scope 3). Consequently, similar projects may produce substantially different emission estimate despite following the same reporting framework. Such inconsistencies increase the risk of omissions, double counting, and reduce comparability between projects and reporting periods. (WRI & WBCSD, 2004).

Addressing these challenges requires standardized methodologies, clearly defined reporting boundaries, consistent calculation procedures, and robust internal guidance. Together, these measures improve the reliability, transparency, and comparability of project-level carbon

accounting while supporting the increasing demand for consistent sustainability information from regulators, customers, and other stakeholders.

3 LITERATURE REVIEW

This chapter reviews previous research relevant to project-level sustainability reporting. The literature is organized around three themes that are central to the present study: the implementation of sustainability reporting within organizations, sustainability reporting as a source of stakeholder value, the quality and industry specific sustainability reporting disclosures. Together, these studies provide an empirical understanding of the organizational, stakeholder, and industry-related factors that influence sustainability reporting practices.

Although previous research has contributed substantially to the understanding of sustainability reporting implementation and stakeholder communication, comparatively less attention has been devoted to how sustainability information is captured and communicated at the project level and how customer sustainability information requirements differ across industries. The chapter therefore concludes by identifying the research gap that forms the basis of this study.

3.1 Sustainability reporting implementation

The growing adoption of sustainability reporting has created new organizational challenges related to the implementation of reporting frameworks and the integration of sustainability information into business operations. Previous research has shown that organizations often struggle with collecting reliable sustainability data, establishing governance structures, engaging stakeholders, and adapting to evolving requirements and reporting standards (Adams & Frost, 2008; Maione, 2023).

Maione (2023) examined the implementation of the Global Reporting Initiative (GRI) Standards though a qualitative single-case study of an Italian energy company. The study was based on an analysis of corporate sustainability reports, integrated reports and press releases from 2018-2022. The findings showed that although the GRI framework was adopted for its flexibility and comprehensive guidance, the company experienced significant challenges in collecting and managing sustainability data, the integration of sustainability into corporate strategy, and responding to changing regulatory requirements and stakeholder expectations. The study concluded that successful implementation requires a proactive and adaptable approach, supported by continuous improvements to reporting processes and organizational practices.

Similarly, Adams and Frost (2008) investigated how organizations integrate sustainability reporting into management processes through a qualitative multiple—case study of seven organizations. The empirical data were collected through semi-structured interviews with

employees responsible for sustainability reporting and examined how sustainability information was managed internally in comparison with what was ultimately disclosed externally. The authors found considerable variation in the development of sustainability performance indicators, data collection processes, and development of sustainability performance indicators, data collection processes, and the integration of sustainability information into organizational decision-making. Although reporting practices differed depending on organizational context, the implementation of sustainability reporting generally contributed to improved data management, performance measurement, and risk management. However, the study also highlighted that the absence of standardized internal processes resulted in inconsistent reporting practices and varying levels of reporting maturity across organizations.

Collectively, these studies demonstrate that implementing sustainability reporting extends beyond complying with reporting frameworks. Effective implementation requires clear governance structure, systematic data collection processes, and the integration of sustainability information into operational decision-making.

3.2 Quality and industry-specific sustainability reporting

As sustainability reporting has become increasingly standardized through frameworks such as the GRI and ESRS, greater attention has been directed toward both the quality of sustainability disclosures and their relevance across different industries. Previous research suggests, sustainability priorities may vary across industries, while challenges related to reporting quality, comparability, and level of detail remain even within standardized reporting frameworks. (Eccles et al., 2012; Janik et al., 2020).

Eccles et al. (2012) examined sustainability reporting across six industries to investigate whether a common reporting framework adequately captures the sustainability issues that are material for different sectors. By comparing climate-related disclosures across industries, the authors found considerable variation both between sectors and among companies operating within the same industry. The findings suggest that sustainability reporting should account for sector-specific materiality, as the relevance and emphasis of sustainability issues may differ depending on the industry context.

While Eccles et al. (2012) highlight differences across industries, Janik et al. (2020) provide a sector-specific perspective by examining the quality of sustainability reporting among 61 European energy companies. Through a content analysis based on the GRI Standards, the study assessed disclosures relating to greenhouse gas (GHG) emissions, circular economy issues, report

clarity, comparability and reporting quality. The findings showed that reporting within the energy sector was primarily concentrated on GHG emissions, while circular economy issues received considerably less attention. Moreover, ambitious sustainability objectives were not always supported by detailed operational disclosures on specific actions, performance indicators, and data collection methods.

A broader perspective is provided by Du Toit (2024), whose systematic literature review of thirty years of sustainability reporting research concludes that substantial progress has been made in standardizing sustainability reporting. Nevertheless, persistent challenges remain regarding reporting quality, comparability, materiality, and the practical implementation of reporting frameworks. The review further highlights a continuing need for research examining how sustainability information is generated, managed, and translated into decision-useful disclosures within organizations.

Collectively, these studies demonstrate that the adoption of sustainability reporting frameworks alone does not guarantee high-quality or decision-useful sustainability disclosures. While Eccles et al (2012) emphasize the importance of sector-specific materiality, Janik et al (2020) demonstrate variation in the emphasis and quality of sustainability disclosures within the energy sector. Du Toit (2024) further shows that challenges related to quality, comparability, materiality, and implementation persist despite the increasing standardization of sustainability reporting. Together these findings suggest that both the usefulness of sustainability reporting depends not only on standardized frameworks but also on the relevance of the reported information and the quality of its practical implementation.

3.3 Sustainability reporting as stakeholder value

Beyond regulatory compliance, sustainability reporting has become an important mechanism for communicating sustainability performance and creating value for stakeholders. Previous reach suggests that transparent sustainability reporting can strengthen stakeholder relationships, improve organizational legitimacy, and enhance corporate reputation. However, the benefits of sustainability reporting depend not only on the disclosure of sustainability information but also on its credibility, quality, and relevance to stakeholders' information needs. (Radhouane et al., 2018; Du Toit, 2024).

To examine how stakeholders respond to environmental reporting, Radhouane et al. (2018) analysed environmental disclosures among the 120 largest publicly listed companies in France

between 2007 and 2011. The study distinguished between shareholders and customers as two primary stakeholder groups and examined how each group perceived environmental reporting.

The findings indicate that shareholders and customers groups value environmental reporting differently. While shareholders often viewed environmental initiatives as costly investments that may reduce short-term financial returns, customers responded more positively to organizations demonstrating both strong environmental performance and transparent environmental reporting. Companies that combine credible environmental disclosures with strong environmental performance achieved improved customer-related outcomes, including higher sales growth and increased operating efficiency.

These findings are consistent with Adams and Frost (2008), who argue that sustainability reporting creates value not only through external communication but also by improving decision-making, stakeholder engagement, and organizational performance. Their findings suggest that sustainability information becomes most valuable when it is integrated into management processes rather than treated solely as an external reporting exercise.

Similarly, Du Toit (2024) concludes that sustainability reporting has evolved beyond a compliance-driven activity toward a broader mechanism for accountability, transparency, and stakeholder communication. Nevertheless, the review highlights that the value of sustainability reporting ultimately depends on the credibility, comparability, and decision-usefulness of the reported information.

These studies demonstrate that sustainability reporting creates value beyond regulatory compliance by strengthening stakeholder relationships, supporting organizational decision-making, and improving transparency. However, this value depends on the quality, credibility, and relevance of the reported information rather than on disclosure alone. Consequently, effective sustainability reporting requires not only comprehensive reporting frameworks but also reliable data, transparent methodologies, and meaningful stakeholder engagement.

3.4 Research gap

Existing studies have examined the implementation of sustainability reporting frameworks, reporting quality, stakeholder value, and industry-specific reporting practices (Adams & Frost, 2008; Eccles et al, 2012; Janik et al., 2020; Maione, 2023; Du Toit, 2024). Collectively, these studies demonstrate that effective sustainability reporting depends on how sustainability information is collected, managed, integrated and communicated. Inadequate reporting practices

may limit the intended benefits of sustainability reporting, such as enhanced stakeholder value, transparency, and credibility.

Although these studies address different aspects of sustainability reporting, they share several characteristics. First, they primarily adopt an organizational perspective, focusing on corporate sustainability reporting and company-wide reporting practices. Second, the majority employ qualitative case studies, content analysis, or multiple-case designs based on sustainability reports, interviews, and corporate disclosures. Lastly, none of the previous studies has studied sustainability reporting at the operational level.

Table 4 Summary of previous research and their focus areas

Study	Research Focus	Method	Level of analysis
Adams & Frost (2008)	Implementation	Qualitative multiple-case study	Corporate
Maione (2023)	GRI implementation	Qualitative single-case study	Corporate
Eccles et al. (2012)	Industry-specific reporting	Comparative industry analysis	Corporate
Janik et al. (2020)	Reporting quality	Content analysis	Corporate
Radhouane et al. (2018)	Stakeholder value	Quantitative study	Corporate
This thesis	Project-level sustainability reporting and customer requirements	Exploratory qualitative singe-case study	Project

As summarized in Table 4, previous research has focused on sustainability reporting from a corporate perspective. These studies provide valuable insight into reporting implementation, quality, stakeholder value, and industry-specific materiality, limited attention has been given to how sustainability reporting is implemented at the operational level.

Furthermore, limited attention has been given to how organizations respond to increasing customer requests for project-specific sustainability and carbon-related information, or how these requests are translated into practical reporting processes. Existing reporting frameworks, including CSRD, ESRS, GRI, and ISSB Standards, establish requirements for corporate sustainability reporting but provide limited guidance on how sustainability information should be collected, managed, and communicated within individual projects.

This gap is particularly relevant for project-based industrial organizations, where sustainability information is generated across the value chain through engineering activities, supplier networks, and project documentation before being aggregated into corporate sustainability reports. As customer requirements for project-specific sustainability information continue to increase, organizations require practical approaches for capturing and managing sustainability information at the operational level.

To address these gaps, this thesis adopts an exploratory qualitative single-case study of ABB's Automation Energy Industries Finland (FIAUEN). By combining the analysis of internal project documentation, customer sustainability requests, and semi-structured interviews, the study extends previous research from corporate level to project level. In doing so, the study provides insight into the operationalization of sustainability reporting within a project-based industrial context.

4 METHODOLOGY

This chapter presents and justifies the methodological approach adopted to address the research questions of this thesis. First, the research design and its methodological choices are discussed. The chapter then describes the data collection process which consists of three complementary sources: internal project documentation, customer sustainability requests, and semi-structured interviews. Thereafter, the procedures used to analyse and compare the empirical material are presented. Finally, the chapter discusses trustworthiness of the study and the ethical considerations related to the research process.

4.1 Research design

This study adopts an exploratory qualitative single-case study design to examine project-level sustainability reporting within ABB Automation Energy Industries Finland (FIAUEN). The research design was selected because project-level sustainability reporting remains relatively underexplored in previous research and the purpose of the study is to develop an in-depth understanding of current practices and customer requirements rather than to test predefined relationships or hypotheses. An exploratory approach is particularly appropriate when exiting knowledge of phenomenon is limited and when the research seeks to identify practices, patterns, and challenges that may not yet be clearly established.

A qualitative approach was considered suitable because the research questions focus on how sustainability information is currently captures and reported and what sustainability and carbon-related information customer's request. Qualitative research enables organizational processes, experiences, and stakeholder perspectives to be examined in detail and its therefore appropriate for understanding how sustainability reporting is implemented in practice (Rashid et al., 2019). A quantitative approach could have provided measurable information on, for example, frequency and distribution of different customer sustainability requests. However, such an approach would have provided less insight into the underlying reporting processes, challenges, interpretations, and experiences of the participants. The qualitative approach therefore allows the study to examine not only what information is available and requested, but also the organizational context in which these practices occur.

A single-case study design was selected to enable a detailed examination of project-level sustainability reporting within one organizational setting. Case study research is particularly suitable for investigating phenomena that are closely connected to their real-life context (Yin, 2011). In this study, reporting practices are influenced by existing project processes,

documentation practices, supplier information, and customer requirements, making the organizational context an important part of the phenomenon being studied. Focusing on a single case therefore enables these relationships to be examined in greater depth than would be possible through a broader comparison of several organizations. However, the single-case design also limits the generalizability of the findings, as practices identified within ABB FIAUEN may not directly represent those of other organizations or industries.

The methodological choices are also consistent with approaches applied in previous sustainability reporting research. Adams and Frost (2008) used qualitative case studies and interviews to examine how sustainability information was integrated into organizational processes, while Maione (2023) applied a qualitative single-case study and document analysis to investigate the implementation of sustainability reporting practices. Content analysis has similarly been applied to sustainability disclosures to identify reporting patterns and areas of emphasis (Janik et al., 2020). Building on these approaches, the present study combines different forms of empirical material to examine sustainability reporting specifically at the project level.

Although the research is conducted as a single-case study, multiple sources of empirical material are used, including internal project documentation, customer sustainability requests, and semi-structured interviews with internal and external participants. The use of multiple sources enables findings to be examined from different perspectives across the empirical material. This methodological triangulation strengthens the credibility of qualitative case study research by reducing reliance on a single source of evidence (Yin, 2011). Semi-structured interviews were selected rather than questionnaire surveys because they allow participants to explain their experiences, perspectives, and interpretations in their own words while enabling the research to explore relevant issues in greater depth.

The different sources of empirical material were selected to address the two research question from complementary perspectives. The first research question, concerning how sustainability information is currently captured and reported at the project level, is primarily addressed through the analysis of internal project documentation and interviews. The second research question, concerning the sustainability and carbon-related information requested by customers, is addressed through the customer sustainability request data and interviews. Together, these sources provide an empirical basis for examining both existing reporting practices and the external sustainability information requirements influencing project-level sustainability reporting.

4.2 Data collection

To address the research questions, empirical data was collected from three complementary sources: internal documentation, customer sustainability request data, and semi-structured interviews. Each source provides a different perspective on project-level sustainability reporting. Internal documentation provides insight into exiting reporting practices and the sustainability-related information currently included in project documentation. Customer sustainability requests provide evidence of the sustainability and carbon-related information requested by customers and indicate recurring areas of customer interest. Finally, the interviews provide contextual understanding of current reporting processes, practical challenges, and future reporting needs by capturing the experiences and perspectives of individuals involved in or affected by these processes. Together, these three sources enable the study to examine both documented practices and stakeholder perspective, while allowing findings to be compered across different forms of empirical material.

4.2.1 Internal documentation

Internal project documentation was examined to understand how sustainability-related information is incorporated into existing project documentation. Access to the documentation was obtain through a meeting with a lead engineer from AUEN, who introduced the overall documentation structure and explained how sustainability-related information is currently incorporated into project documentation within ABB Automation Energy Industries Finland.

The primary empirical material consisted of the final documentation from a completed domestic nuclear automation project. The project was deliberately selected as an information-rich case due to the highly regulated and safety-critical nature of the nuclear industry, which results in extensive and detailed documentation and thereby provides a basis for examining sustainability related information at the project-level.

The material included technical specifications, safety documentation, testing and commissioning records, manuals, supplier documentation, and final project deliverables. Given the broad scope of material, the analysis focused specifically on documentation relevant to sustainability, carbon-related information, environmental impacts, supplier information, and other sustainability-related disclosures. The purpose of the document analysis was not to evaluate the environmental performance of the project itself, but rather to identify what sustainability-related information was documented and communicated at the project level.

4.2.2 Customer requests data

The second source of empirical material consisted of an internally maintained database of customer sustainability requests complied by ABB Automation Energy Industries. The database, which was exported to Microsoft Excel for analysis, contains sustainability-related questionnaires and information requests received from customers across different industries. The database is used internally to track customer requests, identify recurring sustainability topics, and support consistent responses to similar requests overtime.

The Excel database contains 48 sustainability-related customer requests from 38 customers received between December 2023 and December 2025. The requests are classified according to customer name, industry, project, questionnaire type, format, responsible ABB contact person and the sustainability topics addressed. The database includes both structured sustainability questionnaires and ad hoc information requests submitted by customers during supplier evaluations, procurement processes, and project execution. As participation was voluntary and requests originated from customers' own sustainability reporting and supplier assessment processes, the database reflects the requirements of customer that actively requested sustainability-related information from ABB.

For the purpose of this study, the customer requests were systematically reviewed and categorized according to industry sector. The requested information was subsequently grouped into broader categories, such as carbon emissions, environmental performance, product-related information, certifications, and governance-related requirements. This categorization provided a structured overview of sustainability information requested across different industries and enabled the identification of recurring reporting requirements and potential industry-specific differences.

The customer request database complements the document analysis and interviews by providing direct evidence of the sustainability and carbon-related information requested by customers in practice. Together with the interview data, the customer requests support the second research questions by providing insight into recurring customer reporting expectations and differences across industry sectors.

4.2.3 Interviews

Semi-structured interviews were conducted with both ABB employees and selected customers to obtain an in-depth understanding of current project-level sustainability reporting practices, associated challenges, and customer reporting requirements. Semi-structured interviews were considered appropriate because they provided consistency through predefined themes while

allowing follow-up questions and further explanation of issues raised by the participants. This flexibility was particularly relevant given the exploratory nature of the study and the limited established knowledge regarding sustainability reporting at the project level.

Participant were selected through purposive sampling based on their professional roles and expected knowledge of sustainability reporting, project practices, customer requirements, or related activities. As no single role within the organization was directly responsible for all aspects of project-level sustainability reporting examined in this study, participants were selected from functions that were considered to have the closes relevant knowledge and experience. Potential internal participants were identified based on their involvement in sustainability activities, project operations, or related reporting practices and were contacted by email with information about the study and an invitation to participate. External participants were similarly selected from among ABB FIAUENs largest customers, based on their involvement in procurement, sustainability, and project level practices and their ability to provide customer perspective on sustainability information requirements.

This purposive selection enabled the study to obtain information from participants with relevant practical knowledge, but it also introduced potential selection bias. As participants were selected based on their proximity to sustainability and project-level practices, their perspective may reflect a greater awareness of sustainability issues than those of employees or customers less directly involved in these areas. Furthermore, because no participant had responsibility for project-level sustainability reporting as a clearly established function, the selected participants represent the most relevant available perspective rather than a predefined group of project-level sustainability reporting specialists. This limitation was partly addressed by including participants from different organizational roles and geographical contexts, as well as external customer perspectives, and by comparing interview findings with the other empirical sources.

Two interview guides were developed based on the research questions and previous sustainability reporting literature. Separate interview guides were prepared for internal and external participants to reflect their different perspectives while maintaining comparable themes across the interviews. The questions were informed particularly by Adams and Frost (2008), Maione (2023), Janik et al. (2020), and Radhouane et al. (2018).

Adams and Frost (2008) emphasize the integration of sustainability information into management systems and decision-making. Based on these findings, the internal interview guide included questions concerning the use of sustainability information in projects, sustainability

indicators, integration of sustainability data into existing systems, and challenges related to data consistency and stakeholder requirements. These questions were intended to examine the extent to which sustainability information is incorporated into existing project practices rather tha treated solely as an external reporting activity.

The interview guide was further informed by Maione (2023), who identifies challenges associated with implementing standardized sustainability reporting, including data collection across organizational functions, stakeholder engagement, and aligning sustainability reporting with corporate strategy. These findings motivated questions concerning responsibilities for sustainability reporting, coordination between organizational functions, existing reporting processes, and barriers to developing more systematic project-level reporting practices.

Janik et al. (2020) identify differences between strategic sustainability ambitions and the level of operational information disclosed by organizations. Based on these observations, participants were asked about the availability of project-level sustainability data, carbon-related indicators, data quality, reporting boundaries, and existing methods for collecting and communicating sustainability information. These questions were intended to explore whether sustainability objectives and reporting requirements can be supported by information available at the operational level.

Finally, Radhouane et al. (2018) demonstrate the importance of considering stakeholder-specific information needs in environmental reporting. This perspective was particularly relevant to the external interview guide, which included questions concerning sustainability and carbon-related information requested from suppliers, differences in requirements across projects and industries, and expected future developments in customer requirements. The purpose was to capture the customer perspective and complement the internally maintained customer request data.

The guide was organized into five thematic sections for internal employees and four thematic sections for external customers: (1) general background and sustainability requirements, (2) current project-level sustainability reporting practices, (3) data quality, challenges and reporting gaps, (4) improvements and future developments, and (5) customer requirements. Both guides are found in the appendix of this thesis. Appendix 1 includes all five of thematic sections and is used for interviewing the employees of the case company, meanwhile appendix 2 includes the four first thematic sections and is used for external customer interviews.

In total, seven primary participants contributed to the study, including four internal employees and three external customer representatives. In addition, two internal colleagues participated as

observers in one of the interviews and contributed clarifications and supplementary comments when relevant. The internal participants represented operational and sustainability-related roles at local and regional levels, while the external participants represented procurements and HSE-related functions. Table 5 provides an overview of the participants, their affiliation, roles, interview formats, dates, and durations.

Table 5 Information about the interview participants

Interviewees	Affiliation	Role	Format	Date	Duration
Participant 1	Internal	Head of Operations, AUEN Finland	Video	15.6.2026	0:47:25
Participant 2	Internal	Head of Sustainability, AUEN NEU	Video	16.6.2026 and 22.6.2026	1:27:47
Observer 1	Internal	ESG Analyst	Video	16.6.2026 and 22.6.2026	1:27:47
Observer 2	Internal	Sustainability research	Video	16.6.2026 and 22.6.2026	1:27:47
Participant 3	Internal	Sustainability Advisor, AUEN UK Cluster	Video	23.6.2026	1:02:36
Participant 4	Internal	Local Division and Country Sustainability Manager for ABB Norway and AUEN Norway	Video	25.6.2026	0:31:54
Participant 5	External	Strategic Purchaser	Video	26.6.2026	0:19:20
Participant 6	External	Procurement	Written	8.7.2026	0:00
Participant 7	External	HSE coordinator	Written	8.7.2026	0:00

Prior to the interviews, participants received the interview guide to provide an opportunity to familiarize themselves with the themes and prepare relevant information. The oral interviews were conducted online through Microsoft Teams and lasted approximately 20-90 minutes. Follow-up questions were used when clarifications or further elaboration was considered necessary. With participants' consent, the interviews were audio-recorded and subsequently transcribed verbatim to support systematic analysis.

One internal interview differed slightly from the standard format. One participant served as the primary respondent, while two colleagues attended as observers and contributed clarifications, and supplementary comments when relevant. Their contributions were included in the empirical material but distinguished from those of the primary respondent. In addition, two external participants were unable to participate in oral interviews due to scheduling constraints during the summer periods. These participants received the same external interview guide and submitted written responses electronically. The written responses consisted of approximately 530 words and 420 words. While the written format limited the possibility of asking follow-up questions and seeking immediate clarification, it enables the inclusion of relevant customer perspective that would otherwise not have been available.

Participant requirement and data collection continued until the interviews began to produce recurring themes and limited substantially new information. During the later interviews, similar observations regarding data availability, reporting responsibilities, customer requirements, and the lack of standardized project-level practices repeatedly emerged across participants. This indicated that sufficient thematic saturation had been achieved for the exploratory purpose of this study, and additional interviews were therefore not considered necessary.

Saturation in this context does not imply that all possible perspectives on project-level sustainability reporting were captured. Rather, it suggests that additional interviews within the selected participant group were unlikely to substantially change the main themes identified in the empirical material. However, the relatively small and heterogenous participant group, together with the inclusion of written responses two external participants, means that thematic saturation cannot be assumed across all relevant organizational roles, stakeholder groups and customer segments.

4.3 Data analysis

The empirical material was analysed by systematically reviewing and organizing the three data sources according to recurring topics and themes relevant to the research questions. The analysis was conducted separately for each source before the findings were compared across the material. This approach enabled the specific characteristics of the project documentation, customer sustainability requests, and interview data to be retained while allowing recurring patterns and differences to be identified across the sources.

The analysis began with the internal project documentation. The material was systematically reviewed to identify information related to sustainability and was subsequently organized into

broader categories on the type of information contained in the documents. These categories were used to identify which sustainability-related themes were most visible in the existing project documentation and what types of information were included within each theme. Attention was given to recurring information related to environmental aspects, health and safety, compliance, supplier information, and carbon-related information. This provided a structured overview of how sustainability-related information was represented in existing project documentation.

The customer sustainability request data were analysed separately using the internally maintained Excel database. To preserve customer anonymity, individual companies were grouped according to their respective industry sectors rather than analysed or presented by company name. The requests were then reviewed and summarized according to the sustainability topics and information most frequently requested by that specific industry. This enabled recurring customer requirements to be identified while also allowing similarities and differences in reporting expectations across industry sectors to be examined.

The interview material was subsequently analysed to develop a broader understanding of project-level sustainability reporting and to contextualize the patterns identified in the project documentation and customer request data. The Microsoft Teams recordings were transcribed, after which the transcripts were reviewed alongside the recordings to correct transcription errors and ensure consistency in terminology and context. The transcripts were systematically reviewed to identify recurring perspectives concerning current reporting practices, customer requirements, data availability, reporting challenges, responsibilities, and future development needs.

Finally, the findings from the different empirical sources were compared to identify similarities and differences between existing project documented, customer sustainability requirements and participants perspectives. The interviews were particularly used to contextualize and assess whether the patterns identified in the documentary material and customer request data were consistent with participants' broader understanding of project-level sustainability reporting. This comparison enabled the study to develop a more comprehensive understanding of current reporting practices and customer requirements while strengthening the credibility of the findings through methodological triangulation.

4.4 Ethical considerations

Prior to the interviews, all participants were contacted via email and provided with an information letter. The information letter outlined the purpose and objectives of the study, explained the ethical principles guiding the research, and described the measure taken to ensure confidentiality

and anonymity. Participants were also informed about how the collected data would be used and were asked to provide their consent before participating in the study.

As separate interview guides were developed for internal and external participants, two versions of the information letter were prepared: one for employees of the case company and another for external customer representatives. The information provided to participants clarified that the thesis was conducted for academic purposes and that no immediate practical implementation of the findings was planned. However, it also noted that participants were informed that the findings could provide a basis for potential future development of project-level sustainability practices within the case company.

By agreeing to participate, participants consented to the use of their responses for research purposes. All responses were treated confidentially and anonymized in the final thesis to prevent individual participants and external organizations from being identified. With the participants' consent, the oral interviews were audio-recorded to facilitate accurate transcriptions. The recordings were retained only for the duration of the research process and deleted following the completion and submission of the thesis. Participation was entirely voluntary, and no financial or other compensation was provided.

5 RESULTS

This chapter examines the results of this thesis and provides an understanding of how sustainability is presented in project level documentation by analyzing the collected data. Furthermore, this chapter creates an overview of which customer requests for sustainability reporting has been identified. The customer requests will be categorized and analysed by industry, to help identify next steps for case company's project documentation regarding sustainability.

5.1 Current state analysis

At the project level within ABB's AUEN operations, sustainability reporting is not implemented as a distinct framework. Instead, sustainability-related information is embedded within technical documentation, compliance processes, and project deliverables. As a result, the current approach is largely indirect, engineering-driven and primarily focused on safety, operational reliability, and regulatory compliance rather than structured ESG reporting.

5.1.1 Reporting practices

The document analysis shows that project-level sustainability reporting within the case company is primarily embedded in technical, operational, and safety-related documentation. Sustainability-related information is dispersed across several project documents, reflecting regulatory compliance, quality assurance, and operational requirements throughout the project lifecycle. Rather than being collected through a standardized sustainability reporting process, the available information is documented as a part of engineering, commissioning, maintenance, and safety activities.

The strongest sustainability dimension identified in the project documentation is safety. Safety-related information is systematically documented through functional safety specifications, hazard analyses, risk assessments, alarm management documentation, and commissioning records. These documents ensure that automation systems operate safely throughout their lifecycle while supporting compliance with relevant standards and customer requirements. In addition, project documentation contains extensive technical information related to equipment specifications, system architecture, testing, maintenance and operational performance, which indirectly contributes to sustainability by supporting long-term reliability, operational efficiency, and asset longevity.

The interview findings strongly support these observations. Internal interviewees consistently describe project-level sustainability reporting as being heavily centred around Health, Safety, and

Environment (HSE) activities rather than broader sustainability performance. Existing project reporting primarily consists of hazard observations, safety incidents, HSE plans, risk assessments, and compliance documentation, while dedicated environmental or social sustainability indicators remain largely absent. Several interviewees emphasized that there is currently no formal project-sustainability reporting process beyond these established HSE practices. Table 6 illustrates the main categories of project-level sustainability information identified in the documentation review, supported by the interviews. The first category "Safety and automation" refers to technical documentation used to define, configure, and manage industrial systems and processes. The second category "Monitoring and traceability" includes records that support operational oversight, performance monitoring, and the tracking of products or components throughout their lifecycle. "Operations and maintenance" category cover customer-oriented documentation that provides guidance on the safe and effective use, inspection, and maintenance of systems and equipment. Finally, "Certifications and compliance" consists of documentation demonstrating conformity with relevant standards, regulatory requirements, and sustainability-related assessment frameworks. To maintain confidentiality, the analysis focuses on the functions and purposes of these document categories rather than their specific contents.

Table 6 Summary of project-level sustainability information

Main findings	**Examples of documents**	**Supporting evidence**
Safety and automation systems	Specifications, parameter settings, logic diagrams and signal lists	Document analysis; supported by P1 and P3
Monitoring and traceability	Logs, signal data, and serial number tracking	Document analysis; supported by P1 and P3
Operations and maintenance	Customer-facing operation and maintenance manuals	Document analysis; supported by P1, P3, and P4
Certifications and compliance	Product and system certifications, sustainability assessments, compliance with EN and IEC standards	Document analysis; supported by P2 and P4

The interview findings support the observations from the document analysis. Internal participants consistently describe project-level sustainability information as being embedded within existing technical, safety, operational and compliance-related related documentation rather than maintained through a dedicated sustainability documentation. Participants 1 and 3 emphasized the central role of engineering and operational documentation in project execution, while Participants 2 and 4 highlighted that sustainability-related information is typically obtained from existing project records, supplier documentation, certifications, and compliance documentation when responding to customer requests. Together, these perspectives support the categorization presented in Table 6 and indicate that project-level sustainability information is primarily generated through established project documentation processes rather than through separate sustainability reporting activities.

Sustainability-related information is generated throughout the project lifecycle, including design, installation, commissioning and final delivery. However, the information is not collected according to predefined sustainability objectives or project-level key performance but remains distributed across multiple documents and organizational functions.

The interviewees explained that responsibilities for sustainability data are similarly fragmented. Depending on the type of information required, data may originate from project management, procurement, engineering, HSE personnel, supplier documentation, or corporate sustainability specialists. Consequently, no single function currently owns project-level sustainability reporting. Instead, reporting activities are typically organized in response to customer requests.

The document analysis further indicated that project documentations contain very limited information regarding carbon emissions or other environmental performance indicators. While certificates, material documentation, equipment specifications, and compliance declarations are routinely included, project-specific greenhouse gas emissions, carbon footprints, lifecycle impacts, and Scope 3 emissions are generally absent. This finding is consistently confirmed throughout the interviews, where both internal and external participants described the absence of standardized methodology for calculating and documenting carbon emissions at the project-level. Participant 3 explained the current situation as follows:

> *“There isn’t really a standardized methodology for doing this consistently across projects. It very much depends on the project and on what the customer is asking for”.* (P3)

The distinction between corporate-level and project-level reporting was also emphasized by Participant 4:

> *"The most difficult part is reporting at the project level. We are very good at reporting at the organizational level, but project-level reporting is much more challenging"*. (P4)

The interviews indicate that the challenge is not limited to the availability of individual data points, but concerns the absence of common process for defining, collecting, calculating, and documenting sustainability information at the project level. Where carbon-related information is available, it is typically based on Environmental Product Declarations (EPDs), supplier information, or customer-specific requests rather than systematic project reporting.

Several respondents noted that complete project carbon footprints are particularly difficult to produce because projects combine ABB products, third-party equipment, engineering services, logistics, and installation activities, all of which require information from multiple stakeholders across the supply chain.

Another recurring finding concerns the reporting process itself. The interview revealed that sustainability information is largely collected in response to customer requests rather than through standardized internal project procedures. Participant 3 described how the information collected at the project level depends strongly on requirements identified by individual customers:

> "*When we look at things on a project-by-project basis, if something comes in that is outside the standard, it depends on the specific customer requirements identified during the tender phase"*. (P3)

A similar pattern was identified by Participant 1, who emphasized that sustainability activities at the project level remain primarily responsive rather than proactive:

> *"We fulfil customer requirements as far as we can, but it is quite rare that we work proactively with sustainability at the project level"*. (P1)

This customer-driven approach is also reflected in how sustainability information is managed. Sustainability specialists frequently gather information from multiple internal systems, supplier documentation, and corporate reporting databases to respond to customer questionnaires during tendering or procurement processes. During project execution, however, sustainability reporting is considerably more limited, and most projects do not systematically collect sustainability information beyond existing HSE reporting.

Despite the current limitations, the interviews also revealed an ambition to move towards a more integrated approach. Several participants described a future in which sustainability information would become part of standard project documentation rather than being separately complied whenever requested by customers. Participant 2 described this ambition as follows:

> *"The ultimate goal is to be able to say: I give you an entire package of information where sustainability is included by default"*. (P2)

This view was shared by Participant 4, who similarly emphasized the integration of sustainability information into normal project deliverables:

> *"Ideally, this should become a natural part of the project deliverables"*. (P4)

In addition to differences in the information requested, customers use a wide range of reporting platforms, Excel templates, supplier portals, questionnaires, and digital systems. Project teams may therefore be required to provide similar sustainability information in different formats and at the different levels of detail. Internally, sustainability information is similarly distributed across multiple reporting systems, including HSE reporting tools, supplier sustainability platforms, customer requests management systems, and corporate sustainability databases. This fragmented reporting landscape increases manual work and makes consistent project-level sustainability reporting challenging.

Taken together, the document analysis and interviews demonstrate that current project-level sustainability reporting is largely embedded within existing technical and HSE documentation rather than managed through a distinct sustainability reporting process.

5.1.2 Development needs

The findings reveal that current project documentation lacks standardized sustainability-related data collection and reporting. Although sustainability considerations are increasingly embedded within corporate reporting and customer requirements, the analysis indicates that project-level reporting practices have not yet developed to the same extent. Across both the document analysis and the interviews, four recurring themes emerged: the absence of standardized reporting methodology, limited availability of sustainability data, fragmented reporting responsibilities and systems, and increasing customer expectations.

The most frequently identified challenge concerns the absence of a standardized methodology for project-level sustainability reporting. While corporate sustainability reporting follows established

frameworks and reporting requirements, the interviewees emphasized that no common approach currently exists for determining which sustainability information should be collected at the project level, how reporting boundaries should be defined, or which indicators should be monitored. Several participants particularly emphasized that the first step should be to establish what information is relevant before developing additional data collection processes. Participant 2 described this as follows:

> *"The first thing is to define what actually needs to be measured, what the KPIs should be, and why we are collecting that information"*. (P2)

Participant 3 similarly emphasized that increasing the amount of collected data would not necessarily solve the current reporting challenges:

> *"It's not necessarily about collecting more data, it's about understanding what data is actually useful"*. (P3)

This was also reflected in the internal project perspective, where Participant 1 highlighted the need for clearly defined indicators and targets:

> *"What should we actually follow? What should we include? We need to have some kind of target."*. (P1)

Together, these responses indicate that the development need concerns not only data collection, but the establishment of common methodology defining what should be reported, measured, why it should be measured, and how the information should be reported across projects.

A second recurring challenge concerns the limited availability of environmental and carbon-related data. The document analysis demonstrated that existing project documentation primarily focuses on safety, technical performance, and operational reliability, while environmental indicators are considerably less developed. The interviews further revealed that project-specific greenhouse gas emissions, Scope 3 emissions, lifecycle impacts, logistic emissions, and complete project carbon footprints are generally unavailable because the required information is not systematically collected during project execution.

This limitation was also in the customer perspective. One external participant explained that their sustainability data collection has primarily focused on information obtained from suppliers rather than calculating emissions at the level of individual projects.

> *"We have mostly focused on collecting information from suppliers, but we have not yet taken it to the project level"*. (P5)

When asked specifically whether emissions are currently measured at the project level, the same participant provided a particularly direct response:

> *"How are emissions currently measured?... Not at all"*. (P5)

Where carbon-related information is available, it therefore often relies on Environmental Product Declarations (EPDs), supplier disclosures, or customer-specific requests. Since automation projects typically combine ABB equipment with third-party products, engineering services, transportation, and installation activities, interviewees highlighted that obtaining complete and reliable sustainability information depends heavily on suppliers and external stakeholders. Missing EPDs, inconsistent supplier reporting, and limited access to verified emissions data were identified as significant barriers to comprehensive project-level reporting. Participant 4 summarized the broader difficulty:

> *"Project-level reporting is what we struggle with the most"*. (P4)

The findings also demonstrate that reporting responsibilities and digital systems remain highly fragmented. Sustainability information is currently distributed across several organizational functions and managed through multiple reporting tools, customer portals, supplier platforms, spreadsheets, and internal databases, and other reporting systems. As a result, sustainability specialists frequently need to compile information manually from multiple internal and external sources when responding to customer requests. The interviews indicate that this process is both resource-intensive and difficult to standardize, particularly when similar information is stored in different systems or owned by different organizational functions. This lack of integration therefore not only increases administrative work but also creates challenges for maintaining consistent reporting practices across projects.

The fourth development area concerns changing customer expectations. The interviews indicate that sustainability requests have become increasingly detailed during recent years. Whereas earlier requests were more commonly focused on corporate sustainability policies, certifications, and high-level climate commitments, customers increasingly request project- and product-specific information. This includes Scope 3 emissions, EPDs, life cycle assessments, supplier sustainability information, logistic emissions, material compliance documentation, and project-specific carbon footprint calculations.

The changing nature of customer requirements was described by Participant 2, who observed a clear development in the type of environmental information requested:

> *"Previously our customers didn't require Environmental Product Declarations. Now we see a much stronger mandate for those declarations".* (P2)

At the same time, customers request similar information using different reporting formats, levels of detail, and calculation methodologies, creating additional complexity for project teams. The findings therefore indicate not only an increase in the amount of sustainability information requested, but also a shift towards more detailed, transparent, and verifiable project-level information.

Despite these challenges, the interviews also identified several opportunities for improving project-level sustainability reporting. Across the participants, there was broad agreement on the need for more standardized approach supported by common reporting templates and clearly defined indicators. Improving the availability and accessibility of sustainability data, particularly supplier and product-level environmental information, was also considered important. Participants identified stronger integration with existing project management processes and clearer ownership as important areas for future development.

Finally, the findings indicate a need for a common methodology for project-level carbon accounting to improve consistency, transparency, and comparability of carbon-related information across projects. Table 7 summarizes the main challenges identified and together with the corresponding opportunities for improvements.

Table 7 Identified challenges and participant development needs

Identified challenges	Development need	Source
Lack of standardized reporting	Define common project-level methodology, KPIs, boundaries and templates	Internal interviews (P1-P4)
Limited sustainability data	Improve access to supplier EPDs and emissions data	Internal and external interviews; project documentation
Fragmented responsibilities and systems	Establish clearer ownership and integrate reporting processes	Internal interviews (P1-P4)
Increasing and varying customer requirements	Standardize how project-level customer sustainability requests are addressed	Internal and external interviews; customer request database

Overall, the findings indicate that the principal barrier to project-level sustainability reporting is not the absence of sustainability initiatives, but rather the lack of standardized structure through which existing sustainability information can be consistently collected, integrated and communicated. While safety and technical documentation are already well established, broader environmental and carbon-related reporting remains fragmented and largely customer-driven. Overall, the results suggest that future improvements should prioritize methodological standardization, digital integration, and clearer reporting responsibilities before expanding the scope of project-level sustainability reporting.

5.2 Customer requirements

The interview findings indicate that requirements have increased in both frequency and complexity. These requirements are primarily driven by carbon-related and product-specific information rather than comprehensive project-level sustainability reporting. The most frequently requested information noted by interviewees and the database includes product carbon footprints, EPDs, supplier sustainability information, and ESG documentation and certificates. The findings further indicate that many of these requests are driven by customers' own

sustainability reporting obligations, including compliance with the Corporate Sustainability Reporting Directive (CSRD), Scope 3 greenhouse gas accounting, and internal ESG reporting requirements.

5.2.1 Overview

The analysis of customer sustainability requests, supported by the interview findings, indicate that customer requirements have increased in both frequency and complexity. Overall, customer requests primarily concern environmental and climate-related information, followed by supply chain transparency, governance and social responsibility. Table 8 provides an overview of the sustainability topics most requested by customers.

Table 8 Sustainability topic requests

Main Categories	**Examples of requests**
Environmental and climate	Scope 1-3 emissions, Product Carbon Footprints, EPDs, lifecycle assessment
Supply chain	Supplier sustainability data, material compliance, responsible sourcing
Governance	ESG ratings, sustainability reports, ISO certifications
Social and ethics	Human rights due diligence supplier codes of conduct, supply chain transparency

The interviews further indicate that customer requirements differ not only between industries but also according to customer maturity, geographical region, and regulatory obligations. While some customers primarily request high-level corporate sustainability information, others require detailed project- and product-specific information. Participant 2 particularly emphasized the role of customer maturity in determining the level of detail requested:

> *"Depending on the customer and the maturity of the customer, they ask very detailed and very specific things".* (P2)

These differences are reflected in requests ranging from transportation emissions, product life cycle data, supplier emissions, and project-specific carbon footprint. The findings further suggest

that customer requests have become increasingly detailed over time, with a growing emphasis on verified and auditable sustainability information rather than general sustainability commitments. This development is reflected in a shift from broad sustainability statements towards documented and traceable evidence that can support customer reporting, procurement, and compliance requirements. The implications of this development are further examined in the analysis chapter through the lenses of stakeholder and legitimacy theory.

Participant 3 described this development as a shift in the type of sustainability information increasingly customers expect:

> *"There has been a shift from policy-based sustainability discussions towards auditable, traceable and verifiable information"*. (P3)

Finally, the interviews show that the requested information is rarely available through a single source. Instead, responses typically require data to be compiled from multiple organizational functions. As a result, customer requests are currently addressed on a case-by case basis, with information assembled according to the specific request rather than generated through a standardized project-level reporting process.

5.2.2 Industry-specific requirements

The analysis further revealed that customer sustainability requirements differ due to differences in regulatory environments, value characteristics, and organizational sustainability priorities. A common topic that emerged in all sectors was carbon-related information, but some variation in the type and level of detail of the information requested could be identified. Table 9 summarizes key sustainability priorities and representative customer requests identified across the six industry groups.

Table 9 Industry specific customer requests

Industry	Primary focus	Types of requests
Oil and gas	Climate governance	GHG emissions, LCAs, circularity
Energy services and engineering	Supply chain	EPDs, supplier data, ISO, SBTi
Transmission system operators (TSOs)	Project performance	ECIs, project emissions, renewable energy
Electricity and utilities	Operational performance	Energy mix, emission intensity
Life science and biotech	Product traceability	BOMs, PCFS, LCAs
Industrial technology	Product compliance	Emission targets, material compliance

Within the oil and gas sector there is a strong emphasis on governance, standardized compliance frameworks, and comprehensive greenhouse gas (GHG) emission reporting. In addition to measuring emissions, these companies increasingly require life cycle-based analysis, circularity initiatives, and clearly defined energy transition strategies, indicating a relatively mature approach to sustainability extends beyond disclosure towards transformation.

In contrast, companies operating within energy services and engineering, place greater emphasis on supply chain transparency and standardized frameworks. Their requirements frequently include alignment with ISO standards, Science Based Targets Initiative (SBTi) commitments, and third-party disclosures such as Eco Vadis. Furthermore, these firms require detailed product-level environmental data including Environmental Product Declarations (EPDs) and lifecycle assessment (LCA), particularly for carbon intensive materials.

Transmission system operators (TSOs) adopt a more project-oriented perspective. Their requirements focus on quantifiable environmental metrics at the infrastructure level, including Environmental Cost Indicators (ECIs), raw material passports, and emission reporting linked to project execution. In addition, there is a clear expectation for the use of renewable energy during construction and manufacturing phases.

Within electricity generation and utilities sustainability reporting is primarily centred around production-related impacts. Key aspects include energy mix transparency, emission intensity, and operational efficiency, particularly in relation to large-scale energy assets such as nuclear and hydropower facilities. Compared to other ‘s, there is less emphasis on supply chain requirements and greater focus on asset-level performance.

The life science and biotech sector demonstrate a highly data-sensitive approach to sustainability. Companies in this sector require detailed product level information, such as bills of materials (BOMs), raw material composition and lifecycle assessments or product carbon footprints. In addition, they emphasize energy consumption, renewable energy usage, and traceability of equipment and installations.

Industrial Technology and electrification companies focus on emission performance, reduction targets, and material level compliance. Their requirements often include tracking emission at the business segment level as well as ensuring compliance with regulations concerning specific substances used in manufacturing.

Overall, while carbon emissions represent a common theme across all industries, the level at which they are addressed differs significantly, ranging from strategic transition planning in oil and gas to project-level metrics in transmission and product-level assessment in life science. Moreover, supply chain transparency is particularly pronounced in energy services and life sciences, whereas companies across multiple sectors exhibit a stronger alignment with standardized frameworks such as ISO, SBTi and EPD. These differences highlight the importance of tailoring sustainability reporting frameworks to industry-specific characteristics and value chain dynamics.

6 ANALYSIS AND DISCUSSION

This chapter discusses the findings of the study in relation to the research questions, the theoretical framework, and the previous research (Chapters 2 and 3). Rather than restating the empirical results, this chapter interprets their implications for project-level sustainability reporting within the case company. Attention is given to how the findings contribute to the understanding of sustainability reporting practices at the project level, the challenges associated with translating corporate sustainability requirements into operational project documentation, and the increasing sustainability information demand from customers. The chapter concludes by outlining the theoretical and managerial contributions of the study, acknowledging its limitations, and suggesting directions for future research.

6.1 Discussion of findings

The findings reveal four central patterns in project-level sustainability reporting: a reactive and customer-driven approach, the dominance of established HSE practices, a growing mismatch between existing project-level information and customer requirements, and the fragmentation of sustainability information across documents and organizational functions. Table 10 below summarizes the main empirical findings and their interpretation in relation to the theoretical framework and previous research.

Table 10 Summary of the main empirical findings

Theme	Empirical finding	Interpretation
Reactive reporting	Reporting is reactive and customer-driven	Not integrated into standard project processes
HSE dominance	Safety and compliance dominate	HSE is more established than environmental reporting
Reporting mismatch	Customer needs exceed available information	Growing gap between existing and requested carbon data
Fragmentation	Data is dispersed and lacks standardization	Integration and common methodologies are needed

One of the most prominent findings is that project-level sustainability reporting remains largely reactive and customer-driven. Sustainability information is primarily collected in response to customer requests instead of being gathered continuously throughout project execution. As a result, responding to sustainability requests often requires information to be gathered manually from several organizational functions, project documents, and suppliers. Similar implementation challenges have been identified by Maione (2023), who highlighted difficulties related to sustainability data collection and management, stakeholder engagement, the integration of sustainability into corporate strategy, and the continuous adaption to evolving reporting requirements. Maione (2023) further suggests that organizations may gradually move from reactive toward more proactive reporting by developing systematic reporting processes and adapting to evolving stakeholder expectations. The findings of the present study support this perspective and demonstrate how increasing customer requirements create pressure to move toward more structured project level reporting practices.

A second prominent finding concerns the dominant role of health and safety within existing project-level sustainability practices. Both the document analysis and the interviews show that sustainability-related information is primarily embedded in established HSE, engineering, compliance, and operational documentation. Risk assessment, safety documentation, commissioning activates, and regulatory compliance are systematically incorporated into existing project processes, whereas dedicated environmental and carbon-related indicators remain considerably less developed. From an institutional perspective, this difference may reflect the longer institutionalization of health and safety requirements within industrial project practices. HSE requirements have long been embedded in regulations, engineering standards, and operational procedures, whereas environmental and carbon-related reporting is subject to more recently intensified regulatory and stakeholder pressure. Consequently, environmental sustainability information has not yet reached the same level of integration within standard project documentation as established HSE practices.

The third central finding is a mismatch between the sustainability information currently available at the project level and the information increasingly requested by customers. Existing internal documentation primarily emphasizes engineering, health and safety, compliance, testing, commissioning, and operational information. In contrast, customers increasingly request carbon footprints, Scope 3 emission, supplier emissions, EPDs, and life-cycle information. The findings therefore indicate that customer requirements are developing beyond the sustainability information traditionally captured through existing project documentation.

This mismatch can be interpreted through stakeholder theory, which emphasizes that organizational reporting practices are influenced by the information need and expectation of relevant stakeholder groups. In the present study, customer represents an important source of pressure for more detailed project-level sustainability information. As customers face increasing sustainability disclosure requirements and greater expectations concerning value-chain transparency, their information needs extend beyond traditional technical compliance documentation toward carbon life-cycle information. This development may partly reflect increasing regulatory reporting requirements, including the CSRD and ESRS, which place greater emphasis on sustainability information throughout the value chain. Customer requirements therefore contribute to transferring sustainability information demands from the corporate level further into supplier and project-level activities. (Rimmel, 2020).

The increasing emphasis on verified carbon and environmental data can also be interpreted through the lens of legitimacy theory. According to legitimacy theory, organizations must demonstrate that their activities are aligned with evolving societal expectations in order to maintain legitimacy (Suchman, 1995). As sustainability expectations develop, stakeholders increasingly expect organization not only to communicate sustainability commitments but also to provide credible evidence demonstrating how these commitments are implied in practice. From this perspective the growing demand for auditable, traceable, and verifiable project-level information reflects a legitimacy mechanism whereby customers seek assurance that sustainability claims are supported by measurable and documented actions. Consequently, project-level sustainability reporting serves not only an informational function but also legitimizing function by providing evidence that sustainability commitments are translated into operational practices.

The findings further reveal a related distinction between corporate- and project-level sustainability reporting. While corporate sustainability reporting is comparatively established and supported by standardized frameworks, these requirements have not yet been fully translated into corresponding project-level processes. Project-level reporting remains decentralized and dependent on customer specific-requirement, suggesting and operational gap between established corporate reporting structures and the process through which sustainability information is generated and managed within individual projects.

Finally, the findings indicate that one of the main challenges is not necessarily the complete absence of sustainability information, but its fragmentation. Relevant information already exists, such as HSE systems, supplier documentation and sustainability functions, however, the

information is not currently integrated into a common project-level sustainability reporting structure. This distinction is important because it suggest that developing project-level sustainability reporting does not necessarily require organizations to create entirely new information systems or data sources. Rather, an important challenge lies in identifying, integrating, and structuring existing information while addressing areas where data remain limited.

The finding is consistent with previous research emphasizing data management and organizational integration as central challenges in sustainability reporting implementation (Adams & Frost, 2008; Maione 2023). However, the present study extends these observations to the project level by demonstrating how fragmentation occurs across project documentation, organizational functions, suppliers, and customer-specific reporting requirements. The absence of common reporting boundaries, indicators, responsibilities and methodologies further limits consistent and comparability of sustainability information between projects. Consequently, greater standardization appears necessary not only to respond more efficiently to customer requirements but also to bridge the gap between corporate sustainability reporting and the operational processes through which sustainability information is generated at the project level.

6.2 Practical implications

Based on the findings, several practical implications can be identified for ABB AUEN and other project-based industrial organizations. The primary need is to establish a standardized methodology for collecting, integrating, and reporting existing sustainability data throughout the project lifecycle. Such a methodology should define common reporting boundaries, responsibilities, and reporting requirements while integrating sustainability information into existing project documentation and workflows. Standardized templates could further facilitate the reuse of information across projects and reduce the manual efforts associated with responding to individual customer requests.

The findings also highlight the importance of supplier documentation and digital integration. As many requested sustainability indicators depend on supplier data, improved access to standardized environmental information, such as EPDs, could strengthen further project-level reporting. Increased digitalization and system integration could further improve data quality, traceability, and accessibility. This aligns with the ambitions expressed by several interviewees to integrate sustainability documentation into standards project documentation rather than treating it as a separate reporting activity.

Overall, a more standardized and integrated project-level reporting approach could improve internal efficiency, consistency, and transparency but while strengthening ABB's ability to respond to increasing customers sustainability information requirements.

6.3 Theoretical contribution

The study contributes to sustainability reporting research by extending the analysis from corporate-level disclosure to the processes through which sustainability information is generated and managed (Du Toit, 2024; Maione, 2023). The findings demonstrate that established corporate sustainability reporting practices do not necessarily translate into standardized project-level reporting processes.

The study further contributes by demonstrating the role of customers in driving this development. Increasing requests for carbon footprints, Scope 3 emissions, EPDs, and life-cycle information create reporting pressure that extends through the project value chain, requiring project organizations to obtain information from both internal functions and external suppliers. This extends the stakeholder perspective on sustainability reporting by illustrating how stakeholder information demands influence reporting practices below the corporate level. (Radhouane, Nekhili, Nagati, & Paché, 2018; Rimmel, 2020).

Finally, the findings highlight that the project-level reporting challenge concerns not only data availability but also the integration and structuring of existing information. By combining project documentation, customer requirements, and interview perspectives, the study therefore provides empirical insight into the operational gap between corporate sustainability reporting requirements and project-level information management. This finding is consistent with previous research that emphasize data management, organizational integration, and reporting implementation as key sustainability reporting challenges. (Adams & Frost, 2008; Maione, 2023).

6.4 Limitations and future research

This study was conducted as an exploratory qualitative single-case study of ABB's Automation Energy Industries Finland (FIAUEN). The findings therefore reflect the specific organizational context, reporting practices, and customer requirements of the case company and cannot be statistically generalized to other organizations or industries. However, the purpose of the study was to generate an in-depth understanding of project-level sustainability reporting rather than to achieve statistical generalization.

The study focused specifically on industrial automation and electrification projects, and reporting practices may therefore differ in other project-based industries. Furthermore, the customer request analysis was based on an internally maintained database and therefore reflects the requests received by the case company rather than the full range of sustainability requirements in the market. As sustainability regulations and customer expectation continue to evolve, the identified requirements may also change over time.

Data collection introduced additional limitations. Due to the timing of the study during the summer period, two external participants provided written response instead of participating in semi-structured interviews, limiting the opportunity for follow-up questions and further clarification. In addition, this study focused on sustainability reporting processes rather and organizational practices rather than the calculation of greenhouse gas emissions or the development of project-level carbon accounting methodologies.

Future research could extend the findings in several directions. First, future studies could develop and validate standardized methodologies for project-level sustainability reporting, including common approaches to data collection, system boundaries, responsibilities, and reporting practices. Second, comparative studies across project-based industries, such as manufacturing, construction, infrastructure, and engineering, could examine whether similar reporting challenges and customer requirements occur in other contexts. Finally, future research could investigate the integration of project-level carbon accounting and digital reporting solutions to improve the accuracy, efficiency, and scalability of project-level sustainability reporting.

7 CONCLUSION

This thesis examined the project-level sustainability reporting within industrial automation and electrification, with the purpose of understanding how sustainability information is captured and reported at the project-level and identifying the sustainability and carbon-related information was requested by the customers. The study was conducted as a exploratory qualitative single-case study of ABB Automation Energy Industries Finland (FIAUEN).

The findings show that sustainability reporting at project-level exists to some extent but is primarily embedded in existing project documentation and processes. Sustainability-related information is generated through engineering activities, HSE processes, procurement, supplier documentation and commisioning. Among these areas, safety, compliance and technical documentation are the most established, where as environmental and carbon-related information remains considerably less developed. There is currently no standardized project-level sustainability reporting proceses in the case company, and the reporting is still largely reactive and customer-driven.

At the same time, customers incresingly requests more detailed sustainability information. The most frequently identified themes incliude carbon footprints, Scope 3 emissions, Environmental Product Declarations (EPDs), supplier emissions and lifecycle information. Although some differences were identified between industries, carbon and environmental information emerged as recurring themes across the customer groups examined. These requirements extended beyond the sustainability information currently available in standard project documentation

The findings therefore reveal a mismatch between existing internal information and customer infromation requirements. While internal project documentation primarily emphasizes technical information, HSE and compliance, customer requirements increasingly focuse on carbon emissions, supplier information and life-cycle impacts (see Tables 6-9). In addition, sustainability-related information was found to be fragmented across different documents, organizational functions, suppliers, and systems. Specific information gaps were also identified, particularly regarding project-level carbon emissions and standardized methods for their calculation.

Overll, this study shows that project-level sustainability reporting whitin the case company remains less standardized than corporate sustainability reporting. While considerable sustianability-related information is already generated through existing project activities, it is not

yet systematically integrated into a common project-level reporting process. At the same time, increasing customer requirements create a need for more detailed carbon and environmental information. The findings therefore highlight the need for greater integration and standardization of sustainability information at the project level to better align existing reporting practices with customer information requirements.

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Appendix 1 Internal interview guide

General

1. Briefly introduce yourself and your role in relations to projects and suppliers.
2. How does your organization collaborate with suppliers regarding sustainability expectations, reporting requirements or emissions-related information?
3. Which sustainability requirements, frameworks, or stakeholder expectations are most influential in your organization (CSRD, internal reporting, customer demands)?
4. Are there differences in sustainability or carbon-related information requirements across industries, projects or customer types? Can you give examples?

Current state of Project-Level Sustainability Reporting

1. How is sustainability information currently collected, managed, and reported within projects?
2. Who is typically responsible for sustainability data collection, reporting, or coordination in projects?
3. What type of sustainability data, indicators, or KPIs are currently available at the project level?
4. How are emissions and carbon-related impacts (ex. CO_2 emissions, lifecycle impacts) currently measured, estimated, or documented in projects?
5. What systems or digital tools are currently used for sustainability data collection, management, or reporting at the project level?
6. Which sustainability information is reported internally but not requested by customers?
7. Which sustainability information is requested by customers but difficult to provide?

Data Quality, Challenges and Gaps

1. How reliable do you perceive project-level sustainability data to be, and how is it verified or validated?
2. To what extent do you think current sustainability reporting reflects actual project activities, emissions and impacts?
3. What are the main challenges, gaps, or missing elements in current project-level sustainability reporting?
4. Do multiple sustainability requirements, frameworks, reporting requirements and customer expectations create complexity or confusion at the project level? In what ways?

5. What sustainability information is easiest to obtain?
6. What sustainability information is most difficult to obtain?

Improvements and Future Perspectives

1. What improvements in sustainability information, KPIs, carbon/lifecycle data, systems, templates or processes would strengthen project-level sustainability reporting?
2. How do you expect sustainability reporting requirements to evolve in the next 3-5 years?
3. What role should suppliers like ABB play in supporting your future sustainability and carbon reporting needs?

Customer Requirements

1. What sustainability information does customers most frequently request during project discussions or procurement processes?
2. What carbon-related information does customers request most frequently?
3. Have customer requests changed during the last five years? If yes, how?
4. Which industries place the greatest emphasis on sustainability information?

Appendix 2 External interview guide

General

1. Briefly introduce yourself and your role in relations to projects and suppliers.
2. How does your organization collaborate with suppliers regarding sustainability expectations, reporting requirements or emissions-related information?
3. Which sustainability requirements, frameworks, or stakeholder expectations are most influential in your organization *(CSRD, internal reporting, customer demands*)?
4. Are there differences in sustainability or carbon-related information requirements across industries, projects or customer types? Can you give examples?

Current state of Project-Level Sustainability Reporting

1. How is sustainability information currently collected, managed, and reported within projects?
2. Who is typically responsible for sustainability data collection, reporting, or coordination in projects?
3. What type of sustainability data, indicators, or KPIs are currently available at the project level?
4. How are emissions and carbon-related impacts (ex. CO2 emissions, lifecycle impacts) currently measured, estimated, or documented in projects?
5. What systems or digital tools are currently used for sustainability data collection, management, or reporting at the project level?
6. How would you describe your experience with the sustainability information currently included in ABB's project documentation?

Improvements and Future Perspectives

1. What improvements in sustainability information, KPIs, carbon/lifecycle data, systems, templates or processes would strengthen project-level sustainability reporting?
2. How do you expect sustainability reporting requirements to evolve in the next 3-5 years?
3. What role should suppliers like ABB play in supporting your future sustainability and carbon reporting needs?