

HOW SUSTAINABLE
FINANCE, GREEN BUILDING
CERTIFICATIONS, AND
GREEN PROPTech ARE
WORKING TOGETHER TO
ENHANCE SUSTAINABILITY
IN THE SOUTH AFRICAN
REAL ESTATE MARKET.

BUILDING THE FUTURE

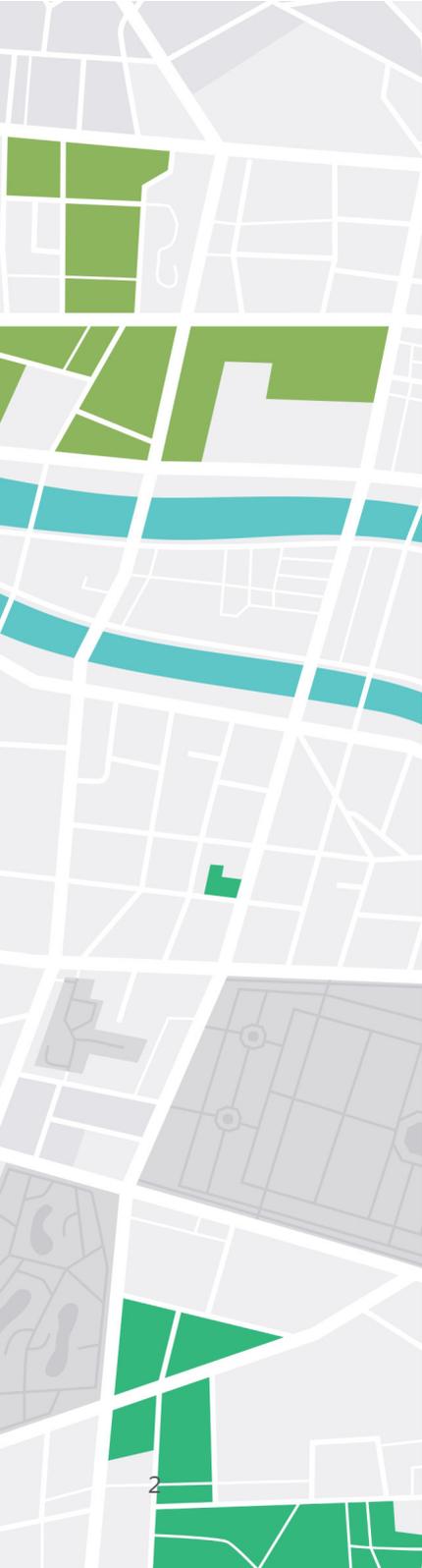
A RESEARCH REPORT
COMPILED BY:

GREEN BUILDING
COUNCIL SOUTH AFRICA
(GBCSA)

REDIMENSION CAPITAL

RMB





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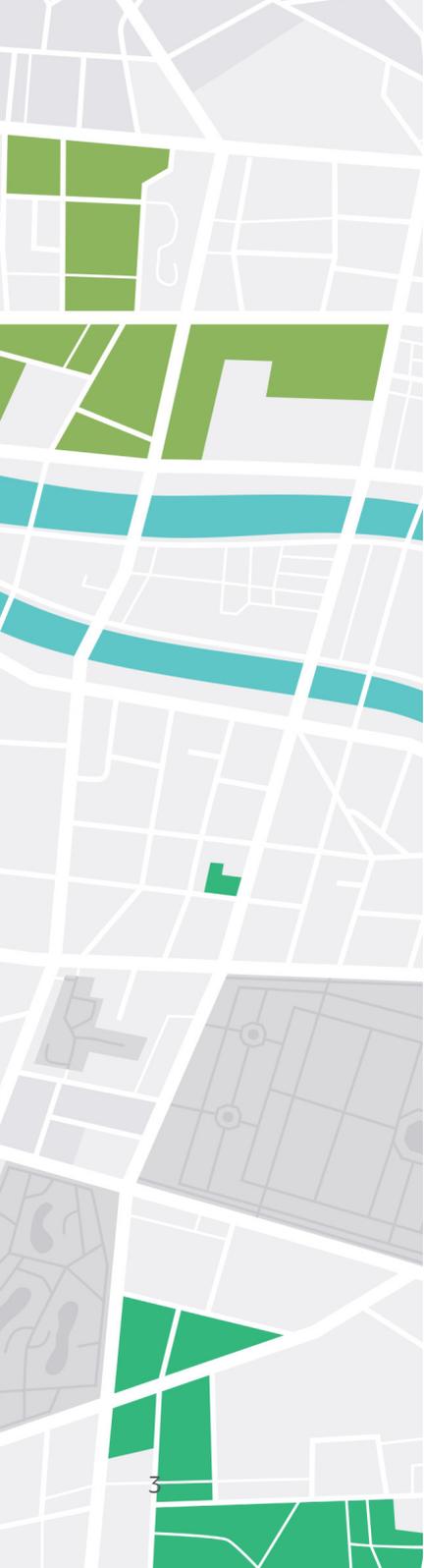
BUILDING THE FUTURE

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Foreword

“It is becoming ever clearer that we are living in an era marked by unprecedented environmental challenges. A more volatile climate is exacerbating inequalities, disproportionately affecting vulnerable communities and amplifying the urgency for comprehensive and co-ordinated action across all sectors.

As the single largest contributor to global greenhouse gas emissions, the real estate sector stands at a critical juncture. For South Africa, with its unique environmental and economic context, the need for inclusive and sustainable buildings and spaces is more pressing than ever.

This research report, focused on the convergence of green finance, green building certifications and green proptech, serves as a valuable resource for developers, investors and other stakeholders who are committed to advancing sustainability in real estate. It highlights how organisations can leverage numerous evolving tools, products and technologies to respond to the pressing need for change and how they can take advantage of the various ancillary benefits that come with it.

By engaging with and embracing sustainable practices, innovation and technology, the sector can become a more responsible participant in the global economy, delivering value to various stakeholders. While daunting, it’s an exciting future where the environmental stewardship and economic growth can go hand-in-hand.”

DAVID GREEN
CEO, V&A Waterfront



PURPOSE OF THIS REPORT

Purpose of this report

This report is for change-makers in the South African property market who want to build a better future. It outlines the scale of the climate challenge and real estate's contribution to it and presents three independent, but mutually beneficial solutions that can work holistically together to address our development and environmental needs.

Specifically, the report provides greater clarity on numerous components which are enabling and incentivising improved sustainable outcomes for the sector including regulations, green building certifications, available technologies and sustainability-related financing solutions.

Together, these elements create a comprehensive approach to Environmental, Social and Governance (ESG), mitigating environmental risks, while driving enhanced social outcomes which assist to underpin and defend long-term asset values and to align real estate operations with broader ESG objectives.

This report acts as a primer, providing a selection of key information on sustainable finance systems, green building rating tools and proptech innovations that enhance building performance, and the fundamental connections between these concepts.

Who is it for?

The report is intended to be used as a useful reference document for those beginning their greening journey, to understand basic principles and scope of the following concepts:

- Certified green building
- Green proptech
- Sustainable finance

This report is no substitute for expert guidance in the critical areas of green proptech, green certified buildings, and sustainable finance. However, it acts as an important entry point for the discussion on how these components come together to support a resilient and future-ready built environment.



PURPOSE OF THIS REPORT

Why you should read it

A changing climate and heightening social challenges has created a dynamic environment where specialist knowledge on interconnected and complex topics is necessary for doing business sustainably.

By providing the reader with an overview of the tools and components working together in response to the sector's greatest challenge, this report serves as a crucial initial 'next step' along the journey of learning for an active participant in the sector.

After reading this report you will:

1. Grasp the climate challenge ahead of us, and why the built environment is such a critical role player;
2. Understand the basics of ESG, green building certification, green proptech and sustainable finance; and
3. Be able to equip your business strategy with complimentary solutions to support the transition to a low-carbon, resilient future.



A stylized map of a city grid. A teal river flows from the top left towards the right side of the map. Several blocks are highlighted in green, primarily along the river and in the upper right quadrant. Other blocks are highlighted in a light grey color. The map is composed of white lines representing streets on a light grey background.

1 INTRODUCTION

ESG principles driving sectoral change

The real estate sector's response to ESG concerns parallels global trends but is uniquely shaped by local challenges and regulatory frameworks. Like elsewhere, there's a growing emphasis on integrating sustainability principles into business practices and operations.

There are similar concerns around accelerated obsolescence in buildings that are not efficient and relevant for the future with an increasing focus on creating buildings that minimise environmental impact, reduce operational costs, and provide healthier, more accessible and engaging living, working and entertainment spaces for tenants and end-users.

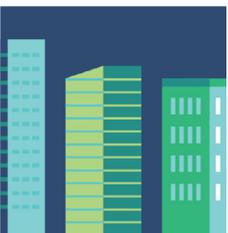
However, the environment in which real estate operates in South Africa creates unique challenges such as service delivery failures, intermittent and unreliable power supply, water scarcity and social inequality and its associated risks. In addressing these local challenges, the real estate sector can have a meaningful impact in addressing both environmental and social aspects of ESG.

ESG in the South African built environment

The concept of ESG continues to gain significant traction globally, and locally, including in South Africa's built environment sector. There is the beginning of a general recognition amongs stakeholders of the interconnectedness of environmental sustainability, social consciousness and upliftment along with the benefits of having a robust governance framework.

ESG reporting is the manifestation of this recognition; evolving from voluntary initiatives to, in many cases, a strategic business imperative with mandatory weight.

Understanding a business's performance against ESG expectations, and how those expectations must be translated for the nuances of local context is becoming a critical driver of long-term business sustainability.



INTRODUCTION

For South African property owners, ESG presents a landscape that encompasses several distinct territories:

Climate risk

Climate change is presenting landlords with both physical risks, which can result in property damage, operational disruptions and increased maintenance costs, and transitional risks resulting from regulatory changes, market adjustments and increased associated costs.

The building and construction sectors, being a significant contributor to climate change and accounting for around 39%¹ of global greenhouse gas emissions, have no option but to proactively respond to the need for both climate change mitigation and adaptation and are taking the issue and impact on various stakeholders increasingly seriously. A deeper discussion of what a changing climate may mean for buildings in South Africa is discussed in Section 2 of this report.

Regulations and policies

Globally, governments and international bodies are increasingly implementing regulations that require businesses to adhere to sustainability standards. This drive to mandate sustainability measures is starting to gain momentum in South Africa, with strong examples being National Governments' onboarding of Energy Performance Certificates (EPCs) for buildings, and Local Government stepping up to the C40 Cities Programme. This is a trend that is picking up pace, and increasing the reach of sectors it affects. Further related details of the South African ESG regulatory environment are detailed in Section 3 of this report.

Reporting and disclosure requirements

ESG is impacting how investors and other stakeholders perceive business sustainability. Accordingly, transparency and comprehensive disclosures are in increasing demand. The Johannesburg Stock Exchange (JSE) has developed Sustainability Disclosure Guidance which includes Climate Change Disclosure Guidance specifically tailored to the South African context.

In addition, the Companies and Intellectual Property Commission (CIPC) has launched an initiative to introduce mandatory ESG reporting for public and state-owned entities from 2025 onwards. These disclosure considerations and the sectors progress in reporting are detailed in Section 3 of this report.

Increasing consumer awareness and a preference for sustainable products is compelling companies to adopt sustainable practices. For landlords, this is playing out in the tenant space where the MSCI South Africa Green Annual Property Index indicates that green-certified buildings attract and retain tenants in buildings with reduced operational costs.

¹ Green Building Council, 2019

INTRODUCTION

A green building business case

Occupiers of space are also facing the same pressures to decarbonise and are becoming increasingly conscious of their emissions, which often must be reported on. As such, they are demanding spaces which are representative of their objectives for lower emissions, and seek quantifiable data to support this.

Green building certification can address these drivers through verified and transparent building performance data, and research conducted on the South African office sector unpacks both the effect this can have on an investment's performance, and how little greening actually costs construction projects. A deep dive into what green building certification means in South Africa, and the research around the green building business case are detailed in Sections 4 and 5 respectively.

Delivering on sustainable outcomes and complying with the various regulations and disclosure requirements requires property owners to better understand the performance of their buildings and businesses. This typically requires the integration of technologies that can capture and assimilate information to make more informed decision-making.

Green technology integration

Technologies are enabling both ESG and commercial outcomes associated with material operational efficiencies, creating smarter, more sustainable buildings, that can benchmark, monitor, and optimise performance in near real-time. These solutions are supporting efficiencies in newly designed buildings, such as in the case study of the Ridge, V&A Waterfront (see section 6), but also have the ability to plug into existing structures, elevating their sustainable performance through upgrades and refurbishments.

Given that the most climate responsible kind of construction is the repurposing of buildings that already exist², it will be key for landlords to seek to retrofit technology solutions and drive the necessary change management to make such technologies effective.

In addition, technology supported by enhanced analytics is making data-led decisions possible, further optimising resource usage and driving an improved occupier experience. The property technology landscape is detailed in Section 7 of this report.

² World Economic Forum, 2024

INTRODUCTION

Access to capital

Financiers are increasingly prioritising ESG criteria in their investment decisions. This shift is driven by the recognition that sustainable companies tend to perform better in the long term and are less exposed to certain risks.

The real estate sector is similarly seeing heightened ESG activity, particularly in more developed markets, with an increased uptake of sustainable finance instruments. As a result, sustainable real estate companies are gaining improved access to capital, at more favorable terms, allowing them to take advantage of opportunities, both to continue to address ESG risks in their portfolios, and to be opportune in their investment activities.

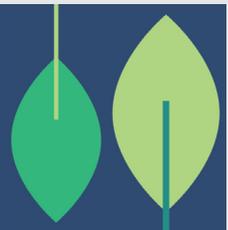
Sustainable finance, including green bonds and loans and sustainability-linked bonds and loans, provides the necessary capital for developing and retrofitting properties to meet ESG standards.

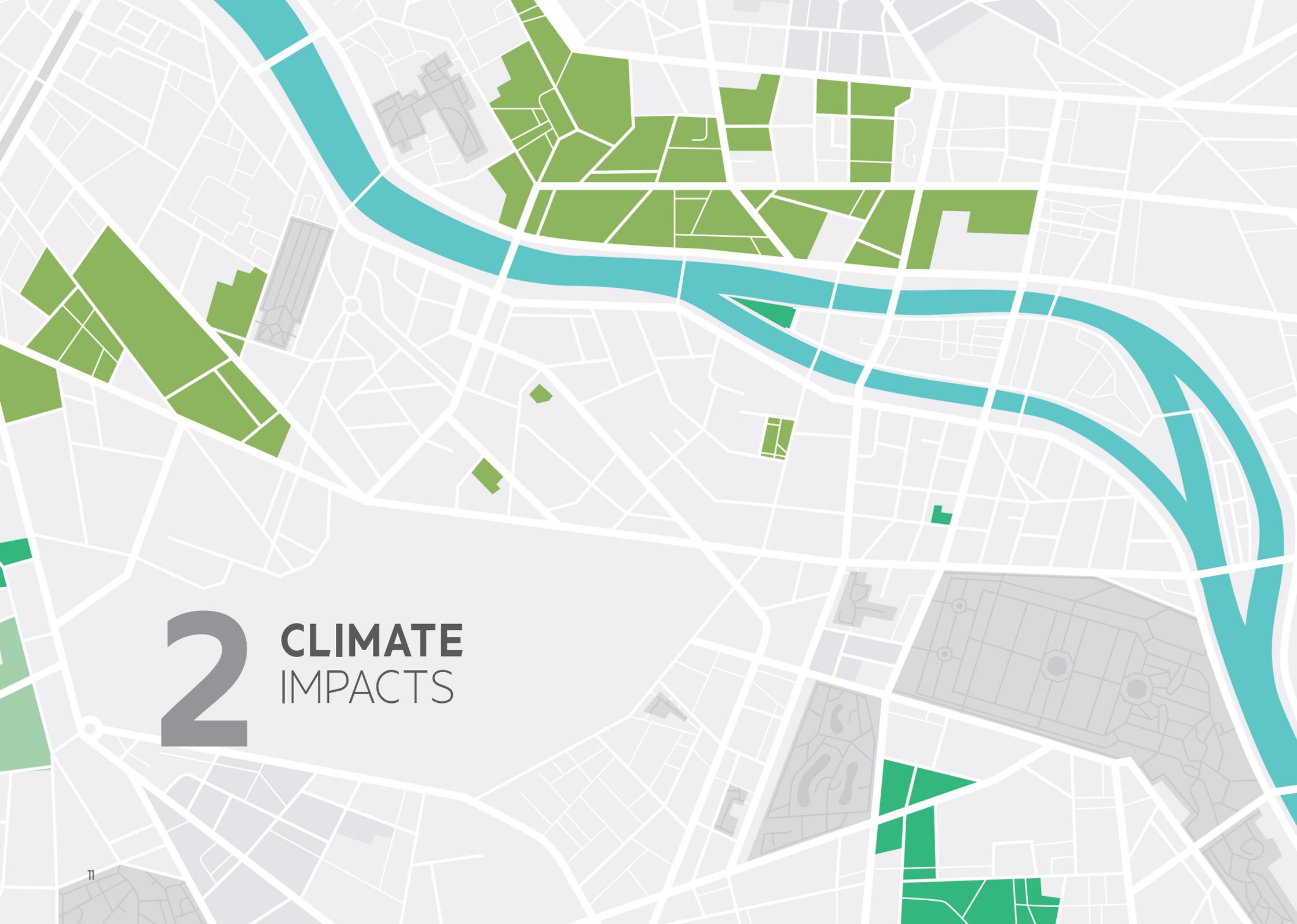
Numerous financing solutions have been developed in recent years that acknowledge and incentivise green initiatives which typically underpin an improved credit profile. Sustainability-related financing solutions are covered in Section 8 of this report.

Steps towards a sustainable business model

This report covers numerous considerations for property owners and operators in driving more sustainable business models. Specifically, the report provides greater clarity on numerous components which are enabling and incentivising improved ESG outcomes for the sector including regulations, green building certifications, available technologies and ESG-linked financing solutions.

Together, these elements create a comprehensive approach to ESG, mitigating environmental risks while driving enhanced social outcomes, which assist to underpin and defend long-term asset values, and to align real estate operations with broader ESG objectives.





2 CLIMATE IMPACTS

The scale of the climate challenge ahead of us

Based on recorded data, scientists have demonstrated that the Earth's climate is now changing faster than at any point in known history. There is also scientific consensus that unmitigated carbon emissions will lead to global warming – posing risks to all life on Earth.

Additionally, science is indicating that every half a percent of temperature rise makes a difference to our ecosystems. The global body of scientists studying climate change and contributing to the International Panel on Climate Change (IPCC) presented the world with evidence that proves the unprecedented scale of the challenge that lies ahead if we do not keep global temperature increase within a 1.5-degree threshold.

The only way to slow down the pace of climate change and avoid its devastating impacts on ecosystems, health and development, is to slow down the rise in greenhouse gases emitted from human activities (such as burning coal to generate electricity) informed by the principles of a just transition.

Scientists have calculated and agreed on global carbon trajectories to maintain the 1.5 degree global warming threshold (and not exceed it). However, the steep curve of these trajectories speaks to the need for urgent action.

The IPCC warns that:

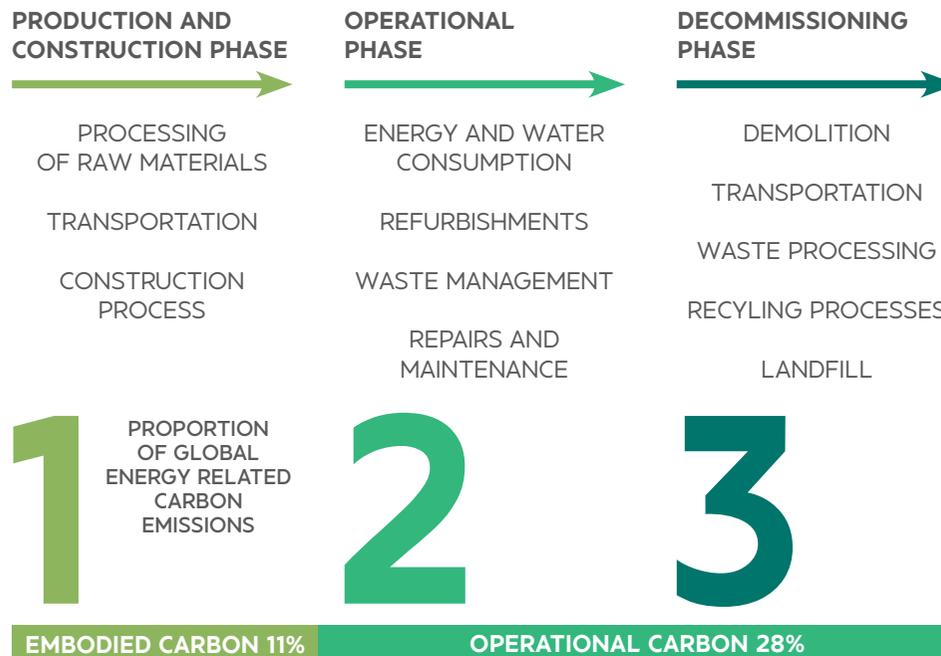
“Unless humans drastically reduce the use of coal, oil and gas within the next 10 years, global temperatures will likely rise more than 1.5 degrees Celsius - surpassing the climate target in the international Paris Agreement and cause irreversible and catastrophic damage. The powerful tornadoes, record-breaking wildfires, highly unusual snowstorms, and other severe or unusual weather events that US regions are experiencing will become even more devastating once this threshold is passed.”

³ IPCC, 2023

How does real estate contribute to the climate change challenge?

Buildings contribute to carbon emissions throughout their life cycle. Collectively, embodied, operational and decommissioning carbon from real estate represents over a third of the world's annual global greenhouse gas emissions.

Emissions commence from the production of the materials and consumption of energy used in the creation of buildings (known as embodied carbon) and evolve to carbon produced during the operational life of a building, including the consumption of energy and water (known as operational carbon), through to decommissioning of old or redundant buildings.



¹ World Green Building Council, 2019

After World Green Building Council, 2019¹

Mitigation into adaptation

Much of the familiar climate discussion has centred around the concept of mitigation of anthropogenic climate change through the reduction of greenhouse gas emissions.

Noting the global average of carbon emissions from the built environment hovers at around 39% of total emissions, and that the volume of that contribution shows little sign of reduction. This topic is as relevant and important as ever, and the commitment to achieving a sustainable emissions trajectory cannot waver. However, it is becoming increasingly apparent that the conversation can no longer be only about mitigation.

The role of climate activism needs to expand, from championing sustainable practices that reduce emissions to include driving resilient practices that ready all sectors, including real estate, to face the climate effects and physical risks associated with climate change.

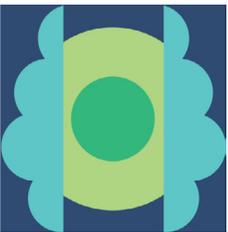
As the sector strives for a cleaner, more efficient and lower emissions future, it will also need to adapt to a hotter, drier, and more unpredictable present. The built environment we create will need to adapt accordingly.

Climate adaptation means many things for the built environment, but primarily it means that existing building stock (and the way existing buildings are managed) will need to be retrofitted for, and new buildings optimised towards resilience against, more extreme temperatures, resource scarcity and natural disaster threats.

AMANDA WILLIAMS⁴
Head of Environmental
Sustainability, Chartered
Institute of Building (CIOB)

“The built environment sector must lead on resilience, placing adaptation at the forefront of how we design, build, maintain, and occupy buildings so that they are fit for a future that will be defined by the impact of climate change. This is not giving up on mitigation, which must continue to be front and centre. It is accepting that we must be ready for an uncertain future.”

⁴ Williams, 2024



CLIMATE IMPACTS

In South Africa, current projections are indicating that these changes will include⁵:

- Higher temperatures and more frequent heatwaves impacting health through heat stress
- Severe droughts happening more frequently, exacerbating existing water shortages
- Heavy rainfall events that cause flooding and other related disasters
- Intensification of severe weather events such as tropical cyclones and wildfires
- Continued sea level rise and increasingly severe ocean and coastal weather conditions

These changes are expected to be severe, and seem to be happening faster in Southern Africa than in other regions, with warming reported around twice the global rate⁶.

What does this mean for buildings?

Physical risks related to climate change affect businesses at all levels in various intuitive ways⁷:

PHYSICAL RISKS IMPACTING BUSINESS MODELS		
1	Quality and quantity of raw materials impacted by physical risk	Example: The number of regions most highly suited to growing coffee is forecasted to decline by 50% by 2050.
2	Reliance on global supply chain with large, complex networks	Example: In 2011 severe floods in Thailand disrupted the operations of more than 14,500 global companies reliant on Thai suppliers, resulting in estimated losses of \$15 to \$20 billion. Western Digital, a significant player in the global hard-drive market, lost 45% of its shipments, and Hewlett Packard suffered losses of \$2 billion.
3	Assets located in regions vulnerable to climate change	Example: Typhoon Haiyan, one of the strongest cyclones recorded in history, resulted in total losses and damage of \$3billion. This includes damage to over 2,300 health facilities and 560 transmission towers and substations, impacting private operators and the public that depend on these services.
4	Employees exposed to climate-related health risks	Example: In the US, on average, heat stress kills 40 workers annually, mostly in outdoor jobs such as farming, construction and package delivery. Aside from their concerning impacts on employee health, heat stress and zoonotic risks can result in unplanned labour shortages. Likewise extreme weather events may prevent travel to work.

⁵ University of Cape Town, 2024

⁶ DFFE, 2021

⁷ Global Resilience Partnership, 2024

After Global Resilience Partnership, 2024. Please see original article for data sources.

In 2022 the estimated global cost of natural disasters, many of them linked to climate change, was over USD313 billion⁷, approximately ZAR5.7 trillion.

For buildings in South Africa, given what we know about the country's vectors of risk, it will mean implementing some or all of the following solutions:

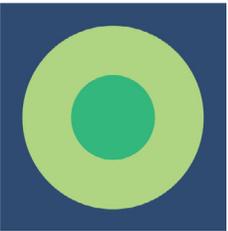
- Improving internal temperature-control systems that are able to deal seamlessly and efficiently with more extreme outdoor temperatures, relying on less water, and particularly less potable water, to do so
- Building more resiliently, allowing structures to better deal with the physical risks of climate change, like wildfires and intense storms
- Anticipating increased rates of infrastructure failure, and longer lead times for remediation
- Driving passive design (designing for the least consumption of water and electricity) and on-site resource generation (designing for the least reliance on external infrastructure systems)

While the specific challenges per building aren't yet clear, or completely predictable, what is increasingly likely is that all buildings will have to work harder to keep their users comfortable and safe in a harsher, less predictable climate.

Given these risks and the significant store of capital within real estate, it is no surprise that buildings and building owners are facing an unprecedented demand for data on both their adaptation and mitigation strategies from financiers, investors, and regulators.

The drive to understand and verify how green and resilient physical assets, such as real estate, are, is clearly reflected in the nine distinct green taxonomies issued in 2023. Green proptech solutions and green building certifications have a role to play in meeting this need. Green proptech supports buildings to increase efficiency, decrease carbon emissions and continue to deliver the high standards of interior and systems performance demanded of the spaces where we will spend time in a warming world. Green building certifications provide a trusted standard in green investment and measurable mitigations and adaptations towards a climate sensitive future.

⁸ JLL, 2023



The building and construction sector: A key participant in the global climate response

In responding to the threats posed by climate change, real estate is going to play a vital role and will need to show leadership in considering how it optimises its impact, driving efficiencies in how spaces are designed, developed, produced and operated.

Being responsible for around 40% of the problem means that the building and construction sector is also poised to seize an opportunity of being around 40% of the solution. For example, demand side solutions that optimise energy efficiency within buildings are comparatively the most cost effective climate abatement solutions, with extensive off-the shelf solutions available.

It is in recognising the opportunities for positive change-making that sustainable finance, green building certification and green proptech come together. They are able to support the scaling of solutions within the built environment to make a tangible difference in how our physical assets contribute and respond to future climate-linked challenges.

The real estate's carbon footprint comprises both embodied carbon and operational carbon, produced throughout the property life-cycle.

Operational carbon represents 28% of global carbon emissions, representing the bulk of total annual emissions. While new buildings can have carbon reducing technologies embedded in the design phase, reducing operational carbon from standing assets through retrofitted technologies will be a key unlock to sector decarbonisation by 2050⁹.

At approximately 11% of global carbon emissions, embodied carbon is also a major contributor to global carbon emissions. While new construction technologies, techniques and materials (as discussed further in this paper) are targeting lower carbon emissions in design, development and construction, the efficient repurposing of existing buildings represents the most meaningful way to avoid waste and additional embodied carbon¹.

⁹ AO PropTech, 2022

¹ World Green Building Council, 2019



An asset class with high potential social impact

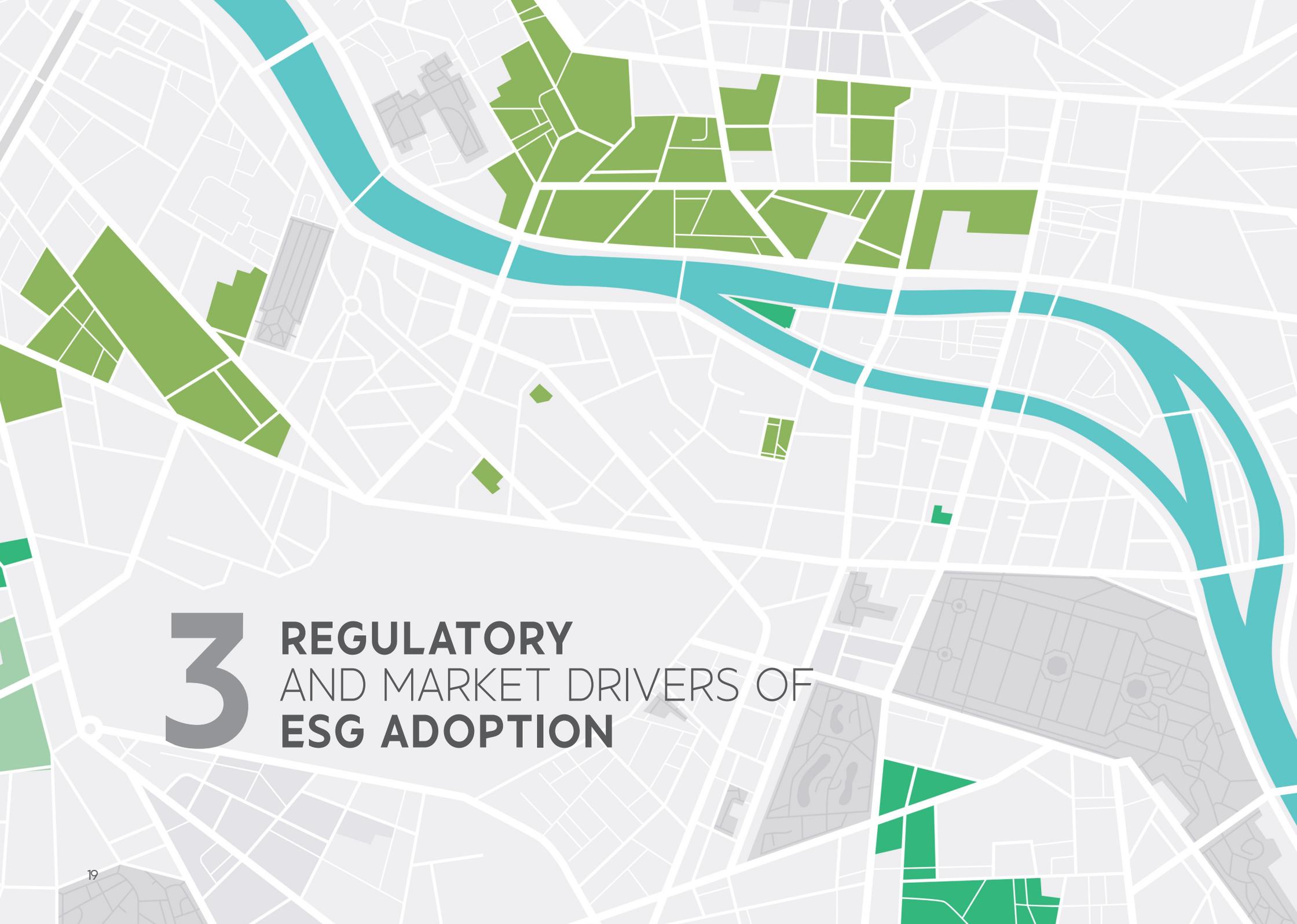
As an ubiquitous asset experienced on a consistent basis, the real estate sector is recognised as having the potential to create significant social impact. It is a critical component of the national economy, contributing significantly to employment and the country's GDP.

The construction sector alone employs over 1.2 million people in South Africa, with a significant and superior number of additional people employed, both formally and informally, in properties' daily operations and functions¹⁰. As governments focus on creating inclusive urban environments, real estate developers and owners will have a responsibility to create spaces that contribute to a positive social fabric. The consideration of green space and its impact on how people behave and build communities, the availability of affordable housing, access to amenities, security, and how a precinct contributes to delivering broader economic prosperity are all key components to an inclusive and sustainable urban environment.

In recent years, South Africa has seen an increased formalisation of real estate subsectors with high social impact. These include student housing, rural and peri-urban retail, affordable housing, healthcare and elderly care facilities. It is anticipated that, as these sectors mature and are able demonstrate defensive income returns, they should attract additional capital to further expand their offering and impact.



¹⁰ University of Pretoria, 2024

A stylized map of a city grid. A teal river flows from the top left towards the bottom right. Several areas are highlighted in green, including a large block in the upper center, a diagonal strip on the left, and a few smaller patches. A large grey area is visible in the bottom right. The text '3 REGULATORY AND MARKET DRIVERS OF ESG ADOPTION' is overlaid on the map.

3

**REGULATORY
AND MARKET DRIVERS OF
ESG ADOPTION**

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

Regulatory and market drivers of ESG adoption

Increased awareness of climate related risk has meant that regulatory and market drivers that support ESG disclosure have gained significant traction in recent years. Both the voluntary and regulatory environment related to ESG disclosure, reporting and labelling is constantly evolving, and often in rapid bursts.

This section of the report outlines the key regulatory and market drivers that prioritise ESG disclosure. It is not meant to be a comprehensive or detailed overview and assumes that future changes must be anticipated by the reader.

The regulatory landscape for the South African built environment incorporates a framework of legislation, regulations, guidelines, and standards. As governments and regulatory bodies seek to promote ESG outcomes, it follows that both mandated requirements and voluntary guidelines relating to ESG in the property sector will also evolve to align practices, disclosures and outcomes.

A selection of applicable legislation, regulations, guidelines and standards are highlighted below, which collectively aim to promote sustainable and inclusive planning and development and position South Africa as a leader in respect of its ESG outcomes.

As stakeholder scrutiny increases public reporting is becoming more important and regulated.

Companies are required to go a step further and not only demonstrate progress in their sustainability performance, but also publicly commit to ESG metrics such as net zero targets and increased diversity representation. The key link to make is that ESG disclosure, particularly when aligned with a consistent methodology that allows for comparison, means that physical and transition risks associated with real estate will become more easily identifiable to investors. Green premiums, and increasingly, brown discounts (i.e. real estate assets with poor sustainability features are trading at a discount as opposed to green assets commanding a higher price), can become factored in by an increased understanding of the building's sustainability associated risks, or opportunities.



REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

GLOBAL AND REGULATORY TRENDS AND DRIVERS

The past three years have seen regulators drive sustainable rules and disclosure, the development of green taxonomies and greater global alignment of reporting standards. The key takeaway is ESG disclosure is being mandated by regulators in major economies, with ripple effects for trade partners. Notwithstanding conflicting support for the term ESG, capital providers and businesses acknowledge sustainability as a value driver, with stable securities providing an abundance of options for businesses looking to shift from brown to green, being supported by stronger regulatory certainty. Some of the milestones include:

EU CORPORATE SUSTAINABILITY REPORTING DIRECTIVE (CSRD)	<p>In effect from 2024, the CSRD requires extensive and detailed disclosures on various ESG-related topics, including environmental aspects aligned with the EU Taxonomy, social and human rights issues, and governance matters. It mandates companies disclose plans that align their business models with goals limiting global warming to 1.5°C as per the Paris Agreement.</p>
EU SUSTAINABLE FINANCE DISCLOSURE REGULATION (SFDR)	<p>The SFDR mandates that investment products be categorised into three distinct groups based on their degree of sustainability and related features. Additionally, financial market participants who are now subject to these regulations are required to comply with specific disclosure obligation.</p>
US SEC CLIMATE DISCLOSURE RULES	<p>Finalised in 2024, the US SEC has issued a climate disclosure rule for all registrants. The rules are intended to address investor requests for more consistent, comparable, and reliable information about the effects of climate-related risks on a company's business and how the company has addressed or plans to address those risks</p>
IFRS (INTERNATIONAL FINANCIAL REPORTING STANDARDS)	<p>IFRS Accounting Standards are, in effect, a global accounting language. Companies in more than 140 jurisdictions are required to use them when reporting on their financial health. IFRS standards are commonly adopted by all global capital markets.</p> <p>In 2023, IFRS launched two significant sustainability related standards:</p> <ul style="list-style-type: none"> • IFRS S1: General requirements for disclosure of sustainability-related financial information • IFRS S2: Climate related disclosure

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

GLOBAL AND REGULATORY TRENDS AND DRIVERS

IFRS (INTERNATIONAL FINANCIAL REPORTING STANDARDS) (cont.)

IFRS Sustainability Disclosure Standards are developed by the International Sustainability Standards Board (ISSB). The ISSB is an independent standard-setting body within the IFRS Foundation. IFRS Sustainability Standards (“ISSB Standards”) are developed to enhance investor-company dialogue so that investors receive decision-useful, globally comparable, sustainability-related disclosures, that meet their information needs.

The ISSB Standards broadly incorporate the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD). ISSB requires the disclosure of sustainability-related factors that could reasonably be expected to affect (short, medium or long term) your: business model; strategy; cash flows; access to finance; and cost of capital.

SUSTAINABILITY STANDARDS AND FRAMEWORKS AND RATINGS

Several global frameworks, standards and rating agencies that promote global alignment of sustainability, climate risk and ESG disclosure are being implemented. Different ways of segmenting these initiatives also exist.

They all share the common goal of promoting transparency, comparability, and accountability in sustainability reporting. Examples include:

Frameworks (incl. principles and global goals)

- Task Force for Climate Disclosure (TCNFD)
- Climate Disclosure Project (CDP)
- Principles for Responsible Investment (PRI)
- Greenhouse Gas Protocol

Standards

- ISSB
- Global Reporting Initiative (GRI)

Ratings Agencies

- MSCI
- Sustainalytics
- S&P Global
- GRESB

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

SOUTH AFRICA'S REGULATORY DRIVERS

COMPANIES ACT	<p>The Companies Act, 2008, and the Companies Regulations, 2011, (Companies Regulations) require certain companies (including state-owned companies, public companies listed on an exchange and non-profit companies incorporated by the state or performing a statutory or regulatory function) to comply with the IFRS when preparing their financial statements.</p>
KING IV	<p>The King IV Report on Corporate Governance (King Code), issued by the Institute of Directors in Southern Africa, provides principles and recommended practices for corporate governance, including ESG disclosures. Compliance with the King Code is on an “apply and explain” basis encouraging corporates to consider and explain the actions they take in aligning with good governance principles). JSE-listed companies must apply all the King Code principles and only the King Code practices the JSE has made mandatory. Relevant principles to ESG disclosure include:</p> <ul style="list-style-type: none"> • Principle 4: The governing body should appreciate that the organisation’s core purpose, risks, and opportunities are inseparable from its sustainability • Principle 5: The governing body should ensure that reports issued by the organisation enable stakeholders to make informed assessments of the organisation’s performance and its short, medium, and long-term prospects
JSE	<p>The Johannesburg Stock Exchange (JSE) mandates ESG disclosures for listed companies through its listing requirements and guidance. Companies listed on the JSE are required to produce a standalone ESG report or alternatively an integrated report that includes ESG information.</p> <p>This report provides a holistic view of the company’s strategy, governance, performance, and prospects, reflecting the commercial, social, and environmental context within which it operates. The JSE further encourages listed companies to disclose their sustainability practices and impacts, covering areas such as environmental management, social responsibility, and governance practices. It has developed the Sustainability Disclosure Guidance which draws on an extensive range of influential global initiatives on sustainability and climate change disclosures including the GRI.</p>

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

SOUTH AFRICA'S REGULATORY DRIVERS

<p>JSE (cont.)</p>	<p>Sustainability Reporting Standards, TCFD recommendations, the International Integrated Reporting Council's International Integrated Reporting Framework, and the sustainability/ESG guidance of various peer exchanges. This Sustainability Disclosure Guidance seeks to assist companies, both listed and unlisted, to navigate ESG disclosure requirements in a manner specifically tailored to the South African context¹¹.</p>
<p>CIPC</p>	<p>The Companies and Intellectual Property Commission (CIPC) introduced mandatory ESG reporting in Q4 of 2023, alongside XBRL filing. This initially applies to public companies and state-owned companies, with voluntary filing currently open. However, from the financial year 2025-26, disclosure of ESG data will be compulsory for these entities, with a requirement for more detailed reporting using specific tagging formats.</p>
<p>SARB PRUDENTIAL AUTHORITY</p>	<p>In 2023 the SARB Prudential Authority released four proposed guidance notes for comment by banks (as well as branches of foreign institutions, controlling companies, eligible institutions, and auditors of banks or controlling companies) and insurers on climate-related disclosures and risk practices. They are expected to treat climate risk as a financial risk rather than merely a reputational risk event. Boards of directors and senior management should ensure appropriate allocation of oversight and management responsibilities for managing climate-related risks.</p>
<p>BUILDING RELATED REGULATION: SANS 1544 (EPCs)</p>	<p>An Energy Performance Certificate (EPC) is a government mandated display of energy consumption that applies to certain existing buildings. It acts as a public declaration of a building's energy use, and forms part of the government's set of initiatives for driving more sustainable practices in the built environment. In South Africa, the regulations for EPCs are governed by the National Energy Act (Act No. 34 of 2008) and the regulations published by the Department of Mineral Resources and Energy.</p> <p>The regulation applies to occupancy classes A1-A3 and G1, public buildings that are bigger than 1 000m² and private buildings bigger than 2 000m². Applicable buildings must be registered on the National Building Energy Performance Register system by 3 August 2024. Thereafter, by 7 December 2025, buildings are required to display EPCs publicly¹².</p>

¹¹ JSE

¹² SANEDI

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

VOLUNTARY LEADERSHIP

GREEN BUILDING CERTIFICATION

As a global and local trend, many leaders within the property sector have demonstrated their commitment to sustainability through green building certification. Green building certification, like **Green Star** or **EDGE**, means that a project has:

- Quantified and verified environmental performance
- Undergone a rigorous technical assessment
- Met robust benchmarks
- Been certified by an independent credible third-party

UN SDGs

The **Sustainable Development Goals** (SDGs) are a universal call to action to end poverty, protect the planet and improve the lives and prospects of everyone, everywhere. The SDGs were adopted by all United Nations Member States in September 2015 as part of the 2030 Agenda for Sustainable Development. There are 17 SDGs, across a range of environmental and developmental themes, which are commonly used to align and report on by organisations.

C40 CITIES

In South Africa, four major metros including the City of Cape Town, Ethekwini, City of Johannesburg, and City of Tshwane were the vanguard for the **C40 Cities South Africa Buildings Programme**, with Ekurhuleni subsequently swelling the ranks. The commitment targets align with the highest ambition of the Paris Agreement and encompasses the enactment of regulations to ensure new buildings operate at net zero carbon by 2030 and all buildings by 2050.

To meet this commitment, the municipalities will¹³:

- Establish a roadmap for the commitment to reach net zero carbon buildings
- Develop net zero carbon policy and regulations that support net zero carbon buildings
- Engage stakeholders to support policy development and implementation
- Develop compliance tools, processes and capacity to support policy and regulation implementation

¹³ C40 Cities

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

VOLUNTARY LEADERSHIP

GREEN FINANCE TAXONOMY

South Africa's **Green Finance Taxonomy** was released in April 2022 as a catalogue or classification system that defines a minimum set of assets, projects, and sectors that are eligible to be defined as "green" or environmentally friendly. It supports initiatives toward sustainable finance by reducing costs and uncertainty in classifying a core set of green activities. This includes setting out specific criteria for the construction of new buildings that can be classified as 'green'.

The Green Finance Taxonomy provides a robust framework that supports the growth of sustainable real estate by offering clear guidelines for what constitutes a green building which helps developers and investors reduce the risk of greenwashing, improving access to capital and fostering trust and transparency in the market.

SUSTAINABILITY DATA TRANSPARENCY INDEX (SDTI)

The **Sustainability Data Transparency Index (SDTI)** is a benchmarking tool designed to evaluate and rank companies based on the transparency and quality of their sustainability data disclosures.

Developed to promote accountability and enhance the visibility of corporate ESG performance, the SDTI assesses various aspects of sustainability reporting, including the comprehensiveness, consistency, and comparability of disclosed information. Transparency scores on the SDTI represent how effectively a company communicates its sustainability practices and impacts, with higher scores indicating more thorough, reliable, and accessible sustainability data. These scores help stakeholders, including investors and consumers, make informed decisions and encourage companies to improve their sustainability reporting.



REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

VOLUNTARY LEADERSHIP

SUSTAINABILITY DATA TRANSPARENCY INDEX (SDTI) (cont.)

In its latest SDTI report for 2023¹⁴, 30 Real Estate Investment Trusts (REITs) listed on the JSE were assessed and demonstrated an average transparency score of 46.28%. This was an improvement on the 2022 report which scored the consortium at 43.17%. The highest overall score for 2023 (excluding REITs with dual listings on other international exchanges) was 73.74%. The transparency scores were disaggregated by indicator groups as follows:

TRANSPARENCY SCORES

OVERALL SCORE	STANDARD DISCLOSURES	ECONOMIC	GOVERNANCE	LABOUR	HEALTH AND SAFETY	ENVIRONMENT	CSI/ SED
46.28%	32.92%	68.00%	75.91%	37.86%	24.50%	31.17%	30.78%

In respect of environmental disclosures, the transparency scores were disaggregated by indicator groups as follows:

TRANSPARENCY SCORES ON ENVIRONMENTAL DISCLOSURES

ENVIRONMENT	ENERGY	CARBON	WATER	WASTE	MANAGEMENT
31.17%	27.14%	40.67%	35.83%	28.33%	22.50%

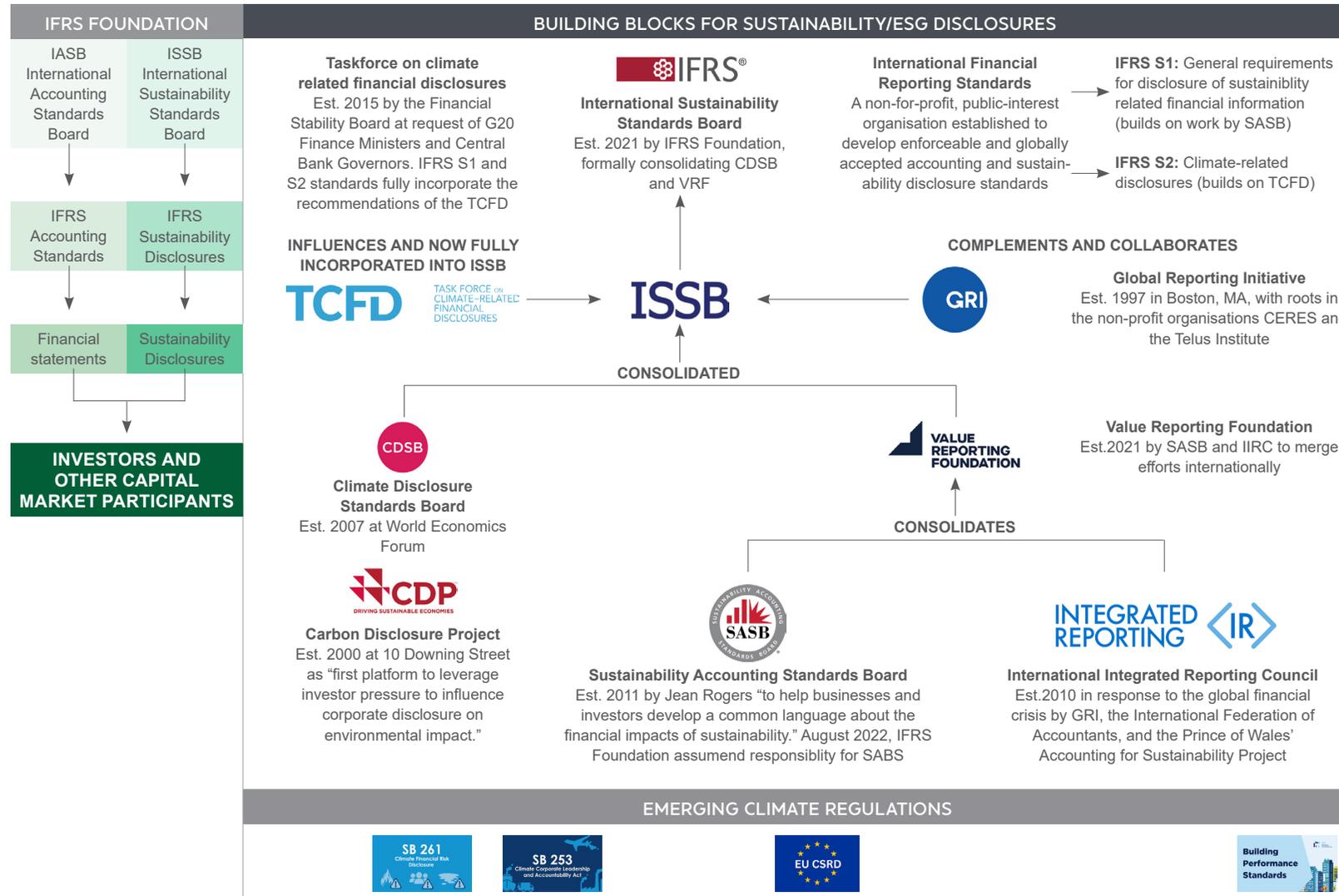
While there is significant variability in how the top REITs score relative to the bottom REITs on the SDTI, the overall trend suggests a growing recognition of the importance of sustainability transparency.

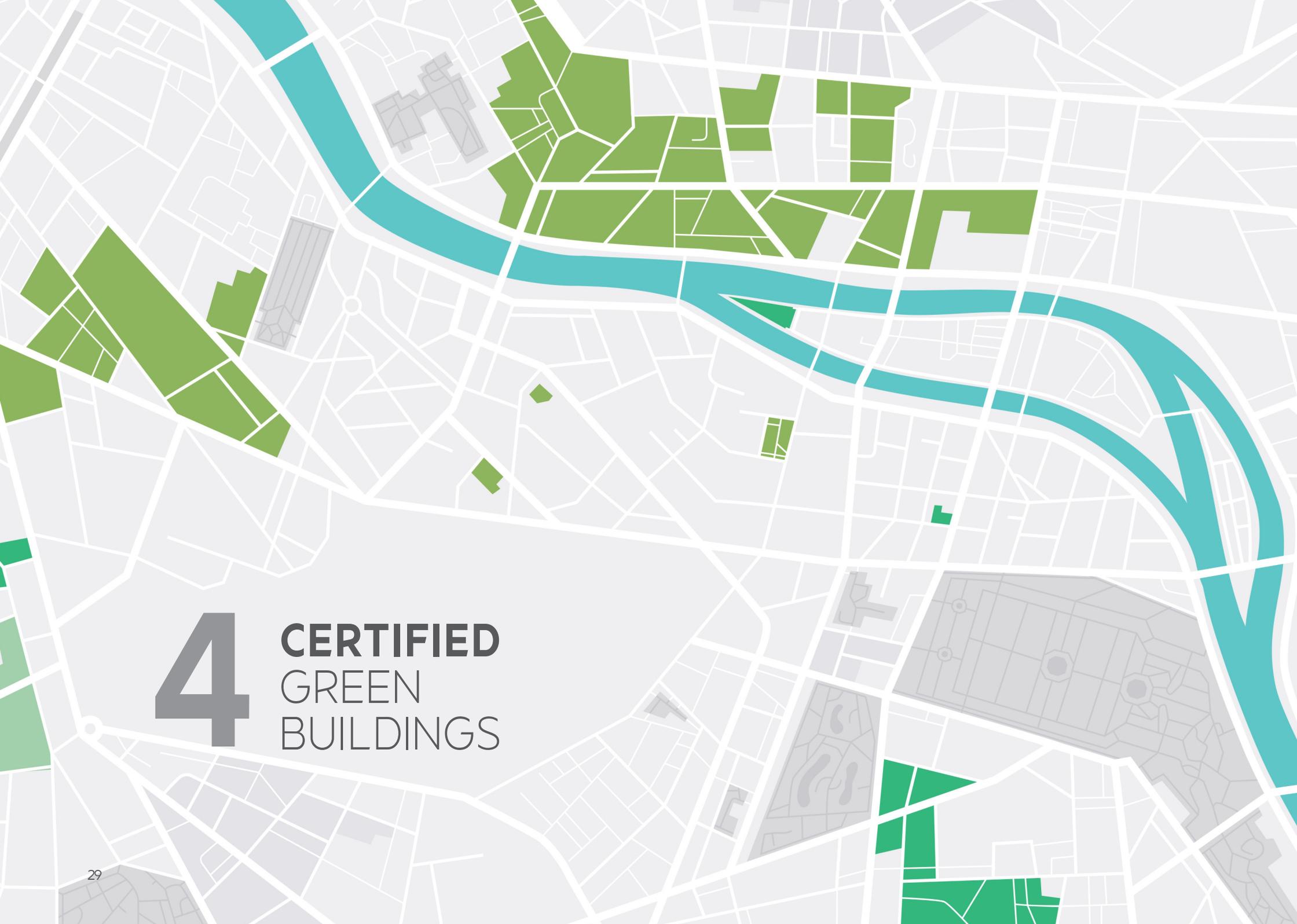
It is anticipated that, driven by an increasing push for REITs to improve their disclosure practices by investors and regulators, these scores should continue to improve over time.

¹⁴ IRAS, 2023

REGULATORY AND MARKET DRIVERS OF ESG ADOPTION

SUSTAINABILITY STANDARDS AND FRAMEWORKS





4 CERTIFIED
GREEN
BUILDINGS

Certified green buildings

One of the key mechanisms that makes adhering to sustainability regulations, and managing physical and transition risks easier, is a green building certification. A green building certification is a third-party verified confirmation of specific aspects of that building or projects design, construction, or operational reality.

Green building certifications generally have a broadly environmental scope which includes a core focus on energy, carbon, and water, but encompasses aspects such as indoor environmental quality, social and community impacts, and cultural and place-making elements of projects.

Green building certification options

Certification is a means to verify that a projects claims of being green are credible, audited and approved. It is the process by which environmental initiatives, incorporated into the design, construction or operational management of a building, are independently reviewed, assessed, and verified. Although green building certification is often discussed as a straightforward topic, it is a complex and layered territory.

This section of the report is going to unpack the realm of green building certification, from different systems, through the variety of tools in the South African certification landscape, and finally, to the connections between certification and both proptech and ESG.

Some of the well-known systems internationally include:

- **LEED** (Leadership in Energy and Environmental Design) – developed and administered by the United States Green Building Council;
- **BREEAM** (Building Research Establishment Environmental Assessment Methodology) – developed and administered by the Building Research Establishment;
- **Green Star** – developed and administered by the Green Building Council of Australia;



CERTIFIED GREEN BUILDINGS

- **WELL Building Standard** – developed and administered by the International Well Building Institute;
- **NABERS** (National Australian Built Environment Rating System) – developed and administered by the Australian Government; and
- **Green Globes** – developed and administered by the Green Building Initiative.

A comprehensive comparative overview of the leading global certification systems can be found on: <https://gbca-web.s3.amazonaws.com/media/documents/financing-transformation-a-guide-to-green-building-for-green-bonds-and-green-loans.pdf>.

Rating systems used in South Africa

Locally the following systems are most widely used:

- **Green Star South Africa** and **Net Zero**, developed and administered by the Green Building Council of South Africa (GBCSA);
- **EDGE** (Excellence in Design for Greater Efficiencies), developed by IFC, and administered by GBCSA.

Within each of these systems are a number of tools that provide certification for a specific subset of green buildings. These tools are usually quite different from each other, each being tuned towards a specific purpose.

Some of the differentiators between tools can be:

- **Distinct areas of focus** (such as net zero carbon, or usage of energy and water);
- **Specific scales of measurement** (such as an entire precinct, or a single office building);
- **Dedicated typologies** (such as schools, or industrial buildings); or
- The distinction between certifying **new buildings being designed or constructed**, and **existing buildings already occupied and in operation**



CERTIFIED GREEN BUILDINGS

GREEN BUILDING CERTIFICATION TRENDS IN SOUTH AFRICA	
CERTIFICATION SYSTEM	NUMBER OF PROJECTS CERTIFIED (2009 – 2023)
GREEN STAR NEW BUILDINGS AND MAJOR REFURBISHMENTS	332
GREEN STAR EXISTING BUILDING PERFORMANCE	609
GREEN STAR INTERIORS	46
GREEN STAR SUSTAINABLE PRECINCTS	3
EDGE FINAL	56
GBCSA NET ZERO	64
ENERGY WATER PERFORMANCE	74
TOTAL	1 184

From GBCSA data

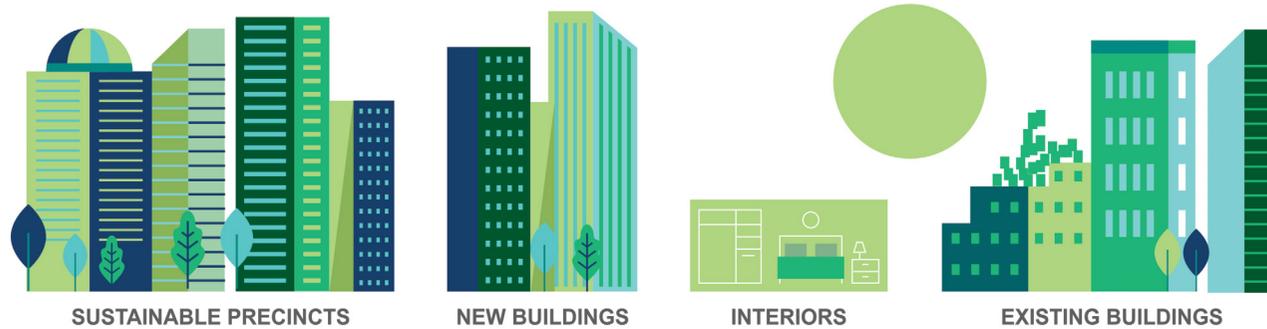
Because there is so much variation in construction projects needing reliable certification (including project phase, size, sector and other factors), there must be substantial variation within the set of tools available for certification. Even within a system, like that used for Green Star South Africa developed and administered by GBCSA (responsible for the vast majority of all South African certifications), a complete set of tools is needed to meet the diversity of certification needs.

Green Star SA ratings

- Green Star New Buildings and Major Refurbishments
- Green Star Existing Building Performance
- Green Star Interiors
- Green Star Sustainable Precincts



CERTIFIED GREEN BUILDINGS



Green Star New Buildings and Major Refurbishments

Green Star New Buildings and Major Refurbishments covers all typologies, scales, and stages of new construction or retrofits and substantial alterations to existing construction. The upcoming Version 2 tool update expands the minimum requirement core from previous versions and includes a focus on sustainability beyond what we've come to expect from a green building, including in areas like place-making, nature stewardship, local economic development, and resilience planning.

Green Star Existing Building Performance (EBP)

Green Star Existing Building Performance (EBP) not only offers certification for existing building assets, and therefore the majority of South Africa's building stock, but demands efficiency and accountability in building management and operation, exploring performance areas like detailed submetering, occupant satisfaction surveys, and building operating manuals. The EBP tool is different from other Green Star tools in that it must be recertified every three years to keep the rating valid. This offers an in-built mechanism to drive improvement in the previously achieved rating.

Green Star Interiors

Green Star Interiors is dedicated to furnishings and other elements installed as part of the fit-out process. It supports the creation of healthy, productive spaces with reduced running costs and lowered environmental impact. It is an addition to the Green Star family that ensures that a space can be a certified green investment from foundation (covered by New Buildings and Major Refurbishments) to finish.

CERTIFIED GREEN BUILDINGS

Green Star Sustainable Precincts

Green Star Sustainable Precincts certifies large scale estate, neighbourhood or campus-style developments with residential components and covers a range of sustainability areas that include the broader ecological impact of the development, internal and external transport connections, and a strong resource efficiency focus. Its scope is beyond individual buildings, focussed on supporting the creation of holistic environments where people can live, work, and play healthily and safely.

Net Zero

Additionally, to focus specifically on the critical challenge of **Net Zero buildings**, the GBCSA has developed the Net Zero Modelled and Net Zero Measured systems which contain the following specific tools:

- Net Zero Carbon
- Net Zero Water
- Net Zero Waste
- Net Zero Ecology

The **GBCSA Net Zero Carbon tool** uses either design (modelled) or performance (measured) data of a new or in-use building to verify that the building has achieved zero kilograms of carbon emission equivalent (kgCO₂e) per meter squared, per year, through a combination of energy efficiency, renewable energy supply and carbon offsets. Carbon offsets represent a necessary compromise, or a stepping stone, on the South African built environment's journey towards objective net zero carbon. **Net Zero Water** takes a similar approach to the project's total water use. **Net Zero Waste** verifies the diversion of a project's construction or operational waste from landfill, and **Net Zero Ecology** confirms that the project has resulted in no net reduction to the ecological value of a site, as compared to its pre-development state.

EDGE

GBCSA proudly offers **EDGE** (Excellence in Design for Greater Efficiencies) certification, a green building design tool, a certification system, and a global standard developed by the International Finance Corporation (IFC), a World Bank Group member.

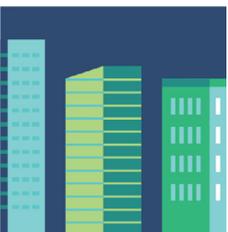
EDGE-certified projects reduce carbon emissions, save water, and lower living costs for occupants. To achieve an EDGE rating, a minimum saving of 20% in energy, water and embodied carbon in materials must be proven through initiatives implemented in the design phase and confirmed during construction. EDGE certification is ideal for various building typologies. Whether it's residential, commercial, hospitality, or retail, EDGE helps optimise a building's resource efficiency. This tool, developed especially for developing economies, takes a

CERTIFIED GREEN BUILDINGS

focused approach to the impact of a project's design on energy, water and embodied carbon, through the use of an online integrated calculator called the EDGE App.

In terms of green building certification schemes, the most well-known and locally used brands in South Africa that apply to all typologies are summarised here:

GREEN BUILDING CERTIFICATION SCHEMES IN SOUTH AFRICA		
GREEN STAR	NET ZERO	EDGE
		
<p>Green Star is an internationally recognised holistic green building rating system that aims to create healthy, resilient and positive places for people and the natural environment.</p> <p>Green Star covers new and existing buildings, fitouts and precincts and has nine focus environmental impact areas:</p> <ul style="list-style-type: none"> • Management • Health and wellbeing • Energy • Transport and location • Water • Materials • Ecology • Emissions • Innovation <p>A building development can receive either a 4-Star rating signalling that it has employed best practice, and a 5-Star rating which recognises South African excellence or the coveted 6-Star rating indicating that the project is a world leader.</p>	<p>The GBCSA suite of Net Zero tools award projects that go beyond the partial reductions recognised in the current GBCSA tools.</p> <p>GBCSA has taken the initiative to reach the endpoint of completely neutralising, or positively redressing, their impacts.</p> <p>Projects are able to achieve Net Zero/Net Positive Ratings in:</p> <ul style="list-style-type: none"> • Carbon • Water • Waste • Ecology 	<p>EDGE: 'Excellence in Design for Greater Efficiencies' is a resource efficiency tool developed by IFC.</p> <p>EDGE enables developers and builders to quickly identify the most cost-effective strategies to reduce energy use, water use and embodied energy in materials.</p> <p>It has three focus environmental impact areas:</p> <ul style="list-style-type: none"> • Energy • Water • Embodied energy of materials <p>A building development can achieve EDGE Certified, signalling a 20% reduction in consumption across the three impact areas, or EDGE Advanced if energy reduction is increased to 40%. If EDGE Advanced is achieved, the project can consider targeting EDGE Zero Carbon.</p>



CERTIFIED GREEN BUILDINGS

While it can be tempting to reduce the variety of green certification options down to the single question of 'which certification is best?'. The more accurate approach would be to ask, 'which certification is best for this project?'. Each of the certification tools has different focus areas, a different breadth of scope and different intended applicability. The stage, scale, scope and input data (either design data or operational data) of what is intended to be certified help determine which certification tool best meets the needs of a specific project.

CERTIFICATION TOOLS				
	URBAN SCALE	BUILDING SCALE		INTERIOR SCALE
RATED ON DESIGN AND CONSTRUCTION	Green Star Sustainable Precincts	Green Star New Buildings and Major Refurbishments EDGE Certified EDGE Advanced		Green Star Interiors
	GBCSA Net Zero, Modelled			
RATED ON ACTUAL OPERATIONAL PERFORMANCE	GBCSA Net Zero, Measured			
		Green Star Existing Building Performance		
		EWP (GBCSA Energy Water Performance)	EDGE Zero Carbon	

Finding the tool that best fits the project matters for climate risk and ESG because the information contained in all these green building certifications is pertinent to environmental reporting areas (carbon emissions, water and energy usage, and the embodied carbon of construction materials). Further, some certifications like the GBCSA's Net Zero suite, provide both information and evidence of the building or project meeting specific climate goals.



CERTIFIED GREEN BUILDINGS

For example, Green Star also includes verified information on a project's contributions towards social equity, community development and inclusivity within the built environment, which are relevant for many ESG frameworks.

Those green building certifications that rely on operational data for their issue (such as verified water and electricity consumption) such as the Green Star Existing Building Performance, and Net Zero Measured tools, can act as an aggregator of performance information for a building, often confirming a relative level of resource efficiency against a relevant benchmark. This performance data will feed directly into a portfolio's reported consumption data and ESG metrics.

Where do certified green buildings come in as a response to the demands imposed on buildings by climate change, and climate change reporting?

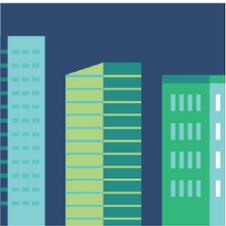
A verified green building certification is a reliable package of information about the performance of that building, and its resilience to the physical and transition risks linked to climate change.

However, the value of a green certification isn't in the accolade itself, it's in the systems and solutions integrated into the design of that building, and its operations, that the certification confirms. Green certification is a signifier of a good, efficient, and resilient building. It is a demonstrable shorthand for high-performance and cutting-edge design.

"Green certifications are becoming less of a differentiator and more of a requirement. As momentum for more transparency and accountability around sustainability grows, tenants will increasingly seek environmental performance indicators, such as energy use intensity, electrification and clean energy, on top of green credentials. The Buildings Breakthrough announced at COP28 in December 2023 – which aims to make low emission, climate-resilient buildings the new norm by 2030 – will add to this momentum¹⁵."

GUY GRAINGER¹⁵
Global Head, Sustainability Services, JLL

¹⁵ Grainger, 2024



How do we get our buildings green and greener?

Green buildings must deploy a range of tools, techniques, and technologies to achieve the high standards imposed by certification systems. Some of these standards relate to the inherent design characteristics of a building, like its insulation or HVAC system, which would typically fall within the design and construction phase of the building. Thus these would be applicable to, for example, Green Star New Build.

Other standards focus more on the systems and management practices designed to support efficient operation, like logging and aggregating of energy use data. These typically within certification tools focused on the performance of existing buildings (e.g. Green Star Existing Building Performance). Others have fixed, practically demonstrable criteria for the performance of the building, as designed, or post occupation, that require both efficient systems, and in-depth reporting on the efficacy of those systems (e.g. GBCSA Net Zero suite).

Many of the processes for achieving a building green enough for certification are supported by the innovative techniques and technologies emerging from the local proptech space covered in more detail in Section 7 of this report.

Proptech, as a means of delivering building efficiency and environmental excellence, is a key supporting sector, not only for green building certification but for ESG and other climate reporting that is reliant on both sustainable performance, and the data to verify it.

Strategic green proptech solutions help buildings become efficient, and an efficient building is the point of departure for a green building.

Green buildings whose performance is clearly supported by data can become certified green assets, a cornerstone of companies' transition planning and climate reporting strategies, and the start of the journey towards a low-emissions future.



Trends in South African certification

Since the first green building certifications in 2009 (two years after the founding of the GBCSA), there has been a good story to tell about the green certification trend. In 2009 only one green building was certified. Fifteen years on, the cumulative total of green building certifications exceeds one thousand.

The pace of certifications within the property sector is rapidly increasing, and seems set to continue, especially with the strong incentives provided by increasing ESG reporting initiatives, and the technological solutions provided by the growing proptech sector.

The landscape of green building certifications in South Africa is clearly dynamic and evolving, supported by a variety of comprehensive systems and tools tailored to meet diverse project needs. While affirming a building's adherence to high sustainability standards, these certifications can demonstrably enhance market values and improve attractiveness to tenants and investors. As climate change demands more resilient and sustainable buildings, green building certifications, assisted and enabled by green proptech, will continue to serve as a reliable indicator of a building's environmental performance and compliance with ESG frameworks.

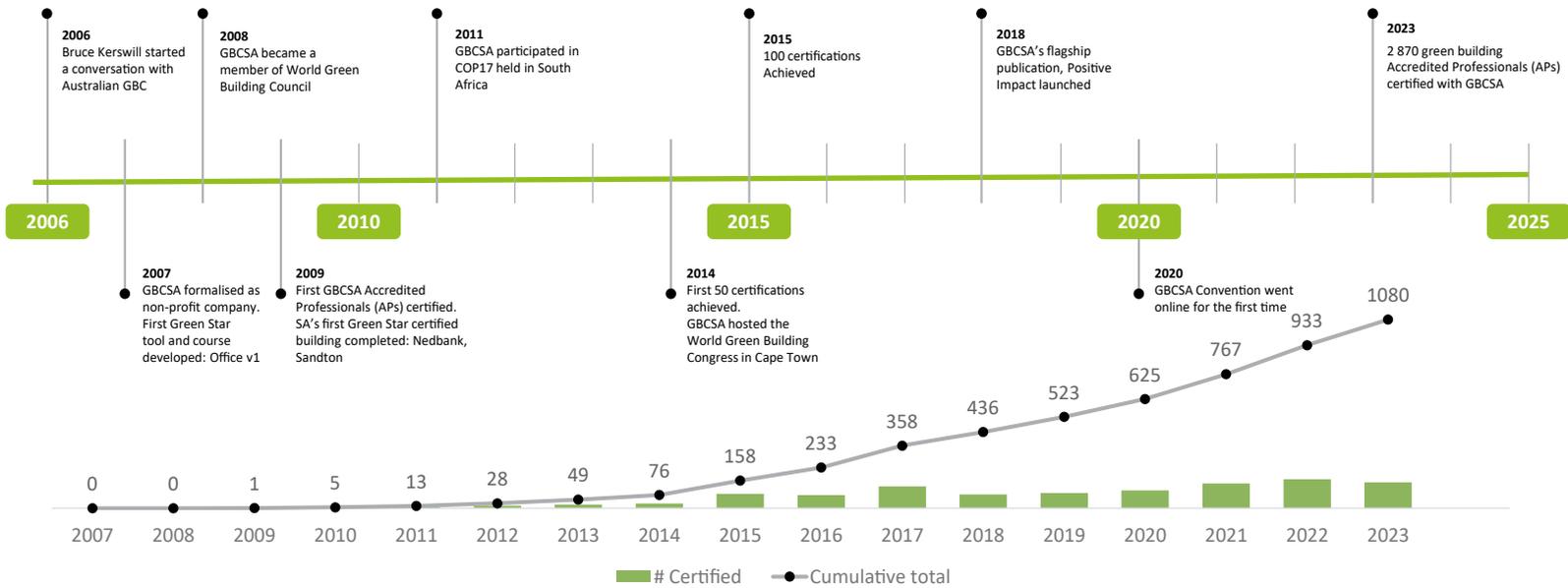


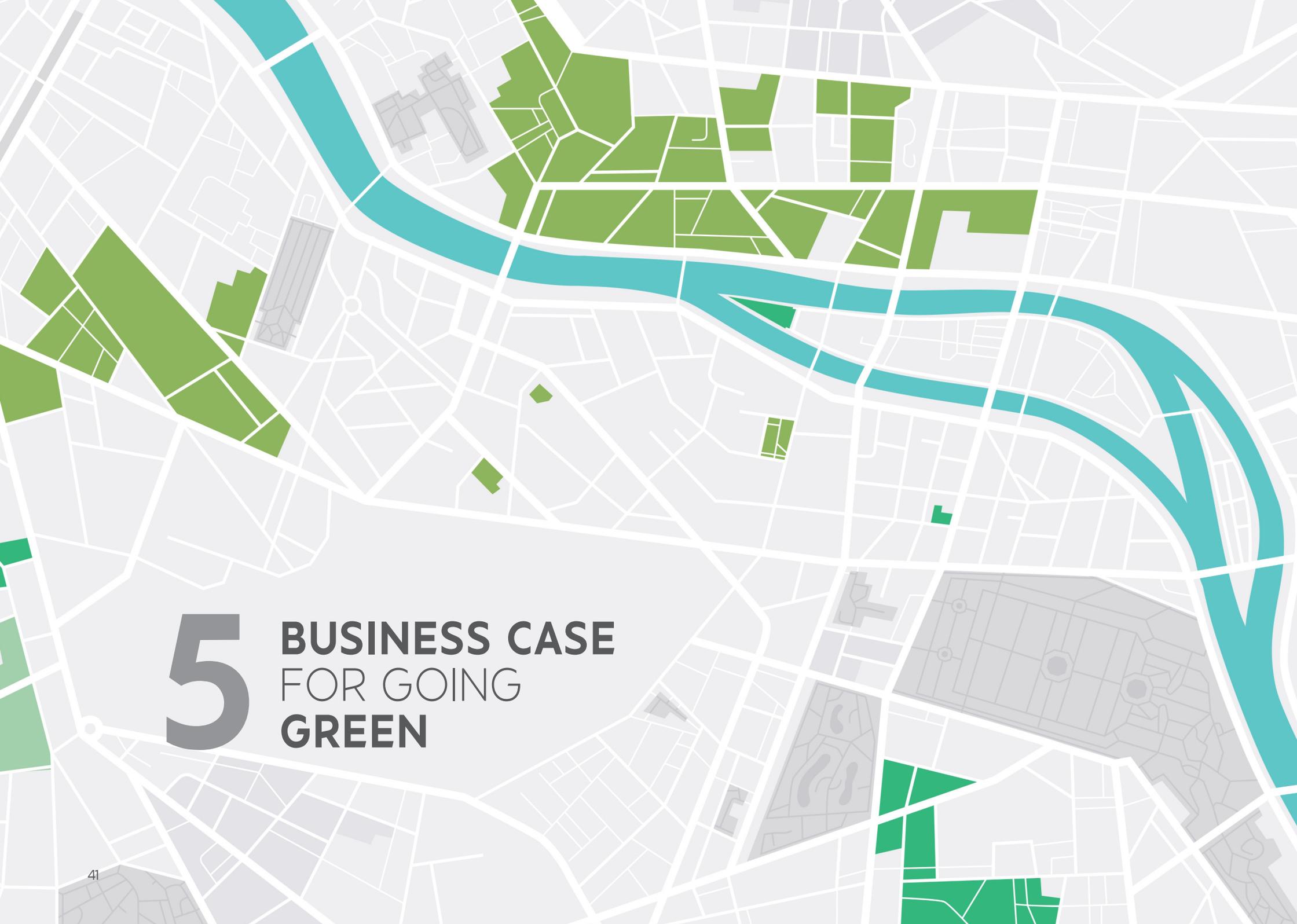
GREEN BUILDINGS PROJECTS CERTIFIED PER YEAR

1 000+ certifications

Approx 2 870 green building Accredited Professionals (APs) certified with GBCSA

Advances in our knowledge sharing and advocacy strength and networks



A stylized map of a city grid. A teal river flows from the top left towards the bottom right. Several areas are highlighted in green, including a large block in the upper center, a diagonal strip on the left, and a few smaller patches. A large grey area is visible in the bottom right. The text '5 BUSINESS CASE FOR GOING GREEN' is overlaid on the map.

5 BUSINESS CASE
FOR GOING
GREEN

BUSINESS CASE FOR GOING GREEN

The cost benefit equation for green-certified buildings

The perception of both green building certification, and green design and construction techniques themselves, is often as an extra expense with no direct financial return. However, there is increasing evidence to support the basis that being green is indeed aligned with commercial objectives.

There are two key elements to understanding the green building business case (over and above the intangible benefits to people and planet inherent in any sustainable building choices):

1. **The Green Cost Premium**
– the additional costs associated with a green-certified project in South Africa
2. **Green Investment Performance**
– the demonstrable marginal returns and efficiencies that a green-certified project can generate

GBCSA has partnered with key research bodies to develop a methodology and metrics that unpack and track both the green cost premium, and the performance of green certified investments over time.

Measuring the impact of green spending is a key market service to support actors within the construction sector in encouraging a green sector transformation.

The GBCSA is proud to partner in reporting on these impacts, along with the **Association of South African Quantity Surveyors (ASAQS)**, the **University of Pretoria** (for the Green Building in South Africa: A Guide to Costs and Trends report series), and **MSCI** (for the MSCI South Africa Green Annual Property Index, sponsored by **Growthpoint Properties**).



¹⁶ University of Pretoria, 2016

Cost of Green

At the start of the journey to map and track the actual 'cost of green' in South Africa, it was noted that in local and international research, green developments were regarded as 15–25% more expensive than comparable conventional developments.

This sets the scene for the persuasive importance of reliable data. In that founding year (2016), the first issue of the report noted the actual green cost premium as only 5.95% (a figure that has come down year-on-year to the latest average value of 3.15% from the 2022 report).

The vast gap between perception and verified fact demonstrates the importance of original research in shaping a conversation based on reality, rather than fears of change.

The critical importance of this kind of work for the green building movement in general was recognised internationally in 2023, by the **Pacific Association of Quantity Surveyors**, awarding Danie Hoffman of the University of Pretoria, for the Academic Excellence of his work with the report series.

The report analyses construction cost data collected through a specific credit in the Green Star New Build certification process and isolates the portion of spend attributable only to green measures that would not have been present in a 'brown' construction process.

By 2022, the cumulative study population had risen to 170 office projects certified with the Green Star new Build tool.

The findings in 2022 indicate not only that the average (median) difference between a green and brown building is only 3.15%, but that Green Star certification is possible at 4-Star level from only 0.47%.

It shows that year-on-year, as the green building sector in South Africa matures, and green processes become mainstreamed, the difference in investment to achieve green assets becomes increasingly smaller.



COST OF GREEN

LOWER THAN EXPECTED AND STILL FALLING

The key findings of the report indicate that the cost of green is diminishing in South Africa (from 5.95% in 2015 to 3.15% in 2022) and that a 4-Star certification is possible from as little as 0.47%.



Green Construction Cost Premium from 'Green Building in South Africa: A Guide to Costs and Trends - 2022 Edition'¹⁷

¹⁷ GBCSA, ASAQS, University of Pretoria 2022

MSCI South Africa Green Annual Property Index

Some of the ways in which green-certified buildings are good investments are clear and intuitive, like reduced operating cost through lower energy and water usage, more efficient performance of systems, or increased productivity due to healthy workplaces. Others are subtler, linked to discount rate, cost to income ratios, total returns, and similar metrics.

International research that demonstrates trends, such as green-certified premises attracting tenants or driving a rental premium is clear and consistent, but context matters, especially to a sector like real estate. In order to capture a picture of the performance of green investments in South Africa that is both complete and accurate, clear analysis of good local data is needed.

The MSCI South African Green Annual Property Index 2023 develops such a picture. Running for the last eight years, the index evaluates the performance of comparable certified and non-certified platinum and A-grade offices within South Africa. The 2023 index sampled a total of 258 properties (163 certified with Green Star New Build Office and 95 non-certified).

This year, despite the overall context of low growth and oversupply in the office sector, the results of the index show certified properties outperforming non-certified properties in total returns by 150bps (5.8% vs 4.3% respectively), confirming the trend of green-certified out-performance in total return.

The index also tracks capital growth, net income growth, and discount rates. It unpacks the effects of green certification on net operating income, vacancy rate and operating costs. It also unpacks some of the overall South African context within which the green office story is unfolding.

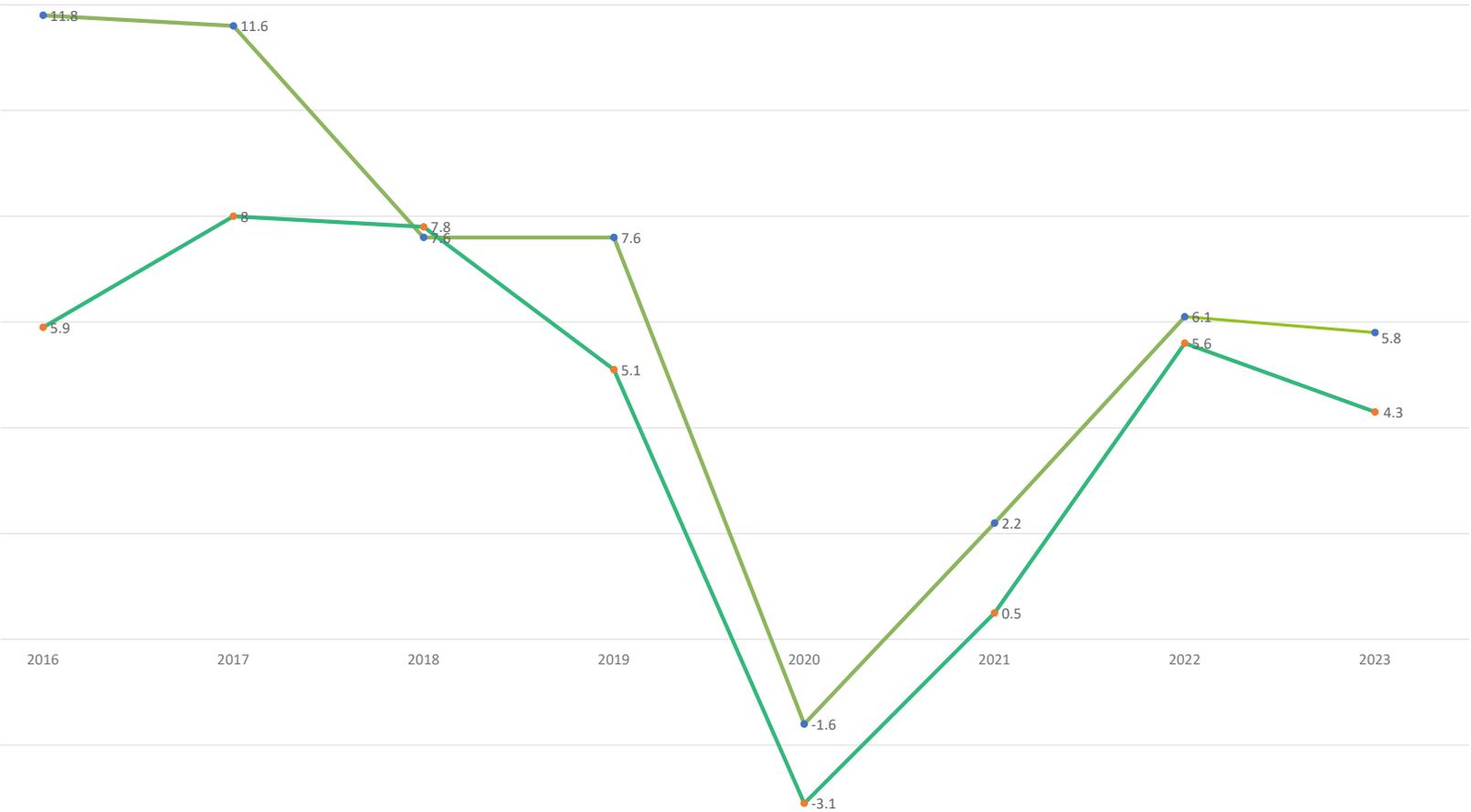
A 2023 finding showed higher capital growth, higher net income growth, and lower discount rates for green-certified buildings than for uncertified equivalents.



GREEN RETURNS FOR CERTIFIED OFFICES

TOTAL RETURN FOR GREEN-CERTIFIED OFFICES REMAINS HIGHER IN 2023 IN SOUTH AFRICA

TOTAL RETURN



From the MSCI South African Green Property Index 2023¹⁸

- CERTIFIED
- NON-CERTIFIED

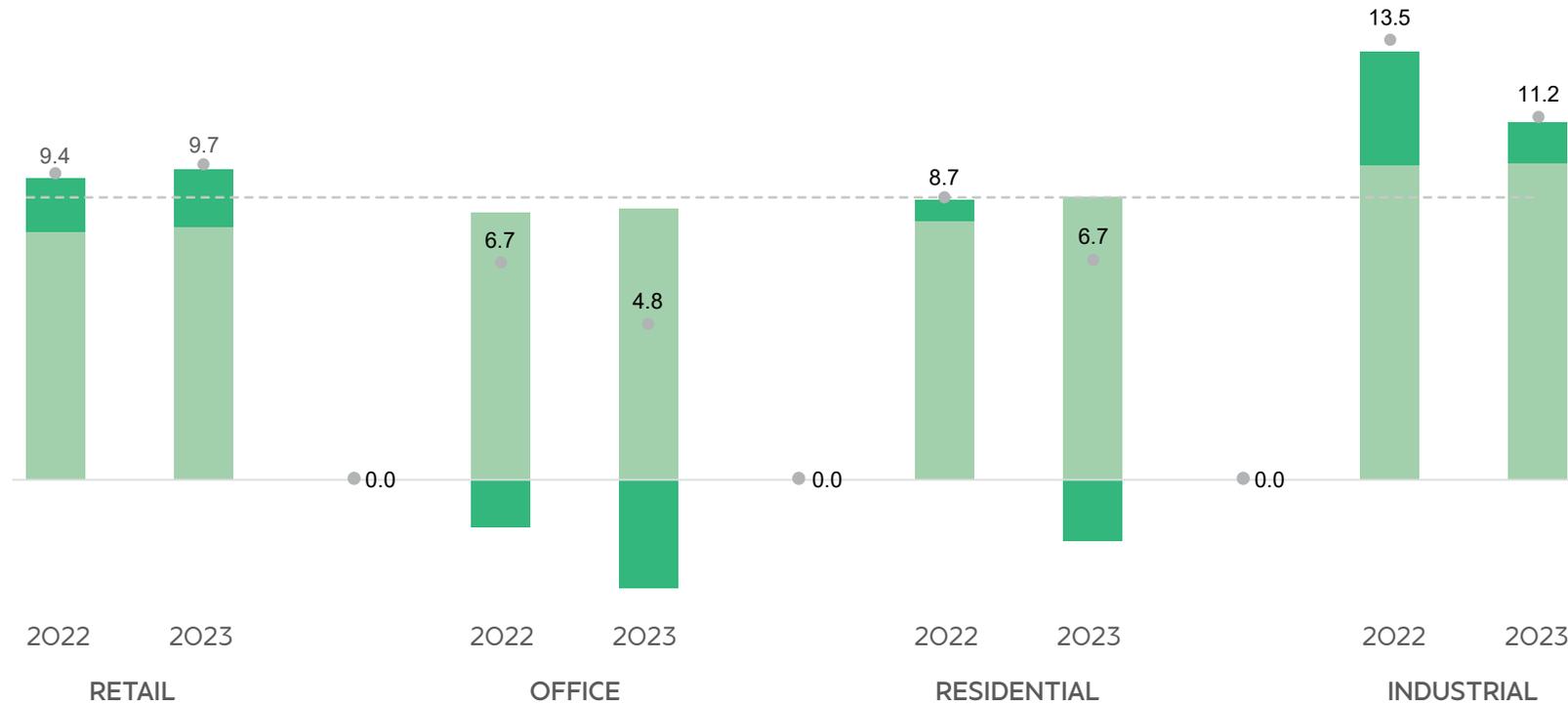


¹⁸ MSCI, 2024

THE SOUTH AFRICAN PROPERTY SECTOR

A STORY OF PATCHY RECOVERY WITH SOME LAGGING SECTORS

STANDING INVESTMENT



From the MSCI South African Green Property 2023 Results Announcement Event.

This grounding context is critical in turning research into insight and understanding the performance of green investments within the current setting for offices overall.

- CAPITAL GROWTH
- INCOME RETURN
- TOTAL RETURN

-- 2023 TOTAL RETURN FOR ALL SECTORS (8.7%)



¹⁸ MSCI South African Green Property Index, 2023

GREEN RETURNS FOR CERTIFIED OFFICES

GREEN-CERTIFIED OFFICES SHOW LESS OF A LOSS THAN NON-CERTIFIED OFFICES IN 2023 IN SA



From the MSCI South African Green Property Index 2023¹⁸

- CERTIFIED
- NON-CERTIFIED

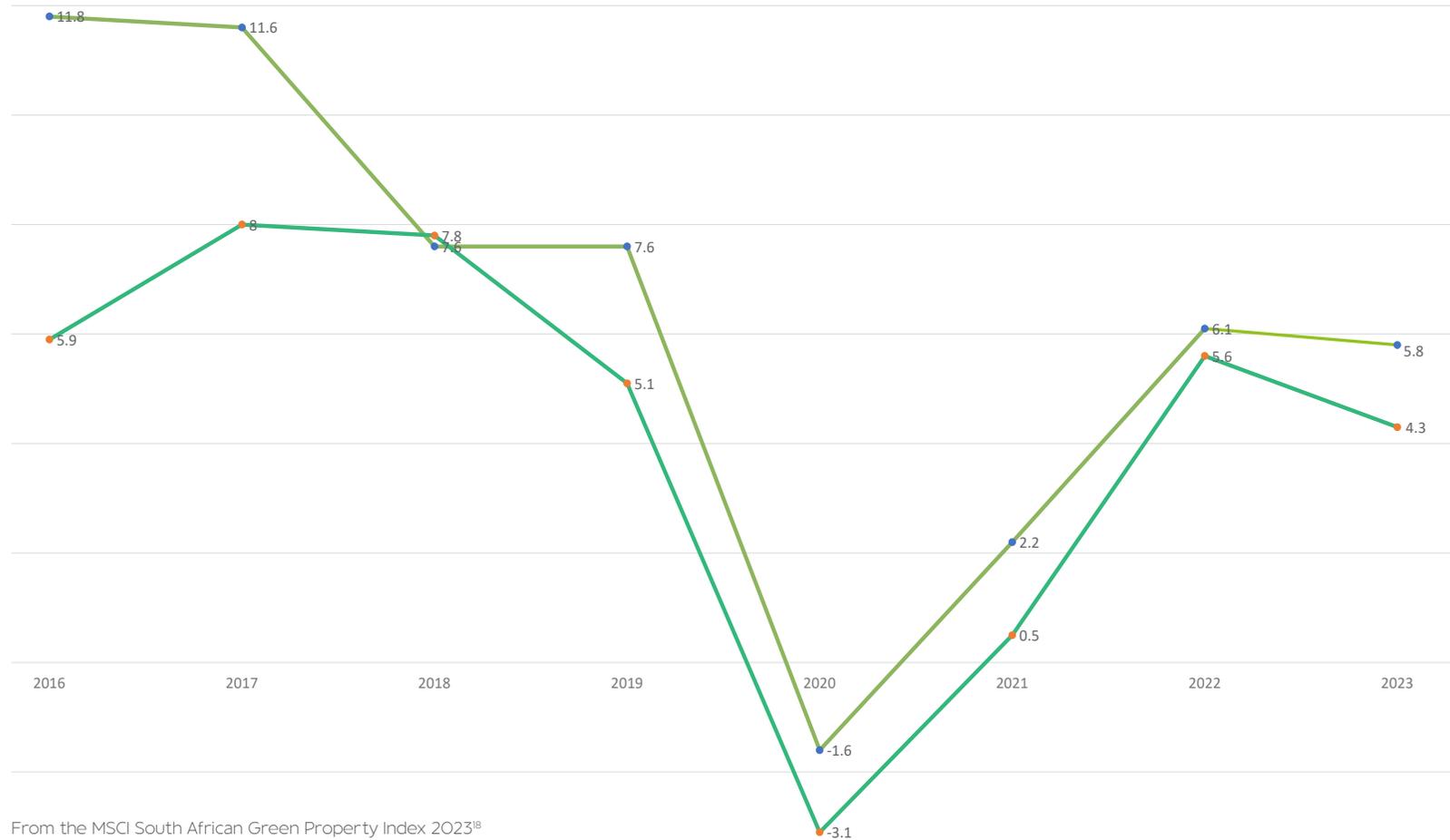


¹⁸ MSCI South African Green Property Index, 2023

GREEN RETURNS FOR CERTIFIED OFFICES

NET OPERATING INCOME FOR GREEN-CERTIFIED OFFICES RECOVERING IS FASTER IN 2023 IN SA

NET OPERATING INCOME (%)



From the MSCI South African Green Property Index 2023¹⁸

- CERTIFIED
- NON-CERTIFIED



¹⁸ MSCI South African Green Property Index, 2023

BUSINESS CASE FOR GOING GREEN

Going forward the index seeks to expand the sectors it studies, to unpack the green investment story across retail and, eventually, industrial sectors.

Measuring impact matters. Greening, and especially the kind of green certification that is supported by proptech innovations and supports ESG reporting requirements, is a change of paradigm for the South African setting. Good data that is well analysed can serve to turn sustainable business decisions from a leap of faith to good business sense.



A stylized map of an urban area. A river, colored in a vibrant teal, flows from the top left towards the right side of the frame. The map is composed of a grid of white lines representing streets and building footprints. Several building footprints are highlighted in a solid green color, indicating the focus of the case study. Other buildings are shown in a light grey color. The overall aesthetic is clean and modern.

6

CASE STUDY
FOR GREEN BUILDINGS
THE RIDGE

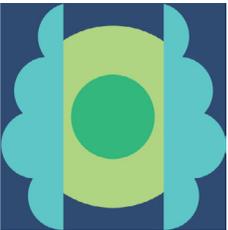
CASE STUDY THE RIDGE

A case study for green buildings The Ridge

The Ridge, a new commercial building in the Portsworld District of the V&A Waterfront, celebrates its 6-Star Green Star Office Design and As Built rating by the Green Building Council South Africa (GBCSA). The rating is considered by the Council as demonstrating “World Leadership”.

The Ridge deploys some of the most advanced sustainable building technology available globally, as well as original blue-sky thinking. It was born from the V&A Waterfront’s vision to set new standards for the future of commercial office buildings. The final design was the result of the creative inputs of the project’s multi-disciplinary design team, which worked closely together.

Over the past decade, the Waterfront has blazed a trail of sustainable development, rewarded with Green Star accreditations by the GBCSA. Individual buildings include the Allan Gray building at No.1 Silo, the Watershed and No.5 Silo, all 6-Star Green Star buildings plus a number of other firsts which include the



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former Grain Silo which became Zeitz MOCAA (Museum of Contemporary Art Africa) and the boutique Silo Hotel, as well as No.6 Silo incorporating the Radisson Red (the first 5-Star Green Star hotel). David Green, the CEO of the V&A Waterfront, explains that this project showcases the capabilities of the Waterfront as a developer in providing custom designed office or mixed-use accommodation to the highest standard in line with the needs of the customer.

“The Ridge, and our other developments, provide a working example of how it can be done for companies looking to the future of their businesses in a sustainable way, with a focus on both environmental performance and the greatest asset a company has: its people.”

Donald Kau, Head of Communications & PR at the V&A Waterfront explains that the Ridge has been an important milestone for the Waterfront in its rollout of bespoke office space, mixed-use and retail offerings.

“Armed with a development approach we consider as ‘Our Normal’, we’ve implemented people-centred innovations in all our bespoke developments. These promote a healthy work environment, help in combating sick building syndrome and promote low carbon modes of transport. These include pedestrian footpaths, bicycle routes/parks, outdoor greened relaxation areas and even food gardens”, he says.

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DAVID GREEN
CEO, V&A Waterfront

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DONALD KAU
Head of Communications
and PR, V&A Waterfront



CASE STUDY THE RIDGE



The Ridge was designed to be a world-class living, breathing building by incorporating a number of standout features, some of which are firsts for South Africa.

Air quality

The building operates on a mixed-mode interior climate control system, which includes the following features: Natural ventilation, which significantly raises the indoor air quality and is controlled by the occupants. This means that office workers may open the windows to let in fresh air for up to 80% of the year. An impressive atrium runs from ground to the third level of the building. Referred to as the 'central street', it helps to pull air through the building, in through the windows and out through the rooflights, while also bringing many other benefits to workers and visitors inside the building.

Minimal HVAC (air conditioning) usage

The building incorporates passive (non-energy consuming) temperature-control mechanisms, several of which are unique, "A virtual sum of parts that leads to a greater whole", says Kirsten Goosen, Development Manager for the project. The zigzag shaped engineered timber façade ingeniously orientates the glass windows towards the north or south, which prevents lower angle sun from the east or west from entering the office spaces. This provides natural daylight, while reducing glare and patches of hot sunlight. "This has a major impact in promoting both fresh air quality and the saving of energy", adds Kirsten.

Thermally Activated Building System Technology (TABS)

"TABS is installed into the soffits (ceilings) above the working areas of the building, and this cools the concrete structure by means of water circulating from the chiller and heat pumps on the roof. The cooler soffit hence cools the air below, which circulates around the workspace. TABS is another important contributor to the mixed-mode climate control system at work inside the building", she explains.

"TABS is another contributor to the mixed mode climate control system at work inside the building."

KIRSTEN GOOSEN
PROJECT DEVELOPMENT MANAGER, V&A Waterfront

CASE STUDY THE RIDGE

The green elements of this syndication drove up lender appetite, leading to increased access to liquidity at better prices for V&A.

“All these measures mean that people inside the building will experience steady indoor ambient temperatures which respond slowly to outdoor temperature variations. The mixed-mode system design aims for the building’s conventional air conditioning system to be active for only 20% of the year. This is in line with international standards such as WELL™, in promoting occupant productivity and thermal comfort”, she adds.

Further demonstration of innovation is the highly creative use of plastic waste as ecobricks inside non-load bearing concrete floor slabs, to displace the use of conventional concrete or polystyrene void formers. This appears to have been a first for a South African commercial building. The Ridge project will repurpose approximately 5.2 tons of single use plastic. 84% of this plastic would have ended up either in landfill or worse, the ocean.

6-Star green building certification

The achievement of the 6-Star Green Star green building certification led to the opportunity for V&A Waterfront to include The Ridge, among other buildings, in successfully raising a R1bn syndicated green loan, partnered by RMB acting as Sustainability Co-ordinator, and aligned to the Loan Market Association’s Green Loan Principles.

“The V&A has always considered sustainability to be an integral component of our business strategy. Our specific goals are to drive sustainability, opportunity and inclusivity through our work and strategically leverage our ecosystem to provide value to all stakeholders. We are therefore proud that we have been able to partner with RMB, as an experienced sustainability co-ordinator, and other banks to leverage our existing green assets to raise green loans in our inaugural fund raise in the syndicated loan market,” says Antoinette Basson, CFO at V&A.

As this was V&A’s inaugural fundraising initiative in the syndicated loan market, it was essential to ensure a successful transaction to set V&A on the path for future loan syndications. The green elements of this syndication drove up lender appetite, leading to increased access to liquidity at better prices for V&A.

“The V&A has always considered sustainability to be an integral component of our business strategy. Our specific goals are to drive sustainability, opportunity and inclusivity through our work and strategically leverage our ecosystem to provide value to all stakeholders.”

ANTOINETTE BASSON
CFO, V&A Waterfront





7

PROPTech AS AN ENABLER FOR ESG AND GREEN BUILDINGS

ESG and technology – two sides of the same coin

Improving ESG outcomes is an increasing imperative for the real estate sector – investors, tenants, and regulators are applying pressure to drive more sustainable business models. In addition, as the operating environment for real estate in South Africa evolves, ESG and commercial outcomes are increasingly aligned.

Holistic ESG strategies are leveraging technology, including devices, software, systems and processes. These technologies allow businesses to gather the necessary data and insights to understand and respond to ESG risks and opportunities.

Given the relationship between ESG, technology and property sector returns, it is no surprise to note that 70% of global real estate technology investment is now allocated to climate positive solutions (up from 20% five years ago)¹⁹.

Following the global lead, the South African property technology (proptech) market is responding to the opportunity that ESG represents. Through the development of extensive technologies, proptech businesses are seeking to address the sector's most critical ESG requirements through the property life-cycle.

Given the generality of governance technologies across sectors, this report focuses on solutions to environmental and social aspects of the real estate sector.

¹⁹ State of Built World Tech, 2023

South African green proptech landscape

OPERATIONAL CARBON TECHNOLOGIES		
EMBODIED CARBON	OPERATIONAL CARBON	
DIGITISATION	ENERGY GENERATION, SOURCING AND MANAGEMENT	DIGITISATION
<ul style="list-style-type: none"> Design software Construction process management Building Information Models Digital twins 	<ul style="list-style-type: none"> Embedded generation Power wheeling Storage Energy management systems 	<ul style="list-style-type: none"> Utility consumption Building monitoring Equipment and infrastructure monitoring Smart buildings/smart metering 
BUILDING MATERIALS	CONSUMPTION OPTIMISATION	ESG REPORTING
<ul style="list-style-type: none"> Material manufacturing Alternative materials Supply chains/local sourcing Carbon sequestration Waste management 	<ul style="list-style-type: none"> Consumption reporting HVAC management Circular economy Digital twin AI and machine learning 	<ul style="list-style-type: none"> Waste reporting Water reporting Energy reporting Consulting 
BUILDING TECHNIQUES		
<ul style="list-style-type: none"> Pre-fabricated modular construction 3D printing 		

Table source: REdimension Capital

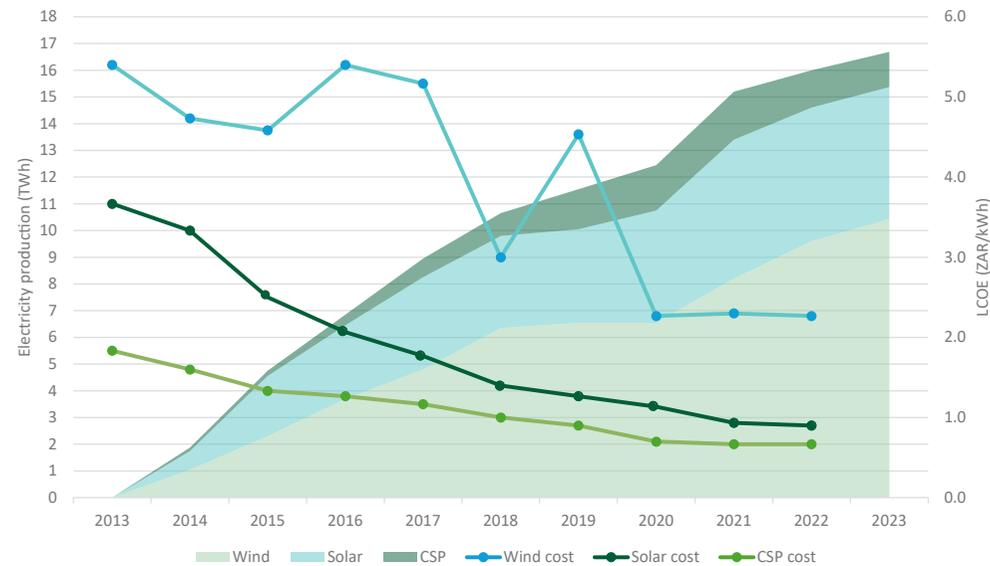
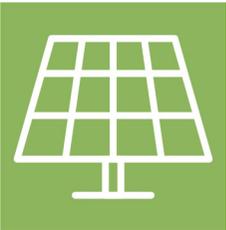
Operational carbon technologies

South Africa's climate makes solar one of the most accessible green energy alternatives, boasting more than 2 500 hours of sunshine annually and delivering 4.5 and 6.5kWh/m² in solar radiation.

Embedded solar and storage

Driven by supply disruption, rooftop solar capacity increased by 349% in a little over a year between March 2022 and June 2023 and represented 4,412MW at that time. In addition, as wheeling frameworks become more established and grid access is provisioned more efficiently²⁰, it is anticipated that additional opportunities will be available for large consumers to wheel renewable energy from independent power producers (IPPs).

This significant pivot to renewable energy, and embedded generation in particular, has meant that property owners have needed to engage with numerous technologies that allow them to accurately monitor and optimise the performance of their energy production systems. This is ever more acute where batteries



²⁰ Eberhard, 2023

²¹ Centre for Renewable & Sustainable Energy Studies, University of Stellenbosch, 2023

After Centre for Renewable & Sustainable Energy Studies²¹

PROPTECH AS AN ENABLER

are installed, allowing for time-of-use optimisation (the ability to acquire and store energy at times when it is cheapest). The rapid technological advances in batteries, and electric vehicles (EVs), present an exciting future for real estate and how it can be optimised for a dynamic power curve and variable tariff environment.

Leveraging the batteries of EVs, buildings and EVs can work in a symbiotic relationship, where EVs supply a building with complementary power during peak demand periods, and harvest energy to recharge during off-peak day time periods where solar systems, both embedded and utility scale, are producing excess power.

Power wheeling

The sharp increase in the registration threshold for IPPs in 2021 (1MW increasing to 100MW) unlocked significant private investment into energy generation. As large off-takers across portfolios, property companies are engaging these IPPs in the private acquisition of wheeled power through long-term power purchase agreements. These contracts have two distinct benefits in both reducing the average cost of energy acquired by the property portfolio and reducing the overall carbon footprint, as power is typically generated from renewable sources (solar, wind or hydro).

This process of wheeling power between IPPs and the underlying properties requires a significant amount of technology to be able to monitor near real-time generation and consumption for both the IPP and the property to allow for accurate billing and rebates. This process is made more complex where a portfolio of multiple properties enter into a wheeling arrangement whereby consumption needs to be aggregated in real-time across numerous properties across multiple jurisdictions.

Energy management systems

Energy Management Systems (EMSs) can monitor, control, and optimise energy procurement, generation and consumption in real estate. These systems leverage advanced technologies to provide a comprehensive view of a building's energy sources and uses, integrating various energy sources and optimising their procurement and use in a cost-efficient manner. Additionally, EMSs can predict energy demand and manage energy storage solutions, ensuring that excess energy generated during low-demand periods is stored for use during peak times. This enhances energy efficiency, reduces operational costs and carbon emissions, and makes buildings more sustainable and cost-effective.

Utility monitoring and consumption optimisation

Optimising for utility consumption starts with having a deeper understanding of consumption patterns across any property. Answering the question of "who or what is consuming when?" enables property owners to identify high or anomalous consumption which can inform actions that reduce wastage and drive greater efficiency. Proptechs are providing platforms, tailored to the property sector, to aggregate consumption

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data, allowing management teams to visualise, understand and report consumption more accurately, efficiently and in near real-time. These platforms monitor trends and patterns, leveraging machine learning to notify of anomalies in consumption, including leak detection and equipment failures.

In the majority of commercial property arrangements, tenants are responsible for the costs of consumption of utilities. However, these utilities are typically also viewed within the total cost of occupancy of any property. Accordingly, there is commercial rationale for landlords to educate and assist tenants with lowering their consumption.

In line with the benefits of real-time monitoring of consumption, proptechs are providing tenants with a transparent platform to understand their consumption behaviour and the associated costs, allowing them to rationalise consumption and become more efficient. These platforms are also reducing the number of disputes between landlords and tenants in relation to recoveries.

Digitisation and data capturing

Gathering, aggregating and distilling building data forms the backbone of any digitally enabled optimisation strategy and underpins numerous technology solutions within a smart building ecosystem. Leveraging Internet of Things (IoT) devices, property owners can gather insights into energy and water efficiency, temperature and weather conditions, asset and infrastructure health and even end-user health and safety concerns.

Building monitoring

Beyond utilities, IoT is enabling a holistic view of a building environment, allowing buildings to become smarter to drive improved efficiencies, such as where:

- **Sensors** can detect empty rooms and turn off lights accordingly or alter the brightness in a room based on the availability of natural lighting at a point in time
- **By gathering weather and temperature data**, buildings are able to provide the underpinning to machine learning for HVAC systems, that allows them to manage a large number of environmental variables and adjust their operations autonomously to run more efficiently
- **Smart geyser systems** are allowing heating cycles to be optimised taking account of numerous variables including loadshedding schedules
- **Collecting and monitoring air quality data** helps to identify areas within buildings with poor air quality, alerting managers to the need to mitigate potential associated health risks and to improve overall well-being for occupants

PROPTech AS AN ENABLER

- **Technology** has enabled the design of taps to regulate the outflow of water regardless of the water pressure
- **Physical infrastructure** and equipment within buildings can be **tracked and monitored** alongside digital infrastructure/asset registers. These **data sets and systems** can assist in predictive maintenance scheduling, assisting with lowered maintenance costs and wastage, while ensuring that asset health is prioritised

Water infrastructure

Over 40% of municipal water is lost before it reaches municipal customers²². A constant feature in urban areas, pipe leaks are the result of poorly maintained infrastructure and a lack of up-to-date pipeline distributions across cities.

The impact that proptech can deliver to water usage and sustainability can be significant. Not only can current technologies be used to map all water pipes across buildings and cities, but technologies can also be used to monitor flow and pressure data and detect leakages in real time.

Digital twins

A digital twin is a live digital replica of a building. The digital twin model incorporates the digital physical and functional aspects of a building known as a Building Information Model or BIM but takes the model further to incorporate operational data. A digital twin provides property owners with a fully auditable overview of an asset at any point in the asset's lifecycle.

This tool allows owners to move away from outdated building plans and allows for seamless updates to the building profile in accordance with any changes made.

Furthermore, proptechs are leveraging digital twin technology to run simulations to better understand the impact of environmental variables on asset performance. These variables include occupancy, weather and temperature, time-of-day utility pricing, among other factors, to generate machine learning algorithms to optimise consumption and performance.

The application of digital twins can be applied to much greater systems too, such as the national power grid system. Through the use of smart meters, digital twins of suburbs and towns can assist with understanding demands on the grid to prioritise grid upgrades and enable better maintenance planning.

Furthermore, asset digital twins allow one to model the performance of assets in the grids, such as transformers, or back up power supply assets such as generators. This also offers the ability to perform diagnostics when breakdowns have occurred to better understand the source of the problem²³.

²² WRC, 2023

²³ SA Instrumentation and Control, 2023

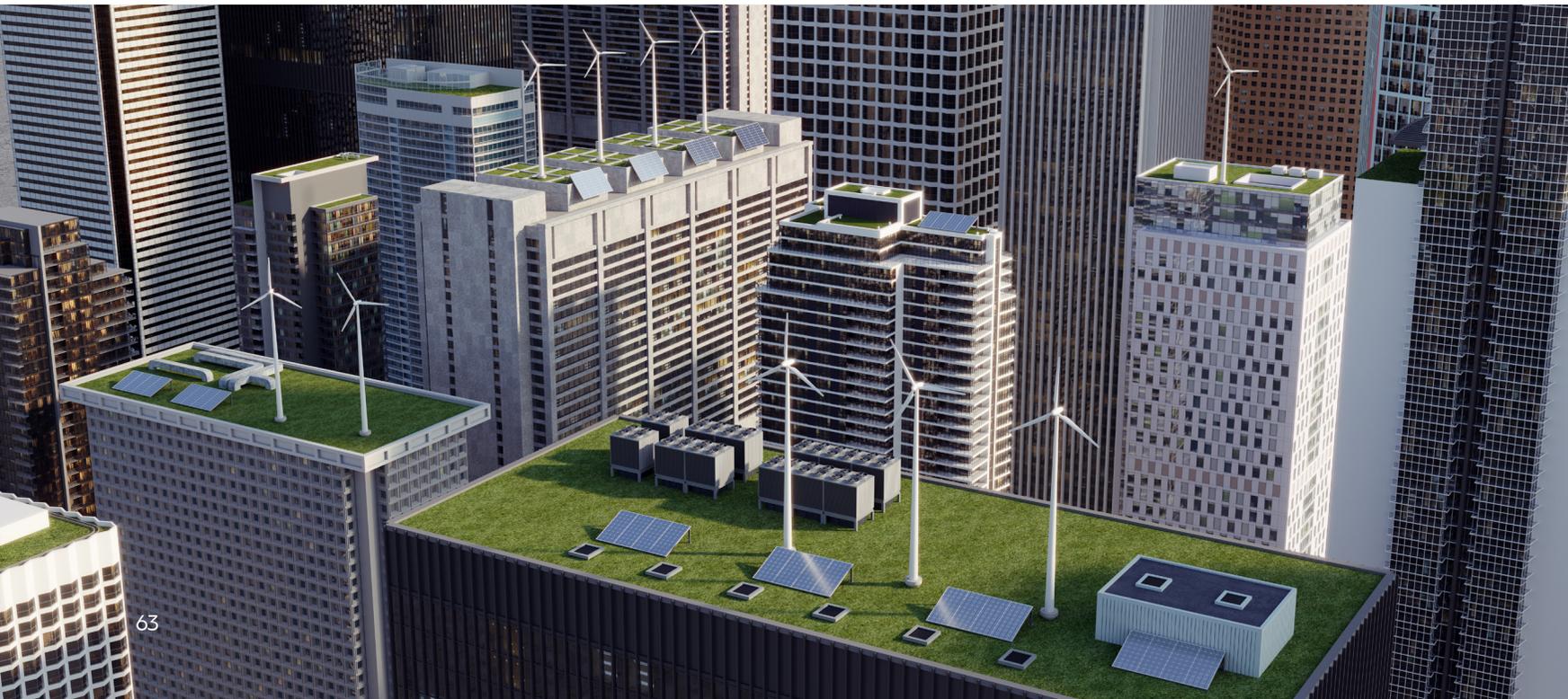
PROPTECH AS AN ENABLER

Waste management technologies

Waste management is a crucial component to creating a circular economy. In the case study of the Ridge building at the V&A, a deeply human, and social solution to waste diversion was implemented. But this is far from the only approach being implemented in South Africa.

Technology is playing a role in making waste management a smarter, more efficient process, providing insights into waste composition and optimising collections, aiding recycling efforts. Numerous technologies are seeking to enhance waste collection processes. Solar powered in-bin waste compressors maximise bin capacities. Bin sensors are allowing bins to communicate with property managers allowing collections to be carried out only as necessary.

Leveraging BIM models and machine learning, collection routes can also be adjusted to minimise unnecessary collection runs. Technologies are facilitating waste audits during the waste sorting and weighing process. These processes are crucial for property owners and tenants to understand their waste composition, allowing them to optimise for various sources independently.



Embodied carbon technology

Digitisation

Driving a reduced carbon footprint in the development and construction phase of real estate requires the use of data-led technologies. These technologies can consolidate and report on carbon consequences emanating from decisions around material usage and construction techniques. Similarly, using BIM to improve real estate development planning, design and execution, with enhanced collaboration between professional teams, allows project managers to optimise the allocation of resources and minimise wastage.

Materials

Traditional construction materials carry a significant carbon cost where concrete alone is responsible for approximately 8% of greenhouse gas emissions annually²⁴.

The global green building materials market, which includes building materials that carry a lower carbon cost than traditional alternatives, is showing positive signs of growth²⁵. Currently, traditional materials are still preferred due to their inherent reliability, but there are indicators of this paradigm changing. Significant investment is being made into the development of highly durable and reliable alternatives to traditional materials, most notably, the production of a low carbon cement.

Building techniques

According to a study by Wits University²⁶, construction waste in South Africa amounts to between 5 million and 8 million tonnes per year. Most of this waste goes directly to landfill, with a small portion being reused or recycled

Modular construction techniques allow entire buildings to be constructed offsite and transported as a flat pack, reducing the deliveries made to site in the initial construction phase. Modular builds increase flexibility of buildings by way of reconfiguration of internal walls. This allows buildings to be renovated while minimising associated emissions, and keeping the building relevant as its needs change over time. Modular buildings can even be taken apart and assembled in other locations which can generate 50-70% less carbon emissions than equivalent new constructions.

Modular construction also allows for more sustainable building materials to be used with high insulation advantages and they are 30-50% faster to build overall, research suggests that modular constructions can produce 45% less carbon than their traditional counterparts²⁷.

3D printed buildings can be built on or offsite²⁸ and can reduce the carbon footprint of a building by reducing the building materials required by 30-60%²⁹ and reducing building waste. This technique can also reduce construction time and allows for greater complexity in building designs.

²⁴ Tunley Environmental, 2023

²⁵ Allied Market Research, 2020

²⁶ University of the Witwatersrand, 2022

²⁷ Modular Building Institute, 2024

²⁸ The RIBA Journal, 2022

²⁹ Greystar, How is 3D Printing driving sustainable construction practices? 2024

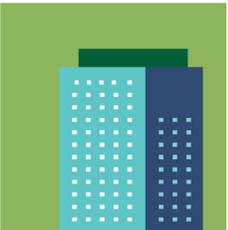
PROPTECH AS AN ENABLER

Artificial Intelligence (AI)

Artificial Intelligence (AI) and **machine learning** will play an increasing role in reducing emissions. Linking into the aforementioned technologies, AI can significantly reduce the carbon footprint of the real estate sector by optimising for both operational and embodied carbon.

- By autonomously analysing data, AI-enabled systems are able to regulate heating, cooling, lighting, and other systems in real-time, minimising energy consumption.
- Predictive maintenance powered by AI can also reduce wastage and drive peak efficiency on a cost-adjusted basis.
- AI is assisting in optimising design and construction processes and analysing materials and construction methods to achieve the lowest carbon impact.
- AI-driven simulations can help architects and engineers design structures that require fewer resources and generate less waste.
- Additionally, AI can assist in supply chain optimisation, ensuring materials are sourced and transported in the most carbon-efficient manner.

Proptechs in South Africa are increasingly looking at how AI can be leveraged into their product offerings, and it is expected to become a staple component of how real estate is developed, managed and operated efficiently.



Headwinds to technology innovation and adoption

Balancing costs with medium-term benefits

The real estate sector is showing an increasing awareness of, and willingness to adopt, technologies. However the technologies that have been most successful, are generally able to demonstrate an immediate benefit to the client. For example, a technology that reduces energy consumption has a clear net bottom line impact and is highly saleable, particularly where the revenue model of the proptech is linked to the savings generated.

Conversely, a technology that improves the user experience for the tenant and results in that tenant being retained may generate more value to the landlord but is unable to immediately demonstrate the benefit and is therefore more difficult to sell in the current economic cycle.

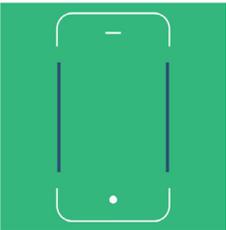
Timing of defensive investments

Technologies that address ESG can have immediate bottom line impacts but tend to also be more defensive in nature, particularly where more onerous regulation is enacted. Given the capital constrained cycle the South African market has experienced, landlords may be reluctant to invest in value defensive technologies too early in the cycle and before the investment is a necessity.

Culture of innovation and change management

The real estate sector globally has been characterised as failing to foster a culture of innovation due to its traditional nature and resistance to change. A lack of technological integration, outdated business models, and a general risk aversion among stakeholders, combined with the industry's regulatory environment and fragmented market structure, has complicated efforts to implement innovative solutions.

Building a culture of innovation starts with leadership, generating broad organisational buy-in on the benefits of alternative operating practices and technologies. This needs to be supported by the understanding that change can, in time, generate improved personal and organisational outcomes. Ultimately, change may in certain instances require forcing from the top through the realignment of remunerative incentives with innovative goals.

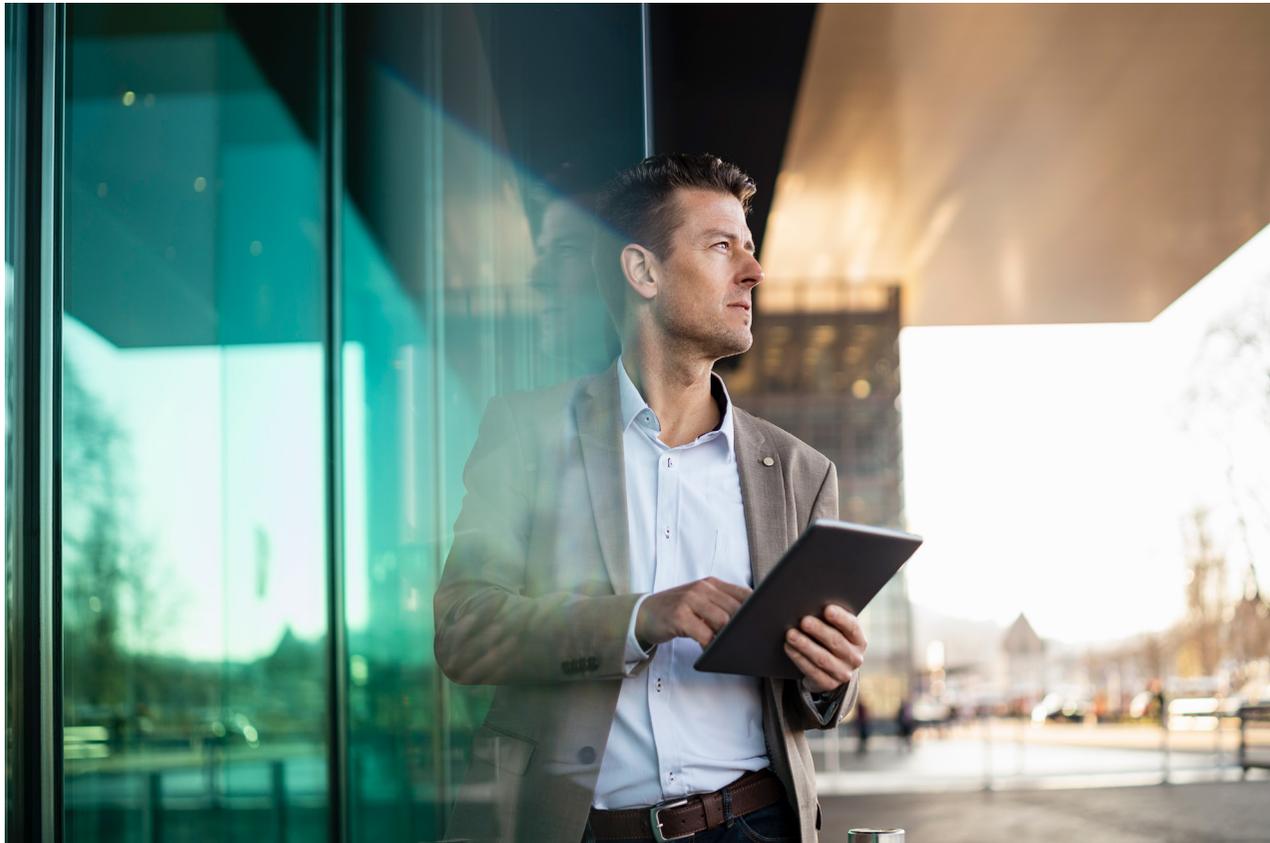


The crucial role of technology in green certified buildings and sustainable finance solutions

As demonstrated, technological advancements are not only capable of enabling more efficient and effective operations aligned to ESG outcomes, but are also driving greater resilience and adaptability in businesses, ensuring they are better informed and able to navigate the complexities of global and local challenges.

Technology and ESG are intrinsically linked. The benchmarking and optimisation of green buildings, and the monitoring of sustainability performance, are part of what underpins this connection.

Technology can also enable the development of innovative financial products through facilitating efficient data management, transparent reporting, enhanced risk assessments, and resource optimisation. It is an essential tool for the building and construction sector, where its potential to shape and deliver a more sustainable and responsible future for the sector and the planet is only just beginning to be understood. ‘



A stylized map of a city grid. A teal river flows from the top left towards the bottom right. Several blocks are highlighted in green, indicating specific areas of interest. The rest of the map is a light gray grid with white street lines.

8

**SUSTAINABLE
FINANCE
OPPORTUNITIES**

The role of financial institutions in greening portfolios

Many banks, asset managers and other financial institutions have acknowledged how pivotal their role is in tackling climate change and facilitating and directing capital towards supporting the transition to a lower carbon economy.

Many of these institutions have announced public targets to signal their intent in the transition. The FirstRand Group, for example, has committed to being net zero in its own operations by 2030, facilitating R200bn worth of sustainable financing by 2026 and having net zero financed emissions by 2050³⁰.

In addition to financial institutions having their own sustainability targets and commitments, identifying opportunities linked to sustainability that can differentiate companies and provide new avenues for growth, is becoming increasingly important.

As sustainability becomes more of a strategic imperative for clients and their suppliers, so linking corporate funding strategies to sustainability objectives offers companies a new avenue to identify and build on these opportunities.

This has led to a greater focus on sustainable finance opportunities as a lever to maximise benefits for business, its stakeholders and the environment.

The drivers for corporate and stakeholder interest in sustainable finance are multifaceted, reflecting a blend of economic, regulatory, social, and environmental motivations. These drivers collectively underscore the importance of sustainability as a critical component of modern business strategy, aligning economic performance with social and environmental objectives.

Real estate assets often make up a sizeable portion of many financial institutions' asset base. Therefore, the greening of these assets is pivotal to addressing climate commitments made by such organisations, in addition to ensuring that they are managing long term risk adjusted returns, while remaining relevant to

³⁰ FirstRand Group Climate Change Policy, 2023



SUSTAINABLE FINANCE OPPORTUNITIES

their clients and broader stakeholder base. Further, climate transition and adaptation represents a significant opportunity for financial institutions (FIs). This is because greening often requires significant upfront capital expenditure and can enable the FI to expand their client base and access new funding opportunities, while also building a green portfolio that allows for access to increased liquidity through green bonds.

Sustainable finance represents a crucial tool to support financial institutions in reorienting capital flows and investment towards achieving set commitments.

This landscape is rapidly evolving, with a growing array of products, tools and technologies available to support the planning, implementation, and management of these initiatives and financial instruments. These help to optimise financial outcomes and ensure the long-term sustainability of green building projects.

The evolution of sustainable finance instruments

Over recent years sustainable debt financing has increased twentyfold, from about \$10 billion in 2017 to a record high of about \$230 billion in 2021. Green bonds accounted for the vast majority of these instruments, with some emerging debt instruments, like sustainability-linked bonds and loans and social bonds and loans, growing at a faster pace in recent times. In addition to this, the market is seeing the development of other more nascent sustainable finance products which are likely to play a more prominent role within emerging markets going forward (e.g. carbon offsets, blended finance, green funds, green mortgages, off balance sheet solutions, etc.). We have outlined key characteristics of the two most common sustainable finance instruments outlined below.

Sustainability-linked bonds and loans

This is a bond/loan instrument for which the financial and/or structural characteristics can vary depending on whether the issuer/borrower achieves predefined sustainability/ESG objectives. Sustainability-linked bonds and loans (SLBs and SLLs) are a forward-looking performance based instrument.

Green buildings provide a robust and measurable way to achieve sustainability performance targets (SPTs), making them a critical component of SLBs and SLLs. Certifications like Green Star, LEED, BREEAM, etc. provide verifiable metrics of their sustainability performance.



SUSTAINABLE FINANCE OPPORTUNITIES

These certifications can be tied to SLBs/SLLs as performance indicators. In addition to green building certifications, other measurable outcomes such as energy/water savings, reduced carbon emissions and other environmental benefits of green buildings can be quantified, providing clear metrics to link with the financial performance of the bond/loan. As noted in the table below, many banks around the world have issued SLBs to finance green building construction, renewable energy, and improve energy efficiency.

SUSTAINABILITY-LINKED BONDS ISSUED WITH GREEN BUILDINGS SERVING AT LEAST ONE OF THE KPIS					
	EQUITIES PROPERTY FUND ³¹	HULIC ³²	INVESTEC BANK PLC ³³	CORPORATION INMOBILIARIA VESTA ³⁴	GLP J-REIT ³⁵
COUNTRY	South Africa	Japan	United Kingdom	Mexico	Japan
VALUE (MILLION)	800	10 000	800	350	6 000
CURRENCY	ZAR	JPY	ZAR	USD	JPY
COUPON	3 month JIBAR + 1.65%	0.44%	3 month JIBAR + 3.675%	3.63%	0.28%
KPI THEMES	Green buildings, renewable energy, sustainable sourcing	Green buildings, renewable energy	Green buildings, renewable energy	Green buildings	Green buildings
GREEN BUILDING KPI DETAILS	All new building developments must achieve green certification	By 2025 the con- struction of Japan's first fire-proof, 12-story wooden commercial facility the Ginza 8-chome development plan will be completed	Achieve 4 additional Green Star building certifications by 30 June 2022	Percentage of Gross Leasable Area (GLA) of properties that are certified sustainable as compared to the GLA of all prop- erties in the total portfolio	Over 80% at the coverage rate of the properties that obtained at least one High-rank in environmental certification among properties owned by GLP J-REIT, based on Floor Area

³¹ Equities Property Fund
Applicable Pricing
Supplement, 2021

³² Hulic SLB media release,
2020

³³ Investec Property Fund SLB
Applicable Pricing, 2021

³⁴ Corporación Inmobiliaria
Vesta Sustainability-Linked
Bond Second Party Opinion,
2021

³⁵ GLP J-Reit SLB media
release, 2021

Green bonds and loans

This is a bond/loan instrument where the proceeds are used to finance or refinance new or existing eligible green projects. Green buildings can be used as the eligible green project.

Certified green buildings are a natural fit for green bonds/loans due to their clear environmental benefits (energy efficiency, water conservation and reduced emissions), the ability to achieve and verify high sustainability standards, market demand and supportive regulatory frameworks. They offer measurable and

SUSTAINABLE FINANCE OPPORTUNITIES

reportable outcomes that are essential for the credibility of the green bond/loan. The green bond market has observed clear outperformance from green bonds vs vanilla bonds, given the increased appetite for assets that are climate friendly. This has led to higher levels of debt subscription and lower costs of capital for borrowers, as shown in the table below.

OVERSUBSCRIPTIONS COMPARED TO VANILLA EQUIVALENTS						
	USD			EUR		
	Green	Vanilla	Green advantage	Green	Vanilla	Green Advantage
H1 2023	5.4	2.4	125%	3.2	2.7	19%
H2 2022	5	3.0	67%	3.6	3.0	20%
H1 2022	3.8	2.7	41%	3.1	2.4	29%
H2 2021	3	2.7	11%	3.4	2.7	26%
H1 2021	4.7	2.5	88%	2.9	2.6	12%
H2 2020	3.5	3.3	6%	4.2	2.9	45%
H1 2020	2.6	2.3	13%	5.2	3.1	68%
H2 2019	2.7	1.9	42%	2.8	2.0	40%
H1 2019	4.1	4.5	9%	3.9	3.3	18%
H2 2018	4.5	2	5%	2.6	2.1	24%

Source: Climate Bonds Initiative

Over the last five years, green bonds have consistently attracted larger book cover and spread compression than their vanilla equivalents (USD bonds: spread compression averaged 29bps for green bonds and 23bps for vanilla bonds for H1 2023)

Despite most vanilla bond deals being oversubscribed, the gap between vanilla and green bond oversubscriptions is substantial.

Issuers that participate in bonds that have a green label attract more interest and diversify their investor base with some in the EUR SSA and Covered Bond categories in particular attracting strong interest during book building and tightening further in the secondary market.

SUSTAINABLE FINANCE OPPORTUNITIES

The table below includes a selection of local and international green bonds issuances linked to green building certifications.

GREEN BONDS ISSUED WITH GREEN BUILDINGS SERVING AT LEAST ONE ELIGIBLE GREEN CATEGORY					
	Redefine Properties Ltd ^{36 37}	Wallenstam ³⁸	Acorn Project Ltd ³⁹	Growthpoint ⁴⁰	Digital Realty ⁴¹
Country	South Africa	Sweden	Kenya	South Africa	United States
Value (m)	425	400	4 262	560	83.54
Currency	ZAR	SEK	KES	ZAR	USD
Coupon	3-month JIBAR + 1.70%	Stibor + 1.20%	12.25%	3-month JIBAR + 2.00%	3.95%
Use of proceeds categories	Energy efficiency, green buildings, renewable energy, sustainable water management	Green buildings, renewable energy, clean transportation, energy efficiency	Green buildings	Green buildings	Green buildings, energy and resource efficiency, renewable energy
Green building eligibility criteria	<p>A building must have achieved or needs to achieve one or more of the following:</p> <ul style="list-style-type: none"> • LEED • Green Star Cat 4/+ • Sustainable Precincts certification • Net Zero carbon/water/waste/ecology certification • EWP level 6/+ • EDGE certified by the IFC's EDGE partners • BREEAM 'Very Good'+ • Energy Performance Certificate at B/+, per SANS 1544: 2014 • Energy Star 85/+ • EcoDistricts • Living Building • WELL Building 	<p>Development, acquisition, major renovation or otherwise completed properties that have, or will, receive:</p> <ol style="list-style-type: none"> a design stage certification a post-construction certification a post-construction certification of Miljöbyggnad 'Silver' or better, as well as 20% lower energy use than required by the applicable national building code 	<p>In line with the key focus areas of the IFC EDGE tool, eligible green buildings must achieve a minimum 20% reduction in the following key areas, as compared to the baseline:</p> <ul style="list-style-type: none"> • Water efficiency • Energy efficiency • Materials efficiency 	<p>The proceeds of the green bonds will mainly be used to refinance funding obtained for green office buildings that form part of the THRIVE Platinum Portfolio, comprising Growthpoint's top green-rated properties.</p> <p>Office buildings with the minimum of a 4-Star Green Star rating that are part of the Growthpoint THRIVE Portfolio will be eligible for the proceeds from the Green Bond</p>	<p>Any projects which have received/expected to receive certification according to the standards of one/more of these internationally-recognised third-party verified 'green building' certification standards at one of the specified levels:</p> <ul style="list-style-type: none"> • LEED: Silver/Gold/Platinum • BREEAM: Very good/Excellent/Outstanding • BCA Green Mark: Gold/Gold Plus/Platinum • Green Globes: 3/4 Globes • CEEDA: Silver/Gold • CASBEE: B+/A/S • DGNB: Silver/Gold/Platinum

³⁶ Redefine Properties Ltd Pricing Supplement

³⁷ Redefine partners with RMB to enable its sustainable funding strategy

³⁸ Wallenstam Pricing Supplement

³⁹ Acorn Project Ltd Green Bond Framework

⁴⁰ Growthpoint Green Bond Framework

⁴¹ Digital Realty Green Bond Framework

SUSTAINABLE FINANCE OPPORTUNITIES

In addition to traditional sustainable finance instruments such as green loans/bonds and sustainability-linked loans/bonds, there are additional non-traditional instruments and mechanisms that have been growing in the market which have been outlined below:

ADDITIONAL NON-TRADITIONAL INSTRUMENTS AND MECHANISMS IN THE MARKET

	BLENDING FINANCE	CARBON OFFSETS	RECs	VENTURE CAPITAL	MARKETS/ LISTED REITs	OFF-BALANCE SHEET FUNDING
DESCRIPTION	<p>Plays a key role in building the market through accessing different pools of capital and other concessionary tools and technical support.</p> <p>Key in providing technical support, capacity building, regulations, certification.</p>	<p>Voluntary and formal carbon markets can, in turn, help to channel domestic and international capital into green construction.</p>	<p>Energy Attribute Certificates (EACs) are electronic records that verify the origin of energy by a registered renewable energy entity.</p> <p>An EAC represents ownership and use of the environmental attributes of the MWh of electricity generated from a renewable source. EACs are issued primarily as Renewable Energy Certificates (RECs).</p>	<p>Funding new and emerging mitigation and adaptation technologies/ building future pipeline of investments.</p>	<p>Real Estate Investment Trusts (REITs) own, operate or finance income-generating real estate and often have the potential to scale financing of green building construction and operation.</p>	<p>Off-balance sheet funding refers to the exclusion of assets or liabilities on a company's balance sheet to provide improved liquidity.</p>
RELEVANCE TO THE REAL ESTATE SECTOR	<p>Through innovative financial structures, blended finance has the ability to help make sectors of the real estate market which have not been able to attract traditional funders bankable and therefore attract traditional (and non-traditional funders). Blended finance is also able to assist with funding into the real estate sector through credit enhancement and risk mitigation.</p>	<p>The real estate sector may provide opportunities to reduce carbon emissions through rooftop solar or biological sequestration. This can help to meet net zero targets or to generate carbon offsets which can be sold, creating a revenue stream. Conversely the real estate sector can also source carbon offsets from other projects domestically or internationally to hit net zero targets.</p>	<p>Procuring RECs is the cheapest, most hassle-free way real estate companies can access green attributes to offset scope 2 emissions, because it uses existing technology and infrastructure.</p>	<p>Innovation in new technologies servicing the real estate market which have the ability to drive more sustainable outcomes through reducing embodied or operational carbon.</p>	<p>Indexes such as the MSCI South Africa Green Annual Property Index which provides an independent, globally consistent view on the investment performance of green-certified and non-certified office buildings.</p>	<p>Financing solar assets for real estate counters through off-balance sheet mechanisms such as service providers providing leasing models/ performance-based models to the owner.</p> <p>In this case the owner does not have to purchase the asset outright which can also provide liquidity benefits.</p>

Source: Rand Merchant Bank

Role of green certification and proptech in building a sustainable finance market

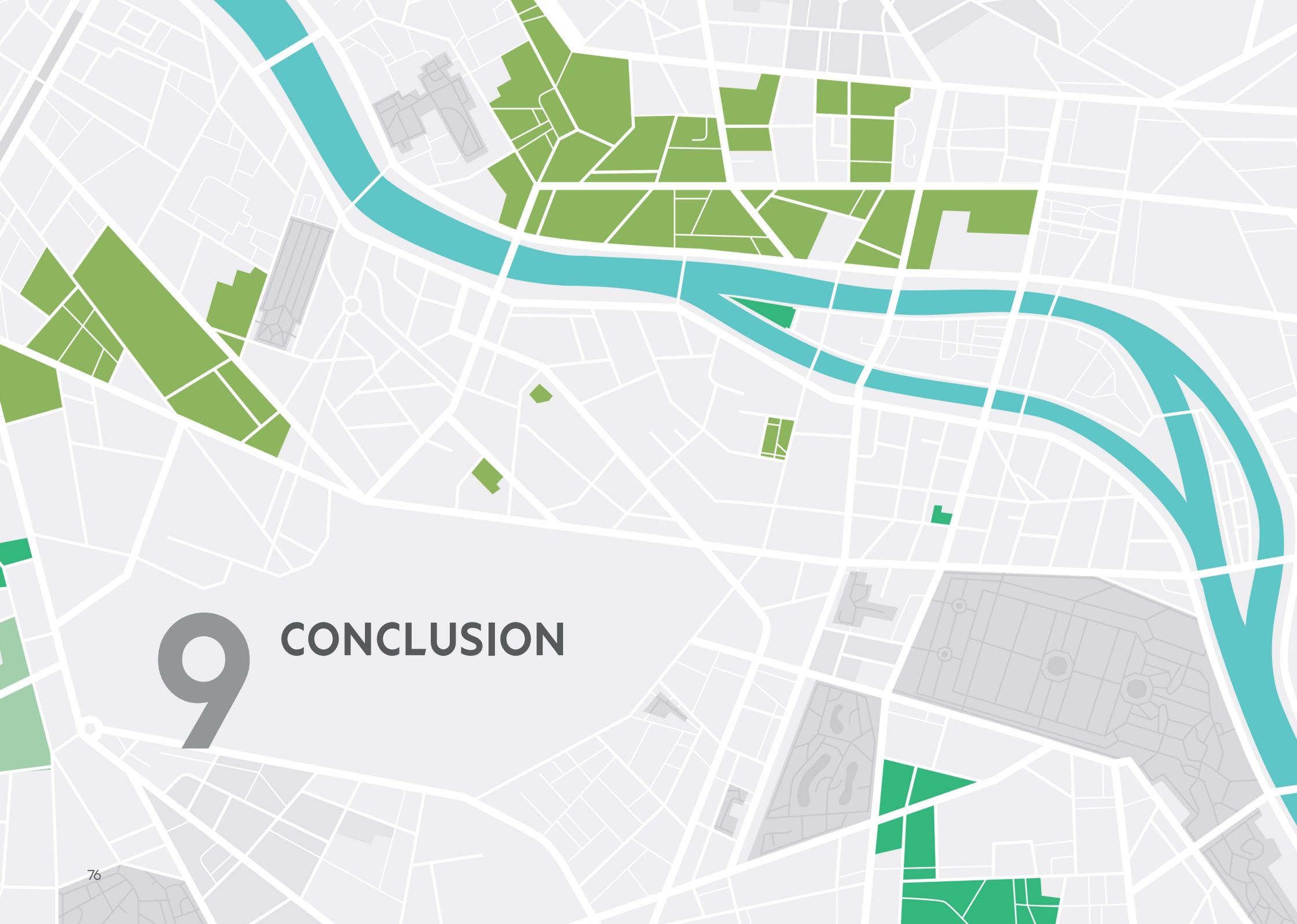
A cornerstone of structuring sustainable finance instruments, for both green and sustainability-linked financing, is the ability to accurately report on and quantify the impact achieved.

Both proptech and green certification bodies have been substantial enablers of this. The real estate sector has benefitted from tailwinds in the form of certifications such as energy performance certificates (EPCs) (which is set to become mandatory in 2025), as well as green building certifications, which both offer an objective, third-party view of the environmental footprint of the asset being financed.

Other sectors have not been as easily enabled, with green or social impact being significantly more difficult to quantify, and more subjective to justify.

Ultimately, the credibility of green building certification bodies, supported by the data and reporting quality enhanced by proptech, has led to ease of execution of sustainable finance in the real estate sector with both local and international investors taking comfort in the validity of the certification.



A stylized map of a city grid. A teal river flows from the top left towards the right side of the map. Several areas are highlighted in green, including a large block in the upper center, a diagonal strip on the left, and a few smaller patches. A large grey area is visible in the bottom right corner. The text '9 CONCLUSION' is overlaid on the map.

9

CONCLUSION

CONCLUSION

Pivotal crossroads

The real estate and construction sector stands at a pivotal crossroads in the global response to climate change and social sustainability.

This report has illustrated the sector's significant role and responsibility in reducing carbon emissions across the property lifecycle—from embedded carbon during construction to operational and decommissioning carbon. As a major contributor to global greenhouse gas emissions, the sector must lead by example in adopting and promoting ESG principles.

The increasing adoption of green building certifications and the implementation of technologies that enhance energy efficiency and resource optimisation are setting new benchmarks for sustainable practices within the South African market.

These interlinked innovations are mitigating environmental impacts and are setting the industry on a new course in which its assets are more adaptable and resilient to a more volatile and extreme environmental conditions.

The evolving local and global ESG reporting frameworks underscore an evolving landscape in which real estate investment decisions are increasingly linked to ESG factors. As demonstrated by the MSCI SA Green Annual Property Index, there is already

a demonstrable financial benefit being achieved by green-certified buildings notwithstanding the marginal green premium to achieve the status. Similarly, sustainable finance instruments, such as green bonds and sustainability-linked loans, are providing the necessary capital, with clear incentives, to develop and retrofit properties to meet ESG standards.

The journey towards sustainability in the real estate sector is complex and multifaceted. However, with continued innovation, commitment, and collaboration, the sector can play a transformative role in shaping a resilient, inclusive and sustainable urban future.

By embracing this holistic approach, the real estate sector will be able to address immediate environmental and social challenges and will pave the way for a sustainable world for future generations.



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REdimension Capital was established in South Africa in 2021 to accelerate innovation in the built environment. Leveraging the unique blend of property-centric skills and experience of its founders, the company has created an ecosystem at the intersection of real estate, technology and sustainability with the ambition of enhancing operational performance and improving sustainability in the built world. REdimension Capital has adopted an advisory-based approach to investing and works closely with forward-thinking strategic corporate and investment partners to advise, invest and innovate future technology. REdimension Capital is a category 1 Financial Service Provider (No. 52205).



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Green Building Council South Africa (GBCSA) is a dynamic non-profit organisation that has been at the forefront of advancing sustainable practices in the property and construction sectors since its establishment in 2007. Our commitment to creating a greener, more sustainable built environment is unwavering, and we are proud to be part of a global network of like-minded organisations, including the World Green Building Council (WGBC). We strive to be catalysts to the widespread adoption of sustainable and decarbonised built environments. Together, we are redefining the way we build, ensuring that our structures not only meet the needs of the present but also safeguard the future for generations to come.

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APPENDIX

ENVIRONMENTAL REGULATIONS

1. National Environmental Management Act (NEMA)

Purpose: Provides a framework for environmental management in South Africa.

Relevance: Ensures that environmental considerations are integrated into all stages of property development, from planning to construction and operation.

2. Environmental Impact Assessment (EIA) Regulations

Purpose: Mandates EIAs for certain types of developments to assess their potential environmental impacts.

Relevance: Ensures that developers identify, evaluate, and mitigate environmental impacts before proceeding with projects.

3. Energy Efficiency Regulations

Purpose: Set standards for energy consumption in buildings.

Relevance: Promotes the design and construction of energy-efficient buildings, reducing their carbon footprint.

4. Water Use License Regulations

Purpose: Regulate the use and management of water resources.

Relevance: Ensures sustainable water use practices in property development and operation.

5. Energy Performance Certificates (EPCs)

Purpose: Mandate that certain buildings must display their energy performance ratings.

Relevance: Encourages building owners to improve energy efficiency, providing transparency on energy use and fostering a market for energy-efficient buildings.

6. National Climate Change Response Policy

Purpose: Provides a comprehensive framework for responding to climate change.

Relevance: Guides the real estate sector in implementing climate adaptation and mitigation strategies.

7. Air Quality Act

Purpose: Aims to improve air quality to safeguard human health and the environment.

Relevance: Ensures that real estate projects comply with air quality standards to minimise pollution.

APPENDIX

ENVIRONMENTAL REGULATIONS (cont.)

8. ISO 14001 Environmental Management Systems

Purpose: Provides a framework for effective environmental management.

Relevance: Helps real estate companies reduce their environmental impact and improve sustainability.

SOCIAL REGULATIONS

1. National Building Regulations and Building Standards Act

Purpose: Sets minimum standards for construction and building safety.

Relevance: Ensures that buildings are safe, healthy, and environmentally sound.

2. Broad-Based Black Economic Empowerment (B-BBEE)

Purpose: Aims to redress the inequalities of apartheid by promoting economic participation of black people in the South African economy.

Relevance: Encourages property companies to engage in fair labour practices, support local communities, and promote diversity and inclusion.

3. Occupational Health and Safety Act (OHSA)

Purpose: Ensures the health and safety of employees in the workplace.

Relevance: Mandates safe working conditions during construction and operation phases of real estate projects.

4. Housing Development Agency Act

Purpose: Facilitates the development of sustainable human settlements.

Relevance: Supports the creation of affordable housing and improved living conditions.

5. Employment Equity Act

Purpose: Promotes equal opportunity and fair treatment in employment.

Relevance: Encourages diversity and inclusion within the workforce of real estate companies.

6. Construction Industry Development Board (CIDB) Regulations

Purpose: Establishes best practices and standards for the construction industry.

Relevance: Ensures ethical practices and enhances skills development within the sector.

APPENDIX

GOVERNANCE REGULATIONS

1. Companies Act

Purpose: Provides the legal framework for corporate governance in South Africa.

Relevance: Ensures transparency, accountability, and ethical business practices in real estate companies.

2. King IV Report on Corporate Governance

Purpose: Offers principles and practices for good corporate governance.

Relevance: Encourages real estate companies to adopt integrated thinking, ethical leadership, and stakeholder inclusivity.

3. Municipal Finance Management Act (MFMA)

Purpose: Ensures sound and sustainable financial management in municipalities.

Relevance: Governs the financial aspects of municipal real estate projects, promoting fiscal responsibility.

CITY INITIATIVES

1. C40 Cities Initiative

Purpose: A network of the world's megacities committed to addressing climate change.

Relevance: Involves selected South African cities in a global effort to reduce greenhouse gas emissions and improve urban sustainability. This includes implementing local policies and projects that

INDUSTRY STANDARDS AND CERTIFICATIONS

1. Green Building Council South Africa (GBCSA) – Green Star Rating System

Purpose: Provides a framework for assessing the sustainability of building projects.

Relevance: Encourages best practices in green building design, construction, and operations.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

SDG 3: Good Health and Well-being

Relevance: Promotes the construction of buildings that enhance the health and well-being of occupants through improved air quality, natural lighting, and green spaces.

APPENDIX

SUSTAINABLE DEVELOPMENT GOALS (SDGs) (cont.)

SDG 6: Clean Water and Sanitation

Relevance: Ensures sustainable water management practices in real estate development, contributing to water conservation and quality.

SDG 7: Affordable and Clean Energy

Relevance: Encourages the use of energy-efficient technologies and renewable energy sources in buildings.

SDG 9: Industry, Innovation, and Infrastructure

Relevance: Supports the development of resilient infrastructure and innovative building practices.

SDG 11: Sustainable Cities and Communities

Relevance: Promotes the creation of inclusive, safe, resilient, and sustainable urban environments.

SDG 13: Climate action

Relevance: Drives efforts to reduce greenhouse gas emissions and improve climate resilience in the built environment.

SDG 16: Peace, Justice and Strong Institutions

Relevance: Ensures transparent, accountable and inclusive governance practices within the real estate sector.