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Master thesis
Internal Carbon Pricing within the Gasunie

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Abstract

As climate targets tighten, internal carbon pricing (ICP) is increasingly employed by companies to steer sustainable decision-making. This thesis explores the barriers and drivers associated with the application of an internal CO_2 price within Gasunie, a Dutch energy infrastructure company. Through qualitative interviews with internal stakeholders across departments, this study reveals how the mechanism is perceived, applied, and integrated into project evaluations and organizational processes. Key barriers identified include limited integration into operational and financial decision-making, complexity in scope 3 emissions accounting, and challenges related to trade-offs between sustainability and short-term cost-efficiency. Conversely, the ICP functions as a powerful communicative and decision-support tool, fostering awareness and aligning investment decisions with long-term environmental value. Opportunities lie in expanding the mechanism beyond CO_2 to broader sustainability metrics, refining its application across the value chain, and linking it to accountability structures and performance incentives. The findings contribute to academic literature on carbon pricing as an organizational instrument and provide practical guidance for enhancing the effectiveness and strategic impact of internal pricing mechanisms in the energy sector.

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Introduction

The pressing challenge of climate change remains one of the most critical threats to humanity in the 21st century, with global greenhouse gas (GHG) emissions continuing to rise at an alarming rate. Carbon dioxide (CO_2), the primary driver of anthropogenic climate change, accounts for approximately three-quarters of total GHG emissions, stemming largely from energy production, industrial processes, and land-use changes. The latest reports from the Intergovernmental Panel on Climate Change (IPCC) warn that without immediate and substantial reductions in CO_2 emissions, the goal of limiting global warming to 1.5°C or even 2°C above pre-industrial levels may slip out of reach (Ipcc, 2022). This failure would exacerbate the frequency and intensity of extreme weather events, rising sea levels, and disruptions to ecosystems and human livelihoods.

The United Nations' Sustainable Development Goals (SDGs) highlight the interconnected nature of this challenge. SDG 13, "Climate Action," explicitly calls for urgent measures to combat climate change and its impacts, while other goals, such as SDG 7 ("Affordable and Clean Energy") and SDG 12 ("Responsible Consumption and Production"), underscore the need to transition toward low-carbon energy systems and sustainable resource use (*THE 17 GOALS | Sustainable Development*, n.d.). Achieving these goals requires transformative actions from governments, corporations, and civil society, as well as unprecedented collaboration across all sectors. Among the pivotal solutions to mitigate CO_2 emissions, carbon pricing has emerged as a critical tool. By attaching a monetary value to carbon emissions, carbon pricing mechanisms aim to internalize the social and environmental costs of CO_2, thereby incentivizing reductions in carbon-intensive activities. Policy instruments such as cap-and-trade systems and carbon taxes have been widely implemented at macroeconomic levels, covering significant portions of global GHG emissions. However, while these mechanisms have achieved varying degrees of success in reducing emissions at

national and regional scales, their effectiveness in catalyzing granular, organization-level behavioral change remains inconsistent.

Recognizing this gap, businesses have increasingly adopted Internal Carbon Pricing (ICP) as a voluntary initiative to embed climate considerations into their strategic and operational decisions. Internal Carbon Pricing (ICP) is a voluntary business strategy where companies assign a fictive or real cost to their own carbon emissions. This internal price is used to steer investment decisions, encourage carbon efficiency, and prepare for external regulatory risks (Ditillo & Lisi, 2016). The pricing mechanism can take the form of either a shadow price (used only for decision-making) or an internal carbon fee (charged to business units). An example of shadow pricing is how the company E.ON applies shadow prices. They use a price of €20 per ton as a base case and €40 per ton as a worst case when evaluating investment decisions. This means that whenever E.ON considers a capital investment, such as upgrading a power plant or building new infrastructure, it factors in the hypothetical future cost of carbon emissions (Ma & Kuo, 2021). Although the company doesn't actually pay these prices internally, they are used in financial models to assess project viability. For instance, when comparing two power plant upgrades, one emitting 100,000 tons of CO_2 annually and another emitting 40,000 tons, the projected carbon cost over a 10-year period ranges from €20 million to €40 million for the higher-emission option, versus €8 million to €16 million for the lower-emission alternative. Although these prices are not paid internally, they inform strategic decision-making by highlighting future carbon cost exposure and encouraging investment in lower-carbon technologies.

These price points are based on expected future costs of emission certificates under the EU Emissions Trading System (EU ETS). The European Union Emissions Trading System (EU ETS) is a cap-and-trade mechanism that limits total greenhouse gas emissions from high-emitting sectors by allocating tradable emission allowances. Each allowance permits the

emission of one ton of CO_2. Firms that emit less than their allowance can sell the surplus, while those exceeding their limits must purchase additional credits, thereby internalizing the cost of emissions. The carbon price within the EU ETS is market-driven and has fluctuated significantly, with recent prices ranging between €70 and €100 per ton. As a regulatory benchmark, the EU ETS provides firms with a financial signal to reduce emissions and invest in cleaner technologies (About the EU ETS, n.d.).

ICP enables firms to simulate the impact of external carbon pricing policies, assess the financial implications of their emissions, and prioritize investments in low-carbon technologies. By integrating a monetary value on carbon emissions into decision-making processes, ICP provides organizations with a framework to align their operations with broader climate goals, such as those outlined in the Paris Agreement and the SDGs. However, despite its potential, the adoption and implementation of ICP face significant challenges, including methodological inconsistencies, resistance to change within organizations, and the resource demands of establishing robust pricing frameworks (Ditillo & Lisi, 2016).

Gasunie, a utility company transitioning toward more sustainable practices. These practices include the reduction of greenhouse emission gas (GHG). To reach the goals they want to achieve regarding the reduction of carbon, they implemented ICP. While ICP holds potential to align corporate goals with climate objectives, its implementation is complex. With the implementation and use of ICP, the Gasunie faces several barriers. Literature acknowledge this problem and mentions different kind of barriers when using ICP. These barriers include the difficulty of accurately pricing carbon within internal contexts, integrating ICP into scope 3 emissions, and overcoming resistance to change within traditional business operations (Harpankar, 2019). At the same time, ICP presents opportunities for firms to enhance environmental performance, stimulate innovation, and manage regulatory and financial risks associated with carbon-intensive operations (Zhu et al., 2022). This study focuses on how ICP

can drive within an organization as well as what the barriers are when implementing and using ICP.

Despite the growing interest in ICP, the decision-making processes it influences remain underexplored, particularly in utility companies like Gasunie. Understanding how ICP can drive or hinder corporate action on climate change is critical for identifying strategies to accelerate the transition to low-carbon operations (Qin et al., 2023). This study seeks to examine these dynamics, addressing a gap in the literature and offering insights into optimizing ICP implementation.

To achieve these results and bridge the gap, eight interviews are conducted with employees of the Gasunie stationed at different departments. By conducting these interviews a good overview of opinions within the Gasunies departments about the implementation and the working of ICP is collected. Specific insights about ICP are obtained and categorized in barriers and drivers when using ICP. With this study answer is given on the research question:

> *What are the barriers when implementing and using ICP and how can ICP drive within the Gasunie?*

The structure of this study is structured in the following sections: section two is digging deeper into the literature. Theory is found to find the specifics about the gap within the theory. The third section of the study provides methodology of the procedures used to collect and analyze data. A reasoning for the selection of the research method is provided as well as the reasoning of why qualitative research is conducted. Thereafter, the fourth sections offers insights in the empirical results of the data analysis done. The results are presented based on the conceptual model made to ensure structure and detailed presentation of results. The final section of the study delves into the discussion and discusses further research that's necessary.

Theory

The scholarly discourse on carbon pricing has evolved considerably over the past decades. Initial research focused on macroeconomic instruments like carbon taxes and cap-and-trade systems, highlighting their cost-effectiveness and potential for emissions reduction on a national or regional scale (Aldy & Stavins, 2012). More recent studies, however, have turned attention to microeconomic applications, such as Internal Carbon Pricing (ICP), where businesses proactively set an internal price on carbon to inform decision-making (Bento & Gianfrate, 2020), (Gorbach et al., 2021).

Explicit pricing and implicit pricing

ICP methods typically fall into two categories. Explicit pricing and implicit pricing, where explicit pricing consist of shadow pricing and carbon fees. (Gorbach et al., 2021). Shadow pricing is a theoretical or hypothetical carbon price used by organizations to simulate the financial impact of carbon emissions on investment decisions and business operations. It does not involve an actual transfer of money within the organization. Instead, it serves as a risk assessment and strategic planning tool. A carbon fee is an internal monetary charge imposed on business units, activities, or operations based on their GHG emissions. Unlike shadow pricing, carbon fees are real financial transactions within an organization. These fees are often collected to create a dedicated revenue stream that funds carbon reduction projects, such as energy efficiency upgrades, renewable energy installations, or carbon offsets. Ma and Kuo (2021) explains the use of carbon fee with Microsoft as an example. Microsoft applies an internal carbon fee of $15 per metric ton of CO_2 emissions. This fee is charged to individual business units based on their emissions, and the collected funds are reinvested in sustainability initiatives and green innovations. As a result, Microsoft has achieved annual energy cost savings of $10 million by stimulating innovation and operational efficiency improvements through the ICP mechanism (Ma & Kuo, 2021). Implicit carbon pricing refers to the indirect

or retroactive cost associated with measures a company takes to reduce its emissions. Unlike shadow pricing and carbon fees, implicit pricing is not deliberately set in advance. Instead, it emerges as a calculated cost of implementing specific initiatives to abate carbon emissions.

Implicit carbon pricing is the indirect, retroactive cost of actions taken by a company to minimize emissions. It is not deliberately set in advance like shadow pricing and carbon fees. Rather, it develops as planned costs of carrying out particular actions for reducing carbon emissions. Implicit pricing is derived by dividing the total cost of a project (e.g., installing renewable energy systems or improving energy efficiency) by the emissions reductions achieved. It provides a backward-looking benchmark to estimate the economic cost of reducing one ton of CO_2 equivalent (tCO_2e) (Barron et al., 2018). An example of implicit carbon pricing can be drawn from a company's investment in emissions reduction technologies. For instance, if a firm spends €500,000 on renewable energy procurement and this investment leads to a reduction of 10,000 tons of CO_2 emissions, the implicit carbon price would be €50 per ton. As described by Ben-Amar et al. (2022), such a price is not explicitly set or charged within the firm, but is inferred from the marginal abatement cost of implemented measures.

Barriers

These approaches enable companies to quantify their carbon footprint and integrate it into strategic planning, capital investment decisions, and risk assessments. Empirical studies suggest that ICP can lead to measurable improvements in environmental performance, such as reductions in carbon intensity per revenue and per employee (Zhu et al., 2022). In addition, ICP also functions as an signaling mechanism toward external audiences, reinforcing the stakeholders' commitment to sustainability targets and obedience to new regulations/laws.

However, organizations often experience barriers when implementing and using ICP. Riedel et al. (2021) identify a range of interrelated barriers that obstruct the adoption and effective implementation of ICP. One of the barriers is the absence of a comprehensive

environmental strategy or pre-existing carbon management structures, such as greenhouse gas (GHG) inventories, limits organizational capacity to implement ICP effectively. Instrument-related barriers are also pronounced. ICP is often perceived as a complex and administratively demanding tool, especially in the case of internal carbon fees or internal emissions trading schemes. Uncertainty about how to determine an appropriate carbon price level further compounds this complexity. External barriers primarily relate to insufficient regulatory pressure and ambiguous policy signals (Bento Gianfrate, 2020). Existing carbon pricing mechanisms such as the EU Emissions Trading System (EU ETS) and national carbon taxes are frequently viewed as offering prices too low to motivate meaningful corporate action.

Perhaps the most important barrier for the roll out of ICP is the definition of an optimal carbon price, which is sometimes referred to as the "right price trap". This derives from the trade-off between economic viability, environmental cost, and stakeholder consensus. Price will need to be reasonable in terms of a company's ability to both pay the price and sustain business cases, so not to cause undue strain on business units. Simultaneously, the price needs to take into account the actual social cost of carbon (SCC) to achieve substantive emission reductions of greenhouse gases (GHG). But without underlying support, ICP can become seen as intrusive or out of touch with market realities, resulting in a backlash throughout the organization. The social cost of carbon (SCC) represents the net present value of the damage caused by emitting an additional metric ton of carbon dioxide into the atmosphere. It serves as an estimate of the marginal external cost of greenhouse gas emissions and provides a monetary valuation of climate-related damages, including impacts on human health, agricultural productivity, property damages from increased flood risk, and ecosystem services (Tol, 2010).

"The right price trap"

Gorbach et al. (2021) emphasize that carbon prices aligned with SCC estimates, ranging from 200 per ton depending on modeling assumptions, often far exceed carbon prices set in

external regulatory frameworks. This mismatch can have a large retarding effect on uptake, especially if external carbon taxes are still at less than 20/ton. The ensuing regulatory mismatch gives SCC-based pricing that looks like a mistake to companies situated in such jurisdictions. In addition, energy-intensive industry firms struggle to remain competitive; high internal carbon prices drive production costs higher, potentially hurting businesses operating in markets with weaker environmental legislation (Qin et al., 2023).

Drivers

Internal carbon pricing (ICP) is increasingly adopted by utility companies as a strategic tool to integrate climate considerations into decision-making processes (Saloranta et al., 2021). Several key drivers underpin this trend. First, regulatory anticipation motivates companies to proactively align with expected climate regulation, reducing transition risks and ensuring compliance readiness (Bento et al., 2020). Second, corporate sustainability goals play a pivotal role; firms with strong ESG commitments often implement ICP to embed carbon accountability into capital allocation, procurement, and project evaluation. Third, reputational benefits drive companies to signal climate leadership to stakeholders, including investors, customers, and civil society (Bento et al., 2020). Fourth, financial incentives and access to green capital can also encourage ICP adoption, as companies seek to attract climate-conscious investors. Finally, organizational learning and innovation are promoted through ICP, enabling firms to identify emission hotspots and stimulate low-carbon solutions. Together, these drivers contribute to the institutionalization of ICP as a governance mechanism that fosters more sustainable and forward-looking decision-making in the utility sector (Ma & Kuo, 2021).

External Sector-Wide Developments on Internal Carbon Pricing

An important parallel development within the Dutch energy sector involves a coordinated initiative by national network operators, including TenneT, Alliander, Enexis, Stedin, and

Gasunie, to align and institutionalize internal carbon pricing (ICP) within their operational and investment decision-making processes. In collaboration with the consultancy Kalavasta and under the umbrella of Netbeheer Nederland, a phased research program was launched to assess the use, effectiveness, and potential of ICP in critical operational domains such as procurement, maintenance, and infrastructure planning. (Kalavasta, 2024)

The findings of the first phase of this program revealed that while a nominal internal carbon price of €150 per tonne of CO_2 was in use among most network operators, its impact on investment and procurement decisions remained limited. Nevertheless, ICP did contribute to heightened awareness and informed several strategic adjustments, such as Gasunie's initiative to increase the frequency of methane leak detection activities in an effort to reduce scope 1 emissions. The study also pointed to inconsistencies in the application of ICP across organizations, ranging from differences in pricing levels to varying tools (e.g., CE Delft's Asset Tool vs. the Environmental Cost Indicator) and the extent of coverage across operational processes. These disparities hinder a level playing field and constrain broader sectoral decarbonization efforts.

In the second phase, the research focuses on conducting sensitivity analyses to identify "tipping points" at which internal carbon prices begin to exert significant influence over investment decisions. These abatement cost curves are intended to inform future adjustments in carbon pricing levels and support the case for broader integration of ICP within organizations such as Gasunie.

The case of Gasunie illustrates the complexities of implementing effective internal carbon pricing in infrastructure-intensive companies. On the one hand, the company pursues decarbonization through investments in lower-emission assets and reductions in direct methane emissions. On the other, it must navigate competing priorities such as network reliability, financial constraints, and broader societal expectations regarding the affordability of energy

services. This tension is also acknowledged in Kalavasta's reports, which highlight the need for sector-wide harmonisation, the development of practical protocols, and integration of ICP into corporate risk management frameworks.

Implementation Challenges

Effective implementation of ICP requires more than setting a numerical value. Embedding ICP into risk management, procurement, and project analysis necessitates cultural change, organizational capacity, and appropriate measurement tools. Organizations such as Gasunie can benefit from the experiences of peer grid operators by systematically integrating CO_2 pricing into Total Cost of Ownership (TCO) analyses and by adapting procurement criteria based on sustainability metrics. Ecorys underscores the importance of clearly communicating long-term sustainability objectives (the so-called "point on the horizon") to both internal departments and external suppliers, as well as the need for regular monitoring and evaluation of ICP's impact on project selection and emissions reduction.

Deficiencies in the Literature

Although the current literature on ICP offers useful information regarding its uptake, its implementation and its concomitant advantages, there are still many important gaps. These are mainly associated with the incorporation of ICP into decision making, its use in diverse industrial applications, and its long-term efficacy.

A significant gap is represented by the absence of harmonized methodologies to define a "fair" carbon price. Although studies such as Saad et al. (2021) explore various approaches, including prices based on the social cost of carbon (SCC), abatement costs, or implicit pricing benchmarks, there remains no universally accepted method for setting ICP levels. This variability creates uncertainty for companies attempting to balance environmental ambitions with economic feasibility. The default approach of trial-and-error and average external regulatory prices in many organizations leads to variability across industries and geography.

Organizations lack clear benchmarks and can't determine appropriate ICP values that will lead to substantial reductions in emissions without compromising competitiveness.

A second gap in the literature is a lack of knowledge about industry-specific challenges to the implementation of ICP. Industries including energy and manufacturing have demonstrated significant advances, using technologies such as shadow pricing in order to reflect high direct emissions. However, industries with predominantly indirect emissions, such as those in service-oriented sectors, lack tailored approaches for effective ICP design. Sector-specific measures of scope 3 emissions, which are dominant in such industries, are often hard to define and control, whereas there is a paucity of research that addresses these sector-specific complexities.

Conceptual framework

Based on relevant literature, a conceptual framework is developed (Figure 1 Conceptual framework). The conceptual framework is structured to understand the use of ICP within the Gasunie. Specifically what the barriers and drivers are within the Gasunie when implementing and using ICP. By using this framework, it is possible to study the effects of ICP on strategic and operational choices at Gasunie, highlighting critical variables and their relationships. The frame work is based on the framework of Hansson et al. (2022) it uses the same concept but the barriers and drivers are derived from the results of the interviews combined with the literature.

At the heart of the model lies the independent variable: internal carbon pricing. The framework identifies two primary dimensions, barriers and drivers, each distinct but also interrelated factors that influence the effectiveness, and perception of ICP.

Barriers are conceptualized as organizational and operational factors that hinder the effective implementation of ICP. These include price and application, which can pose constraints when the internal price is perceived as misaligned or inconsistently applied across

projects. In addition, implementation challenges, such as (scope 3) data availability, procedural integration, and workload impact, alongside trade-offs between sustainability goals and financial or technical feasibility, further limit the tool's potential.

Conversely, drivers represent mechanisms or conditions that enable or reinforce the use of ICP in strategic and operational decision-making. Here too, price and application reappear, but in their enabling form, such as when a high internal price is used to justify sustainable investments or influence procurement decisions. Additional drivers include sustainability considerations in decision-making, reflecting the role of ICP in shaping long-term investment strategies, and value creation, which captures the contribution of ICP to cultural shifts, awareness, and the perceived legitimacy of sustainability goals.

By structuring the analysis around this model, the study provides a nuanced understanding of how internal carbon pricing operates within the organization, both as a constraint and a driver for sustainable transformation. The dual positioning of certain factors, such as price and application, underscores their complexity and context-dependence within organizational practice.

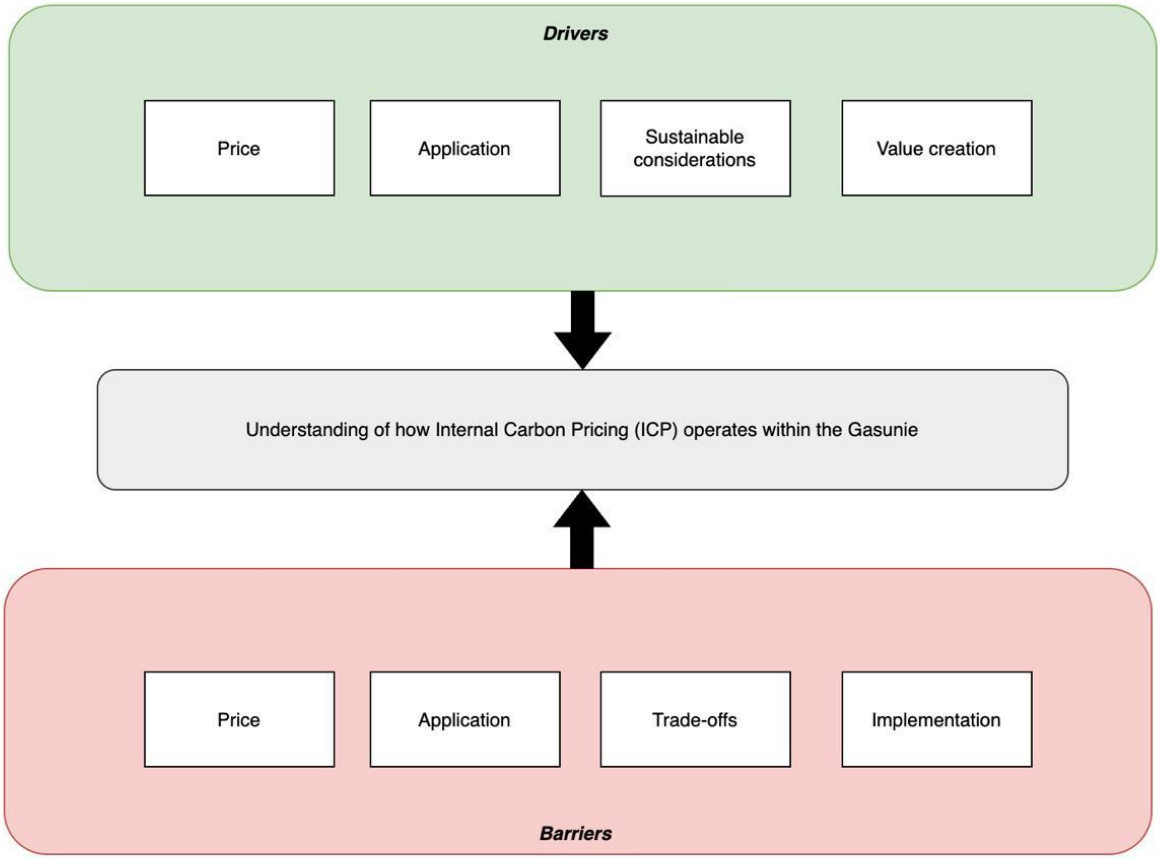

Figure 1 Conceptual framework

Methodology

This research aims to investigate the perception of decision-makers on the mechanism Internal Carbon Pricing within the Gasunie. The research followed a method of qualitative research approach and a grounded theory method. Grounded theory is the method of choice with which to look at, e.g., complex processes like decision making dynamics as affected by ICP in Gasunie, for which traditional theoretical models are inadequate (Charmaz, 2014).

Data-Collection

The study is a work on subjects that range through decision making processes within Gasunie, such as sustainability managers, financial planning, and operations executives. Using a purposive sampling strategy, participants were selected based on their relevant expertise and direct involvement with ICP. In order to cover a variety of points of view, interviews are conducted with eight decision makers who hold different functional positions in the company. The participants all are using the mechanism, used the mechanism once or are involved in the process of implementing the mechanism. Expert sampling is used to sample the participants, this method is often used when investigating new areas of research. This sample size is appropriate for achieving theoretical saturation, the point at which no new insights emerge during data collection (Charmaz, 2014).

Data is collected using semi-structured interviews which provide informants with the flexibility to articulate their experiences but also facilitate the in-depth investigation of emerging themes. Interviews consisted of a set of 15 open-ended questions to achieve the research goal. (appendix C) Questions encompasses areas, including participants' roles, ICP implementation challenges, opportunities for strategic decision making, and the determinant roles for acceptance or resistance to ICP.

Data analysis

To analyze the data, the study followed the grounded theory analytical process developed by Charmaz (2006), which involves a systematic and iterative approach. All interviews are transcribed literally in order to reflect participants' language and their meaning. Subsequent coding is done, in which each line in transcripts is scrutinized to produce open codes. These codes are clustered in themes by mapping focused coding, which reveals and defines patterns and associations in the data. (Charmaz, 2014).

The method is particularly appropriate for investigating complex, under-researched phenomena, such as internal carbon pricing in organizational contexts. In this study, the grounded theory method facilitates an in-depth examination of how internal carbon pricing is perceived, applied, and contested across different departments within a utility company. The method's enables the researcher to remain responsive to emerging patterns and adjust the focus of inquiry accordingly. (White & Cooper, 2022)

Ethical considerations

This research was conducted in accordance with ethical guidelines to ensure the integrity of the study and the protection of participants. Prior to each interview, participants were informed about the purpose of the study, their right to withdraw at any time, and how their data would be handled. Informed consent was obtained, and all data was anonymized to protect individual and organizational identities. The collected data is securely stored and will only be used for academic purposes related to this thesis. Due to ethical considerations and confidentiality, AI assisted tools where only employed for the abstract, introduction and literature review. Specifically, ‘Research Rabbit’ was used to find certain literature. Open AI was used to improve academic language and structure in the theory chapter. Every piece of content

reviewed by AI is critically assessed and reviewed by the researcher to ensure academic integrity and alignment with the research objectives.

Empirical Results

This section presents the findings from the conducted interviews. The results are categorized into barriers, drivers. These barriers and drivers lead to recommendations for improvement which are discussed in the conclusion. All data were collected through qualitative interviews. When conclusions or opinions were mentioned by at least two respondents, they were considered relevant for drawing conclusions in this research. A visualization of results based on quotes from interviewees is given in Figure 2 Summary of key results.

Barriers

This section describes the barriers that hinder the mechanism, as well as aspects that obstruct, complicate, or negatively influence the expansion, implementation, or application of internal carbon pricing.

Price

A key barrier identified in the empirical findings concerns the strategic positioning of Gasunie's internal CO_2 price relative to both market prices (e.g., the EU ETS) and the broader societal value of carbon emissions. The organization currently applies an internal carbon price of €200 per ton, which is notably higher than the EU ETS market range of approximately €70–€100 per ton. While many respondents view this higher price as a positive signal and a future-oriented tool, it simultaneously introduces practical and conceptual challenges in application.

Several participants emphasized that the internal price functions as a stimulant for low-carbon decision-making, particularly for long-lived infrastructure assets that may operate well into the 2040s. From this forward-looking perspective, designing today based on projected future carbon costs is seen as a rational and responsible approach. As one respondent noted, "*You're effectively engineering for 2045, and that's a good thing*." This also explains the

internal policy of assessing projects with a 25-year horizon, thus anticipating long-term emissions liabilities.

However, tensions arise when comparing Gasunie's internal pricing with those of market actors. Some respondents mentioned that other companies continue to use EU ETS-based or otherwise lower benchmarks. This leads to competitive distortions: Gasunie may green-light projects that other organizations find economically unfeasible, which may raise concerns about the fairness of market dynamics and the presence of a level playing field. One respondend mentioned the crux between social value and competitive advantage as the following: "*You do want to stay in conversation with parties. If you charge an absurdly high price, no one will take you seriously. So I can understand that pragmatism. But at the same time, the real social costs of CO_2 are probably higher than what we are now calculating internally."*

At the same time, respondents raised critical reflections on the sufficiency and temporal robustness of the €200 price. While this figure surpasses prevailing market rates, several interviewees noted that it may still fall short of reflecting the true societal costs of carbon emissions. References were made to academic and policy reports estimating "social prices" as high as €800–€1,000 per ton.

In addition to these normative concerns, participants also discussed the challenge of static pricing in dynamic project environments. Projects may span 20 to 30 years, but the internal CO_2 price is not currently indexed or structured to change over time. As one respondent put it, "*We're working on projects that last twenty years, but we don't know whether €200 will still be representative in 20 years."* Another interviewee added that it is not rational to assume future increases while making no present-day adjustments. Instead, they argued, the value we assign to emissions today should already reflect our long-term expectations: *"If you think it should be €1,000, then include that now."*

This links directly to the debate around discounting. Some respondents expressed concern that applying discounting logic to CO_2 savings would undervalue long-term reductions and discourage ambitious future-proof decisions. As one participant reflected, *"CO_2 saved now is worth more financially than CO_2 saved in twenty years, but that's exactly why we shouldn't discount it."*

Application

Despite the strategic intention behind internal carbon pricing (ICP) to guide investment and operational decisions, several respondents highlighted significant barriers in its practical application. A recurring challenge concerns the limited scope of the ICP in capturing the full climate and environmental impact of projects. One prominent critique was the narrow focus on CO_2 alone, while other pressing sustainability dimensions remain unaddressed.

As one respondent remarked, "*We shouldn't throw everything on CO_2. There are other environmental problems, like nitrogen or material usage, that we need to consider."* This sentiment reflects a broader concern that, although CO_2 is a crucial metric, exclusive focus on it risks overlooking the holistic environmental impact of operations. Another participant noted, *"Much of our materials are recycled, which is good, but still at the bottom of the R-ladder. What we really want is reuse, and that requires more time, money, and effort."* This observation highlights the perceived limitation of the ICP as a tool that, while financially incentivizing CO_2 reduction, does not sufficiently stimulate deeper systemic practices such as circularity or integrated environmental performance.

Furthermore, Scope 3 emissions, typically originating from suppliers or downstream users, were frequently cited as a grey area within ICP application. Several interviewees expressed difficulty in attributing emissions or reductions across the value chain, resulting in ambiguity about ownership and incentive alignment. This not only complicates reporting but can undermine the perceived fairness or credibility of the CO_2 pricing mechanism itself.

Trade offs

The implementation of an internal carbon price within Gasunie reveals a series of trade-offs, where sustainability objectives come into tension with other business priorities such as cost control, operational reliability, and safety. Interview data indicate that in certain cases, the internal CO_2 price contributes to the deterioration of a project's financial viability. While this may be defensible from a societal value perspective, the economic implications remain a concern. As one respondent noted, this reflects a deliberate choice to prioritize societal benefit over short-term financial gain, yet such decisions require a strong internal commitment and sense of purpose.

Operationally, the internal CO_2 price introduces practical dilemmas. For projects with minor emissions and high associated costs, proportionality is questioned. Interviewees shared examples of procurement decisions where trade-offs must be made between emissions, cost, and lead times. In cases where all suppliers meet the required specifications, the CO_2 price may tip the balance in favor of the more sustainable option. However, in projects with strict safety requirements or critical delivery schedules, those considerations may override emissions concerns.

Importantly, several respondents emphasized that the internal CO_2 price rarely serves as the decisive factor in investment decisions. It is more often perceived as an added value within a broader business case, what one interviewee called a "*nice to have*", rather than a determinant of project approval. Technical constraints, safety risks, or feasibility considerations typically outweigh carbon price impacts in final decision-making processes.

Implementation

The implementation of the internal carbon pricing mechanism within Gasunie presents a multifaceted set of barriers, both in practical application and institutional alignment. Respondents consistently expressed that, while the theoretical framework of a €200 per ton

CO_2 price is well-established, its systematic and consistent integration across all departments and project phases remains fragmented.

One of the most frequently cited challenges concerns the lack of emissions data, particularly for Scope 3 emissions. Although Scope 1 and 2 emissions are generally well-accounted for, many of the emissions embedded in purchased goods, services, and construction materials fall outside Gasunie's direct control. As one respondent noted, "*Almost no supplier has that [emissions data] in order, even the larger parties."* This issue results in delays and reliance on external databases, often with conservative assumptions, sometimes adding a 30% buffer, which can penalize suppliers and distort cost calculations. This lack of transparency and reliability in emissions data severely hampers effective implementation.

Moreover, while internal policy documents and Treasury protocols clearly incorporate the carbon price, notably in annual stakeholder reporting and financial modelling, the mechanism appears to be less embedded in actual decision-making at the project level. Several respondents highlighted a discrepancy between formal communication and operational reality: "*Internally, it's more present than in project practice or customer interactions."* This disconnect raises questions about internal alignment and the extent to which sustainability tools are operationalized beyond strategic communication.

Finally, a broader institutional concern emerged regarding the epistemic legitimacy of the carbon price itself. Multiple respondents questioned the basis for the €200 valuation, suggesting it lacks sufficient societal or scientific substantiation. As one participant explained, "*Perhaps it's too high, perhaps it's too low, but we don't hear much debate about it, even in public discourse."* This highlights the need for a clearer articulation of how the price was derived and what social, ecological, and economic principles underlie it.

Drivers

The following section outlines four themes that represent key drivers behind the use of internal carbon pricing (ICP) within Gasunie. These categories reflect the positive impact of the mechanism and highlight factors that contribute to its effective promotion and application.

Price

The current internal CO_2 price of €200 per ton, as applied within Gasunie, is largely regarded by respondents as a well-chosen and effective figure. Compared to the European Emissions Trading System (EU ETS), which fluctuates around €80–€100 per ton, the internal price is deliberately set higher to stimulate more sustainable investment decisions. Several interviewees emphasized that this price is sufficiently ambitious to influence project assessments without being prohibitively high.

One of the key strengths identified is that the internal CO_2 price has evolved over time. Originally set at €150 per ton, the price was later increased to €200 following internal research on the added costs of low-carbon alternatives, such as recycled steel, green electricity, and hydrogen, which revealed a differential of approximately €183 per ton. Positioning the price just above this level was seen as a strategic move to ensure environmental considerations would be appropriately internalized in cost-benefit analyses.

Additionally, respondents acknowledged the differentiated impact of the price depending on the type of product being assessed. The CO_2 price was reported to have a stronger effect on investment decisions involving raw materials with high emission intensity per euro, such as steel pipes, whereas for specialized, labor-intensive products like valves or assemblies, the influence of the price diminishes due to the smaller proportional material emissions. Nevertheless, even in these cases, respondents maintained that the presence of the price adds valuable nuance and can act as a tiebreaker in procurement decisions.

There is also recognition of the price's symbolic and strategic value. It sends a clear message of commitment toward sustainability and aligns Gasunie with future climate scenarios and long-term carbon trajectories. While some interviewees suggested that €200 could be subject to reevaluation every five years, they also emphasized that any revision should be upward only, preserving the price's signaling power and ensuring it continues to drive change.

Application

The internal CO_2 price within Gasunie demonstrates tangible added value as a decision-support mechanism across a wide range of operational and strategic processes. While its financial function is evident, allowing more robust business cases through inclusion of emissions-related costs, the application of the internal CO_2 price transcends mere monetary calculations. It functions as both a tool for internal alignment and a strategic instrument in steering procurement, design, and engineering decisions toward sustainability.

Respondents indicate that the internal CO_2 price of €200 per ton is increasingly integrated in project evaluations. Environmental and process engineers routinely include it in lifecycle analyses and investment decisions. Whether choosing between gas-driven and electrically powered components, or assessing supply chain alternatives with varying emissions profiles, the internal price serves to quantify the environmental benefit of lower-emission solutions.

Moreover, examples such as the electrification of gas-driven actuators and the replacement of gas-fired heating with heat pumps at pressure-reduction stations underscore how the CO_2 price underpins emission reduction strategies that would otherwise be difficult to justify based solely on cost-efficiency. These applications highlight its dual role: a financial lever and a moral compass.

Sustainable consideration within decision making processes

The internal carbon price (ICP) plays a pivotal role in shaping decision-making processes within Gasunie, especially when sustainability considerations intersect with financial evaluation. Several respondents indicated that the ICP enables a broader assessment of project feasibility beyond immediate economic return. One respondent noted that in high-investment projects, incorporating the ICP was essential to justify decisions internally, even when *"CO_2 savings are not a real cost saving.*" While this perspective highlights a tension between ecological and financial value, the internal price provides a legitimizing framework for decisions that prioritize emission reductions.

Moreover, the CO_2 price allows environmental considerations to permeate into technical and operational decisions, particularly during the design and construction phases. For instance, the use of battery-powered equipment supplied with green electricity can be financially justified through CO_2-based calculations, whereas diesel generators may otherwise appear cheaper. This reflects a shift in decision-making logic from short-term cost minimization toward long-term sustainability impact.

At the same time, several respondents acknowledged that the influence of the ICP decreases in more immediate and financially constrained contexts. While the internal price can steer choices when there is room for strategic flexibility, in practice, some stakeholders revert to conventional cost-based logic when under pressure. Nonetheless, the internal CO_2 price continues to offer a valuable lever to integrate sustainability into organizational decision-making, especially when viewed over the long term.

Value creation

The internal CO_2 price at Gasunie is perceived not merely as a financial mechanism, but as a tool that fosters broader organizational and cultural value. One of the most consistent themes to emerge from the interviews is the role of the CO_2 price in shifting mindsets across

departments and hierarchical levels. The explicit inclusion of a €200 per ton CO_2 price in investment and procurement discussions gives environmental impact a concrete, calculable weight in decision-making, which in turn legitimizes sustainability within business operations.

Rather than serving solely as a calculative cost element, the CO_2 price functions as a catalyst for organizational learning and cultural transformation. Respondents frequently described it as a "conversation opener" that helps make abstract sustainability goals tangible. In this sense, the internal price acts as a communicative tool, both internally and externally, signaling that environmental responsibility is a foundational pillar of the company's strategy. Several participants indicated that the CO_2 price had become part of the "language" of business cases, helping to frame discussions in terms of societal value rather than only short-term profitability.

Moreover, the internal price helps bridge the gap between ambition and action. For engineers and sustainability professionals in particular, the price provides institutional support that allows them to champion more environmentally friendly solutions, especially in long-term projects. While few interviewees cited projects that were solely approved because of the CO_2 price, many agreed that it served as a "decisive nudge" in cases where sustainability and financial viability were in close tension.

Importantly, this value creation is not only tied to decision outcomes but also to broader awareness and engagement. By assigning a monetary value to CO_2 emissions, employees are "forced to think" about their environmental impact in operational and design choices. While this can translate into more rigorous environmental accounting, there is also recognition that the internal price should be connected to specific goals and outcomes.

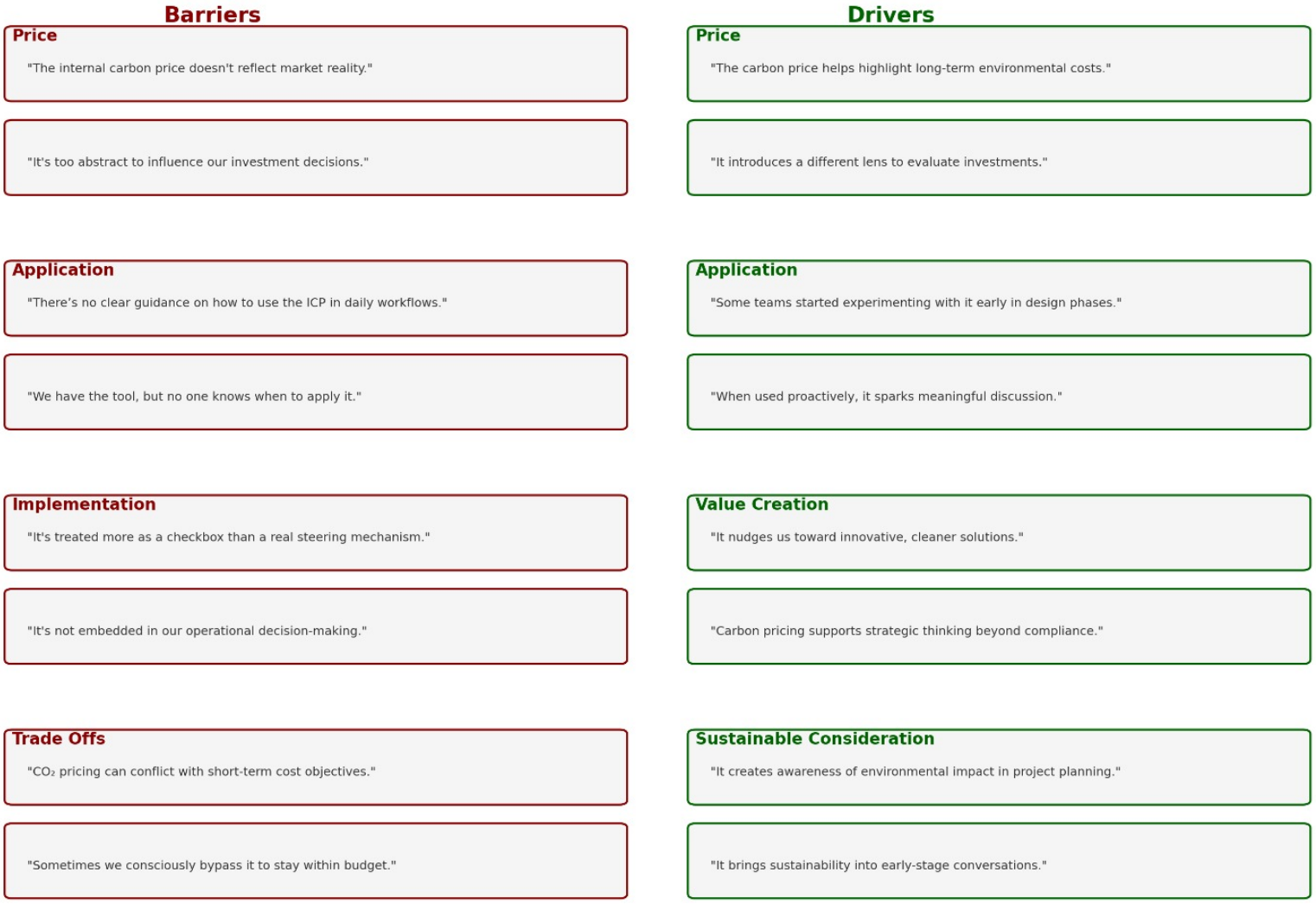

Figure 2 Summary of key results

Discussion

To facilitate the discussion, the various findings under barriers, and drivers are interlinked and critically compared. First the price is discussed, then application and implementation followed by sustainably considerations within decision making processes and value creation. This integrated approach enables a deeper exploration of the mechanism's limitations, its influence on organizational culture and operational integration, as well as trade-off dilemmas.

Price: Rethinking the Role of Internal Carbon Pricing

The empirical findings suggest that Gasunie's internal carbon price is widely recognized and broadly accepted across departments, yet its function varies significantly. For some, it acts as a calculative device, multiplying tons of CO_2 by €200 to justify an investment, while for others, it serves more as a narrative tool that symbolizes the company's environmental commitment. This duality echoes findings from Ecorys (2019), which emphasize the symbolic and practical roles internal CO_2 pricing can play. However, questions remain about the price's material effect on decision-making. The data reveals that it rarely acts as a decisive financial driver; rather, it confirms choices already favored for other reasons.

Implementation and Application: Cultural Adoption vs Operational Integration

A clear theme across interviews is the discrepancy between the theoretical adoption of internal CO_2 pricing and its actual implementation in daily processes. While the mechanism enjoys cultural legitimacy, most respondents view it as a "good idea", its operational role is fragmented. This reflects a classic case of institutional decoupling, where formal structures (e.g., policy documents, public statements) diverge from practical routines. Departments like Sustainability are confident in their application of the price. But operational units, such as risk management, and engineering, report variable integration. In many cases, CO_2 pricing is not yet part of project budgeting, procurement systems, or vendor communication. This gap

suggests that further institutionalization is required, potentially through CO_2-specific KPIs, digital tools, or incentive schemes tied to project approval processes. This is also identified by Riedel et al. (2021) as an important barrier when using ICP.

Although the internal carbon price helps quantify environmental externalities, several respondents noted its conceptual narrowness. Relying solely on CO_2 reduction risks overlooking other environmental priorities, such as circularity, biodiversity, or air quality (e.g., NO_x). The current framework does not account for material reuse or broader lifecycle impacts, limiting its relevance in complex projects with diverse sustainability profiles.

This feedback aligns with growing academic and policy consensus that sustainability decisions should reflect multiple capitals, not just climate impacts. Broadening the pricing system to include other externalities, or pairing the CO_2 price with additional environmental metrics, could improve decision-making fidelity and align better with long-term ecological goals.

Sustainable considerations within decision making: The Trade-Off Dilemma's

A recurring insight is that the internal CO_2 price enhances decision justification more than it alters decision direction. It provides legitimacy for sustainable choices, but rarely outweighs time, cost, or safety concerns. In projects where emissions are diffuse, such as Scope 3 or embedded emissions in products, the price often lacks details or credibility to be actionable. This tension highlights the importance of complementing internal pricing with other steering mechanisms. For instance, if project managers are only held accountable for financial and scheduling performance, CO_2 considerations, however well-priced, will likely remain subordinate. This is also the case within Microsoft (Ma & Kuo, 2021). Integrating the internal CO_2 price into bonus structures, internal cost accounting, or performance evaluations may help elevate its role from supportive to directive.

Value creation: From Accounting Tool to Value Driver

Despite its current limitations, the internal carbon price offers significant strategic potential. Respondents proposed several future-facing opportunities: Reinvestment mechanisms: Creating an internal fund where CO_2- related cost differences are pooled and reinvested in sustainable projects could enhance engagement and perceived fairness. Broader application: Using the price to evaluate Scope 3 impacts or differentiate between imported and locally produced energy sources could extend its relevance beyond internal operations. Dynamic pricing: Adjusting the internal price based on long-term climate scenarios (e.g., €400 per ton by 2040) could improve temporal accuracy and support future-proof investment planning. Environmental expansion: Extending the pricing principle to circularity, NO_x, or biodiversity would align with broader ESG strategies and improve decision quality. Gasunie's choice to maintain a relatively high internal price, substantially above the EU ETS benchmark, signals strategic intent. The challenge now lies in translating this symbolic leadership into operational advantage. If properly institutionalized, expanded, and communicated, the internal CO_2 price can evolve from a compliance mechanism to a tool for innovation, resilience, and sustainable value creation.

Transdisciplinary dimension

An important part of this research was working together with a practice-based organization, which made the project transdisciplinary. Academic work usually focuses on careful analysis, clear methods, and creating knowledge that can be used in many situations. In contrast, people in practice are often more interested in solutions that are useful right away in their specific context. Because of this, there were sometimes different ideas about what counts as valuable or trustworthy knowledge. For example, while the researcher aimed to understand the bigger picture through interviews and analysis, the organization was more interested in clear and practical recommendations. This helped make the research both useful for practice and

meaningful in an academic sense. By engaging in feedback sessions with the organization and talk about academic insights in practical examples, the researcher was able to integrate practitioner knowledge into the research process while maintaining academic depth. This exchange not only enriched the empirical findings but also strengthened the relevance and usability of the research outcomes for the organization. Linking the results to existing literature made the research academic meaningful, then translating this to practical recommendations made this research contribute to both academic literature as well as concrete and useful improvements for the organization.

Conclusion

This study set out to explore the barriers and drivers associated with the internal carbon pricing (ICP) mechanism within a large Dutch utility company. Drawing on a thematic analysis of semi-structured interviews, several key insights emerged that shed light on the practical implications of internal carbon valuation. This led to recommondations for the Gasunie and its use of ICP.

While the internal CO_2 price of €200 per ton is generally seen as credible and well-positioned relative to market alternatives like the EU ETS, its practical implementation is subject to considerable variation. On the one hand, the ICP acts as a positive driver for sustainable decision-making, providing a calculable and communicable valuation of emissions that helps integrate climate impact into investment appraisals and procurement decisions. It is particularly effective in projects involving high material emissions, such as steel pipelines, where its application can tilt the balance toward more sustainable options.

However, the research also reveals that the mechanism faces practical barriers. These include the limited availability and accuracy of emission data (especially Scope 3), a lack of integration into all business units' workflows, and uncertainty around how the ICP should evolve over time. Moreover, while the CO_2 price is conceptually supported across the organization, it is not always the decisive factor in project selection, particularly when safety, compliance, or cost-efficiency dominate decision-making.

The study also identifies promising opportunities for the future. These include expanding the scope of internal pricing to other environmental impacts, such as circularity and NO_x emissions, and formalizing the application of ICP into governance structures such as project budgeting and reporting. There is also growing internal support for using the ICP as a communicative tool to raise awareness, align with long-term sustainability targets, and stimulate broader value creation beyond financial metrics.

Ultimately, this research underscores the potential of internal carbon pricing to serve as both a financial and normative instrument for organizational transformation. For such tools to deliver maximal impact, they must be embedded not only in policy but also in practice — supported by training, data infrastructure, and cross-functional alignment. As climate-related risks and expectations intensify, ICP mechanisms like this one can play a central role in aligning corporate behavior with societal and environmental imperatives.

Recommendations

Based on the findings of this study, several strategic recommendations can be made to enhance the effectiveness and organizational integration of Gasunie's internal carbon pricing (ICP) mechanism. First, a broader application of ICP beyond Scope 1 and 2 emissions is essential. By incorporating Scope 3 emissions, particularly those arising from procurement, construction, and the broader supply chain, Gasunie can better capture the full environmental footprint of its operations and incentivize upstream emission reductions. Second, the ICP mechanism should be structurally embedded into project budgeting and investment decision-making processes across departments. Rather than being treated as a "nice to have" metric, ICP should function as a mandatory evaluative criterion in business cases, thereby aligning sustainability goals with financial and operational strategies. Third, establishing clear governance structures, including departmental CO_2 budgets and sustainability key performance indicators (KPIs), can improve internal accountability and drive more consistent application of the tool.

Additionally, the internal carbon price itself should be subject to periodic review to ensure its continued relevance in light of evolving policy landscapes, market dynamics, and scientific assessments of the social cost of carbon. Expanding the scope of internal pricing to other environmental impact categories, such as nitrogen emissions, biodiversity, or material circularity, could also help Gasunie adopt a more holistic sustainability approach. Furthermore,

introducing a CO_2 investment fund or incentive-based recycling mechanism within the organization could reward low-carbon choices and accelerate innovation. Finally, strengthening internal education and communication regarding the operational use of ICP is vital. Dedicated training programs, detailed toolkits, and case-based guidance would reduce inconsistencies and enable broader institutional uptake. Collectively, these recommendations can support Gasunie in enhancing the operational, cultural, and strategic impact of its internal carbon pricing mechanism, while also advancing its role as a frontrunner in sustainable infrastructure development.

Future research

While this study focuses on a single energy infrastructure company, future research could compare the use and effectiveness of internal CO_2 pricing across different sectors (e.g., heavy industry, transport, utilities) and organizational types (e.g., private vs. public). Such comparisons could reveal how institutional context and sector-specific dynamics shape the adoption and impact of ICP mechanisms. Also, this thesis identifies perceived effects of the CO_2 price on decision-making, but future studies could assess the actual financial and environmental impact of ICP over time

Respondents indicated that CO_2 is only one part of the sustainability puzzle. Future research could explore the feasibility and impact of integrating ICP with internal valuations of other externalities, such as NO_x emissions, circularity, biodiversity, or social inclusion, potentially leading toward a multi-dimensional "sustainability pricing" framework.

A key challenge that emerged in this research is the limited operational accountability for CO_2 performance. Future work could investigate how ICP can be embedded more directly in performance management systems, budget allocations, and incentive schemes, and what governance models support such integration. Additional research could explore how external stakeholders, including regulators, suppliers, and customers, perceive and respond to a

company's internal CO_2 pricing. This could clarify how ICP influences supply chain emissions, procurement practices, and alignment with broader regulatory trends such as the EU ETS.

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Appendix

Appendix A: Consent form

CONSENT FORM INTERVIEW FOR RESEARCH PURPOSES

Internal carbon pricing and the influence on decision-making processes within the Gasunie.

Dear participant

Thank you for your interest in participating in this research. This letter explains what the research entails and how the research will be conducted. Please take time to read the following information carefully. If any information is not clear kindly ask questions using the contact details of the researchers provided at the end of this letter.

WHAT THIS STUDY IS ABOUT?
Het doel van de studie is om de barrières en mogelijkheden te onderzoeken in de Besluitvormingsprocessen die worden beïnvloed door Internal carbon pricing binnen de Gasunie. Daarbij is het doel om te begrijpen en inzicht te krijgen hoe Internal carbon pricing wordt beschouwd en hoe het is geïntegreerd op bepaalde plekken binnen de organisatie. Daarnaast hoop ik inzicht te creëren wat de beschouwing is van werknemers over de hoogte van de interne prijs en hoe de hoogte van de prijs de besluitvorming beïnvloed.

WHAT DOES PARTICIPATION INVOLVE?
Participating in this research involves conducting one interview from around 45 to 60 minutes where you will answer predetermined questions about your perception on the matter. The interview will be semi-structured which means the predetermined questions can be followed up by additional questions to enhance depth in answers.

DO YOU HAVE TO PARTICIPATE?
Participating is completely voluntary, and you can withdraw from the interview at any moment!

ARE THERE ANY RISKS IN PARTICIPATING?
There are no identified risks when participating.

ARE THERE ANY BENEFITS IN PARTICIPATING?
There are no direct benefits for participants when participating in this research. Answers giving can contribute to gain further knowledge on the topic which can be benefit from by readers of the research.

HOW WILL INFORMATION YOU PROVIDE BE RECORDED, STORED AND PROTECTED?
The interview will be recorded and transcribed by using AI tools. Recordings will only be listened by the researcher and will be deleted after they are transcribed. The data that is collected will be stored on a secure drive to ensure privacy.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?
The results of the study will be discussed in the form of a research paper. Besides that a presentation will be given at the Fryslân campus conference to present the conclusions of the study.

ETHICAL APPROVAL
This research has obtained ethical approval from the Campus Fryslân Ethics Committee and the researcher will ensure the study upholds on relevant ethical standards.

INFORMED CONSENT FORM
I kindly ask you to sign this informed consent form. This means you have the intention to participate in this study but are still able to withdraw at any time!

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?
If there are any questions still unanswered don't hesitate to contact me!

Tel: +31 627467782
Email: B.schuddebeurs@student.rug.nl

Consent forms:

https://drive.google.com/drive/folders/1Vua3hCq_V7Z4kJP3HcQxrDDaka29KzMc?usp=drive_link

Appendix B: Transcripts

Transcripts:

https://drive.google.com/drive/folders/18Hjk6muA6cCF5pL6ip4e81BFQS8rRY-6?usp=drive_link

Appendix C: Interview guide

Interview Guide: Exploring the Perception of Internal Carbon Pricing (ICP) Among Decision-Makers at Gasunie

This interview aims to understand how decision-makers at Gasunie perceive, experience, and interact with Internal Carbon Pricing (ICP) in their daily work. It will explore how ICP influences their roles, decisions, and collaboration with colleagues, as well as the challenges and benefits they associate with the mechanism.

Introduction *(5 minutes)*
Can take longer and is not fully scripted

Objective: Establish rapport, explain the research purpose, and obtain consent.

1. **Introduction and Purpose of the Interview**
    - Thank you for participating in this interview. My name is Bram, and I am conducting research on how Internal Carbon Pricing (ICP) is perceived and experienced by decision-makers at Gasunie.
    - The goal is to understand how ICP influences your role, your daily work, and your decision-making processes.
2. **Confidentiality and Consent**
    - Your responses will remain confidential, and no names or identifiable information will be shared in the research findings.
    - With your permission, I would like to record this interview to ensure I capture all details accurately. Do I have your consent to proceed?
3. **Interview Structure**
    - The interview will take approximately **45 minutes** and will focus on five themes:
        1. Your role and how ICP interacts with your work
        2. Your experience using or being influenced by ICP
        3. How ICP affects collaboration and decision-making
        4. Challenges you experience with ICP
        5. How ICP could be improved

1. Role and Interaction with ICP *(5 minutes)*

Objective: Understand how the interviewee encounters ICP in their daily work.

4. Can you describe your role at Gasunie?
5. How does ICP relate to your responsibilities? Do you actively use it, or are you influenced by decisions made using ICP?
6. How frequently do you interact with ICP in your work? Is it a regular part of your decision-making process, or is it more of a background consideration or did it happen once?

2. Experience Using or Being Influenced by ICP *(10 minutes)*

Objective: Explore how ICP is perceived by those who directly use it and those who are affected by it.

7. How would you describe your experience working with ICP? Do you find it useful, challenging, or neutral?
8. In what ways does ICP shape your decision-making process? Can you give an example of a decision where ICP played a role?
9. Have you ever had to adjust or reconsider a project, investment, or operational plan due to ICP? If so, can you describe how that process unfolded?
10. If you don't actively use ICP but are influenced by it, how do you experience its effects? Do you feel that it is an effective tool for guiding business decisions?

3. Impact on Decision-Making *(10 minutes)*

Objective: Understand how ICP affects workplace dynamics and decision-making interactions.

11. Are there differences in how various teams or business units perceive and apply ICP?
12. Do you feel that ICP facilitates meaningful discussions about sustainability, or is it more of a technical/financial tool?
13. What do you think of the price that is currently used as the internal carbon price and is this price high enough to influence your decision?

4. Challenges and Barriers to ICP Effectiveness *(10 minutes)*

Objective: Identify the difficulties employees face when working with ICP and how it affects their work.

15. What do you find most challenging about working with ICP?
16. Is there any confusion or lack of clarity regarding how ICP should be used in decision-making?
17. Do you think that ICP sometimes conflicts with other business priorities, such as cost control or operational efficiency?

5. Opportunities and Improvements *(5 minutes)*

Objective: Identify ways to improve the usability and effectiveness of ICP.

19. In your opinion, how could ICP be improved to make it more relevant and useful in your daily work?
20. If you could change one thing about how ICP is used at Gasunie, what would it be?

6. Closing and Additional Thoughts *(5 minutes)*

Objective: Allow for additional insights and finalize the interview.

22. Is there anything else you would like to share about your experience with ICP?
23. Do you have any questions for me about this research?

Final Remarks:

- Thank you for your time and insights. Your input is extremely valuable in understanding how ICP is perceived and applied within Gasunie.
- If you would like to receive a summary of the findings once the research is completed, please let me know.

Summary of Interview Guide

- **Total Duration:** ~45 minutes
- **Focus:** The interview emphasizes the **user experience** and **perception of ICP** rather than just technical implementation.
- **Themes Covered:**
    1. **Interaction with ICP:** How ICP fits into the interviewee's role.
    2. **Experience with ICP:** Whether ICP is seen as useful, difficult, or neutral.
    3. **Impact on Collaboration & Decision-Making:** How ICP affects teamwork and communication.
    4. **Challenges with ICP:** Barriers that limit its effectiveness.
    5. **Opportunities for Improvement:** Suggestions for making ICP more practical.

This version ensures that the interview focuses on **how ICP is actually experienced and perceived by those who use or are influenced by it**, making it more relevant to the study's goal. Let me know if you'd like any modifications!