

Competitive Differentiation in Green Transition:

The Significance of Green Premium (GrPr)

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Abbreviations and Acronyms

\$	Dollar
€	Euro
°C	Degree Celsius
B2B	Business-to-Business
B2C	Business-to-Consumer
BF	Blast Furnace
BOF	Basic Oxygen Furnace
CBAM	Carbon Border Adjustment Mechanism
CCE	Circular Carbon Economy
CO ₂	Carbon Dioxide
DRI	Direct Reduced Iron
EAF	Electric Arc Furnace
EPA	Environmental Protection Agency
ESG	Environmental, Social, and Governance
ETS	Emission Trading System
EU	European Union

G20	Group of 20
GHG	Greenhouse Gas
GrPr [🌱]	Green Premium
HVAC	Heating, Ventilation, and Air Conditioning
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
LED	Light-Emitting Diode
LEED	Leadership in Energy and Environmental Design
NGO	Non-Governmental Organization
NZBA	Net Zero Banking Alliance
PRT	Personal Rapid Transition
R&D	Research and Development
ROI	Return on Investment
SBTi	Science-Based Targets Initiative
t	Tonne
USA	United States of America

Foreword

At PwC, we closely follow the green transition and sustainability agendas, aligning with our global purpose of building trust in society and solving important problems. We continue to provide guidance through the consultations we initiate and the projects we undertake with our public and private sector stakeholders.

Building on our previous study, which explored the two main archetypes of the green transition landscape (i.e., Green Pioneers and Carbon Players), this paper delves deeper into one of the key opportunities for Green Pioneers: the Green Premium (GrPr⁺). By focusing on the benefits of GrPr⁺ and mitigation of the transition risks, this paper provides insights and tools for leveraging them effectively in sustainability-driven strategies and markets. This approach ensures a smooth transition from understanding the broader context to examining specific strategies for businesses aiming to capitalize on the premium.

Throughout our study, we focus on leveraging the GrPr⁺ and exploring strategic pathways for businesses, enabling them to transcend immediate gains and contribute to a sustainable future. Serving as a guide through the complex landscape of emission reductions, the perspective of GrPr⁺ provides businesses with a roadmap enhancing growth, resilience, and value creation. GrPr⁺ equips companies with the insights needed to navigate this intricate terrain, ensuring informed decisions that promote both competitive advantage and global sustainability. This multifaceted strategy acts as a catalyst for businesses to embrace their role in shaping a more resilient and prosperous future for all.

Executive Summary

The 21st century has witnessed accelerated global climate change, prompting nations, institutions, and individuals to mobilize strategies against corresponding environmental, economic, and social challenges. However, achieving ambitious climate targets faces hurdles such as shifting consumer behavior, market dynamics, and developing green energy infrastructure. Financial barriers further impede private sector involvement in emission reduction efforts.

This paper explores the concept of the “Green Premium (GrPr^{♻️})” and its implications for businesses amidst global efforts to combat climate change. As countries adopt stricter emissions policies and promote sustainability, businesses face heightened transition risks, including increased costs, regulatory uncertainties, and technological challenges. Effective strategies are essential to proactively manage and mitigate these risks.

Within this landscape, two strategic paths emerge: Carbon Players adopt a cautious, incremental approach to decarbonization, optimizing operations while considering trade-offs. Conversely, Green Pioneers pursue sustainable business models, aiming for early market dominance and benefiting from access to green markets, regulatory risk mitigation, and green finance opportunities. Thus, Green Pioneers leverage first-mover advantages, using sustainable innovation to tap into emerging green markets and benefit from a GrPr^{♻️}. This premium reflects the tangible and intangible benefits associated with transitioning products, services, business models, markets, and ecosystems towards more sustainable practices. Companies embracing higher levels of sustainability enjoy benefits like higher product prices, enhanced brand reputation, access to exclusive markets, green funding opportunities, and regulatory resilience.

Furthermore, leveraging GrPr^{♻️} offers a proactive approach to avoid or mitigate transition costs such as increasing cost of carbon, stringent legal and regulatory risks, and technological shift. Rising carbon prices impose operational and financial hurdles across industries, leading to significant operational and competitive pressures. Effective management of the GrPr^{♻️} in this landscape is crucial for mitigating transition risks and ensuring long-term sustainability. Strategic investments focused on cost-effectiveness and optimized return on investment is essential for achieving the decarbonization goals. Effective management entails understanding pricing disparities, consumer preferences, and regulatory frameworks, while adapting to industry dynamics and geographical considerations. GrPr^{♻️} may also change over time, which makes the strategic choices even more difficult and uncertain.

In conclusion, the GrPr^{♻️} offers a strategic pathway for businesses to navigate the complexities of transitioning towards sustainability. By adopting comprehensive GrPr^{♻️} strategies tailored to their industries, geographical contexts, and product offerings, companies can mitigate financial risks, enhance operational resilience, and capitalize on emerging opportunities in a carbon-constrained economy. Effectively leveraging the GrPr^{♻️} supports environmental stewardship and strengthens long-term profitability and competitiveness in a sustainable future.

1 Unravelling the Global Climate Change: Developments, Challenges, and Strategic Choices

The dawn of the 21st century has witnessed an unprecedented acceleration in global climate change characterized by profound environmental, economic, and social challenges. In response to this pressing issue, nations worldwide have come together in a unified effort to combat its effects. The crowning achievement of this collective endeavor came in 2015 with the ratification of the Paris Agreement, a landmark accord designed to curb the global temperature rise to well below 2°C above pre-industrial levels, with an aspiration target of limiting the increase to 1.5°C.¹

Alongside the Paris Agreement, various **regional and national initiatives** have sprouted forth, reflecting the diverse strategies adopted by countries to tackle climate change head-on. By December 2023, approximately **145 countries**, accounting for 89% of global emissions, including major emitters such as China, the United States of America (USA), the European Union (EU), and India have pledged to achieve **net zero emission targets**.² Furthermore, as of March 2023, **8,380 companies** have started taking actions and **3,250 corporate net zero commitments** have been approved under the Science-Based Targets Initiative (SBTi), underscoring the private sector's unwavering dedication to reducing emissions.³

Yet, despite these efforts, the path to achieving ambitious targets is riddled with challenges. The transition to a sustainable future demands a fundamental **shift in consumer behavior, market dynamics**, and the development of **green energy infrastructure**. The elevated costs and evolving nature of green technologies, coupled with inadequate financing mechanisms, pose significant barriers that deter private sector engagement in emission reduction. Consequently, companies find themselves at a crossroad, compelled to make **strategic decisions to balance the risks and rewards of decarbonization** amidst a sea of uncertainties.

In this dynamic landscape, **strategic choices** can be broadly categorized into two main camps: the trailblazers, pioneering the transition toward a more sustainable business model (referred to as **Green Pioneers**), and those opting for a more cautious, incremental approach to decarbonization while optimizing existing markets and operations (referred to as **Carbon Players**). While each strategic choice entails trade-offs, it also offers significant **opportunities for actors to tap into potential growth and stimulate competitiveness**.⁴

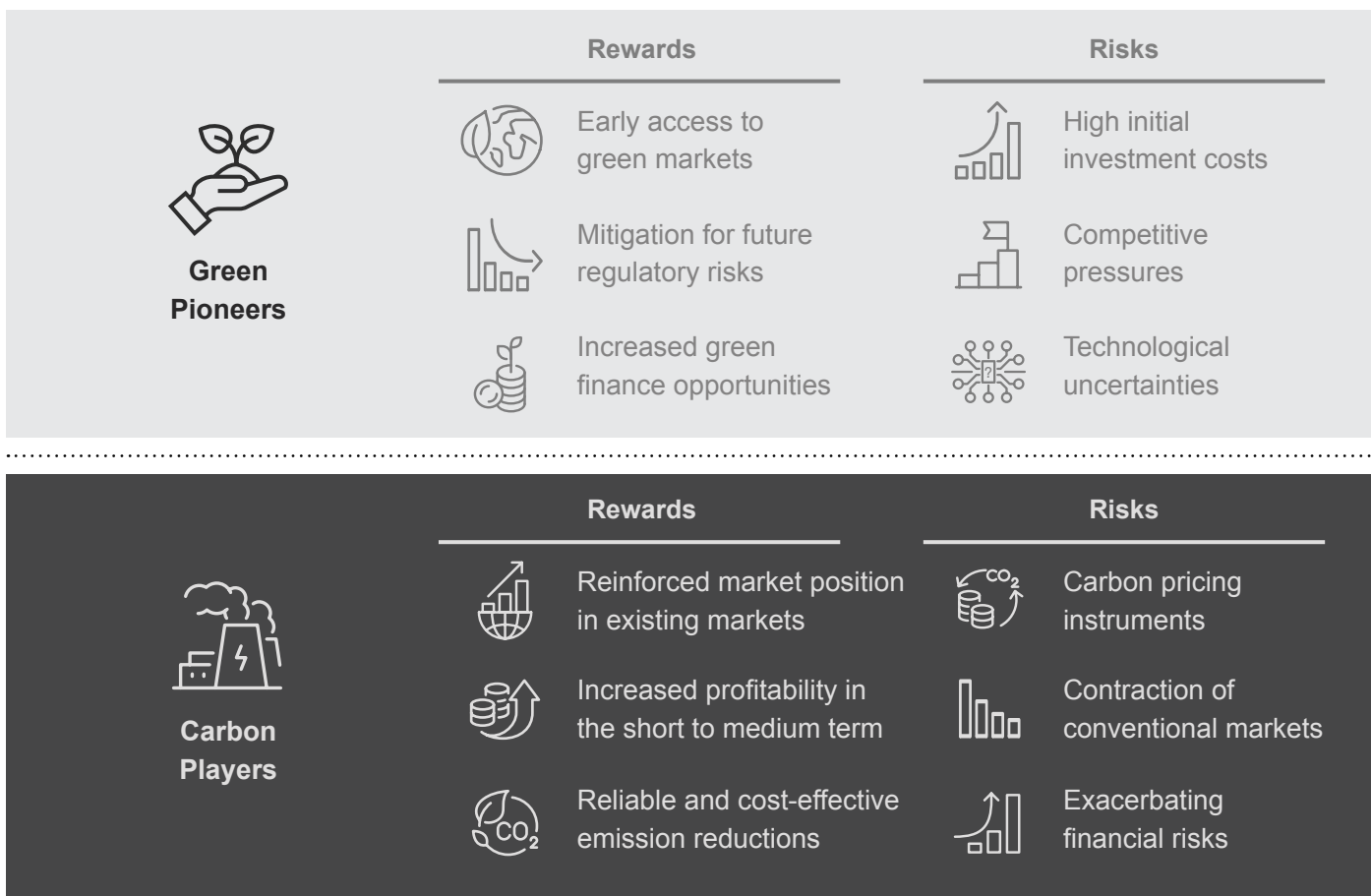
1 UN. (n.d.). Retrieved from <https://www.un.org/en/climatechange/paris-agreement>

2 Climate Action Tracker. (2023). CAT net zero target evaluations. Retrieved from <https://climateactiontracker.org/global/cat-net-zero-target-evaluations/>

3 Science Based Targets. (n.d.). Target Dashboard (Beta). Retrieved from <https://sciencebasedtargets.org/target-dashboard>

4 PwC Türkiye. (2024). Navigating the Evolving Green Landscape: Global Challenges and Strategic Choices

Figure 1. Trade-Offs for Green Pioneers and Carbon Players⁵



By seizing the opportunities presented by the green transition, both Carbon Players and Green Pioneers stand to gain various rewards. **Carbon Players** can expand their market share in conventional product markets and boost profitability in the short to medium term. They can adopt a **wait-and-see approach**, integrating promising green technologies as they mature, thereby ensuring reliable and cost-effective emission reductions. Nevertheless, this strategy carries the **risks of facing stringent adoption of carbon pricing instruments, gradual market contraction** due to evolving green dynamics, and **dwindling financial avenues** for high-carbon activities.

Conversely, **Green Pioneers** set their sights on harnessing the **first-mover advantage** to establish a **competitive edge** and capture a significant **market share** in **emerging green markets**. By doing so, they stand to gain various rewards, including early access to burgeoning green markets, mitigation of future regulatory risks, and access to attractive **green finance opportunities** through new financial instruments. The **financial instruments** promoting sustainable activities, such as **green or climate bonds**, have reached \$575 billion in 2023.⁶ This surge in **green finance** is accompanied by the emergence of new financial products under the broader category of carbon finance. These developments not only present new opportunities for Green Pioneers but also create financial risks for Carbon Players.

⁵ Ibid
⁶ Retrieved from <https://www.bloomberg.com/professional/insights/trading/green-bonds-reached-new-heights-in-2023/>

The readiness of private businesses to confront climate change is paramount for their financial resilience amidst evolving green landscape. Factors such as climate transition risks and investor preferences have played a pivotal role in shaping this trend. Environmentally sustainable “green” portfolios have outperformed less climate-friendly “brown” portfolios over the past decade.⁷

Despite conventional finance theories suggesting a risk-return tradeoff, the increasing recognition of Green Pioneers for their potential to yield higher returns reflects the growing popularity of Environmental, Social, and Governance (ESG) investing. However, the nexus between environmental factors and financial performance remains complex and susceptible to shifting investor sentiments.

Moreover, in addition to government-imposed carbon pricing instruments such as carbon taxes and emission trading systems (ETS) and complementary carbon border adjustment mechanisms (CBAM), voluntary-internal carbon pricing mechanisms introduce a levy on carbon dioxide (CO₂) emissions. While pushing green transition efforts through the adoption of these mechanisms, the regulatory trends put extra costs and burdens on players operating with a high carbon content. On the other hand, these developments also offer substantial opportunities for those players spearheading sustainable business strategies. Among the primary advantages for Green Pioneers is the prospect of capitalizing on a “**Green Premium (GrPr[🌱])**” through catalyzing sustainable innovation, adopting to evolving market demands, and ultimately creating long-term positive financial value.



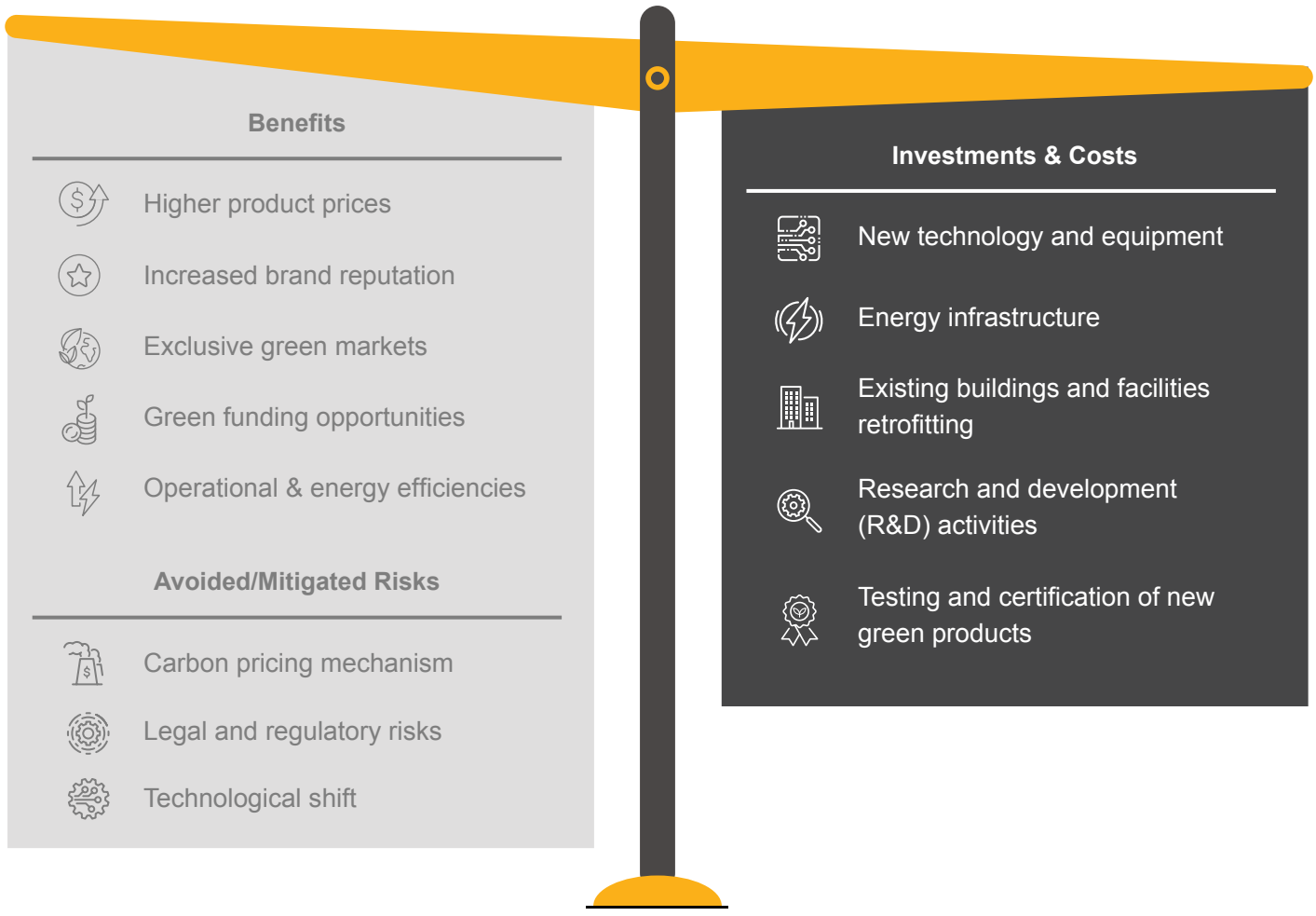
7 2 Degrees Investing Initiative. (2018). The Green Supporting Factor: Quantifying The Impact On European Banks And Green Finance.

2 Redefining the Green Premium

The term “**Green Premium (GrPr⁸)**” as used in the literature reflects the added value, price disparity, and the competitive edge associated with products or services that have lower emissions compared to their conventional counterparts.^{8,9}

It signifies the **tangible or intangible gains** for the companies investing in sustainable strategies, practices, and technologies.¹⁰ Essentially, the **GrPr⁸** reflects the **competitive advantage** and **long-term value creation** when decarbonization strategy becomes integral to business strategy. In addition to its common usage, the term “**GrPr⁸**” typically refers to the additional costs associated with choosing sustainable alternatives.

Figure 2. Needs and Benefits of GrPr¹¹



8 Bill Gates. (2022). How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need

9 World Economic Forum. (2023). Net-Zero Industry Tracker

10 Ibid

11 PwC Analysis

This paper takes a comprehensive approach to exploring the concept of the “GrPr^{♻️}”. Throughout our study, the term encompasses not only the **additional costs** but also the **tangible and intangible benefits** associated with transitioning products or services towards more sustainable practices. Furthermore, the term encompasses the **avoidance or mitigation of potential risks and expenses** that would arise from failing to adopt green practices.

It is evident that the concept of the GrPr^{♻️} is multifaceted, encompassing not only the opportunities arising from the adoption of sustainable practices but also the mitigation of various costs associated with transitioning. Companies actively pursuing a transition toward a greener future reap numerous benefits associated with the GrPr^{♻️}. These include commanding **higher product prices** due to a unique selling point, bolstering **brand reputation**, accessing **exclusive green markets**, and tapping into **green funding** opportunities.¹² Additionally, the GrPr^{♻️} facilitates the avoidance or mitigation of certain costs that pose risks during the transition. Companies aiming to lead in green transition can avoid various transitional risks such as **carbon costs, regulatory and legal hurdles, and technology risks**.

Transitioning towards a green and sustainable business model requires **significant investments** in innovative technologies, processes, and practices. These investments are vital for achieving the business’s **long-term sustainability** goals. Key investments include capital expenditures for new technologies, equipment acquisition, energy infrastructure upgrades, and facility retrofits. Moreover, **research and development (R&D)** activities as well as product testing and certification efforts require significant costs.

Despite the significant upfront costs associated with these efforts, they frequently result in long-term benefits, including gains from the GrPr^{♻️}. To effectively capitalize on the GrPr^{♻️}, it is crucial to carefully weigh the costs and benefits of the related investments, ensuring a favorable return on investment (ROI) structure.



12 PwC Türkiye. (2024). Navigating the Evolving Green Landscape: Global Challenges and Strategic Choices

3 Diverse Gains from Green Premium

The **GrPr**⁺ presents private sector players with a range of competitive advantages. By **pricing products** at a **premium** compared to conventional alternatives, companies can increase profit margins. This strategy also opens doors to **exclusive green markets**, positioning companies ahead of their competitors. Moreover, leveraging value-based, green marketing enhances **brand reputation** significantly. Additionally, as financial markets increasingly prioritize sustainability, companies gain a competitive edge with **improved access to finance** and **lower financing costs**. These advantages collectively strengthen the companies' market position, **operational and energy efficiency** and long-term viability in a transitioning economy.

3.1 Premium Pricing of Low-Carbon Offerings

At present, low or near zero emission products and services can command higher prices compared to their high-emission counterparts. This cost disparity arises from challenges in accurately accounting for the true economic and environmental impacts linked to conventional feedstock like fossil fuels, traditional means of production, and typical process and supply chain management.¹³ On the other hand, most of the decarbonization technologies are still in the developmental stages and have not been scaled up yet, which leads to higher investment costs for green alternatives.

Green and sustainable products, services and technologies appear more expensive upfront despite their long-term environmental and resource benefits. Consequently, both consumers and businesses face **increased expenses** when opting for sustainable alternatives. Through concerted efforts, the high cost of green transition can be gradually reduced to the point where **clean alternatives** become **accessible to all**.¹⁴

From the perspective of customers, studies indicate an increasing trend among individuals to pay a premium for sustainable and environmentally friendly alternatives. PwC's Global Consumer Insights Survey conducted in June 2023 with **8975 consumers from 25 countries and regions** reveals a significant shift in consumer behavior towards sustainability. An overwhelming **80% of respondents express willingness to pay a premium for sustainable products**.¹⁵ Notably, over 40% are prepared to pay up to 10% above average prices, 10% are willing to pay up to 30% more, and approximately 7% are open to paying even higher premiums.¹⁶

¹³ Bill Gates. (2022). How to Avoid a Climate Disaster: The Solutions We Have and the Breakthroughs We Need

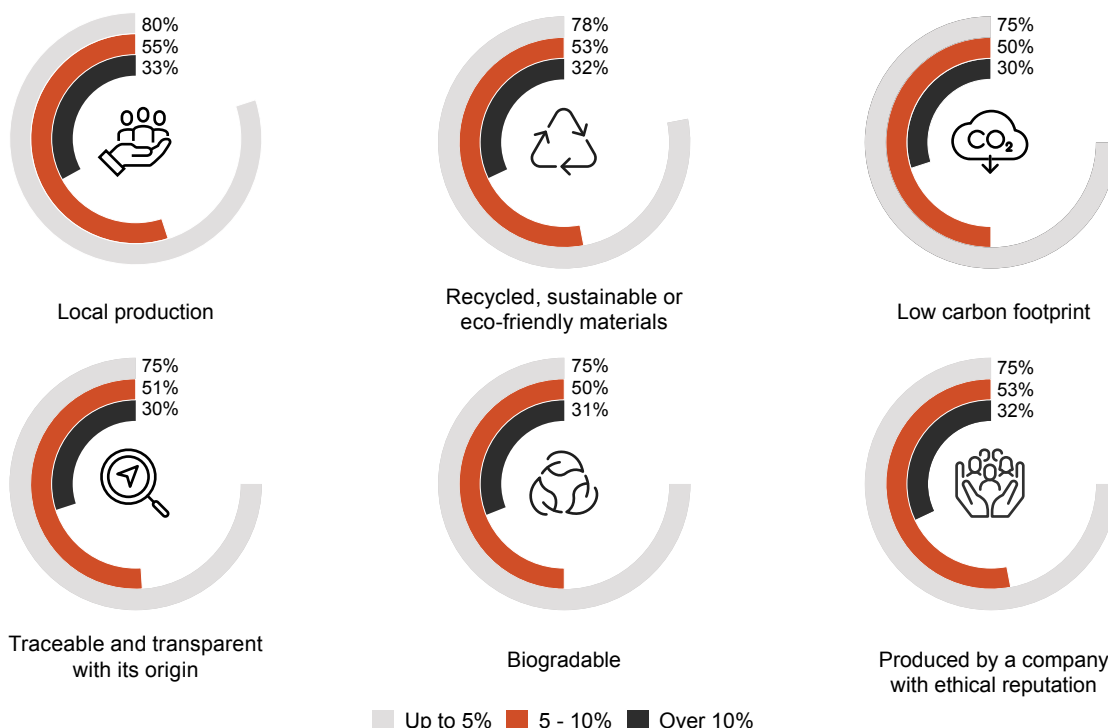
¹⁴ Ibid

¹⁵ PwC. (2023). PwC Global Consumer Insights Pulse Survey

¹⁶ Ibid

Figure 3. Consumers' Willingness to Pay a Sustainability Premium¹⁷

How much extra are you willing to pay?



Millennials and Generation Z, known for their commitment to social and environmental causes, are the most enthusiastic supporters of sustainable purchasing. Compared to the earlier survey, there is a notable **10% increase in the number of consumers willing to pay more for sustainably produced goods.**¹⁸ This indicates a growing alignment between social consciousness and purchasing behavior.

From the business perspective, recognizing that the **GrPr⁺ varies across sectors**, the potential for the premium in each sector changes based on the cost structure such as energy, R&D, and innovation requirements of the clean alternatives.

Furthermore, the price premium is influenced by the consumer segment of the product and by geographical variations. These variations encompass both the location of production and the destination to which the product is exported.¹⁹

For example, **green flat steel** consistently commanded a premium of more than 25% and often more than 30% over conventional flat-rolled steel in 2023, while in Asia there was a 40% premium for green steel over conventional steel.²⁰ On the other hand, the premium for **green aluminium** value-added products in Europe is estimated at \$20-43 per tonne while in the US this figure is expected to diminish significantly approaching to zero.²¹

17 Ibid
 18 Ibid
 19 World Economic Forum. (2023). Net-Zero Industry Tracker
 20 Fastmarkets Commodity Price Data
 21 Ibid

Case Study: Understanding GrPr⁺ in the Steel Industry

Understanding the complexities of the “GrPr⁺” within steel industry entails examining two fundamental elements: **production costs** and **the supply demand dynamics** within the global steel market.²²

As stakeholders navigate this evolving landscape, strategic foresight and adaptability will be key in capitalizing on the opportunities presented by the transition towards green steel production.

While the rising demand for green steel, driven especially by the demand coming from the automotive sector, offers great opportunities for GrPr⁺, the establishment of GrPr⁺ in steelmaking depends on sustained investments in a range of technology pathways.²³ **Electric Arc Furnace (EAF)** facilities that utilize **scrap steel** and powered by **renewable energy sources** represent a viable route to capture the GrPr⁺ with significant emission reductions.

However, **green hydrogen based Direct Reduced Iron (DRI)** also offers a promising pathway for Blast Furnace (BF) facilities in green steel production.

The green steel demand is expected to increase significantly in the forthcoming decades, capturing the GrPr⁺ is only possible with a proactive approach to **seize the early mover advantage**. As multiple steelmakers have already started to implement mixed strategies based on EAF and green hydrogen utilization to seize the early mover advantage, exploiting such efforts requires **value-based marketing methods**.

For example, many steelmakers are adopting Responsible Steel, an internationally recognized and rigorous certification program. Furthermore, companies are developing their own green certifications. For example, **ArcelorMittal**, the world’s leading steelmaker, has developed its own **XCarb** brand to bring together all its reduced, low and zero emission products and initiatives under one umbrella.

Figure 4. Untapping GrPr⁺ Opportunities in Steel Industry²⁴

The anticipated surge in demand for green steel will present substantial opportunities.

- Global steel production was about **1.9 billion** metric tonnes in 2022.
- **71.5%** of global steel production comes from the **BF-BOF** while **28.5%** from the **EAF route**.
- Global steel demand is expected to increase **1.4 times** by **2050**
- Green steel demand is growing **faster** than the producers can ramp up

Traditional methods and innovative technologies can bring steel emissions closer to zero.

- **Utilizing scrap steel** is a major decarbonization lever as it significantly reduces energy consumption.
- **EAFs** are vital decarbonization instruments as they are powered by electricity and can utilize scrap steel.
- **Renewable energy** is the primary affordable and reliable option to decarbonize electricity.
- **Green hydrogen** is the main prominent option for fuel decarbonization by being used in DRI-based production.

Steelmakers can secure the green premium in steel by acting swiftly.

- Move fast to capture the **early mover advantage** and secure early demand.
- Use early demand to **de-risk** the financing of **scaling up** green steel production.
- Utilize **value-based marketing** by leveraging internationally recognized **certifications** and **standards**.
- Continue to **harvest demand** in the green steel market, which will continue to concentrate.

22 Zinchenko S. (2023). “Green steel” premium: to pay or not to pay. GMK Center. Retrieved from <https://gmk.center/en/posts/green-steel-premium-to-pay-or-not-to-pay/>
23 Attwood J. (2023). Green Steel Demand is Rising Faster Than Production Can Ramp Up. BloombergNEF. Retrieved from <https://about.bnef.com/blog/green-steel-demand-is-rising-faster-than-production-can-ramp-up/>

24 World Steel Association, World Economic Forum, IEA, Mission Possible Partnership, BloombergNEF, GMK Center, PwC Türkiye

As **GrPr** stem from shortages in supply side, the price premium may diminish once supply aligns with demand. However, supply demand equilibrium is unlikely in the short term, presenting significant supply side opportunities in sectors with pronounced imbalances. Moreover, the persisting gap between supply and demand offers an **opportunity for proactive players** to capitalize on the value of full decarbonization through **strategic value-based pricing utilizing effective GrPr strategies**.

3.2 Reputation Gains from the Green Premium

Modern consumers are increasingly forming **value-driven relationships with brands**, driven by a growing emphasis on **sustainability**. As awareness of sustainability rises globally, consumer demand for eco-friendly products intensifies, leading to a crucial need for brands to offer strong value propositions that include sustainable practices to build lasting connections with customers. Brands that successfully cultivate an environmentally and socially conscious image through tangible actions are well-positioned to resonate with today's conscientious consumer base, while also benefiting from the **GrPr**.

Companies offering low-carbon products can optimize the financial advantages of a **GrPr** through strategic value-based marketing and pricing approaches. This shift presents an opportunity to leverage sustainability initiatives to enhance pricing power and meet evolving consumer expectations, thereby aligning consumer preferences with corporate strategies.

Establishing a distinctive **green brand identity** offers numerous advantages. It enhances **reputation** and **credibility**, positioning the brand as trustworthy, ethical, and responsible. This distinction supports brand differentiation and fosters positive word-of-mouth. Additionally, it builds customer loyalty and satisfaction by resonating with environmentally conscious consumers. Green branding also facilitates cost and risk reduction through eco-friendly practices, leading to lower operational expenses, increased profitability, and mitigation of environmental risks.²⁵

However, companies must navigate several challenges to establish successful green branding. Ensuring alignment between the brand's values, vision, and environmental impact across all touchpoints is essential. Companies must guard against greenwashing and its repercussions, with transparency, accountability, and responsiveness being crucial to maintaining credibility and avoiding backlash.²⁶

²⁵ Entrepreneur. (2023). How Sustainability is Revolutionizing Branding and Corporate Identity

²⁶ FasterCapital. (2024). Green branding and reputation: From Startup to Eco Warrior: Green Branding for Entrepreneurs

Case Study: Leading Green Branding Practices

Ørsted is a trailblazer company in the renewable energy sector excelling both innovative solutions and exemplary green branding strategies. Founded in 1972 as Dong Energy in order to manage Denmark's oil and natural gas resources, the company began transitioning away from fossil fuels towards electricity in the 2000s.

In 2017, the company divested all its oil and natural gas assets, rebranded as Ørsted, and shifted its focus almost entirely to offshore wind.

Becoming the first energy company with a science-based net zero target in 2021, Ørsted, has a 93% renewable energy share in production in 2023 and has a goal of net zero generation by 2025 and no carbon emissions by 2040.²⁷

This transformation not only signifies a strategic shift toward environmental responsibility but also showcases the creation of a **sustainable identity at the core** values of the company.²⁸ The successful execution of the company's green branding strategies can be outlined as follows:



Demonstrating clear commitments to combating climate change and divesting from fossil fuels, showcasing the company's **authenticity and transparency**, which in turn enhances credibility from the consumer perspective.



Aligning the company's **visual identity** with sustainability by updating its logo to reflect its focus on renewable energy.



Harnessing the power of storytelling to create narratives around the real impact of the company's green solutions, thereby fostering **stronger connections with customers**.



Forming **partnerships** with Non-Governmental Organizations (NGOs) and businesses that share a similar vision for a sustainable future, thereby expanding the company's influence.

Ørsted's commitment to sustainability has yielded significant achievements that bolster the company's resilience and competitive advantage. The integration of sustainability principles has not only facilitated enhanced **customer engagement, strategic partnerships, and commercial opportunities** but has also optimized resource allocation, facilitated access to critical materials, adoption of **state-of-the-art technologies**, and recruitment of **top-tier talent**. These endeavors not only address climate change but also deliver **tangible benefits to both customers and the company**.²⁹

²⁷ Company announcements and annual reports

²⁸ Ørsted. Retrieved from <https://orsted.com/en/who-we-are/our-purpose/our-vision-and-values>

²⁹ Company announcements and annual reports

By capitalizing on these opportunities, Green Pioneers can quickly establish themselves in a growing market, accelerating profit generation while enhancing brand value. Green branding allows companies to distinguish themselves from competitors, pull and retain sustainability-oriented employees, and boost profitability through ethical business practices and decarbonization initiatives, thereby fostering customer trust and sustained loyalty.

3.3 Green Premium as a Gateway to Exclusive Markets

Access to exclusive, forward-thinking, and sustainability-focused markets offers companies unique opportunities to capitalize on the **GrPr**.³⁰ These cutting-edge markets provide a platform for businesses to enhance their green credentials and tap into significant financial incentives, collaborative environments, and heightened market visibility. Emerging examples like NEOM, Masdar City, and Éco-Vallée are analyzed to understand their advantages, offerings, and demand conditions for low-carbon products and services.

NEOM, a futuristic city in northwest Saudi Arabia established in 2017, is dedicated to sustainability through initiatives like the Circular Carbon Economy (CCE). It aims to achieve a 50% renewable energy mix by 2030 and net zero emissions by 2060. Featuring an AI-driven, carbon-free energy system, NEOM allows residents to contribute surplus energy to the grid, fostering a collaborative sustainability ecosystem across diverse regions and sectors through integration of solar, wind, and hydrogen energy.^{30 31}

Similarly, the **Éco-Vallée project** near Nice, France, aims to transform rural and urban areas into a sustainability hub, reflecting the EU's sustainable city initiatives. This project demonstrates that significant initial investments in green transformation yield long-term benefits such as economic growth, job creation, advancements in clean technology, and environmental protection. Governed collaboratively by local authorities, the private sector, and residents, and supported by € 64.5 million in shared funding from partners including the State, the city of Nice, and the Provence-Alpes-Côte d'Azur Region, the Environmental Protection Agency (EPA) plans to invest approximately € 379 million in the Plaine du Var. This investment is expected to catalyze nearly € 2 billion in total investment and create over 30,000 jobs.^{32 33}

Furthermore, **Masdar City**, in the United Arab Emirates serves as a prime example of sustainable urban development. This pioneering initiative is extensively studied as a case study below for its innovative approach to integrating renewable energy, sustainable design, and advanced technologies within an urban setting.

30 NEOM. Retrieved from <https://www.neom.com/en-us/about>

31 NEOM, PwC Analysis

32 Nice ÉcoVallée, Financial Protocol, <http://www.ecovallee-cotedazur.com/territorial-project/financial-protocol>

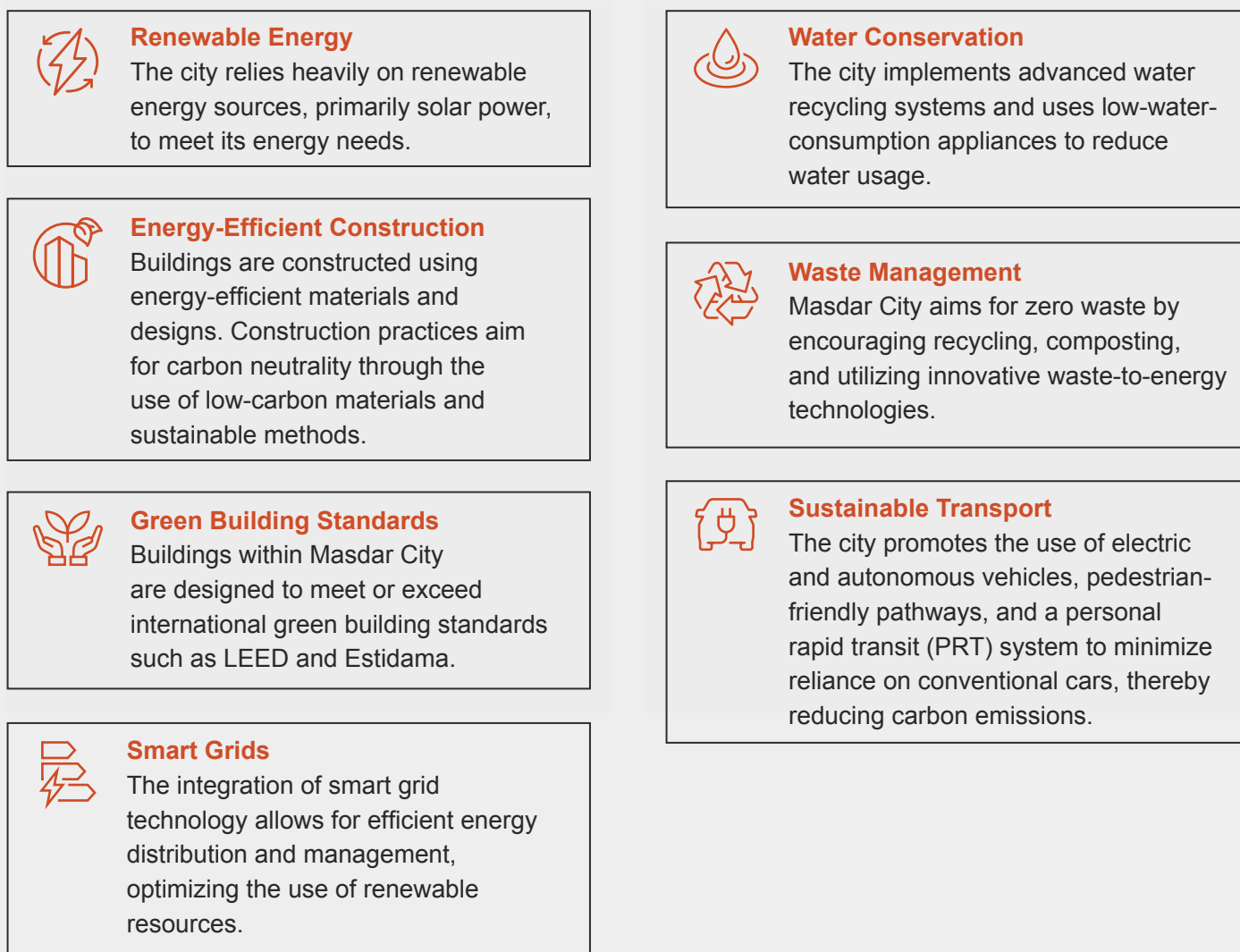
33 Éco-Vallée Announcements, PwC Analysis

Masdar City, United Arab Emirates

Launched in 2006, Masdar City is a pioneering urban development focused on sustainability and decarbonization. This initiative aims to create one of the world's most sustainable urban communities by integrating innovative technologies and practices to minimize its environmental impact.

Masdar City's infrastructure and operational strategies are designed with decarbonization at their core. By being at the forefront of sustainable technology and urban planning, Masdar City attracts businesses and residents who value environmental responsibility, thereby commanding a GrPr⁺. The city offers incentives for companies that contribute to its sustainability goals, fostering an ecosystem where green businesses thrive and can charge a premium for their innovative solutions.³⁴

Figure 5. Sustainability and Decarbonization Initiatives of Masdar City³⁵



³⁴ Masdar City. (n.d.). About Masdar City. Retrieved from <https://masdarcity.ae/about-masdar>

³⁵ Masdar City, PwC Analysis

By adhering to rigorous sustainability standards, businesses can gain a **competitive edge**, appeal to **eco-conscious consumers** in these regions, and command **premium prices** for their innovative and environmentally friendly products and services. They can also strengthen their market position by strategically positioning themselves within these niche markets. It is expected that these sustainability-focused regional markets will grow in significance over time, providing greater opportunities for low-carbon products and services. The **GrPr** therefore acts as a potent driver of growth, empowering companies to distinguish themselves in these exclusive sustainable markets.

3.4 Facilitated Access to Green Finance

Green finance instruments provide companies with significant opportunities to secure low-cost financing options, which are essential for driving sustainable growth and promoting environmental stewardship. By utilizing green bonds and other sustainable financing instruments, Green Pioneers can effectively secure the necessary funds for their sustainability initiatives. These financial tools often come with favorable terms, such as **lower interest rates** and **reduced credit costs**, due to the **decreased risk perception** associated with environmentally responsible projects

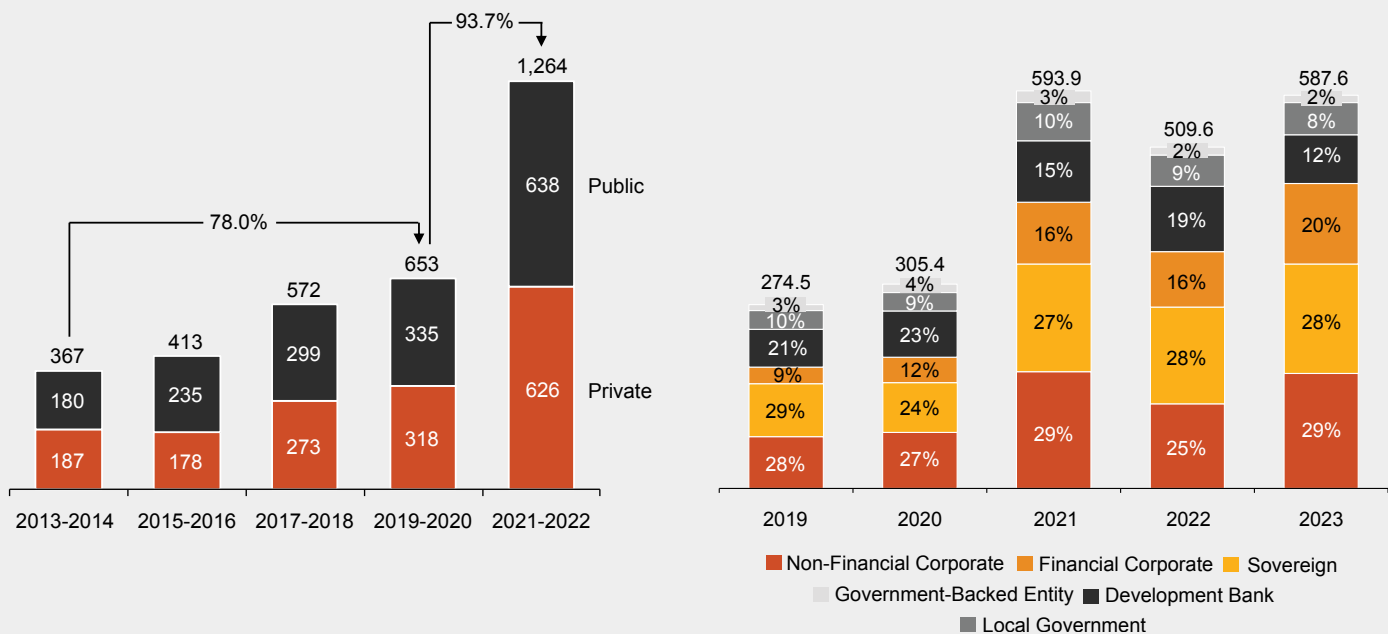
Additionally, national incentives and grants play a crucial role in prompting companies to invest in sustainable practices. Government incentives, including tax breaks and subsidies, alongside grants, are specifically designed to encourage businesses to adopt greener methods. These financial incentives lower the initial investment barrier, making it more feasible for companies to implement sustainable technologies and processes.

Moreover, international development funds have been increasingly directed toward green transition projects. These funds aim to provide the necessary capital for large-scale environmental initiatives, further supporting the global shift towards sustainability. The expansion of such international funding mechanisms underscores the growing recognition of the importance of a coordinated effort in addressing climate change and promoting sustainable development.

As illustrated in the Figure 6, global climate finance has witnessed a significant increase in the recent years, with almost two-fold increase in 2021-2022 period compared to 2019-2020 period. This surge in climate finance underscores the **increasing availability of funds** and the expanding opportunities for companies committed to green and sustainable initiatives.



Figure 6. Global Climate Finance Trends and Green Bond Issuance (Billion \$)³⁶



As an integral element of global climate finance, the volume of green bonds also continues to grow, mirroring the overall trend in sustainable finance. As depicted in the Figure 6, the corporate sector contributes to more than half of the total green bond issuance, significantly driving global market activity. Green bonds generally exhibit more **stable secondary market performance** compared to conventional bonds, benefiting from **high demand** which in turn leads to slightly **lower funding costs**.³⁷

Moreover, companies issuing green bonds often experience a reduced weighted average cost of capital due to a more favorable ‘green’ assessment by investors and stakeholders.³⁸ As a result, the demand for green bonds is expected to be elevated, amid increased investor appetite for sustainable securities that offer transparency over the use of proceeds.³⁹ This trend is further bolstered by ongoing support from regulators and central banks who continue to encourage the adoption of green financial instruments.

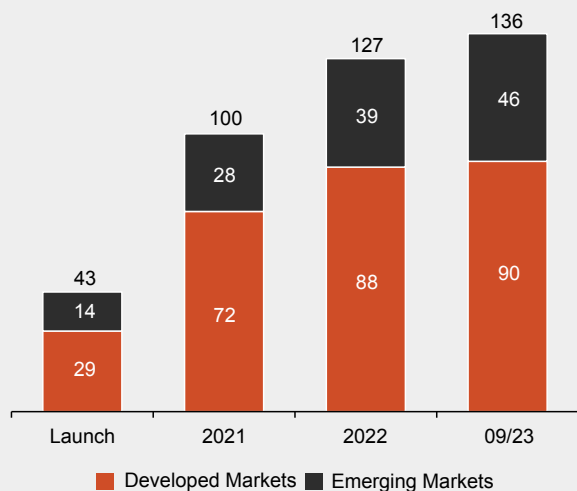
On the other hand, global-scale banking initiatives seeking to align their lending and investment portfolios with the net zero emissions target in 2050 are also expanding. A notable example is the Net Zero Banking Alliance (NZBA) which has tripled its member base since its inception in 2021. NZBA is now representing over \$75 trillion, more than 40% of global financial assets.⁴¹

NZBA members are also reprioritizing emission-intensive sectors such as energy and heavy industry, recognizing the significant impact of these sectors on overall emissions. As a result, as net zero banking initiatives continue to grow, both the availability and the cost of financing will become increasingly linked to a company’s environmental performance and emission reduction commitments. This shift underscores the importance for companies to adopt sustainable practices, as their ability to secure financing will be directly influenced by their progress towards environmental goals.

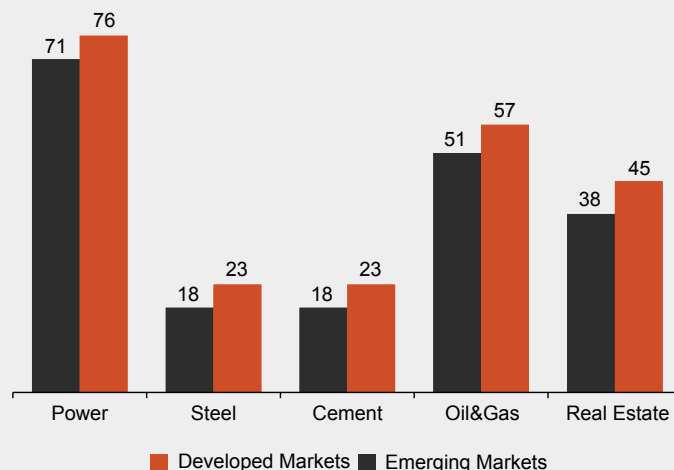
36 Climate Policy Initiative. (2022). Global Landscape of Climate Finance, A Decade of Data
 37 Juvyns V. (2024). Green bonds: Is doing good compatible with doing well in fixed income? JP Morgan Chase.
 38 Hofinger J. (2023). The Greenium. The Pricing of Green Bonds. Frankfurt School of Management.
 39 Juvyns V. (2024). Green bonds: Is doing good compatible with doing well in fixed income? JP Morgan Chase.
 40 Climate Bonds Initiative Interactive Data Platform
 41 UNEP Finance Initiative. (2022). Net Zero Banking Alliance 2023 Progress Report

Figure 7. Composition of Net Zero Banking Alliance Members⁴²

Number of NBZA Members



Number of NZBA Members Which Set Targets in Carbon Intensive Sectors



Moreover, empirical studies focusing on the EU financial markets have demonstrated that strong environmental performance enhances the probability of a company’s loan application being approved while companies with environmentally friendly practices are less likely to encounter collateral requirements.⁴³ As sustainable financial systems continue to expand, it can be hypothesized that this link will further grow and extend to other financial markets.

In conclusion, Green Pioneers can benefit significantly from the GrPr⁺, which brings easier access to low-cost financing options with more favorable terms. Their enhanced environmental performance and emission reduction commitments not only make them attractive to investors but also ensure they are well-positioned to take advantage of the growing demand for sustainable finance. Thus, sustainability becomes a crucial factor in securing financial stability and growth in the evolving green landscape.

3.5 Operational and Energy Efficiency Gains

Energy efficiency is pivotal to the green transition, offering the **fastest** and most **economical path to decarbonization**. Policymakers and industry players also prioritize it due to its vital role in bolstering energy security. As a result, many countries are introducing or significantly enhancing their energy efficiency policies.⁴⁴ These policies, built on best practices and the deployment of existing technologies, are now being implemented on a large scale. For example, lighting standards in the EU, India, Japan, South Africa, and the United Kingdom have been updated to meet or exceed the net zero emission scenario standards.⁴⁵ Similarly, standards for industrial electric motors in the EU, Japan, Switzerland, Türkiye, and the United Kingdom have been revised to match the efficiency class outlined in the same scenario.⁴⁶

⁴² Ibid
⁴³ Zhang, D. (2021). How environmental performance affects firms’ access to credit: Evidence from the EU countries
⁴⁴ IEA. (2023). Energy Efficiency
⁴⁵ Ibid
⁴⁶ Ibid

Businesses must align with these policy changes and embrace efficiency measures to gain the associated benefits. By proactively adopting energy efficiency measures, companies can **lower their energy consumption** for products, services, and operations, **reducing operational costs**. Many companies turn to renewable energy sources like solar, wind, and hydroelectric power, which are sustainable and often more **cost-effective** than fossil fuels in the long run.⁴⁷ Adopting new technologies and practices that are more efficient and sustainable is also essential. For instance, implementing energy-efficient technologies such as LED lighting, high-efficiency HVAC systems, and advanced manufacturing processes can significantly reduce energy consumption. Additionally, the use of smart grids and energy management systems allows for real-time monitoring and optimization of energy use, leading to substantial **improvements in energy efficiency** and significant **cost savings on energy bills**.

Integrating energy efficiency measures with **operational efficiency** efforts helps companies **streamline processes, minimize waste, and optimize resource utilization**, thereby **enhancing productivity and profitability**. Decarbonization efforts require a reevaluation and redesign of existing operational processes. **Operational improvements** and efficiency measures help reduce the total energy consumption from production processes. Companies can employ lean manufacturing principles to improve efficiency while reducing waste.

In addition, incorporating **circular economy** principles—where resources are reused, refurbished, and recycled—can reduce waste and improve resource utilization.⁴⁸ By reusing and recycling materials, companies can significantly lower raw material costs and dependence on virgin resources.⁴⁹ Circular practices can also lead to innovative products and processes, opening new revenue streams and fostering long-term sustainability. Furthermore, **sustainable supply chain practices** also enhance operational efficiency by reducing emissions and improving logistics and inventory management.⁵⁰

In conclusion, companies that proactively embrace the green transition by adopting new technologies, practices, and measures can significantly enhance their energy efficiency and operational excellence. As a result, Green Pioneers can successfully achieve transition to operational and energy efficiencies, seize opportunities from new environmental premiums, and align their operations with global sustainability and circularity trends. Prioritizing the integration of green technologies and materials into their strategies ensures that energy efficiency and circularity principles are embedded throughout their processes and supply chains. This approach not only reduces energy consumption and operational costs but also boosts profitability. By integrating these advancements, businesses can achieve substantial cost savings while positioning themselves for long-term sustainability.

47 *ibid*

48 WB. (2022). Policies from Europe's Circular Economy Transition

49 *ibid*

50 *ibid*

4 Mitigating the Transition Cost through Green Premium

As the profound adverse effects of climate change are being witnessed globally, stricter policies aimed at decreasing and mitigating climate risks are being adopted. These policies serve a dual purpose: to mitigate climate risks and to channel funds towards green initiatives. Transition risks, a critical subset of climate-related risks, encompass uncertainties and negative impacts associated with shifting towards a net-zero economy.

It's important to acknowledge that the transition risk varies widely across industries, locations, and regulatory frameworks, influencing the risks that can be mitigated or avoided. The **industry** in which a company operates significantly shapes its approach to managing transition costs. Factors such as emission reduction potential, marginal abatement costs, and supply chain complexities vary greatly between industries. **Location** also plays a substantial role in the risks encountered. Regions with significant government intervention and strict **regulatory frameworks** tend to heighten transition risks. Moreover, businesses in commodity-exporting countries with energy systems heavily dependent on fossil fuels may also face increased transition risks. These factors critically determine the feasibility and effectiveness of adopting strategies tailored to their specific circumstances.

Understanding and managing these transition risks is essential for businesses to navigate the complexities of emission mitigation and align their strategies with global sustainability goals.

Leveraging **GrPr** becomes crucial in this context, offering a proactive approach to avoid or mitigate transition costs such as **increasing cost of carbon, stringent legal and regulatory risks, and technological shift**.⁵¹ By addressing these factors strategically and integrating **GrPr** strategies successfully into their business models, companies can navigate the transition effectively, mitigate financial risks and position themselves advantageously in a rapidly changing economic and regulatory environment.⁵²

4.1 Mitigating the Carbon Cost

Businesses are increasingly under pressure to decarbonize due to rising carbon prices, driven by the widespread adoption of carbon taxes, ETS, internal carbon pricing models, and complementary carbon border adjustment mechanisms. These mechanisms serve as a financial incentive for companies to reduce their carbon footprint and are implemented based on the price per tonne of carbon emitted.

As global momentum for emission reduction continues to accelerate, an increasing number of countries are adopting these measures. Currently, 39 carbon tax and 36 ETS regimes are implemented globally at national and subnational level.⁵³ **Carbon prices** in these compliance mechanisms range from \$0.46-167 per tonne CO₂⁵⁴, profoundly **impacting production and operational costs**, particularly in carbon-intensive sectors. The direct effect of imposed carbon mechanisms includes an increase in the cost of the emitting company's products, as the company pays an additional price on its CO₂ emissions.

51 Bolton, P., & Kacperczyk, M. (2021). Global Pricing of Carbon-Transition Risk. National Bureau of Economic Research.

52 *ibid*

53 World Bank. (2024). State and Trends of Carbon Pricing 2024

54 *ibid*

Amidst rising carbon costs, companies will face higher expenses, lower profits, and shifts in competitive positioning. This cost increase is often passed along the supply chain, causing other companies to pay higher prices for the emitting company's products and resulting in higher consumer prices.

Complementary mechanisms such as the **EU CBAM** introduce a levy on CO₂ emissions associated with specific **imported goods**, particularly targeting carbon-intensive sectors. This mechanism would effectively impose a “brown penalty” on carbon-intensive goods entering the EU market, significantly affecting their competitiveness, and addressing the possibility of a carbon leakage. Despite its limited initial scope, EU CBAM could disproportionately impact certain emerging-market industries and economies. For example, in the 6 CBAM sector, 43.5% of Turkish exports, 37.3% of Egyptian exports, 18.9% of Indian exports 11.5% of Brazilian exports and 8.6% of Chinese exports are destined for the EU.⁵⁵

The increasing adoption of such mechanisms illustrate a trend toward **higher future carbon prices**.

As carbon prices rise to accelerate the transition to a greener economy, the industrial sectors will face increased challenges in accurately measuring carbon costs and mitigating their operational and financial impacts. While tracking direct emissions is relatively straightforward, the financial implications associated with carbon emissions, including carbon taxes and cap-and-trade systems, represent the **hidden costs of carbon**. A recent PwC study shows that these hidden costs can be significant, potentially amounting to over 1.5% of production value for carbon-intensive goods and up to 10% for electricity, 2.7% for agriculture (specifically beef production), and 3.6% for building systems across Group of 20 (G20) countries.⁵⁶

The impact and magnitude of these risks will vary based on the sector, product range, location, and export destinations of each company. In this context, **GrPr** serves as compass for companies helping them to mitigate the realized and hidden carbon costs. While reaping the diverse benefits of **GrPr**, companies enhance their resilience through adopting sustainable practices and reducing their carbon footprint.

Green Pioneers can lower their carbon tax liabilities and decrease the need for costly emissions allowances under ETS schemes or CBAM. This proactive approach not only helps companies avoid the financial penalties entailing carbon pricing mechanisms but also prepares them for future regulatory changes and market demands, ensuring **long-term operational and financial resilience**. Effectively leveraging **GrPr** underscores the strategic imperative of adopting comprehensive approaches that integrate industry-specific insights, regional dynamics, and evolving sustainability frameworks.⁵⁷

4.2 Mitigating Regulatory and Legal Risks

Policy measures addressing climate change are undergoing continual evolution, significantly impacting businesses worldwide. These policy changes typically fall into two main categories: those that restrict activities contributing to climate change and those that encourage adaptation to its effects.⁵⁸ Measures aimed at restricting activities that accelerate climate change include a variety of **regulatory interventions** including outright **bans**, stringent **procedural requirements**, stricter **green standards**, and **penalties** for environmental non-compliance.⁵⁹

55 World Bank Relative CBAM Exposure Index

56 PwC. (2023). The Hidden Cost of Carbon, www.pwc.com/gx/en/issues/esg/the-hidden-cost-of-carbon.html

57 Bolton, P., & Kacperczyk, M. (2023). Global pricing of carbon-transition risk. *The Journal of Finance*, 78(6), 3677-3754.

58 U.S. Environmental Protection Agency (EPA), Center for Corporate Climate Leadership (2017). Recommendations of the Task Force on Climate-related Financial Disclosures.

59 Ibid

Failure to adapt to the regulatory changes carries both **legal and financial consequences**. For instance, China has outlined plans to ban new steel and cement projects in environmentally sensitive areas, illustrating the implementation of a zoning framework aimed at reducing heavy industries in polluted regions.⁶⁰ Similarly, several countries such as France, Kenya, and Thailand have implemented bans on single-use plastics to mitigate environmental damage.⁶¹ On the other hand, several litigation cases have been filed against cement and steel companies in the US for failing to report hazardous emissions from their plants and neglecting to implement technology upgrades aimed at reducing emissions and pollution.⁶² In Japan, legal action has been taken to halt the construction of coal-fired power plants intended for steel manufacturing.⁶³

This regulatory and legal shift brings significant financial consequences for businesses as well. It translates into challenges such as **higher operational costs, increased energy expenditures, declining demand, reduced profitability, and intensified competition**.⁶⁴ Elevated pricing for greenhouse gas (GHG) emissions and stricter reporting requirements pose a hurdle for the transition journey of the businesses. For instance, some companies choose to offset carbon emissions by purchasing credits, while others are contended with unavoidable costs from regulatory pricing mechanisms like carbon taxes and emissions trading systems. Moreover, governments employ regulations to indirectly price carbon, such as mandating companies to address methane leaks, thereby augmenting emission-related expenses.

Given the dynamic regulatory landscape, the **GrPr**⁶⁵ helps industry players navigate regulatory and legal risks effectively, thereby avoiding associated financial penalties. Ensuring regulatory adjustments are carefully calibrated into decarbonization strategies of the companies is crucial to capitalize on the **GrPr**⁶⁶.

4.3 Mitigating Technology Risks

The pursuit of a green transformation heavily relies on the advancement and widespread adoption of green technologies. Every modeled pathway for limiting global warming to the internationally committed levels necessitates substantial reductions in GHG emissions supported by large scale technology adaptation.⁶⁵ Therefore, innovations in energy production, transportation, and industrial processes are essential for meeting the sustainability goals. While 80% of the technologies required to achieve the 2030 climate targets are already available, reaching net zero by 2050 will still demand significant and rapid technological innovation.⁶⁶

While the evolution of green technologies has demonstrated promising advancements, it is also accompanied by significant **limitations and risks** inherent in the transition. Key among these are barriers related to technology and innovation, the developmental stage of emerging green technologies, and challenges in scaling up and disseminating the best practices.

Firstly, developing and adopting next-generation green technologies involves **substantial R&D costs**, as well as significant initial capital investments. The interconnected nature of green technology networks and infrastructure presents technical challenges, particularly in areas such as energy storage technologies, grid management systems, carbon capture and hydrogen infrastructure networks.

Furthermore, next-generation green technologies are still in the **early stages of development**, necessitating further refinement and commercialization. Nearly half of the reductions in net-zero scenarios developed by the International Energy Agency (IEA) are projected to come from technologies currently at the demonstration or prototype stages.⁶⁷

60 Reuters. (2022). China to Ban New Heavy Industrial Projects in Key Zones

61 UNEP Finance Initiative. (2023). Climate Risks in the Industrial Sectors

62 Maplecroft. (2021). Environmental Risk Outlook

63 UNEP Finance Initiative. (2023). Climate Risks in the Industrial Sectors

64 U.S. Environmental Protection Agency (EPA), Center for Corporate Climate Leadership (2017). Recommendations of the Task Force on Climate-related Financial Disclosures.

65 IPCC. (2023). Synthesis Report of the IPCC Sixth Assessment Report: Summary for Policymakers

66 World Intellectual Property Organization (WIPO). (2023). Green Technology Book: Solutions for Climate Change Mitigation

67 IEA. (2021). Net Zero by 2050: A Roadmap for The Global Energy Sector

Only 26 out of the 1,200 scenarios assessed by the Intergovernmental Panel on Climate Change (IPCC) rely on proven technologies.⁶⁸ This underscores the need for continuous innovation and the advancement of emerging green technologies to achieve long-term sustainability goals.

Scaling up green technology initiatives presents hurdles beyond initial development, especially in achieving economic viability through economies of scale. Thus, breakthrough technologies and innovations have not yet reached extensive usage in the areas where they are most critical. As a result, the focus in the field has started to shift from the scarcity of solutions to **limitations in deployment and adaptation**.

In such a rugged terrain, understanding and embracing the concept of **GrPr** facilitates a smoother transition towards a net zero future, thereby helping to mitigate transition risks associated with climate change. Firstly, pioneering companies can establish reliable **partnerships with green technology suppliers**, ensuring long-term access to cutting-edge innovations and sustainable solutions. This not only enhances operational efficiency but also mitigates supply chain risks. Secondly, leveraging **GrPr** provides an opportunity for early movers to **collaborate with research institutes and universities** for their R&D activities, further advancing innovation in green technologies. Additionally, Green Pioneers can secure access to green financing options for embracing these technologies early on. This enables companies to attract capital for expanding their operations, driving innovation, and promoting sustainable growth. As a result, the pioneers can minimize the cost of the transition while reaping diverse benefits from the **GrPr**.



68 International Institute for Sustainable Development (IISD). (2022). Lighting the Path: What IPCC Energy Pathways Tell Us About Paris-Aligned Policies and Investments.

5 Investment and Cost Imperatives of the Green Transition

In the pursuit of a sustainable future, global capital expenditures and investments play a crucial role in limiting global warming and mitigating its associated risks. Estimates of the total cost of the green transition range from \$100 trillion to \$300 trillion by 2050⁶⁹, according to various studies.⁷⁰ Despite the wide range of these estimates, it is clear that achieving green transition will require substantial **financial commitments** and **significant investments**. Considering the diverse characteristics of different sectors and regions, **investment needs and costs vary significantly**, each presenting unique challenges and opportunities.

These investments often entail substantial **upfront expenditures**, posing a considerable **financial burden on companies**. According to the IEA projections⁷¹, achieving net zero emissions by 2050 will require \$136 trillion in **energy-related investments**.⁷² The electricity sector is projected to be the primary focus, attracting 42% of total investments due to rising demand and electrification.⁷³ Key investment areas within the sector include **energy generation and electricity networks**. Furthermore, energy related spending within the buildings sector, including retrofitting and adopting efficient appliances, requires \$34 trillion investment by 2050.⁷⁴

Improving the energy efficiency of the **building stock** will be important for all industry segments as well as for the consumers. Related investment areas include upgrading **insulation, lighting, and**

heating systems, adopting energy-efficient **HVAC systems** along with integrating **smart building technologies**, which can significantly reduce energy consumption and emissions.

On the other hand, **heavy industries** such as cement, chemicals, and steel are expected to require around \$9 trillion in energy-related investments.⁷⁵ Investment in **energy efficiency** stands as the primary catalyst for growth in heavy industry, yet the roles of **CCUS and hydrogen** are swiftly expanding.⁷⁶ Technologies that contribute to energy savings, such as heat pumps, innovations in electric and fuel efficiency, and industrial **energy management systems**, are the primary investment areas within these sector.

From a broader perspective, regardless of sector-specific needs, there are overarching areas that require investment in the green transition journey. Investments in **new technology and equipment** is pivotal for upgrading existing systems and developing more efficient ones. In this context, **research and development** activities play a crucial role in advancing new technologies and improving existing ones, ensuring continuous innovation and cost reduction. This includes **exploring advanced technologies** such as smart and micro grids, energy storage solutions, green hydrogen, and CCUS. Continued **investment in R&D** ensures that new technologies become more efficient and cost-effective facilitating widespread adoption and integration.

69 WEF. (2023). Costing the earth: What will it take to make the green transition work?

70 The studies mentioned comprise the Network for Greening the Financial System, the International Renewable Energy Agency, BloombergNEF, and the International Energy Agency.

71 The investment trajectory analysis, based on the IEA NZE scenario, defines “energy investment” as capital expenditure on energy supply capacity, infrastructure, and end-use efficiency, excluding operational costs. The focus of the investment trajectory varies by sector. For energy generation, fuel supply, and industry sectors, it covers capital spent on production facilities and infrastructure. In the buildings and road mobility sectors, it includes spending on end-use equipment, such as vehicles for road mobility or heating units for buildings.

72 IIGCC. (2022). Climate Investment Roadmap

73 IEA. (2021). Net Zero by 2050: A Roadmap for the Global Energy Sector

74 ibid

75 ibid

76 ibid

As part of the green transition, **innovative green products and services** are continuously developed and introduced to the market. Consequently, **testing and certification** of new green products and services are essential to ensure they meet regulatory standards and perform as expected, which is vital for market acceptance and deployment. According to the Global Ecolabelling Network, certification programs play a crucial role in promoting sustainable products and practices by providing consumers and businesses with trustworthy information about the environmental performance of products and services.⁷⁷

Lastly, **upskilling and reskilling the workforce** is necessary to equip them with the skills required to operate and maintain new technologies and systems, fostering a smooth transition to a green economy. The transition to a green economy could create 24 million new jobs globally by 2030⁷⁸, but it requires substantial investment in education and training programs. Developing a skilled workforce ensures that industries can effectively implement and manage new technologies, driving the green transition forward.



⁷⁷ Global Ecolabelling Network. (2022). Ecolabels and their role in mitigating climate change
⁷⁸ ILO. (2018). World Employment and Social Outlook 2018: Greening with Jobs



6 Investing Strategically: Balancing Costs, Benefits, and Return of Investment

To fully capitalize on the advantages inherent in the **GrPr⁺**, companies aspiring to lead the green landscape must prioritize **strategic investments** in their green investment portfolios. In this endeavor, understanding the role of **return on investment (ROI)** emerges as imperative, equipping companies with the insights to discern **where and when to channel resources** in decarbonization endeavors to effectively balance return against costs.

The essential query of where to allocate resources finds resolution in **emission measurement** and identification of the **emission hotspots**. Decarbonization investment areas span a spectrum, encompassing transitioning to renewable energy sources, enhancing energy efficiency measures, adopting sustainable supply chain practices, investing in cutting-edge green technologies, and increasing research and development expenditures to develop new sustainable materials, products, or technologies.⁷⁹ Initiating the **investment process** begins with measuring emissions from operations, products, facilities, and suppliers -a critical first step in understanding where to direct investment. Subsequently, identifying measures to mitigate emissions at the most significant sources guides further action.⁸⁰ This approach clarifies which areas require decarbonization efforts, thereby indicating where investments should be made.

On the other hand, various factors affect the **cost-effectiveness** of these investments and subsequent returns. Initial investments may require significant capital, varying based on company size and sector, particularly in carbon-intensive sectors where positive ROI may take longer to achieve.⁸¹ Additionally, location and the energy mix —whether reliant on fossil fuels or abundant in renewable energy sources— significantly impact decarbonization strategies.⁸² Assessing the investment costs, returns, and payback period facilitates informed decision-making to align investments with sustainability objectives while **maximizing ROI**.

The relationship between the cost of decarbonization and the **GrPr⁺** is influenced by the carbon content. The interconnection between the cost and premium serves as a key indicator for comprehending the return on investment. While the cost curve refers to the costs associated with decarbonization efforts, the **GrPr⁺** curve refers to both the benefits and risk aversion inherent in decarbonization efforts.

79 GIC. (2023). Beyond Financial Gaps: Sizing the Decarbonization Investment Opportunity

80 Sustain Life. (2023). The Cost of Decarbonization: How to Measure the ROI

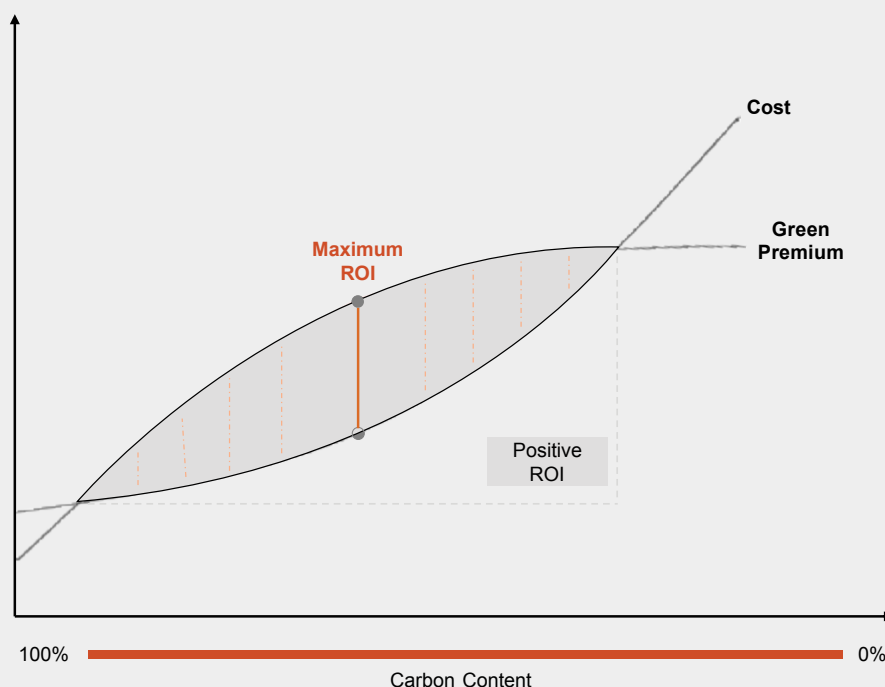
81 ibid

82 IEA. (2023). Reducing the Cost of Capital: Strategies to Unlock Clean Energy Investment in Emerging and Developing Economies

As the carbon content diminishes, the cost of decarbonization increases which suggest that attaining near-zero carbon emissions demands substantially higher expenditures. On the other hand, initial investments can yield significant reductions in carbon content accompanied by the tangible and intangible benefits associated with **GrPr**. This is represented by the exponential increase in the **GrPr** curve, resulting in positive ROI. The positive ROI zone, where costs remain below the attained **GrPr**, delineates the threshold at which returns from decarbonization exceed the associated expenses. However, there exists a point of diminishing returns beyond which further investment yields progressively lower returns, denoted by the peak on the **GrPr** curve. Beyond this point, although reducing carbon content continues to generate positive returns, the rate of return diminishes. Therefore, careful consideration is crucial regarding the point of **diminishing returns**, beyond which additional investments may yield fewer rewards.

The interplay between the cost of decarbonization and the **GrPr** guides companies on when and to what extent decarbonization efforts yield positive returns. It indicates that optimal results can be achieved by investing up to the maximum ROI point, while proceeding beyond this juncture may result in increased costs and diminished returns. Companies committed to ambitious decarbonization strategies may choose to go beyond this juncture. However, those adopting a more cautious approach may focus on aligning decarbonization efforts with the **maximization of ROI**. Amidst the financial hurdles entailing decarbonization, strategic investments play a paramount role in carefully balancing costs against benefits.

Figure 8. Cost of Decarbonization and the GrPr⁸³



In the rapidly evolving transitional landscape, changes in the regulatory environment, advancements in green technologies, and the availability of new financing options directly impact the cost of decarbonization and the **GrPr**. Consequently, **both curves should be perceived as dynamic and subject to change over time**. For instance, technological advancements can drive the cost curve downward as novel green technologies become more affordable and scalable. Moreover, market changes such as increased demand from business-to-business (B2B) and business-to-consumer (B2C) segments for green products, stricter carbon taxes, and broader access to low-cost financing can elevate the **GrPr** curve. These factors illustrate the dynamic nature of the cost of decarbonization and the **GrPr**, emphasizing the need for companies to stay informed, adaptable, and agile in their strategies.


On the other hand, maximizing the **GrPr** comes with certain **limitations**. As a company's **GrPr** increases, the market and client base for such products or services tend to narrow. At its peak, these offerings often appeal only to a niche market.⁸⁴ However, the market for sustainable and green products is expected to expand over time, boosting both supply and demand for high-quality green products.⁸⁵ This growth will likely come with a higher willingness to pay a premium for access to these environmentally friendly options.⁸⁶

The interplay between decarbonization cost, **GrPr**, and the ROI constitute a complex landscape for companies embarking on the journey towards sustainability. This dynamic relationship highlights the importance of **strategic decision-making and adaptation to evolving market dynamics**. Strategic investment decisions are pivotal in navigating these financial challenges, ensuring the ongoing viability of decarbonization efforts while advancing environmental objectives. This fosters a connection between investments and emissions reduction efforts, creating a cycle where strategic investments drive decarbonization, yielding sustainable returns and advancing broader environmental goals.

84 GIC. (2023). Beyond Financing Gaps: Sizing the Decarbonization Investment Opportunity

85 *ibid*

86 WEF. (2023). Winning in Green Markets: Scaling Products for a Net Zero World



7 Concluding Remark

The imperative to address climate change has sparked significant global efforts, as witnessed through initiatives like the Sustainable Development Goals, Paris Agreement, Kyoto Protocol, the Circular Economy Action Plan, and more. However, challenges persist and require strategic decisions from businesses navigating the shift toward sustainability. Whether adopting a pioneering or cautious approach, companies face both opportunities and risks. The concept of the **GrPr** underscores the potential rewards for early adopters and the benefits of avoiding or mitigating transition costs.

However, understanding the concept of **GrPr** is just the beginning. Effectively leveraging these premiums requires a comprehensive approach that integrates the maximum utilization of benefits, optimal aversion or mitigation of transition risks, and strategic investment decisions that consider return on investment. The benefits and mitigated or avoided transition risks of the **GrPr** vary across industries, locations, and regulatory environments. A company's industry influences its decarbonization approach due to differences in emission reduction potential, abatement costs, supply chain complexities, and demand for low-emission products. Geographical location also affects these factors, as regions with strict regulations and government interventions tend to heighten transition risks and the premium. These factors underscore the importance of adopting tailored strategies.

Effective **GrPr** management requires a coordinated strategy that includes leveraging price premiums, establishing robust green branding, accessing niche markets, and securing low-cost financing. As consumers increasingly prioritize environmental considerations, the price premium for innovative green products becomes more acceptable in both B2B and B2C contexts. This trend highlights the growing importance of green branding for companies. The expansion of green markets also presents an opportunity for companies to enhance their environmental credentials and leverage the **GrPr**. Such strategic positioning aligns with consumer values and boosts competitiveness in a market driven by sustainability concerns.

On the other hand, **GrPr** management helps companies mitigate or avoid green transition risks. As carbon prices rise to facilitate the transition to a greener economy, companies will face increasing challenges in managing carbon costs and mitigating their financial and operational impacts. In this context, the concept of the **GrPr** helps companies avoid financial penalties related to carbon pricing mechanisms and prepares them for future regulatory changes and market demands.

To fully capitalize on the **GrPr**, companies must prioritize strategic investments that reduce carbon content and yield significant benefits. Initial investments offer high returns, but there is a point where further investment yields diminishing returns. Companies can choose between ambitious decarbonization strategies, or a cautious approach focused on maximizing ROI. It should be acknowledged that both cost of decarbonization and **GrPr** are dynamic parameters. They are influenced by technological advancements, market demand, regulatory changes, and availability of financing. Maximizing the **GrPr** also comes with certain limitations. While increasing the **GrPr** can narrow the market to a niche, the overall market for green products is expected to grow.

Navigating the complexities of transitioning to a low-carbon economy requires adopting a strategic, value-based approach that considers potential benefits and costs. It is essential to recognize the broader societal impacts and opportunities associated with sustainable practices. Embracing sustainability not only mitigates environmental risks but also fosters social responsibility and enhances community resilience. Companies that prioritize sustainability initiatives contribute to job creation, economic development, and improved public health outcomes, generating positive ripple effects beyond their immediate operations. By aligning environmental stewardship with social and economic well-being, businesses can build greater trust and collaboration with stakeholders, enhancing their overall reputation and long-term sustainability.⁸⁷



87 UN Global Compact. (2023). The Ten Principles of the UN Global Compact. <https://www.unglobalcompact.org/what-is-gc/mission/principles>

