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CHALLENGES AND OPPORTUNITIES OF CORPORATE CLIMATE ACTION IN SOUTH AFRICA: AN INVESTIGATION USING THE AQAL FRAMEWORK OF THE INTEGRAL THEORY

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A dissertation submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Master of Science.

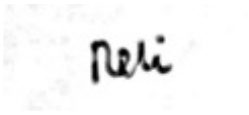
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DECLARATION

I declare that this Dissertation is my own, unaided work. It is being submitted for the Degree of Master of Science at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



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(Signature of candidate)

__3rd__day of __November___in___2022_

ABSTRACT

Climate change is a complex, wicked problem of the 21st century caused by greenhouse gas (GHG) emissions produced by economic growth endeavours and urban life. World leaders have signed agreements to work towards Net Zero emissions by 2050 and keep global average temperatures below 2°C. However, almost a decade later, global temperatures are reaching all-time highs and there seems to be no change in sight.

Because the private sector is the leading emitter, this study aimed to determine the personal and cultural values, beliefs and perceptions, behaviours, and systems that foster (opportunities) or impede (challenges) corporate climate action in South Africa. A holistic approach – the AQAL (all quadrants, all levels, all lines, all states, all types) framework of the Integral Theory – was used, considering that South Africa is a developing country that is dealing with a number of urgent environmental, social, and economic challenges and understanding the complexity of social issues and the South African context particularly.

Data were collected through interviews with environmental/sustainability specialists practicing in the private sector, environmental and business organisations, government and academics in sociology, business, and climate change. Furthermore, content analysis of climate change legislation, policies and guidelines relevant to South Africa, as well as climate change related business reports of a sample of JSE listed companies was conducted. The results showed that companies are starting to consider climate change in relation to their operations, however, they were perceived to be performing poorly, only taking opportunities that are easy and quick to return benefit and not taking transformative climate actions to re-engineer their core operations.

The challenges that were found to be impeding corporate climate action in South Africa were uncertainties around climate change, ineffectiveness of climate change campaigns and guidelines in enforcing climate action, a perverse economic system, socio-economic priorities that take precedence over climate action requirements, South African social dynamics relating to poverty and aspirations that stymie the activism culture, a lack of financial and technical capacity and expertise, tension between young, creative thinkers who are more concerned about climate change and old leaders who may be skeptics and make decisions

based only on financial flows, a lack of infrastructure for certain climate related actions such as recycling, issues relating to the coal and energy sector and national governance.

The opportunities that could be leveraged related to platforms like the NBI where businesses can collaborate on policy, global initiatives, and workable solutions, opportunities to collaborate with academics and other research organisations who are producing contextual data and solutions, young creative thinkers whose ideas can be integrated into decisions making processes, existing climate change awareness and activism by NGOs and conscious civil society, opportunities for government and business to band together to share resources, technical capacity and expertise, leveraging public and private funds to invest in climate change projects and infrastructure, possibilities of diversifying the energy mix through private energy production and grid feed-in, and positioning the country to receive international aid.

Recommendations to mitigate the barriers of corporate climate action and leverage opportunities include collaboration between the different stakeholders to come up with comprehensive solutions and policies to create and enabling environment for positive business response, government finding the political will to make hard decisions, combining business and government resources, capacities and competencies, delegating certain mandates to other stakeholders such as business and environmental organisations, opening up communication pathways for bottom-up influence in business, and business and government leveraging their roles as opinion shapers to educate, raise awareness, shift mindsets and reframe aspirations.

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List Of Abbreviations

Abbreviations	Definition
BUSA	Business Unity South Africa
BEE	Black Economic Empowerment
CAN	Climate Action Network
CDP	CDP
CEO	Chief Executive Officer
COJ	City of Johannesburg
CSI/R	Corporate Social Investment/Responsibility
CSIR	Council for Scientific and Industrial Research
DEA or DFFE	Department of Environmental Affairs or Department of Forestry, Fisheries and Environment
DTI	Department of Trade Industry and Competition
ESG	Environmental, Social, and Governance
GBV	Gender Based Violence
GHG	Greenhouse Gases
ICCM	International Council on Mining and Metals
IRP	Integrated Resource Plan
JSE/FTSE	Johannesburg Stock Exchange/ Financial Times Stock Exchange
NBI	National Business Initiative
NCPC	National Cleaner Production Center
NDCs	Nationally Determined Contributions
NGO	Non-Governmental Organisation
SANEDI	South African National Development Energy Institute
SDGs	Sustainable Development Goals
Solar PV	Solar Photovoltaic
TCFD	Task Force on Climate-related Financial Disclosures
WWF	World Wide Fund for nature

Chapter One: Introduction

For years the world has faced a surge of complex and dynamic challenges – such as climate change (Esbjörn-Hargens, 2009; Nelson, 2010; Elia & Margherita, 2018; Zio, 2018; Kawa *et al*., 2021; Wang *et al*., 2021). Industrialisation, rapid population growth, urbanisation, and globalisation are the overarching anthropogenic activities that have led to and continue to be the cause of significantly negative impacts on the earth's natural resources and climate system (Brundtland, 1985; Heal & Kriström, 2002; Berliner, 2003; Esbjörn-Hargens, 2009; Nelson, 2010; Whitmarsh, 2011; Kundzewicz *et al*., 2018; Smith & Mayer, 2018; Zio, 2018; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Marti., 2021; Wang *et al*., 2021).). As a result, mankind is now faced with an impending whirlwind of complex networks of events which require collaboration and decisive, yet strategic action (Brundtland, 1985; Heal & Kriström, 2002; Berliner, 2003; Whitmarsh, 2011; Smith & Mayer, 2018).

Africa emits a disproportionately low, 4% of the global emissions (Ayompe *et al.*, 2021). However, Africa is said to be a disproportionately more vulnerable region to the potentially catastrophic impacts of climate change (Ntarmah *et al*., 2021; Sono *et al*., 2021; Samuels *et al*., 2022). The effects of the changing climate are already being felt in various regions of Africa and will continue to be felt more significantly in the expanding dryland regions of southern Africa (Mortimore *et al*., 2009; DEA, 2013; Sono *et al*., 2021; Samuels *et al*., 2022). The resilience of this region is compromised because of the lack of readiness for climate change, thus there is a dire need for urgent action (Sono *et al*., 2021).

Climate change is seen by some as a big and complex phenomenon that is far removed, others are in denial about its existence and others are making deliberate efforts to discredit climate change science for their own selfish gains (Comyns, 2018; Bouman *et al*., 2020; Wong-Parodi & Feygina, 2020; Brosch, 2021; Harth, 2021; Lucas, 2021). As a result, not enough is being done while costs and urgency accumulate and society gradually loses its coping capacity with every passing year (Nelson, 2010; Camargo *et al*., 2020; Wong-Parodi & Feygina, 2020; Glenk *et al*., 2021; Wang *et al*., 2021).

Over the years, numerous global environmental frameworks have been put forward in a bid to offer support for society's shift to a low carbon way of life, however, these frameworks have often been formulated with a scope for negotiation and agendas that are open to interpretation

which undermines the urgency of action (O'Brien, 2010; Camargo *et al*., 2020; Baniya *et al*., 2021; Puertas & Marti, 2021). Nonetheless, many countries have committed to the objectives of the 2015 Paris Agreement for keeping global average temperatures below 2°C by reducing GHG emissions, investing in and using renewable energy, managing energy use, and formulating effective climate change policy (Comyns, 2018; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Mart, 2021). In 2020, Camargo *et al.* (2020) pointed out the reality that governments are not living up to their commitments, with most countries performing mediocrely according to the 2021 Climate Change Performance Index (CCPI) (Puertas & Mart, 2021).

Climate action in low-income countries is not a priority (Camargo *et al*., 2020; Baniya *et al*., 2021). The economic investment required for effective climate action limits climate action in developing countries like those in Africa, where economic development is still the primary goal (Camargo *et al*., 2020; Baniya *et al*., 2021; Jakučionytė-Skodienė & Liobikienė, 2021). Likewise, in South Africa, climate action is insufficient because of a multitude of complex issues such as insufficient collaboration, inequality, high unemployment rates and a political system that perpetuates the prioritisation of high visibility projects for economic growth and investment (Leck & Simon, 2018). In South Africa, investment in climate action is seen as investment in luxuries and even the financially capable hold to this belief (Leck & Simon, 2018).

Aside from governments, there has been a growing call for the private sector to engage constructively and get involved in countries' response to climate change (Rincón-Ruiz *et al*., 2019; Puertas & Marti, 2021). The private sector is responsible for at least 71% of the world's GHG emissions since 1988, therefore, it is safe to say that the changes required for an effective shift to a low carbon economy are hinged on the changes in the operations of businesses (Kouloukoui *et al*., 2019; Tavakolifar *et al*., 2021). The private sector' priority is creating and growing the wealth of shareholders and continuing to pursue economic growth and prosperity, notwithstanding research that shows that businesses that consider the greater good of society perform better than those that focus on economic growth only (Scheyvens *et al*., 2016; Nijhof *et al*., 2019).

Many climate-related frameworks have been released to support businesses in addressing climate change issues, however, businesses have been found to be performing below par.

Companies have been measuring, monitoring, managing and reporting on GHG emissions and pricing carbon, exploring climate related risks and opportunities, engaging in Corporate Social Responsibility (CSR) activities, investing in green bonds, new business avenues and climate research and innovation, and collaborating with other businesses (Comyns, 2018; Seles *et al*., 2018; Sharma, 2019; Flammer, 2021; Jiang *et al*., 2021; Kuo & Chang, 2021; Zemigala, 2021).On the other hand, there are companies that have created movements around climate change denial to discredit climate change science and promote inaction and further investment in the fossil fuel and carbon intensive industries (Comyns, 2018; Kouloukoui *et al*., 2019; Wong-Parodi & Feygina, 2020; Harth, 2021; Lucas, 2021).

In Africa, the capitalistic system of the West has permeated the practices of African managers (Okereke *et al*., 2019). While African companies incorporate mitigation measures in their business strategies, social and environmental performance is driven only by the financial gains and does not differ from foreign companies (Okereke *et al*., 2019; Kim & Jo, 2021; Zemigala, 2021). While some research is available on climate action of African companies, there is a gap in literature on corporate climate action in South Africa. Sarvajayakesavalu (2015) noted that a skilful and contextual approach is needed when addressing challenges of implementation in developing countries. The complex history and cultural diversity in South Africa and various other issues presents a unique challenge in decision making as decisions are often influenced by various personal and cultural values, beliefs and perceptions, behaviours and systems that may foster of impede implementation of climate actions (Leck & Simon, 2018).

Therefore, to explore corporate climate action in South Africa, skilfully, contextually, and holistically, the Integral Theory Framework was used. The AQAL framework of the Integral Theory was designed to facilitate the exploration of all aspects – personal, cultural, behavioural, and institutional – of reality concerning any subject (Esbjörn-Hargens, 2009). Therefore, the use of this framework is ideal for conducting a comprehensive assessment based on the exploration and understanding of various personal and cultural values, beliefs and perceptions, behaviours and systems that present opportunities and challenges for corporate climate action in South Africa.

1.1 Aim

In this research, the aim was to use a holistic framework – the AQAL framework of Integral Theory – to explore and analyse the personal and cultural values, beliefs and perceptions, behaviours and systems that foster or impede corporate climate action in South Africa. Furthemore, alignments (opportunities) and misalignments (challenges) in the data collected were determined and used to make recommendations to leverage the alignments (opportunities) and remedy the misalignments (challenges) to further corporate climate action in South Africa.

1.2 Key Questions

Q1. What are the personal and cultural values, belief and perceptions, behaviours and systems relating to corporate climate action in South Africa?
Q2. What are the alignments (opportunities) that can be leveraged and misalignments (challenges) that must be remedied to foster corporate climate action in South Africa?

Chapter Two: Literature Review

2.1 Climate change - a wicked problem

Over the course of the 21st century, world has faced a surge of complex and dynamic challenges – such as climate change (Esbjörn-Hargens, 2009; Nelson, 2010; Elia & Margherita, 2018; Zio, 2018; Kawa *et al*., 2021; Wang *et al*., 2021). Due to the advances of humankind in industry, population growth, urbanisation, and globalisation, there have been unprecedented rates of natural resources depletion and production of greenhouse gas emissions (GHGs) that have led to the warming of the earth – due to a significant increase in the amount of solar radiation trapped in the atmosphere – and imbalances in the earth's natural systems (Brundtland, 1985; Heal & Kriström, 2002; Berliner, 2003; Esbjörn-Hargens, 2009; Nelson, 2010; Whitmarsh, 2011; Kundzewicz *et al*., 2018; Smith & Mayer, 2018; Zio, 2018; Kouloukoui *et al*., 2019; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Marti., 2021; Wang *et al*., 2021). Climate change has resulted in negative shifts in ecosystems around the world, causing unprecedented rapid, and extreme physical changes that have caused public concern (Esbjörn-Hargens, 2009; Nelson, 2010; Kundzewicz *et al*., 2018; Zio, 2018; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Marti, 2021; Wang *et al*., 2021).

While it is known that the abovementioned anthropogenic activities have contributed significantly to climate change, the extent of the contribution is unknown (Heal & Kriström, 2002; Berliner, 2003; Whitmarsh, 2011; Kundzewicz *et al*., 2018). In fact, the climate change phenomenon abounds with uncertainties due to a collection of factors that cannot be anticipated because climate change is a novel, unprecedented phenomenon (Whitmarsh, 2011; Kundzewicz *et al*., 2018). Furthemore, climate change, like all wicked problems, is characterised by complex linkages and interactions between different facets that cannot be fully understood or solved due to a lack of exhaustive information (Rittel & Webber, 1973; Whitmarsh, 2011; Waddock, 2013; Waddock *et al*., 2015; Kundzewicz *et al*., 2018). Therefore, there is a gap in understanding the full extent of the potential risks relating to climate change because there is a complex network of consequences and threats that transcend the environmental sphere into the social and economic spheres with which the environment is complexly interconnected (Waddock, 2013).

Climate change is more than just an environmental phenomenon, it is a social and behavioural problem that cannot be addressed with traditional scientific modes of intervention because it is not a well-defined, 'tame problem' that scientists are trained to deal with (Rittel & Webber, 1973; Waddock, 2013; York *et al*., 2021). According to Rittel & Webber (1973), wicked problems differ from tame problems in that wicked problems cannot be fully understood and defined, therefore, the traditional scientific method which is centred around a falsifiable hypothesis which can be repeatedly tested experimentally or computationally cannot be applied to wicked problems.

A wicked problem is multifaceted, with the different facets representing multiple stakeholders' perspectives of the problem and how it ought to be solved (Rittel & Webber, 1973; Waddock *et al*., 2015; Elia & Margherita, 2018; York *et al*., 2021). Therefore, climate change discourse requires a multistakeholder and multilevel approach that is governed by collaboration and deliberations to foster inclusion, reflectiveness, and responsiveness to the differences in opinions, interests, and worldviews which are in themselves dynamically and complexly intertwined (Rittel & Webber, 1973; Waddock *et al*., 2015; Dentoni *et al.*, 2018; Elia & Margherita, 2018; York *et al*., 2021).

While all stakeholders that are involved in wicked problem discourse are in an equal position to evaluate and form opinions on solutions tabled, none are equipped to make decisions regarding the criteria of 'correctness' of the solutions, which ultimately negatively affects final decision-making in terms of which solutions to implement (Rittel & Webber, 1973). As with other wicked problems, climate change solutions are rarely satisfactory to all stakeholders involved and more often than not can be improved or replaced as there are no correct solutions, just good or bad interventions (Rittel & Webber, 1973; Waddock *et al*., 2015). Even when solutions are agreed on, the problem lies in that it is impossible to determine the full extent of the consequences of solutions for wicked problems – which are significant and can be effectively irreversible – because they transcend temporal boundaries and it is impossible to determine all the lives that are affected (Rittel & Webber, 1973).

Regardless of the wicked complexity of climate change, inaction is not an option. It is paramount that governments, businesses and civil society collaborate to take greater action in addressing climate change (Lazarus, 2008; Nelson, 2010; Scheyvens *et al*., 2016; Glenk *et al*., 2021; Wang *et al*., 2021).

2.2 Climate action

Over the past few decades, world leaders have been working and are still working to address climate change. In 1988, the International Panel on Climate Change (IPCC) was established to assess climate change related risks and monitor global warming (DeLeo, 2017). Thereafter, in 1992, the United Nations Framework Convention on Climate Change was established as a platform for international policy negotiations (DeLeo, 2017). In 1997, policymakers established the Kyoto Protocol to address the threats of climate change. This treaty provided participants with guidance on trading and offsetting emissions to limit emissions to 1990 levels within three years. The Kyoto Protocol was largely unsuccessful, following which numerous other meetings occurred, leading to the establishment of the Paris Agreement about a decade later, in 2015.

The Paris Agreement (2015) has been the foundation of national climate change legislation and policies as well as a variety of climate change guidelines and reporting frameworks (Cherry *et al*., 2021; Puertas & Marti, 2021). Despite the development and publication of numerous institutional frameworks, local/international best practice guidelines as well as society's growing awareness of climate change and its inevitable risks, it appears that it has not been enough (O'Brien, 2010; Harth, 2021). In fact, studies have shown noticeable aversion to taking action (Bouman *et al*., 2020; Harth, 2021). Individuals' perceptions of climate change risks have been linked to the probability of them taking action (Bouman *et al*., 2020; Brosch, 2021; Harth, 2021). People who experienced feelings of concern relating to climate change were said to be more likely to exhibit and/or support positive environmental behaviour and policies, however concern alone has proven to be insufficient in promoting positive climate behaviour and the fact that many see climate change as a 'big' and complex concept nullifies the possibility for significant action (Bouman *et al*., 2020; Harth, 2021; Brosch, 2021). On average, people see climate change as a phenomenon far removed from them – in time and place – which has been the leading driver of inaction (Bouman *et al*., 2020; Harth, 2021).

Over and above this, there is still a significant proportion of people who are in denial about the reality of climate change. Only slightly above 50% of people in America acknowledge the reality of climate change (Comyns, 2018; Wong-Parodi & Feygina, 2020). Furthermore, there

is a well-documented body of evidence showing that climate change inaction is also being perpetuated by efforts of politicians and the fossil fuel industry to discredit climate change science and activism for selfish gains (Comyns, 2018; Wong-Parodi & Feygina, 2020; Harth, 2021; Lucas, 2021). As a result, not enough transformative action is being taken and if any, it is not effective enough to steer humanity away from the predicted worst case scenarios (Camargo *et al*., 2020; Wong-Parodi & Feygina, 2020; Wang *et al*., 2021). Furthermore, the continued delay is causing an accumulation of costs and urgency for action while diminishing society's capacity to cope with the cumulative consequences of insignificant action (Nelson, 2010; Glenk *et al*., 2021).

Therefore, there is an urgent need for society at large to move to more sustainable patterns of consumption and production to break the linkage between development and continued emission of greenhouse gases (GHG) (Puertas & Marti, 2021; Baniya *et al*., 2021). Over the years, numerous global environmental frameworks have been put forward in a bid to offer sustainable ways to do this, however, climate change frameworks often been insufficient in enforcing urgent action (O'Brien, 2010; Camargo *et al*., 2020; Baniya *et al*., 2021; Puertas & Marti, 2021, p.2). In recent years, Net Zero by 2050 – as per the Paris Agreement – has been the most 'adopted' target, with countries mobilising to eliminate the emission of GHGs to keep the global average temperature significantly lower than 2°C (Comyns, 2018; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Mart, 2021). The focus of this endeavour has centred around shifting from fossil fuels and transitioning to a low carbon economy that is run on green technologies and renewable energy – domestic, transport and industry – and reduced exploitation and use of natural resources (Baniya *et al*., 2021; Jakučionytė-Skodienė & Liobikienė, 2021; Puertas & Marti, 2021). While many governments have committed to this endeavour, a gap has been identified between the pledges of countries and the reality of their actions (Camargo *et al*., 2020).

In a recent study by Puertas and Marti (2021), using the 2021 Climate Change Performance Index (CCPI) to determine the performance of countries in terms of climate action, it was found that there are disparities in the actions being taken by countries in response to climate change. Countries are addressing varying combinations of the main focuses of the Paris Agreement – GHG emissions, renewable energy, energy use and climate change policy (Puerta & Marti, 2021). Five northern European countries scored the highest CCPI scores due

to their extensive commitments to reducing GHG emissions, contributing to the Green Climate fund and active and constructive engagement on climate change policies (Puerta & Marti, 2021). Yet despite these high scores, the energy, transport, construction, and agricultural sectors still need improvement (Puerta & Marti, 2021). The lowest ranking countries included several developed and developing countries that are active emitters with high GHG emissions per capita, high energy consumption, absence of renewable energy plans and ineffective climate change policies (Puerta & Marti, 2021). Many countries fell between the two groups with intermediate performances (Puerta & Marti, 2021).

While climate change may be of great concern to African people, states of economic development are a significant determinant of the levels of personal responsibility and the degree and types of climate change related actions that are taken (Jakučionytė-Skodienė & Liobikienė, 2021). Climate actions require varying amounts of income and effort, which puts a limitation on the actions taken (Jakučionytė-Skodienė & Liobikienė, 2021). Developed countries tend towards positive environmental actions whilst low-income countries prioritise economic development over adaptation and mitigation objectives of global climate change frameworks despite having adopted and incorporated them into their policies and national goals (Camargo *et al*., 2020; Baniya *et al*., 2021). In international rankings, South Africa was ranked among developed and developing countries with a high/medium commitment to the energy use objective of the Paris Agreement (Puerta & Marti, 2021). However, these countries were noted to have taken mediocre actions in response to climate change and should strengthen their commitments and improve their actions in reducing GHG emissions, investing in renewable energy and enforcing stricter climate change policies (Puerta & Marti, 2021).

In their research on local authority (municipal level) responses to climate change in South Africa, Leck and Simon (2018) discovered that one of the significant barriers to transformative climate action in South Africa is the lack of sufficient collaboration amongst different bodies of government and between government and other key stakeholders. Leck and Simon (2018) alluded to the legacy of the apartheid regime that perpetuated unequal development and strongly established structural and institutional hurdles, resulting in unequal distribution of resources and capacities for climate action. In addition, due to the ever-prevalent need for the incumbent government to maximise political capital in the face of short-term tenure, projects perceived to result in high visibility are often prioritised, and in

developing countries, environmental issues are often not at the front of the line (Leck & Simon, 2018). Job-creation, improved public health, poverty eradication and social equality are the most pressing priorities, while environmental issues (such as climate action) are viewed as luxuries (Leck & Simon, 2018; DEA, 2018). This kind of attitude is one of the most significant hurdles for climate action as even for those that are more financially buoyant, environmental issues are not a high-ranking priority, with economic growth and investments taking centre stage (Leck & Simon, 2018).

2.3 Corporate climate action

After the release of the Paris Agreement in 2015, over 500 companies around the world committed to meeting and exceeding the pledges of their governments (Comyns, 2018). However, there has been a growing call for the private sector to engage more constructively and get involved in countries' responses to climate change (Rincón-Ruiz *et al*., 2019; Puertas & Marti, 2021). The private sector is the leading GHG emitter. In the past few decades, a 100 fossil fuels producing companies were identified as being responsible for 71% of the world's GHG emissions (Kouloukoui *et al*., 2019). Therefore, the road to a sustainable future hinges on changes in industry operations to lead to a low carbon economy (Kouloukoui *et al*., 2019; Tavakolifar *et al*., 2021).

In 2017, the final report and recommendations of the Task Force for Climate-related Financial Disclosures were released to support business climate action endeavours (Comyns, 2018; Bingler *et al.*, 2022). As of 2022, it was noted that thousands of institutions and firms support and have adopted the TCFD, and its recommendations have been integrated into various climate change guidelines, even those that were launched before the TCFD such as the CDP, the Global Reporting Initiative (GRI) and others (Bingler *et al.*, 2022; Moreno & Caminero, 2022). The TCFD is recognised as powerful tool for assessing and understanding climate related financial risks to better inform investment, credit, and insurance decisions (Bingler *et al.*, 2022). The TCFD reporting framework requires companies to report on their climate related governance structures, strategies, risk management processes and metrics and targets to get perspective on climate related risks and opportunities and determine how these will be managed timeously (Bingler *et al.*, 2022; Moreno & Caminero, 2022).

With climate change guidelines, most of the focus has been on the transparent disclosure of carbon-related information to monitor the performance of the world's corporates while simultaneously assigning certain value on them (Jiang *et al*., 2021). Therefore, carbon management and disclosure has gained much traction amongst the world's big corporates and their stakeholders (Jiang *et al*., 2021). However, research by Zemigala (2021) revealed that corporate solutions for GHG emissions reduction were insufficient. Companies were found to report only on good performances – mostly relating to compliance to regulations – which is not a truthful indication of overall corporate behaviour because companies emphasised meeting standards in a bid to conceal past and present negative impacts (Comyns, 2018; Jiang *et al*., 2021; Megura and Gunderson, 2022). For GHG emissions reduction and as a means of carbon risk management, some companies use science-based targets while others determine their own targets. Furthermore, some companies have determined internal prices for carbon to mitigate the looming Carbon Tax risk that all companies are facing, while others wait for institutional decisions on carbon prices (Kuo & Chang, 2021).

A study by Seles *et al*. (2018) found that companies that have explored the risks and opportunities of climate change have a tendency to perform better environmentally and are more likely to take advantage of new opportunities by creating new business avenues, collaborating with other businesses, and investing in climate research and innovation. The study also identified some key hurdles in corporate climate action relating to governmental regulations and cost implications of action (Seles *et al*., 2018). According to the Kouloukoui *et al*. (2019), the 100 companies that are the world's high emitters rank poorly on climate risk disclosure due to a general lack of concern for climate issues and regulatory shortfalls. It seems that voluntary disclosure is a shareholder management act for securing legitimacy and reducing reputational risks (Comyns, 2018; Kouloukoui *et al*., 2019). A comparison between high emitting companies and low emitters showed no difference in the implementation of climate change strategies (Kouloukoui *et al*., 2019).

Companies operating in climate sensitive industries are less likely to commit to climate action (Tavakolifar *et al*., 2021). Research by Kouloukoui *et al.* (2019) found that there are companies that still do not acknowledge the existence of climate change, while some ignore the potential risks to their business. Research by Lucas (2021) has revealed that in some countries, fossil fuel and carbon intensive companies have used their financial and political power to influence government policies on climate change to thwart the transition of their

countries to low carbon economies and promote further investment in the fossil fuel and carbon intensive industries. It has been noted that some have created movements to discredit pro-decarbonisation science (Comyns, 2018; Wong-Parodi & Feygina, 2020; Harth, 2021; Lucas, 2021).

Corporate Social Responsibility (CSR) is a way in which companies improve their value among investors and consumers and demand premium prices for their good moral reputation (Sharma, 2019). On the stock market, companies seen to successfully balance on the triple bottom line outperform their counterparts who are unable to successfully incorporate environmental aspects to their bottom line (Sharma, 2019). In the pursuit of CSR projects, corporates can pursue projects that result in the honouring of international frameworks, thus raising the standards of corporate climate action. (Sharma, 2019). However, CSR initiatives differ greatly from company to company and from context to context which means that CSR does not always include climate action (Sharma, 2019). Companies have also increasingly been taking advantage of 'green bonds' by setting aside finances to fund climate-friendly projects (Flammer, 2021). Green bonds are more prevalent in China, the USA, and Europe and in companies that operate in environmentally sensitive sectors (Flammer, 2021). Research shows that companies that issue certified green bonds are more likely to improve their environmental performance and experience increased investment as issuance of green bonds also facilitates a positive stock market response (Flammer, 2021). Therefore, green bonds serve as an effective and credible signal for corporate environmental commitment (Flammer, 2021).

2. 4 Climate change in Africa

Environmental aspects

In comparison to the western world, Africa is by far a less significant contributor to the global greenhouse gas (GHG) emissions problem that the world is facing (Ayompe *et al*., 2021; Ntarmah *et al*., 2021). However, according to many researchers, Africa is disproportionately more vulnerable to the potentially catastrophic impacts of climate change (Ntarmah *et al*., 2021; Sono *et al*., 2021; Samuels *et al*., 2022). According to Sono *et al.* (2021), southern Africa is more resilient in comparison to the other regions in sub-Saharan Africa, however, due to the high vulnerability and low readiness, this resilience is nullified,

calling for urgent action. Furthermore, it is because a significant portion of the expansion of drylands in the world has been occurring in southern Africa, meaning that an area is expanding that is significantly more sensitive to climate changes and susceptible to more frequent, more intense, and longer lasting extreme climatic events thus creating significant vulnerability and uncertainty (DEA, 2013; Feng and Fu, 2013; Samuels *et al*., 2022). Climate change impacts are already being felt in different parts of Africa and are putting a significant strain on cities in Mauritania, Niger, South Sudan, Ethiopia, Kenya, Uganda, Mozambique, Zimbabwe and Malawi, indigenous communities such as the indigenous Nama community in South Africa, and ecosystems in general (Sono *et al*., 2021; Samuels *et al*., 2022).

Corporate climate action in Africa

According to a study by Jiang *et al*. (2021), companies with a greater tendency for voluntary carbon disclosure were found to have a significantly higher value especially in developing countries. However, a study by Okereke *et al.* (2019) revealed that capitalism has replaced the spirit of Ubuntu – the spirit of being humane and ensuring that humanity is always considered at the core of decisions and action – among African managers, meaning that pro-environmental actions are considered only based on financial gain as opposed to the greater good of the community (Okereke *et al*., 2019). With that said, African companies were found to have established mitigation measures within their business strategies and foreign companies – the largest controlling shareholders in Africa – did not differ in social and environmental performance when compared to local companies (Kim & Jo, 2021; Zemigala, 2021). Research on corporate climate action in Africa is on the rise, however, at the time of this study, there is a gap in knowledge pertaining specifically to the performance of corporates in South Africa.

2.5 Climate action in South Africa

When governments around the world ratified the Paris Agreement, each country was tasked with formulating Nationally Determined Contributions (NDCs), a set of national plans for climate change response relating to mitigation and adaptation measures (Jenkins *et al*., 2020). South Africa, along with other developing countries, committed to the ambitious targets set out in the agreement despite socio-economic issues and a lack of capacity to fulfil the targets (Weiler *et al*., 2018; Filho *et al*., 2019; Cherry *et al*., 2021). In South Africa, researchers

studying various aspects of municipal climate action confirmed a lack of financial and technical capacity and knowledge and expertise for climate action (Roberts & O'Donoghue, 2013; Fouché & Brent, 2019). Furthermore, it was found that in South Africa, there is a lack of infrastructural capacity – as it relates to transport and recycling infrastructure – to support climate action (Thambiran & Diab, 2011; Issock *et al*., 2021).

On another note, research by Msimanga & Sebitosi (2014) and Fouché & Brent (2019) found that while national government is responsible for determining climate action policy, different departments are responsible for implementing policy. The challenge with this is that in South Africa, the different government departments are not well-coordinated which has resulted in various uncoordinated policies requiring different actions that are sometimes contrary to each other (Filho *et al*., 2019). This lack of coordination has been prevalent particularly in attempts to deal with the energy crisis. When the government put forward the option to unbundle and sell parts of Eskom to deal with the debt issue, unions opposed this for the fear of losing jobs (Folly, 2021).When the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was tabled, Eskom and municipalities opposed it due to the large portions of income that comes from electricity sales (Fouché & Brent, 2019; Mbungu *et al*., 2020; Fraser, 2021).

Despite these challenges, there are opportunities to remedy these challenges through collaboration, education, and awareness raising (Wondirad *et al*., 2020; Schrot *et al.*, 2021; Ranney & Velautham, 2021). It was noted that in order to successfully formulate effective, comprehensive solutions, different stakeholders ought to engage, collaborate, and deliberate to build trust and understanding and foster positive response from different stakeholders (Dentoni *et al.*, 2018; Wondirad *et al*., 2020). Furthemore, to promote positive climate responses, Schrot *et al.* (2021) and Ranney & Velautham (2021) found that climate change education had potential to significantly raise climate change awareness and increase its acceptance and remedy obstructionism. If the abovementioned were to be applied in the South African context, perhaps better climate action performance would be seen.

2.6 Integral Theory as a tool to assess climate action

Thomas *et al*. (2018) noted that, in trying to solve climate change related issues, it is not sufficient to only consider the objective, dynamic relationships and interconnections between

complex systems. They posit that it is equally important to consider and include the subjective values, beliefs, ethical principles and cultural norms that significantly influence climate change perceptions and in turn determine the conception of roles and responsibilities for climate action (Thomas *et al*., 2018). According to O'Brien (2010) and Thomas *et al*. (2018), the lack of inclusion of all perspectives in climate change analyses has been the central driving force for the inability to sufficiently foster climate action. There is a worldwide discipline consensus that the climate change crisis requires a holistic approach which weaves together diverse disciplinary perspectives to foster the resilience of complex systems in the face of climate change (Thomas *et al*., 2018).

The Integral Theory is a comprehensive theory that draws on insights from a wide variety of knowledge fields. As a result, it is used in a variety of disciplines, from natural sciences to social sciences (Esbjörn-Hargens, 2009). The integral framework is becoming a more popular solution-formulation technique as it incorporates different aspects of reality and thoroughly interrelates these to solve novel and wicked problems such as climate change and many other phenomena (Esbjörn-Hargens, 2009). Furthermore, the integral framework provides a map to explore a variety of perspectives from which climate change responses can stem (O'Brien, 2010). Due to the comprehensiveness of the integral framework, it is readily applicable in a variety of contexts from individual to organisational application (Esbjörn-Hargens, 2009).

The AQAL (all quadrants, all levels) framework is a key component of the Integral Theory. It highlights four dimensions/quadrants that represent four "irreducible perspectives" that, if not explored, will result in an incomprehensive understanding of any phenomenon of reality as they represent aspects that are always part of reality (Figure 1; Esbjörn-Hargens, 2009). The four quadrants highlight the idea that any problem can be viewed from two fundamental angles; firstly, by considering the inside and outside perspectives and secondly, by exploring the singular and plural perspectives (Esbjörn-Hargens, 2009). These two angles provide psychological and cultural insights through the exploration of the internal drivers of an individual or a group, as well as insights into behavioural and group dynamics through the exploration of the external drivers of an individual or group (Esbjörn-Hargens, 2009).



Figure 1. The four quadrants of the AQAL framework (Esbjörn-Hargens, 2009)

All individuals experience the world in a manner characteristic of their subjective perspective and intentionality (i.e. individual cognition and consciousness) (Esbjörn-Hargens, 2009; O'Brien, 2010). These are referred to as the interiors as they are representative of the internal drives – psychological state, emotions, values and beliefs – of an individual (Esbjörn-Hargens, 2009). Furthermore, an individual displays scientifically observable behaviours linked to elements of an individual's psychology that are referred to as exteriors – the objective perspective. Individuals do not exist in isolation, they are part of a society or collectives that play an influential role in the experiences of an individual (Esbjörn-Hargens, 2009). Group interiors are referred to as intersubjective cultural realities which are based on the groups' collective values and beliefs, while the exteriors are observed through their philosophical principles and worldview. The inter-objective perspective refers to concrete environmental, organisational and institutional – ecological and social – structural dynamics that influence the exteriors. The four quadrants are further classified using fundamental pronouns – "I", "WE", "IT" and "ITS" (Esbjörn-Hargens, 2009). These represent the Upper Left (UL), Lower Left (LL), Upper Right (UR) and Lower Right (LR) quadrants respectively (Figure 1) (Esbjörn-Hargens, 2009).

2.7 Application of AQAL framework

Ballard *et al*. (2010) conducted a study on using the AQAL framework to accelerate climate action. In their study, they concluded that, for individuals or groups to be able to make transformative changes, there must be an identification of the set of contextual factors at play. This notion rests on the fact that the exclusion or the dismissal of a single factor has the potential to impede progress of actions taken. In the case of climate action, Ballard *et al*. (2010) note that there is a tendency to overemphasise the role of technology without accounting for the other spheres – personal, social, and political – with which it interacts. Therefore, when formulating solutions for effective response to climate change, a learning/ explorative approach much be adopted for contextual constraints and opportunities to emerge – which have a significant effect on the probability of success – so they can be addressed to improve the likelihood of achieving objectives (Ballard *et al*., 2010).

In the case of responding to climate change, Ballard *et al*. (2010) determined that the individual subjective factors (Upper Left Quadrant) to be explored were climate awareness, denial and emotions, perceptions of agency, the capacity to face global scale issues, the ability to conceptualise and hold to a higher purpose, levels of development and the capacity to engage across developmental plains. The individual intersubjective factors (Upper Right Quadrant) related to demographic factors, knowledge of climate issues, and technical and interpersonal skills (Ballard *et al*., 2010). In the Lower Left Quadrant – the collective subjective factors – Ballard *et al*. (2010) identified the importance of groups in charge, shared mindsets, cultural theory, social constructions of environmental risks, organisational culture and organisational developments stage. Lastly, in the lower right quadrant – the collective objective factors – Ballard *et al*. (2010) identified systems considerations relating to technological possibilities, infrastructure, economic issues, systems delays, legal and regulatory issues, and the availability of energy and capital.

According to Ballard *et al*. (2010), internal cognitions relating to climate change are powerful determinant of one's response to climate change. Furthemore, these internal cognitions can be and subsequent behaviours can be reinforced by the cultures in which individuals exist (Ballard *et al.*, 2010). For example, people who part of a pro-environmental group are considered to be more likely to exhibit positive environmental behaviour at a personal level (Ballard *et al.*, 2010). On the other hand, to be effective in climate change endeavours, there

are certain measurable competencies that one has to possess (Ballard *et al.*, 2010). Furthemore, there are certain systems within the context of existence that are often beyond the individual/individual organisation that affect the degree and speed of behavioural responses to climate change.

In applying the integral framework to resilience, Thomas *et al*. (2018), citing Cardona (2013), expressed that within each factor there are risks and vulnerabilities that can either promote or impede the success of proposed strategies, therefore an approach such as the integral framework is crucial if we are to guide research towards a more holistic approach that considers all perspectives. Identifying a particular reality and the different levels within the reality enables practitioners to identify key leverage points for appropriately addressing different realities at relevant scales – "like an acupuncturist hitting the right spot for optimal health and well-being" (Esbjörn-Hargens, 2009, p.9). Furthermore, the integral framework enables users to identify alignments (realities that are congruent and can be enhanced to promote success) and misalignments (realities that are incongruent and must be remedied to promote success) between varying perspectives without giving preference to any perspective (Thomas *et al*., 2018). Therefore, it can be used to ascertain the individual, cultural and institutional beliefs and behaviours related to corporate climate action in South Africa.

Chapter Three: Methodology

The study aimed to explore and analyse the personal and cultural values, beliefs and perceptions, behaviours and systems that foster or impede corporate climate action in South Africa. Furthermore, alignments (opportunities) to be leveraged and misalignments (challenges) to be remedied were determined and used to make recommendations for the promotion of corporate climate action in South Africa. To achieve this aim, a qualitative tool – the AQAL framework of the Integral Theory as described in Section 2.5 – was used to group the data collected into the four quadrants/realities, either personal, cultural, behavioural or systemic.

Data was collected from climate change legislation, policies and guidelines relevant to South Africa. Additionally, data was collected from interviews with environmental/sustainability specialists in government, JSE listed companies, business organisations and environmental organisations. Lastly, data was collected from climate change related business reports or white papers (2019/2020) of the sample JSE listed companies.

Qualitative content analysis was used in this study. This is a form of content analysis in which the researcher seeks to find objective 'truths' by looking through qualitative data (Graneheim *et al.*, 2017). Furthermore, this methodology focuses on finding – within texts – similarities and differences of information on a particular subject (Graneheim *et al.*, 2017). The main challenge of this methodology is maintaining a logical and congruent standard of interpreting the data throughout the various steps of analysis and in the presentation of results (Graneheim *et al.*, 2017).

Content analysis of the sample climate change legislation, policies and guidelines and climate change related business reports was conducted by reading the above mentioned documents word for word, noting statements that contained keywords such as climate change, mitigation, adaptation, climate related risks and opportunities, emissions, water, energy and waste. Furthermore, the context in which these statements were addressed was assessed to determine whether they related to climate action plans, strategies, recommendations or directives for businesses. These statements were then extracted, summarised and grouped according to the AQAL framework. Interviews were listened to, transcribed, analysed,

summarised and grouped according to the AQAL framework. All data were stored on a password protected laptop and research only commenced after ethics clearance from the University of the Witwatersrand's Human (Non-Medical) Research Ethics Committee (H19/07/09) was received.

It must be noted that, while this study may have taken a holistic approach, due to the small sample size and limited time available to conduct the study, it must be taken as a preliminary overview of the state of corporate climate action in South Africa. Additionally, it must be noted that the data are based on the unverified perceptions of individuals, however, these individuals are professionals engaging with businesses on climate change, therefore, it can be inferred that their perceptions, while subjective, are based on experience. It must also be noted that with the summarising and grouping of data, there may be a possible loss of detail or nuances at each stage of data analysis, however every effort was made to include these.

3.1 Climate change legislation, policies and guidelines

Data were collected by downloading and analysing climate change legislation, policies and guidelines relevant to South Africa that were found through targeted internet searches. The collection comprised of documents that the researcher was aware of prior and some that emerged during searches. Initially, the aim was to analyse 10 of these documents, however, the National Climate Change Adaptation Strategy emerged as a key document for inclusion. A total of 11 documents were analysed using content analysis. These included South African legislation and policies as well as some local and international guidelines on climate change. South African legislation and policy documents that were assessed were the National Climate Change Bill, National Climate Change Adaptation Strategy and the National Climate Change Response Strategy. The local and international guidelines assessed included the Paris Agreement, the Global Reporting Initiative (GRI), the Task Force on Climate-Related Financial Disclosures (TCFD), CDP, JSE/FTSE Responsible Investment Index, the SADC Climate Change Adaptation Strategy and Action Plan, the Global Compact Network (SA), and the Equator Principles for Financial Institutions.

Content analysis involved carefully reading through climate change legislation, policies, and guidelines, noting statements that contained keywords such as climate change, mitigation, adaptation, climate related risks and opportunities, emissions, water, energy and waste.

Furthermore, the context in which these statements were addressed was assessed to determine whether they described ways to respond to climate change, requirements and considerations for climate action, descriptions of the role of corporates or directives for corporate climate action. Statements that emerged were copied and pasted onto a word document to formulate a list of statements for each document. The lists were colour coded (colour codes to be used at a later stage). Following that, the statements were summarised by removing filler words (words perceived to not be adding to the meaning of the statement), and turning long sentences/paragraphs into shorter, more concise sentences and removing repeat statements and those making similar points.

Thereafter, a separate list – of themes – was formulated by carefully reading through the statements from each document list and recording the different aspects of climate change response strategies, requirements and considerations for climate action, descriptions of the role of corporates and directives for corporate climate action that different statements were dealing with. For example, if a statement described a mitigation measure, "mitigation" would be added to the list of themes. Whenever a statement was read that described a new aspect that had not been recorded in the list of themes, the theme would be added to the list whilst those that described themes that had already been noted would not be added again to the list. Instead, an "x" in the document colour code would be added next to each theme to keep track of which documents had addressed which themes. The prevalent themes were presented in a table (Section 4.1, Table 1.) showing all the documents and the different themes which they addressed which were then added to the lower right quadrant (systems quadrant) of the final AQAL summary tables (Section 4.4).

3.2 Interviews

Interviewees were environmental/sustainability specialists practising in the private sector, environmental and business organisations, government and academia. These are individuals that are considered to be well versed and experienced on the subject matter hence their perceptions are considered to be a reflection of the experience in the real world. Potential interviewees were contacted via an email which briefly described the research and requested their participation. Furthermore, a participant information sheet (Appendix A) was attached to provide further details on the research, as well as the contact details of the researcher, supervisor, and the University ethics committee.

Individuals that were contacted to participate in the study fell into two groups, the primary group and the secondary group. The primary group was made up of the first people to be contacted and the secondary group was made up of those that were contacted based on the recommendations of others, either from the primary group or the secondary group. The primary group was made up of individuals seen at the School of Animal, Plant and Environmental Sciences (APES) careers night and those provided by my supervisor. The primary group consisted of approximately 20 individuals. Approximately 13 responded and of the 13, five availed themselves to be interviewed whilst the rest recommended and/or forwarded the request to others. In the secondary group, approximately 20 individuals were contacted and of those 10 responded positively and were interviewed. The process of requesting interviews and interviewing those that responded went on for a period of approximately six months, at which point the researcher moved on to data analysis due to time constraints.

Interviews were recorded using a Sony voice recorder, saved on the a password protected laptop, transcribed and analysed once interviews were concluded. A total of 15 people were interviewed. These included three Wits academics, a professor in sociology with expertise in corporate governance, political sociology and development studies, a professor in political sciences and government working at the Wits business school Centre on African Philanthropy and Social Investment and a professor in climatology working at the Wits Global Change Institute. Furthermore, interviewees included two national government officials working at the Department of Environmental Affairs, one in the the mitigation chief directorate and the other in the climate change and air quality department. There were 10 environmental/sustainability specialists, five working for five of the sample JSE listed companies, two working for business organisations and three in environmental organisations.

In 2019, nine interviews were conducted in person at the participants' place of work and six were conducted in 2020 over Skype or Zoom – depending on the interviewee's preference – due to COVID pandemic lockdown. Government officials, academics and environmental/sustainability specialists in environmental and business organisations were asked 10 interview questions (Appendix B), a subset of the 16 questions (Appendix C) that were asked to environmental/sustainability specialists in the sample JSE listed companies. The interview schedule consisted of a set of open-ended questions designed to allow the

interviewees to respond elaborately, providing any information they considered valuable/useful to the research.

The first three questions were designed to elicit information regarding the interviewees' perceptions on climate change and the issues surrounding climate change, what they believed were necessary actions for responding to climate change in South Africa, and their sense of agency concerning raising awareness and making meaningful contributions to respond to climate change, respectively. The following three questions were to elicit information about the interviewees' perceptions on who the key stakeholders are that are responsible for dealing with climate change in South Africa, the role of businesses in responding to climate change and their perceptions of how businesses have been performing in said role, respectively. The 7th question was designed to elicit information on what businesses are perceived to be doing right in terms of responding to climate change, the 8th to determine the systems/structures in place to support corporate climate action i.e. systems and structures that can be leveraged for the success of corporate climate action and the 9th to determine what is perceived to be impeding businesses' ability to respond to climate change i.e. the perceived challenges of corporate climate action. The last question was a prompt for interviewees to add any information they may have forgotten to mention throughout the interview that they felt would be useful in the research. This question was the same and the last for both sets of interview questions.

The additional six questions asked to environmental/sustainability specialists in the sample JSE listed companies were questions designed to elicit information specific to organisational climate change culture, governance and action. The 10th question was designed to elicit information on organisational values, beliefs and behavioural patterns around climate change, the 11th to determine organisational climate change strategies, the 12th to determine specific organisational climate change governance structures and the 13th to determine what institutions/systems companies were aware of that support corporate climate action. The 14th question was designed to elicit information on the climate change guidelines that companies were aware of and determine which ones they had integrated into their operations. The 15th question was designed to determine what businesses perceived to be impeding/challenging their ability to respond to or their efforts in responding to climate change. Ultimately, responses to the questions asked could be categorised as being either positive or negative i.e. opportunities or challenges, whether they support corporate climate action in South Africa

and should be leveraged or inhibit corporate climate action in South Africa and should be remedied.

To differentiate between interviewees and conceal interviewee identities, letter-number codes were created. The letter "J" was used to denote data from the environmental/sustainability specialists and climate change related business reports from sample JSE listed companies, the letter "A" was used for data from academics, the letters "EO" and "BO" respectively for data from environmental/sustainability specialists from environmental and business organisations, and the letter "G" for data from government environmental/sustainability specialists. Numbers were allocated in ascending order. Interview data analysis involved transcribing interviews by carefully listening to interview recordings and typing out responses verbatim on a word document. A table with two columns, questions and response, was drawn for each interviewee, where questions were copied and pasted onto the questions column and responses were typed out in the response column. Thereafter, 20 AQAL tables were formulated (a table for each of the five interviewee groups in each of the four quadrants) and populated by copying and pasting responses from the first word document under the specific interviewee group (government, academics, business organisation, environmental organisation or JSE listed company) and quadrant they were determined to fall under (either personal, cultural, behavioural or systemic). All statements from one interviewee were grouped together in a list in one cell/row.

The second draft AQAL summary (Appendix D) was formulated by collating all statements within the quadrants into lists and summarising them by removing filler words (words perceived to not be adding to the meaning of the statement), and turning long sentences/paragraphs into shorter, more concise sentences and removing repeat statements and those making similar points. Furthermore, statements were grouped into themes which were determined by noting the different aspects that various statements were describing. For example, statements that described perceived roles of businesses in climate action were put under the theme "the role of businesses in climate action".

The final AQAL summary tables (Section 4.4) were formulated by scrutinising the different quadrants of the second draft AQAL summary (Appendix D) and summarising statements further by removing filler words (words perceived to not be adding to the meaning of the statement) in sentences and turning statements into even shorter sentences or adjectival and

adverbial phrases – where possible – and by removing repeat statements within those quadrants and any information that the researcher perceived to be additional/extra/elaborative to what was already on the list. Furthermore, statements from climate change related business reports and the prevalent themes from climate change legislation, policies, and guidelines were added at a later stage (as described in Section 3.3 and 3.1).

3.3 Climate change related business reports (sample JSE listed companies)

Three of the five JSE listed companies interviewed were in the financial sector while the remaining two were from the mining and retail sectors. Therefore, two more companies – for each of the latter sectors – were chosen from a list of companies (provided by my supervisor) in each sector. The first two companies on the list to have climate change related business reports on their website were chosen, to bring the number of sample JSE listed companies' climate change related business reports up to three per sector. Climate change related business reports (2019/2020) that were analysed varied between companies (see Table 2, section 4.3). The CDP, TCFD, Sustainability and Integrated reports – which applied the GRI reporting guidelines – were the climate change related business reports found.

All climate change related business reports (2019/2020) that were found on the company websites were downloaded and analysed using content analysis. The reports were scrutinised, looking for any statement that contained keywords such as climate change, mitigation, adaptation, climate related risks and opportunities, emissions, water, energy and waste. Furthermore, the context in which these statements were addressed was assessed to determine whether they related information about the company's views on climate change, their assessment of climate change in relation to their organisation and operations – climate related risks and opportunities –, their strategies and plans for responding to climate change, governance structures relating to climate change or the actions that they have taken thus far in responding to climate change. Statements of this nature that emerged were copied and pasted onto a word document, creating a list of statements for each company. Statements were then summarised by removing repeat statements and those making similar points as well as filler words (words perceived to not be adding to the meaning of the statement) to create short, concise sentences. These statements were then grouped according to whether they described organisational culture, organisational governance, strategy, risk management, metrics and

targets or performance in the reporting period and then added to the upper right quadrant of the second draft AQAL summary (Appendix D).

When transferred to the final AQAL summary tables (Section 4.4), statements were summarised further by removing any remaining filler words (words perceived to not be adding to the meaning of the statement) in sentences and turning statements into even shorter sentences or adjectival and adverbial phrases – where possible – and by removing repeat statements and any information that the researcher perceived to be elaborative to what was already on the list. Statements on targets were grouped according to the type of targets they represent. For example, targets for the reduction of waste, emissions or water were recorded as "various reductions targets". Statement groups on organisational governance, risk management, metrics and targets were moved to the lower right quadrant (systems quadrant) and groups on organisational culture were moved to the lower left quadrant (culture quadrant) when transferred to the final AQAL summary tables (Section 4.4). Furthermore, these statements were grouped according to sectors and summarised by removing repeat statements and those conveying similar points and any information that the researcher perceived to be additional/extra/elaborative to what was already on the list.

3.4 AQAL Summary Tables

The AQAL summary tables were formulated during the processes of data analysis outlined in Section 3.2. Furthermore, statements/themes from legislation, policies and guidelines and climate change related business reports were collated (as described in the end of section 3.1 and section 3.3) and presented in the final AQAL summary tables (Section 4.4). As this process was being undertaken, connections between quadrants were noted down on paper at the side and they were used to make up the headings in sections 4.5 and 4.6.

Chapter Four: Results

Appendix D contains a comprehensive summary of data collected from 15 interviews, the climate change related business reports of nine JSE listed companies and the sample climate change legislation, policies, and guidelines. There was a consensus amongst interviewees that climate change is a significant challenge of our time that requires everyone to take action both at a personal and corporate level. According to interviewees and the sample climate change related business reports, there has been some improvement in the performance of businesses in climate action. Many businesses are beginning to consider climate change as a material matter and are putting systems in place to respond to perceived climate related risks and opportunities. However, business performance has not been transformative enough. The data revealed that in South Africa, there are various cultural, behavioural, and systemic issues that are hindering the addressing of climate change. For example, the socio-economic issues in South Africa take precedence over climate change because the government's priority is the development of the economy and addressing the great challenges relating to inequality and poverty that many South Africans are faced with (Leck and Simon, 2018). Furthermore, the government has not been able to create a sufficiently enabling policy environment to support positive, transformative action by businesses. The data revealed that there is ample support and clear guidance for corporate climate action, however, companies have not been taking full advantage of what is available. Support has either been ignored, resisted, or deemed insufficient for driving the shift from their for-profit only businesses models to adopting business models that operate on the triple bottom line.

4.1 Climate change legislation, policies, and guidelines summary analysis

A total of 11 legislation, policies and guidelines were analysed. These included South African climate change legislation and policies as well as some local and international climate change guidelines. Table 1 (below) shows a summary of themes determined through content analysis (Section 3.1). There were 22 noteworthy themes that these climate change documents addressed. The following is a list of 10 themes that were present in more than 50% of the documents thus being considered more prevalent amongst the sample climate change documents:

- Suggest measurement, monitoring, and reporting.

- Describe different climate change risks and opportunities.
- Explore financialising climate-related risks and opportunities as a strategy to drive climate action.
- Consider and incorporate the frameworks of other climate change guidelines.
- Outline different standards, protocols, and methodologies for climate action.
- Describe different mitigation and adaptation measures.
- Call for breakdown of silos for collaboration.
- Consider context in climate action.
- Highlight the need for support to enhance climate action capacity.
- Allow a scope for negotiation and leave some aspects open to interpretation.

Apart from the aspect of the TCFD that requires an independent expert for action, all other themes were common among at least three of the sample climate change documents. Nine out of 11 documents covered 10 or more of the noteworthy themes in the sample climate change documents. The GRI and CDP were the only two documents that scored less than 10. The sample climate change documents with the highest number of noteworthy themes covered – the most comprehensive climate change documents – were two government documents, the National Climate Change Adaptation Strategy, and the National Climate Change Bill, which covered 14 themes each. It is worth noting that, in spite of the relatively higher comprehensiveness of these government documents, none of the sample JSE listed companies reported subscribing to government guidelines/frameworks for climate action. Furthermore, of the 11 climate change documents analysed, the two government climate change strategy documents were the only documents that did not clearly/explicitly outline standards, protocols, and methodologies for climate action. Findings are further reported in relation to other quadrants in sections 4.5 and 4.6.

Table 1. Summary of key points contained in the sample climate change legislation, policies, and guidelines

	Private								Government			Total
Climate change document: / **Content:**	**Paris Agreement**	**GRI**	**CDP**	**JSE/FTSE ESG**	**TCFD**	**Equator principles**	**Global Compact Network**	**SADC Climate Change Adaptation Strategy and Action Plan**	**National Climate Change Response Strategy**	**National Climate Change Adaptation Strategy**	**National Climate Change Bill**	
Suggest measurement, monitoring, and reporting.	★	★	★	★	★	★	★	★		★	★	10
Considers and incorporates the frameworks of other climate guidelines.	★		★	★	★	★	★	★		★	★	9
Outlines different standards, protocols, and methodologies for climate action.	★	★	★	★	★	★	★	★				8
Identifies and describes different climate change risks and opportunities.		★	★	★	★	★	★			★	★	8
Explores financialising climate-related risks and opportunities.		★	★	★	★	★					★	6
Suggests mitigation and/or adaptation measures.	★		★	★		★		★	★	★	★	8

	Private								Government			Total
Climate change document: / **Content:**	**Paris Agreement**	**GRI**	**CDP**	**JSE/FTSE ESG**	**TCFD**	**Equator principles**	**Global Compact Network**	**SADC Climate Change Adaptation Strategy and Action Plan**	**National Climate Change Response Strategy**	**National Climate Change Adaptation Strategy**	**National Climate Change Bill**	
Aims to support transition to a low carbon economy.	★				★		★	★			★	5
Calls for breakdown of silos for collaboration.						★	★	★	★	★	★	6
Outlines importance of private sector in climate action.							★	★	★	★	★	5
Considers context in climate action.	★	★	★	★	★	★			★	★	★	9
Offers support for value chain engagement.		★	★				★					3
Supports integration of climate change into core operations.				★					★	★		3
Encourages and/or outlines government supporting role.								★	★	★		3
Considers socio-economic aspects.				★		★				★	★	4
Calls for better coordination across government departments								★		★	★	3
Highlights a need to enhance climate change awareness, education, and communication.	★					★				★		3

	Private								Government			Total
Climate change document: / **Content:**	**Paris Agreement**	**GRI**	**CDP**	**JSE/FTSE ESG**	**TCFD**	**Equator principles**	**Global Compact Network**	**SADC Climate Change Adaptation Strategy and Action Plan**	**National Climate Change Response Strategy**	**National Climate Change Adaptation Strategy**	**National Climate Change Bill**	
Highlights need for alignment with national strategies.					★			★	★		★	4
Actioned by an independent expert.					★							1
Suggests the use of public and/or private sector finances to support climate action.							★		★	★		3
Highlights the need for support to enhance climate action capacity – finances, skills, expertise, or policy.	★					★	★	★	★	★		6
Concerned with resilience.	★					★	★		★		★	5
Allows a scope for negotiation and agendas that are open to interpretation	★	★	★	★	★	★	★	★	★	★	★	11
Total	10	7	9	10	10	13	12	12	11	15	14	

4.2 Interviews summary analysis

Among those interviewed, it was evident that there is an in-depth understanding of climate change as it relates to businesses, society, and government in the South African context. There was a consensus among interviewees that climate change impacts are of concern in southern Africa due to the predicted doubled experience of temperature increase and subsequent catastrophic weather events. Furthermore, there was agreement across interviewees that the impacts are already being felt, making it paramount for South Africa to begin taking adaptation measures in conjunction with mitigation measures to address these impacts especially in light of the vulnerable communities who are predicted to be unable to weather climate change impacts. Interviewees stated that it is important for everyone – government, non-governmental organisations, businesses, academics, and civil society – to get involved, play their role, and contribute to moving the country towards a low carbon economy according to the Paris Agreement.

It was noted that there are certain social and systemic issues in South Africa that are hindering this much needed transition to a low carbon economy. These issues include inequality, poverty, a lack of infrastructure, poor leadership and political will and policy that is not sufficient for enabling positive responses by businesses. The government was said to have been unable to create an enabling policy environment because of a lack of cohesion and political will, resulting in policies that pull in different directions leaving companies confused about what is required of them. On the other hand, it was noted that businesses tend to be obstructionist towards government pressure for change. Among the sample JSE listed companies, the energy situation in South Africa was highlighted as one of the biggest hurdles for climate action, either because of the emissions due to being coal powered or the fact that feeding in renewable energy into the national grid is cumbersome (as is common with government programmes) and expensive, whether one is producing extra energy or is looking to patronise a renewable energy producer.

Granted that there are some social and systemic issues at play, in general, businesses were perceived to be performing poorly, only taking opportunities that are easy and quick to return benefit and not taking transformative action in responding to climate change. Findings are further reported in relation to other quadrants in sections 4.5 and 4.6.

4.3 Climate change related business reports (sample JSE listed companies) summary analysis

Business reports of nine JSE listed companies – three in financial sector, three in mining and three in retail – were analysed (Section 3.3). There were five TCFD reports, two CDP reports, two integrated reports, two sustainability reports and one climate change white paper (see Table 2. below). Among the nine businesses assessed, the TCFD was the most frequently used climate change reporting framework, with five out of nine businesses having produced at least one TCFD report in the data collection period. According to interviews, 20 -23% of JSE-listed companies respond to the CDP. Within the sample JSE listed companies, there were companies who reported committing to engage in more reporting in alignment with other climate change frameworks. Even though there was a significant number of overlapping themes between the non-governmental frameworks that the sample JSE listed companies aligned with and governmental frameworks, there was no observed adherence to any governmental frameworks. It was observed that companies focused on reporting good compliance performance and justifying inaction or poor performance in other areas.

Eight of the nine businesses assessed reported aligning with the Paris Agreement Net Zero by 2050 target and it being the overarching target for their climate action endeavours. Furthermore, climate change related business reports revealed that the sample JSE listed companies have been beginning to investigate climate change and the related risks and opportunities and putting sustainability teams in place to champion the organisational climate change agendas. However, it appears that for this sample of JSE listed companies, climate change is not considered an urgent matter in the short- medium term with majority of the companies reporting that they are considering climate change related risks in the long-term, while they maximise current assets and competencies and slowly begin to move into new industries. With these actions in mind, interviewees still perceived companies to be only taking opportunities that are easy and quick to return benefit – compliance driven responses – without truly transforming core operations. Findings are further reported in relation to other quadrants in sections 4.5 and 4.6.

Table 2. A summary of the climate change related business reports reviewed for each sample JSE listed company

COMPANIES	REPORTS				
	TCFD	CDP	Sustainability	Integrated	White paper
J1	**X**	**X**			
J2	**X**				
J3	**X**				
J4			**X**		
J5	**X**		**X**		
J6	**X**				**X**
J7		**X**			
J8				**X**	
J9				**X**	

4.4 AQAL map

The comprehensive summary in Appendix D was further summarised (as per chapter 3) until the following summary tables were produced. The following tables contain the reoccurring themes among interviewees, sample climate change legislation, policies and guidelines and climate change related business reports of the sample JSE listed companies. Sections 4.5 and 4.6 were formulated by going through all the tables and seeking out the statements in different quadrants that were relevant to the headings determined during data analysis (see section 3.4).

Table 3. Upper Left Quadrant (UL)

General perceptions on climate change

1. It is due to greenhouse gases caused by human activity.
2. It impacts our ability to sustain our current style and quality of living.
3. South Africa will get it worse in terms of water, food security and weather-related impacts.
4. We are already seeing the impact of climate change globally.
5. It is scientifically proven and attempts to discredit it are based on vested interests, poor science, or lack of thereof.

Sense of agency relating to climate action:

6. Everyone has a role to play and the potential to make a difference.
7. Take ownership and contribute.
8. "I am well versed, and people see me as an expert, so I have more influence than others".
9. Environmental specialists have a duty to keep abreast everything on climate change and to try to implement that.
10. Consciousness, awareness and understanding of climate issues gives a sense of responsibility and a fear of the consequences of inaction which can be stressful.
11. Climate action requires passion and compassion because it can be exhausting dealing with systems that cannot be fought.
12. Climate change work cannot be done with authentic power unless one does it personally.

Requirements and opportunities for climate action

13. We have reached certain thresholds and impacts are already here therefore adaptation is the top priority.
14. Mitigation is also key as South Africa is the 14th/15th worst emitter in the world.
15. In South Africa critical adaptation needs are water, agriculture, health, and disaster management.
16. Decarbonising the energy sector, certain industries and the transport sector.
17. We have to restore and protect our natural capital – our ecosystems.
18. Carbon sequestration.
19. Drive simplified education initiatives to create awareness and conscientise people about climate change issues and opportunities to change thinking and behavioural patterns.
20. Young minds to replace the old generation of climate change leaders.
21. Push transdisciplinary approaches in university research and courses.
22. "Strong states need strong markets and strong markets need strong states", so if we have a strong state that has effective management, oversight, compliance monitoring, enforcement and a good enabling environment, the private sector can thrive, and they can also solve for the challenges in society that need to be addressed.
23. The Climate Action Network (CAN) must bring together all the different NGO's that are working in the climate space as well because the NGO sector can ask for many different things that are not necessarily cohesive.

Views on key stakeholders outside of business and their roles

24. Government/Politicians/Policymakers:
    a. Set policies that inform certain practices and decisions to create change.
    b. Act at national, provincial, and local levels.
    c. Model leadership and shape opinions.

    d. Support investment in climate action initiatives.
    e. Fulfill a market maker role by enabling and translating sub-commercial, social lens deals into bankable/commercially viable and sustainable deals.
25. Civil society:
    a. Get involved in green activism to put pressure on companies and government to trigger urgency for action in government and the private sector.
    b. Put forward climate action options and work as a key partner.
    c. Be aware of products and services they purchase and hold companies accountable.
    d. Drive optimisation and improvement of energy performance in the residential sector.
26. Tertiary and private research institutions:
    a. Conduct research on different aspects of climate change.
    b. Generate data and help different stakeholders take informed decisions.
    c. Integrate different initiatives between tertiary and private research institutions.
27. NGOs/Environmental organisations/advocates:
    a. Trade union groups think about job creation and job protection in a low carbon economy.
    b. Create awareness and momentum on the ground and influence policy and societal behaviour.
    c. Continually hold everyone accountable to the dictates of what is needed for climate action.
28. Media
29. International stakeholders:
    a. International funders
    b. International agencies like the UN and UNEP.

The role of and opportunities for businesses in climate action

30. Roles of businesses may vary based on their specific impacts.
31. Acknowledge the problem, the scale of the crisis and the impact.
32. Take a leading role and quite drastic measures to understand and reduce their environmental footprint.
33. Reconsider business models and align operations with environmental governance and social dynamics to gain in profits of the triple bottom line.
34. Businesses, especially the financial sector are the engine of economic growth, creating markets, and change – divest from fossil fuels, invest in new technologies, research & development, and platforms where climate change is taken up.
35. Lend their powerful weight and voice to climate change projects.
36. Provide sustainable products and services and raise awareness through their hugely impactful marketing campaigns.
37. Collaborate as businesses to drive the climate change agenda through constructive engagement – on policy with government, global initiatives, and workable solutions.
38. Ensure that their staff, clients, and supply chain are adequately trained identify and address climate change issues.
39. Put in place good governance structures and ethical leadership to drive climate change throughout with board oversight.
40. Work on resource efficiency.
41. Support the aspirations of government by aligning plans with set policy.
42. Set policies to join the transition to a low carbon economy and avoid business failures.
43. Transformation needs to happen faster.
44. Get more involved in championing environmental education and quality

education as a key to addressing inequality.

45. Mainstream climate change adaptation and mitigation through CSI and BEE work.
46. Inform investors of climate-related CSI projects to increase their awareness.

Table 4. Lower Left Quadrant (LL)

Business concerns

1. Trade unions are worried about losing jobs e.g., the coal sector.
2. Investors get nervous when companies move early or are seen to moving too early.

Business cultures/values/beliefs

3. Companies believe that the energy issue is out of their control, so they obviate responsibility.
4. Driven by profit and the bottom line – they prioritise investment in capitalist projects over climate projects.
5. Greenwashing in CSR/I and reporting.
6. Compliance driven with no value alignment.
7. Companies do not tend to respond voluntarily and proactively without seismic events, punitive legislation, or economic consequence.
8. Issues perceived to be immediate often shift climate change off the agenda.
9. Ideological position that Africa's contribution to climate disastrous activities is very miniscule in comparison to the global north and some of the east.
10. Tension due to differing mindsets between those that are pro-climate and the sceptics.
11. Culturally, South African businesses do not sign up for commitments in the same way that other countries do.
12. Tend to make excuses like "we know it already; we are doing our best" or "we don't have money" or "we don't really know about these things very well".
13. Work tends to be very ad hoc, and project related – once off – while climate action requires long-term, sustainable solutions.
14. Top executives make decisions based on financial flows and do not engage creative thinkers who think differently.
15. Some business leaders have a much deeper sense of climate change issues.
16. Boards and investors do not view climate change as a business survival or business sustainability issue.

Societal cultures/values/beliefs

17. The consumerism mindset is encouraged by government and businesspeople because they want to increase revenue and increase profit.
18. The younger generation led by Greta Thunberg are more aware and conscious and there's been a rise in climate change protests.
19. Consumer activism is at a low level in this country unlike other countries.
20. Different groups in society tend to work in silos.
21. It is very difficult to get older people to change their minds about things and see the value of climate action.
22. Climate action does not align with the aspirational goals of some South Africans.
23. "For many years we were aspiring for certain things and now that they are within our reach, we are told that it's not such a good idea to get that fancy car which tells everybody that you've arrived".
24. There's a belief that growing one's food is a sign of poverty – if you have "moved up" in life, you do not have to do those kinds of things.
25. "… it is demeaning to go cycling and the people want to have BMWs".
26. For the white population in South Africa, urban farming is a new trend – being green.
27. Some people want to cycle.
28. Public transport is preferred to driving a car just because of the convenience and for environmental reasons.
29. Businesses externalise the cost of the environment to the society – if government forced them to internalise these costs, they would look at it differently.

Government cultures/values/beliefs

30. The government tends to not sustain/continue climate change programmes.

Cultures/values/beliefs within the sample JSE listed companies

31. Financial sector
    a. Doing good through our expertise to clients, shareholders, and society.
    b. Taking sustainability to heart to understand climate issues and align to be a more responsible organisation.
    c. We are a change enabler for people that bank with us and for organisations that require funding – we fund in a responsible way to move the climate change agenda forward.
    d. Trying to instil a culture of reusing and eradicate single use utensils from their canteens.
    e. We want our portfolio to be responsible and sustainable.
    f. It is important for us to model what our business will look like if we do operate in certain conditions of climate change.
    g. We do business right because we believe it is the right thing to do.

32. Mining sector
    a. Climate change is considered in terms of climate related risks.
    b. As a global corporate citizen, we believe it is the right thing to do our bit and investors want to know that their money is safe.
    c. Climate change is embedded and integrated into the life cycle from operations to looking at options at closure.
    d. Climate actions are voluntary – our board, CEO and executives believe that as a responsible mining company, we have to do it.

33. Retail sector
    a. Climate change is not a top risk.
    b. Climate change is one part of a bigger environmental sustainability engagement.
    c. Climate change is a long-term focus.
    d. Climate change in retail is usually considered in sourcing.

Table 5. Upper Right Quadrant

Overall performance in South Africa

1. We have not succeeded in changing or deflecting the emissions trend.
2. SA signed the Paris Accord, yet we have not been able to make strides to meet the expectations.
3. NDCs are not enough to stick to below 2°C.
4. There is consumer/citizen awareness around climate change, but it can always be strengthened.
5. We do not have a strong social movement basis to manage climate change in this country – it is not as organised.
6. There's a big youth movement at the moment to make the older people to make changes.
7. Society can be a very powerful force, but they are not using that power enough.
8. Despite the plastic crisis, its impact on the biosphere and the campaigns around it, there is very little change that is coming from the people.
9. Climate change campaigns have not been effective in driving climate action except to open up a conversation for broader environmental stewardship.
10. The SDGs took a few years to get traction.
11. Some renewable energy developed at a national scale.
12. Difficulties managing the issue of people in the coal sector trying to protect their jobs.
13. There are a lot of different, splintered groups – NGO communities, small communities, people working on gender and climate change, people working on climate justice and climate change – that are all driving their own climate agendas, therefore, there is a lack of coherent and very sharp focused strategies on what we should be doing.
14. Local and international bodies are conducting climate change related research and producing more information to be used in climate action.
15. The challenge is that South Africa is a developing country contributing 1.5% of the global emissions.

Personal agency relating to climate action

16. Drive efficiency in energy, water, food, and waste.
17. Investment in renewable energy.
18. Gardening/ urban farming.
19. Participating in climate change strikes.
20. Create awareness within families, communities, and friends and modelling behaviour.
21. Use skills to make a positive environmental impact and make conscious, environmentally sound choices.
22. Choosing transport that is relatively more eco-friendly – an energy efficient vehicle or the Gautrain.
23. Sound waste management through recycling and composting.

NGO performance

24. Business Unity South Africa (BUSA), the National Business Initiative (NBI), Banking Association South Africa and WWF are the champion NGOs that are creating a lot of awareness on the ground.
25. BUSA is driving companies to retrofit to be less dependent on coal, more dependent on renewable energy.
26. NBI:
    a. Brings businesses together for businesses to start collaborating.
    b. Pushing companies to think of the SDGs as a way of reorientating their business to create business value and grow the business in a sustainable way.

27. Banking Association South Africa:
    a. Ensure that our members make informed risk decisions.
    b. Involved in the training and reporting space up to board level and working on upskilling staff on how to manage climate risk.
28. NGOs have taken the DEA and some companies to court and stopped certain projects.

Media

29. The media is a very critical stakeholder and they have not fully come to the party.
30. Inexperienced environmental journalists just take company public relations press statements and publish them as news reports without critical analysis.

Government performance

31. Mitigation chief directorate in the DEA conduct climate change mitigation research and analysis.
32. Department of science and innovation is doing great work with universities and some companies in looking at pilot programmes and projects for future industries – the challenge is scaling up.
33. City of Johannesburg (COJ) had a gas-powered taxis initiative.
34. Government is looking at the integrated resource plan climate change strategies, carbon tax act and the climate change bill.
35. Government has not been able to create enabling policy environment for companies to respond positively – there is a "bureaucratic red tape".
36. Eskom (South Africa's monopoly power utility) is not being fixed quickly enough and government is trying to defend that outdated model because Eskom is a R450bn stranded asset.
37. It has taken the government a long time to realise that they have to open up for independent power producers.
38. There is a government and private funded organisation that trains teachers to be able to teach climate change.
39. Different government departments and agencies like SANEDI, the NCPC, DFFE and DTI working on climate change imperatives.
40. CSIR- NCPC has shown government that it could be a very meaningful implementation agency through various research projects and successful case studies resulting in large energy savings.

Business performance

General:

41. Businesses are performing poorly, and climate action is very slow in general.
42. There hasn't been a significant seismic/transformative change – a lot of companies have just taken the low hanging fruit.
43. Behaviour is improving however it is still a developing space with a long way to go.
44. Most businesses have not shown the willingness and the needed impetus to make changes.
45. There are pockets of excellence.
46. Some businesses are doing sterling work in the degree of attention they bestow on and their management of climate change.
47. A number of companies are producing, using, and sharing clean energy.
48. By large corporate climate action is still a poorly understood, accepted, and adopted attitude and way of doing business.
49. Consumers are not being made quite aware of these issues.
50. The industrial sector is the biggest culprit – contributing 30-50% of national energy use.

51. There hasn't been any significant climate change work being done outside of the sample of ~ 80 companies that file with the CDP.
52. Financial community is starting to see climate change as a risk to the global economy.
53. In the last year or two we have seen an acceleration of interest in the mining sector after ~ a decade of meager response.
54. There are some companies that have refused to accept that they should improve some environmental issues.
55. When it comes to government pressure to change, businesses are obstructionist.
56. Still producing products that generate waste.
57. Realising that there are potential impacts on their operation.
58. Corporates have not been taking advantage of incentives.
59. Jobs are being developed for sustainability departments or some link towards being sustainable.
60. Early adopters that have sustainability teams that cut across the organisation make a larger difference.
61. Sustainability teams have driven ethical and social improvement resulting in competitive advantages and environmental reductions through efficient operations.
62. Retailers are promoting the removal of single-use plastics and making them expensive.
63. Some retailers use marketing to influence activity around climate change.
64. Because of global awareness and pressures, some major banks are moving away from funding fossil fuel projects.
65. Health shops, small local businesses like organic farming producers are more conscious about climate change.
66. It is a complex space where companies could report one thing but do the other.
67. A lot of mining companies have modernised their technologies.
68. There hasn't been real momentum around getting business to advocate for climate solutions with government or figure out ways of participating.
69. Business engagement has often been through industry businesses who have very powerful voices in some of the government mitigation plans despite their aversion to change.
70. Have been pretty good at integrating water issues into strategies and responding quite strongly however, it is not always tied to the climate.
71. Early adopters and market leaders have clearly defined long-term, medium-term, and near-term goals and everyone in the organisation is aware of them.
72. Banking sector is making funding for climate change projects more accessible.
73. NGOs still have to fight their way in to get businesses to understand why it is important to fund climate projects.
74. It is still too easy for mining companies and industries to pollute.
75. An industry is being built around understanding carbon footprints and how to reduce them.
76. A mining company announced that they were moving away from coal and got hammered by their investors.
77. There hasn't been a growing pipeline of carbon emissions reductions projects.
78. Starting to see an increase in emissions in the sample (some of the biggest emitters) of ~ 80 companies with the CDP.
79. Big businesses are starting to embrace the SDGs.
80. Companies beginning to broaden their operations internationally are either in the early stages of integrating climate change into operations or have not taken it up.
81. Multinationals operating in Africa have a long history of engaging in

climate change initiatives but their operations in Africa tell a different story.

82. Companies are making excuses instead of ensuring that their employees and managers are educated on climate change issues.

Compliance and Reporting:

83. There is lots of resistance to regulations like a carbon tax and the business sector is very powerful.
84. Reports are very often just stories, and they are not doing enough.
85. What companies report and what communities perceive companies to be doing are not properly aligned.
86. There's a lot of reporting since 2007/8/9 and a lot more recently through the CDP and sustainability/integrated reporting.
87. Businesses are generally quite good at reporting and disclosure but beyond that there's not really been the activity to back up the reporting.
88. Very good a risk assessment but there is a gap between talking about what the issues are and acting on them very quickly.
89. Failure to understand the need for life cycle costing.
90. Companies have been using misleading practices and metrics to report energy performance leading to the underestimation, under-reporting or confusion.
91. About 80 companies (between 70 and 80 companies each year) respond to the CDP.
92. Big businesses in the stock exchange are responding to compulsory sustainability reports and recognising the risks around climate change.
93. Companies are seeing the benefit of building climate change into their financial systems – disclosing on climate change risk.

Deepening transformative capabilities:

94. Use science-based data to understand climate change and identify major risks to the organisation, especially within the financial services sector.
95. There are multinationals with good learnings and experiences from other countries that can be implemented here however, it needs an enabling environment.
96. Engagement on the NBI platform – ironing out imperative and focus on climate change action (global policy integration).
97. Asking academics to come talk to them about climate change.
98. Boards are starting to do inward thinking and having frank discussions around climate change.
99. Covid forced companies to think differently, adjust and adapt company policies.
100. Many companies have put systems in place to better understand climate change impacts in relation to their operations.
101. Financial sector is looking at theirs and their clients' operations to determine business sustainability considering potential climate change impacts and business impacts on communities.
102. Listed companies are still grappling with the data – using global data to understand local impacts and drive local actions.
103. Retail companies are engaging on sustainability forums to pull the weight of the sector.
104. People are flying into SA and running workshops at the stock exchange – it is becoming a big issue for fund manager and others.

Performance of the sample JSE listed companies

105. Financial sector:

a. Raising awareness on climate change issues and opportunities throughout value chain and sphere of influence.
b. Driving energy efficiency within the organisation.
c. One organisation has been carbon neutral for a decade through offsetting.
d. Reducing impacts on the environment and addressing the climate change requirements – especially relating to water, energy, waste, and emissions.
e. Looking into and investing in new technologies.
f. Investing in and supporting the transition through various new instruments and products.
g. Stakeholder engagement and collaboration with other different groups – government, NGOs, and society.
h. Striving for and achieving positive business related environmental and environmental ratings.
i. Reduced travel during lockdown resulting in decreased costs and pollution.
j. Strategic transition from investments implicated in GHG emissions.
k. Measurement, monitoring and disclosure of water, energy, waste, and emissions.
l. Involved in research to better understand opportunities and formulate strategies to realise opportunities.
m. Factor ESG certification when appointing service providers.
n. Determined an internal price of carbon.
o. Continuous upskilling of board, management, employees, and clients.
p. Commission and partner on research.

106. Mining Sector:

a. Committed to improving preparedness for climate impacts, disclosure and driving positive performance in water, energy, and emissions – prioritising decarbonisation and water stewardship.
b. Reporting in alignment with various climate frameworks.
c. Acting to improve operational efficiency for mitigation and adaptation.
d. Monitoring footprint and looking at options for closure.
e. Looking into and investing in electrification, renewable energy, automation of mines and remote operation.
f. Community engagement on climate change risks and opportunities.
g. Engage governments, peers, and NGOs for development of effective climate change policies and to lobby for appropriate regulations.
h. Determined an internal carbon price.
i. Collaborations with peers and other organisations to drive environmental and climate imperatives.
j. Aware of growing concerns of investors on ESG performance.
k. Gold mining company outlined how gold can be used in technology for low carbon future.
l. Aligning environmental efforts with climate resilience.
m. Achieved reduction and savings goals.
n. Striving for and achieving different environmental certifications and ratings.
o. Mines in South Africa have a higher emissions intensity than other regions due to the exclusive use of coal fired electricity – one company sold their South African mine due to high emissions.
p. Continuing to provide coal to Eskom in alignment with IRP-2030.
q. Maximising value of assets in the shortest possible period to minimise loss/stranded assets in transition.
r. Not seeking further growth opportunities in thermal coal – ending of financing of new coal projects is forcing transition.
s. Involvement in local and international business climate action networks.
t. Leveraging critical competencies while securing new revenue opportunities in renewable energy and minerals with

potential to contribute to low carbon world.

u. Reducing impacts on the environment and addressing the climate change requirements.

107. Retail Sector:

a. Raising awareness on and advocating for sustainability in supply chain.
b. Focusing on and investing in energy, water, and waste efficiency and emissions reduction projects.
c. Emphasis on recycling – phasing out single use plastics and transitioning from virgin materials to recyclable materials.
d. Addressing climate change in terms of food safety, food security, packaging, and ethical sourcing.
e. Committed to international climate protocols and report in alignment with climate frameworks.
f. Subscribe to various environmental guidelines.
g. Engagement and collaboration with value chain, government, research institutions and environmental organisations.
h. Engagement to influence public policy, drive clarity and simplicity in climate change related regulations and deepen transformative capabilities and connectivity.
i. Short to long-term agenda focusing understanding climate impacts on and implications for operations and managing and reducing environmental footprints.
j. Focus on measurement, monitoring, and management of footprint across value chain.
k. Investment in mitigation.
l. Committed to increasing penetration of eco-friendly products.
m. Climate change considerations included in business processes.
n. Determined an internal price of carbon.
o. Investing in CSI.
p. One company reported engagement with the media.

Table 6. Lower Right Quadrant (LR)

Social dynamics in South Africa

1. There are contextual social issues that need attention at the same time as time as global environmental targets for climate change.
2. In South Africa a GBV march or a youth unemployment march would have a much greater focus than a climate march.
3. Climate action in South Africa must consider socio-economic aspects.
4. Government is quite rightly working on service provision, immediate issues communities face and the energy crisis, all which have roots in the apartheid era.
5. The country needs to keep generating enough electricity to grow the economy while considering climate impacts.
6. There are concerns that vulnerable and poorer communities will not be able to deal with climate change impacts and how they can be supported.
7. Many people are not concerned about climate change because they are battling poverty – too worried about what they are going to eat to hold businesses and government accountable .
8. Government interventions like the Just Transition are more focused on the social lens and should be more of a blend of the economic and social lens.
9. We need to consider climate change from a lens of inequality to understand what creates and perpetuates inequality– looking at for profit business principles and the legacy of the colonialism.

Government and political systems

10. There is a lack of leadership and political will in government.
11. Need a better-informed government policy community.
12. The current global climate of politics and negotiation strategies are not effective in driving climate action.
13. Government programmes are often complicated and cumbersome, sometimes requiring hiring someone full-time to sit and do the paperwork which does not make business sense.
14. Our latest IRP states that by 2050 the expectation is that 20% of our electricity will still be generated by fossil fuels while the world is talking about transitioning from fossil fuels by 2035 and being carbon zero by 2050.
15. BEE can be an enabler for climate action.
16. Harsh decisions will not be made because the interministeral committee are conflicted – the minister of energy and mineral resources firstly has a conflict in his portfolio but secondly, he is there to promote the mineral resources sector making it difficult for him to accept the need to transition from fossil fuels.
17. There is a lack of certainty and information from government, the facilitators.
18. Government policy is not clear in terms of how mitigation and adaptation plans will be achieved – vagueness creeps in through the nuances like political will, buy-in and unlocking funding –the finer details are not clear and realistic strategies haven't been formulated.
19. Government departments and agencies that are tasked with and working on climate change imperatives.
20. Climate change legislation, guidelines, regulations, and programmes are not strong enough to push the climate change agenda to where it needs to be, thus are of minimal encouragement for business.
21. The energy policy needs to change because businesses are sitting with excess energy, they could put back into the grid, but it is difficult and costly.

22. A study found that the policy coverage for energy in industry in South Africa was extremely low or non-existent.
23. We are challenged with contradicting policies from different departments – we have a good set of policies that are all pulling in different directions.
24. Some policies are enabling, some punitive and some just get you lost, not knowing what exactly is expected of you as a corporate citizen.
25. The environmental ministry is not an oversight department therefore, its efforts to support the transition to a low emissions economy are thwarted by other departments such as the department of energy and trade and industry.
26. Cabinet resisted the merging of departments of energy and the environment – this could change the mindset in the country.
27. If you have good governance, then you will have good multilateral platforms made up of governments that champion environmental questions.
28. Climate imperatives are often driven by big multinational institutions made up of governments so companies may not necessarily see that as part of their mandates.
29. Different governmental agencies have not given a clear vision in terms of growing new sectors of the economy.

Business and financial systems

30. Being an honest, compassionate CEO – not trying to just make profit – is a hard struggle.
31. The economic growth indicator does not account for socio-ecological bad which should be subtracted from the bottom line.
32. Corporations are pathological institutions.
33. Businesses operate in a perverse capitalist system with business models that cause them to sacrifice human capital/ needs and environmental capital to promote profit.
34. Companies are expected to report factually along the lines of ESG.
35. Companies talk the language of risk and finance - when companies financially quantify the risks and opportunities, they start to drive change internally – TCFD.
36. About 30% of our stock exchange is resource intensive or companies that supply products to the resource intensive sector – South Africa needs to restructure its economy.
37. If we transition too quickly or slowly it can create systemic risk not only to the financial sector but to the whole economy.
38. Globally, climate change can present business opportunities totaling R12trillion – it has the potential to lead global growth.
39. The transition requires businesses to re-engineer their whole business and that costs a lot of money which businesses cannot invest in a short space.
40. From scale to maturity to make a project commercially viable requires a lot of interventions – such as equity – which government has not produced to entice private sector response.
41. The financial sector or investment sector can really drive change – they can leverage their financing to ensure that financed companies identify the risk, manage the risk, and put systems in place to mitigate against climate change impacts.
42. Investor shock is a big challenge/risk for businesses thinking about climate action – it is very difficult for a company to think outside of what the investors want and what they need to do to drive their own profitability, especially in the current economic climate.
43. Companies need a little bit of pressure from the government and from investors to change.
44. There is tension between the people that want to change in the companies

(the environmental specialists) and CEOs that may not listen to them.
45. Businesses need to foster young ideas and allow them to be heard much more in the companies.
46. Businesses are challenged with limited resources, limited time, and limited space to deal with initiatives.
47. Shareholders put pressure on companies to give them the bottom line and rewards relating to shares.
48. Climate bonds are coming through very strongly.
49. Carbon trade/ carbon offsetting – companies can invest in climate change projects like renewable energy to offset their carbon footprint.
50. The JSE requires companies to have sustainability teams and looks favourably on companies that disclose on aspects of climate change.
51. Path dependency – the climate change conversation is catching companies where they have invested a lot of money in relatively old and archaic systems.
52. Businesses do operate in a global competitive environment, so they try to minimise the costs.
53. The triple bottom-line allows companies to still make profits at the same time responding to the needs of the community and the environment and companies have adequate resources are to address climate change in addition to the bottom line.
54. Companies can band together to create their own portfolio to finance climate action.
55. Companies struggle with balancing being successful financially in terms of the bottom-line but damaging the environment and saving the environment but not being financially viable.
56. Some companies have their own support, their own mechanisms, their own media campaigns, and research groups.
57. In a low growth economy, some companies do not have big budget for research and development, new programmes, new investments, and new ideas.
58. The transition was very slow when banks sought to fund only very large projects with a floor limit of 100 million Rands.
59. The investor community in South Africa is not as engaged with climate change issues as they should.
60. Challenges accessing capital for new, big investment projects in the renewable energy/ energy efficiency space.
61. Climate change is not incorporated into market prices – internalising climate change is difficult and attempts like the carbon tax do not send a high price signal.
62. 70% of the coal sector's revenue comes from exports however, India and China, the biggest recipients of our coal are both transitioning.
63. South Africa is a middle-income country, so we do not see any of climate action financial aid from the developed countries.
64. It is key to develop new low carbon economic sectors and industries to avoid resistance due to the perceived threat on certain sectors and jobs.
65. Climate change guidelines are becoming more onerous thus companies need to be aware and can no longer use the "I didn't know" excuse.

Business governance

66. Business policy and purpose for existence has always been for profit – what generates profit, you continue doing.
67. According to the King IV every business in South Africa needs to have an environmental and social governance policy and committees to manage these additional lenses that they may have not factored in ten years

ago which are absolutely critical for sustainability.
68. CEOs are accountable to shareholders and do what the shareholders expect – shareholders are only concerned about the share price.
69. Early adopters and market leaders incentivise good performance either through incentive targets they set or through promotional opportunities within the business.
70. The ESG lens is being implemented in all levels of business.
71. Behavioural economics has shown that much is achieved within a business with a top down and bottom-up focus of work, communication, and recognition.

Incentives

72. Government has in terms of policy fallen short but in terms of providing a stimulus in incentives has done well.
73. There are certain renewable energy and energy efficiency incentives in place as critical enablers of behaviour.
74. Concession for solar PV up to 1 megawatt without requiring a generation license.
75. Government released the12 L energy efficiency tax incentive to provide a stimulus for these projects and achieved 24 terawatts hours energy savings and allotted R3,30 in private sector investment per rand of tax.
76. Some regions in the world incentivise, and in some it is a stick not a carrot – for a developing economy like ours, sticks drive people away – we cannot be too punitive.
77. Funding for climate change globally still sits at 2%.
78. There are no strong enough incentives or drivers for businesses to change their practices at this point – tax incentives are good, but they are probably not going to allow these massive capital refurbishments or new builds that are needed to slow the carbon pathway.
79. Penalties are small in comparison to what businesses can gain – there needs to be far more/ greater consequence for not being more responsible.
80. Manufacturing incentive.
81. Production incentive.
82. Most of these government incentives are financial because financial incentives are a key trigger to business however, not all the incentives are grants and handouts, a lot of them are tax incentives.

Support for corporate climate action

83. There are several local and international organisations, advocacy groups, guidelines & frameworks, policies, structures, and programmes to get businesses to understand their impacts, responsibilities, roles and rights and change behaviour.
84. Partnerships within business – networking with other organisations around the world and people in your sector to change.
85. Support is mainly knowledge based and legalistic and readily available to listed companies.
86. In terms of financial support, there has been some options that have come through and not always used.
87. There is funding from the German fund, global climate fund, global environment and different pots of money that could be used.
88. Different experts and carbon specialists.
89. Guidance, support, and funding that we receive from international agencies for projects in South Africa – some from overseas governments.
90. There's a lot of funding and interest in climate change research in universities and private research institutions.

Environmental system dynamics

91. There are arguments about whether one can attribute local impacts or the local experience with certainty to the impacts of climate change.

92. There are no definite answers about what is coming, and it is difficult to manage what is essentially unknown.
93. It is largely still unseen, and many people cannot connect all the dots.
94. It is so big that people can't relate to it, so they ignore it.
95. The development of farming techniques, promotion of agriculture, urbanisation, industrialisation revolution, digitalisation and the expansion of the population and resource extraction all occurred under a stable climatic regime, climate change is a significant threat to humanity.
96. The southern African experience of the rate of global warming is double the global average which is very significant for our economy and our society.
97. There is an uncertainty around timeframes and uncertainty creates a feeling of comfort within areas of business which impacts people's commitment and results in understating the risk.

Infrastructure

98. There is a lack of enough safe public transport unlike in Europe.
99. We designed out cities for an urban sprawl which means public transport was not well invested in, so people drive their personal, combustion engine vehicles everywhere.
100. Cycling routes were put in place but have been ignored so it is risky.
101. The South African electricity grid is still very carbon intensive – 95% of our power is generated from coal-based power plants – which subjects businesses to high emissions because of consuming coal-based power.
102. Unless we move to diversify our energy mix and have a much stronger renewable energy content in our electricity grid, it will be difficult to meaningfully reduce emissions.
103. Sasol is the biggest producer of fuel from coal in the world and they have such great infrastructure and chemists to easily create a biofuel industry.
104. There isn't an enabling environment for recycling – people battle to find facilities and infrastructure to process waste and make recycling easy – for example there are one or two factories that can actually recycle tetra pack.
105. 30% of water is lost through broken pipes and stealing water – and we need to bring in infrastructure and technology to reduce the amount of water that is wasted.
106. The transport and electricity sector need a massive change which requires a huge budget; however, it is difficult to find that kind of commitment and to make it last because they require maintenance.

Technology

107. While technology is key for climate action, science and hard technical solutions like AI and 4th generation technology are not going to be enough on its own.
108. Digitalisation ushers in incredible opportunities of maximising performances
109. Some businesses are keen to move but they lack the technical capacity.
110. The capital investment for some technologies is very significant therefore it has been a struggle for many businesses.
111. Required technology options are not always available.
112. There are systems that businesses can sign up to and use to see their carbon footprint on a live basis.
113. The big issue for most companies is that they don't have their tons of data and tables on a dashboard to be able to see trends.
114. There are challenges with money for the technology and the skills to

install the technology and run businesses differently.

115. There are issues around technical expertise that exist in companies.

Information, knowledge, and expertise

116. Knowledge is all available but there is a lack of practical understanding.

117. Climate change expertise tend to reside with individuals rather than more broadly and when those individuals leave, the business is right back to square one.

118. There are very well-developed centers for research and centers for sustainability.

119. There has been a lack of data to inform the understanding of the local risks.

120. Big companies are using the existing information to forecast climate change impacts and the smaller the company the less capacity they have to do this.

121. There's a lack of enough scientific data that gives a good view of the history and can be trusted in terms of future predictions.

122. Businesses are responsible for finding out about climate change information and regulations.

123. Need more in terms of information, awareness and guidance on how to begin to comply or change.

Media

124. We have very few experienced environmental journalists who are skilled at critically analysing company statements.

Systems in the sample JSE listed companies

125. Financial sector:

Risk Management

a. Well-defined processes in place for identifying, assessing, and managing/responding to climate-relate risks and opportunities.
b. Various climate risk types identified and considered.
c. Integration of climate risk into existing processes.
d. Board-approved internal climate risk appetite.
e. Scenario analysis and stress testing incorporated in actuarial models and risk management.
f. Review industry trends to provide guidance on ESG matters.
g. Assessing all clients' exposure to climate-related risks and opportunities.
h. Putting in place business continuity plans to address serious emergency incidents.

Metrics and targets

i. Set baselines for energy use, water, business travel and increase of recycling.
j. Met emissions and waste management targets.
k. Overarching ambition is Net Zero by 2050.
l. Divestment from fossil fuel projects over time.
m. Using the carbon budget construct to develop science-based targets to help clients across all sectors transition.
n. Metrics for assessing climate-related risks and opportunities in line with strategy and risk management processes.
o. Scope 1&2 and if appropriate scope 3 GHG emissions.
p. Various reduction targets.
q. Various targets for financing climate related projects.
r. Aim to eliminate single use plastics in retail portfolio.

Governance and climate guidelines alignment

s. Established and are still establishing team/s to carry out environmental imperatives.
t. Compliant with climate change guidelines and regulations which are

integrated into company policy and operations.
u. Top-level buy-in and oversight and cross-departmental collaboration on the assessment and management of climate-related risks and opportunities throughout value chain.
v. Enhancing remuneration policy to incentivise leadership behaviours to align with climate change position.

126. Mining Sector:

Risk Management

a. Climate change risks and vulnerability assessments to be conducted and integrated into business planning and risk registers.
b. Contextual risk assessment, identification, and mitigation by management at all levels.
c. Analyse strategic and emerging risks and macro-trends to develop registers and actions.
d. Rigorous processes to determine and define and manage different risk types, material matters and opportunities throughout value chain.
e. Risk management processes embedded into all processes, functions, and systems.
f. Mature risk management culture which is central to responding climate change.
g. Risk and crisis management are top-level objectives.
h. Climate related risks are considered low in the short to medium-term but expected to increase significance in the long-term.
i. Pressure from consumers, activists, and shareholders for greater visibility and transparency of carbon footprint and emissions reduction strategies.
j. Scenario analysis.

Metrics and targets

k. Aim to transition to Net Zero by 2050 in a practical and cost-effective way.
l. Various reduction targets.
m. Recycling/reuse targets.
n. Aim to leverage opportunities in renewable energy, clean sources of fuel and electric vehicles.
o. Align reductions targets with science-based targets.
p. More reporting in alignment with climate frameworks.

Governance and climate guidelines alignment

q. Established and establishing team/s to carry out and/or ensure integration ESG, environmental, sustainable development and climate imperatives.
r. Top-level oversight and multi-level involvement on climate-related strategy, policies, performance, risks, vulnerabilities, and opportunities.
s. Climate change performance supported by internal performance incentives.
t. Part of ICMM working groups.
u. Committed to international climate protocols.
v. ESG integration into strategy and processes.
w. Aligning governance structures and strategy with climate standards, guidelines, and frameworks.

127. Retail Sector:

Risk Management

a. Processes for identifying and quantifying climate change risks and opportunities which are integrated into business processes and strategies.
b. Climate related risks not considered significant in the medium-term.
c. Scenario analysis.
d. Various risks and response strategies identified.
e. Climate change is not considered amongst the top risks in this sector.
f. Unreliable electricity supply is a material issue.

Metrics and targets

g. Reductions targets.

h. Aligning targets with international guidelines.
i. Targets for phasing out single use plastics and replacing with reusable/recyclable options.

Governance and climate guidelines alignment.

j. Top-level involvement and/or oversight in climate change agenda.
k. Various committees/teams mandated with climate change imperatives.
l. Incentives for good environmental performance.
m. Various policies and plans to drive different climate change imperatives.

Climate change legislation, policies, and guidelines

128. Suggest measurement, monitoring, and reporting.
129. Consider and incorporate the frameworks of other climate guidelines.
130. Outline different standards, protocols, and methodologies for climate action.
131. Identify and describe different climate change risks and opportunities.
132. Explore financialising climate-related risks and opportunities.
133. Suggest mitigation and/or adaptation measures.
134. Aim to support transition to a low carbon economy.
135. Call for breakdown of silos for collaboration.
136. Outline the importance of private sector in climate action.
137. Consider context in climate action.
138. Offer support for value chain engagement.
139. Support integration of climate change into core operations.
140. Encourage and/or outline government supporting role.
141. Consider socio-economic aspects.
142. Call for better coordination across government departments
143. Highlight a need to enhance climate change awareness, education, and communication.
144. Highlight need for alignment with national strategies.
145. Actioned by an independent expert.
146. Suggest the use of public and/or private sector finances to support climate action.
147. Highlight the need for support to enhance climate action capacity – finances, skills, expertise, or policy.
148. Concerned with resilience.
149. Allow for a scope for negotiation and leave some aspects open to interpretation.

4.5 Alignments

The following analysis was undertaken by seeking out statements in one quadrant that were congruent with statements within the same quadrant and/or one or more other quadrants. This means that these statements corroborate each other and can be leveraged for success in corporate climate action. It should be noted that statements are unverified perceptions of interviewees and climate change related reports of the sample JSE listed companies.

a) A sense of urgency translates into personal action:

Everyone has a role to play and the potential to make a difference (UL6) if they take ownership and contribute (UL7). Environmental/sustainability specialists interviewed believe that they are well versed in climate change issues, people see them as experts, and they have more influence than others (UL8). With that, they believe that they have a duty to keep abreast everything on climate change and try to implement that (UL9) because climate change work cannot be done with authentic power unless one does it personally (UL12). They use their skills to make a positive environmental impact (UR21) through modelling behaviour and creating awareness within families, communities, and friends (UR20) and making conscious, environmentally-sound choices (UR21) to drive personal efficiency in energy, water, food, and waste (UR16). The environmental/sustainability specialists are investing in renewable energy (UR17), gardening/urban farming (UR18), recycling and composting (UR23) and using transport that is relatively more eco-friendly when they can (UR22). For the white population in South Africa, urban farming (being green) is a new trend (LL26).

b) Climate action related behaviour is improving within business:

Climate action related behaviour is improving; however, it is still a developing space with a long way to go (UR43). There are pockets of excellence (UR45) where some businesses have been doing sterling work in the degree of attention they bestow on and their management of climate change (UR46). Health shops and small local businesses like organic farming producers are considered to be more conscious about climate change (UR65). Five of the sample climate change legislation, policies, and guidelines outlined the importance of the private sector in climate action (LR136) and interviewees expressed the expectation for businesses to collaborate as businesses to drive the climate change agenda through constructive

engagement – on policy with government, global initiatives, and workable solutions (UL37). There has been engagement on the NBI platform where businesses have been ironing out imperatives and focusing on climate change action (global policy integration) (UR96). The retail sector are also engaging on sustainability forums to pull the weight of the sector (UR103).

Behavioural economics has shown that much is achieved within a business with a top down and bottom-up focus of work, communication, and recognition (LR71). Businesses are expected to put in place good governance structures and ethical leadership to drive climate change throughout with board oversight (UL39). Additionally, they ought to ensure that their staff, clients, and supply chain are adequately trained to identify and address climate change issues (UL38). According to the King IV report on corporate governance, every business in South Africa needs to have an environmental and social governance policy and committees to manage these additional lenses that they may have not factored in ten years ago which are absolutely critical for sustainability (LR67). Within the sample climate change legislation, policies, and guidelines, there was the suggestion that companies measure, monitor, and report on different aspects of climate change (LR128), which aligns with the requirements of the JSE for companies to have sustainability teams as they look favourably on companies that disclose on aspects of climate change (LR50).

Covid-19 forced companies to think differently, adjust and adapt company policies (UR99). Boards are starting to do inward thinking and having frank discussions around climate change (UR98). Many companies have put systems in place to better understand climate change impacts in relation to their operations (UR100). There are people flying into South Africa and running workshops at the stock exchange because climate change is becoming a big issue for fund managers and others (UR104). Listed companies are grappling with the data – using global data to understand local impacts and drive local actions (UR102). Companies are using science-based data to understand climate change and identify major risks to their organisations, especially within the financial services sector (UR94).

It was noted that big businesses are starting to embrace the SDGs (UR79) and the ESG lens is being implemented in all levels of business (LR70). Early adopters that have sustainability teams that cut across the organisation make a larger difference (UR60). Sustainability teams have driven ethical and social improvement resulting in competitive advantages and environmental reductions through efficient operations (UR61). Early adopters have clearly

defined long-term, medium-term, and near-term goals and everyone in their organisation is aware of them (UR71). Early adopters and market leaders incentivise good performance either through incentive targets they set or through promotional opportunities within the business (LR69). Companies are starting to see the benefit of building climate change into their financial systems and disclosing on climate change risk (UR93).

Within the sample climate change legislation, policies, and guidelines financialising climate related risks and opportunities as a platform for climate action was explored (LR132). Due to the fact that companies talk the language of risk and finance, when companies financially quantify the risks and opportunities – through the TCFD for example – they start to drive change internally (LR35). The financial sector is looking at theirs and their clients' operations to determine business sustainability considering potential climate change impacts and business impacts on communities (UR101). They can really drive change by leveraging their financing to ensure that financed companies identify the risk, manage the risk, and put systems in place to mitigate against climate change impacts (LR41). Due to global awareness and pressures, some major banks are moving away from funding fossil fuel projects (UR64). The transition towards renewable energy was initially very slow when banks sought to fund only very large projects with a floor limit of 100 million Rands (LR58), but now, the banking sector is making funding for climate change projects more accessible (UR72), therefore meeting the requirement for business to work on providing sustainable products and services (UL36).

Businesses are expected to work on resource efficiency (UL40) and work on raising awareness through their hugely impactful marketing campaigns (UL36). A number of companies have been able to invest in renewable energy technologies and are producing, using, and sharing clean energy (UR47). Some companies have been pretty good at integrating water issues into strategies and responding quite strongly even though it is not always tied to the climate (UR70). In the last year or two there has been an acceleration of interest in the mining sector after about a decade of meager response (UR53). A lot of mining companies are modernising their technologies (UR67). In terms of awareness raising and education, some retailers use marketing to influence activity around climate change (UR63) and are promoting the removal of single-use plastics and making them expensive (UR62). Furthermore, businesses are expected to get more involved in championing environmental education and quality education as a key to addressing inequality (UL44). In that regard, there is a government and private funded organisation that trains teachers to be able to teach climate change (UR38).

Sample JSE listed companies

Organisational culture (values, beliefs, and behavioural patterns)

Within the financial sector of the sample JSE listed companies, it was reported that they are doing good through their expertise to clients, shareholders, and society (LL31a), taking sustainability to heart to understand climate issues and align to be more responsible organisations (LL31b). Being change enablers for people that bank with them and for organisations that require funding – "we fund in a responsible way to move the climate change agenda forward" (LL31c), trying to instil a culture of reusing and eradicating single use utensils from their canteens (LL31d), doing business right because they believe it is the right thing to do (LL31g). A desire for their portfolio to be responsible and sustainable was reported (LL31e), and that it is important to them that they model what their business will look like if they do operate in certain conditions of climate change (LL31f).

Within the mining sector of the sample JSE listed companies, climate change is considered in terms of climate related risks (LL32a). As global corporate citizens, they believe it is the right thing to do their bit and their investors want to know that their money is safe (LL32b). One company reported that climate actions are voluntary because their board, CEO and executives believe that as a responsible mining company they have to do it (LL32d). Furthermore, in mining, climate change is embedded and integrated into the life cycle from operations to looking at options at closure (LL32c).

Governance

In the financial sector, they have established and are establishing more teams to carry out environmental imperatives (LR125s). There is top-level buy-in and oversight and cross-departmental collaboration on the assessment and management of climate-related risks and opportunities throughout value chain (LR125u). They are compliant with climate change guidelines and regulations which are integrated into company policy and operations (LR125t). As such, they are enhancing remuneration policy to incentivise leadership behaviours to align with climate change position (LR125v).

Mining companies reported that they have established teams and are working on establishing more teams to carry out and/or ensure integration ESG, environmental, sustainable development and climate imperatives (LR126q). There is top-level oversight and multi-level involvement on climate-related strategy, policies, performance, risks, vulnerabilities, and opportunities (LR126r), alignment of governance structures and strategy with climate standards, guidelines, and frameworks (LR126w) and integration of ESG into strategy and processes (LR126v). They are committed to international climate protocols (LR126u) and support climate change performance through internal performance incentives (LR126s). This aligns well with the sample climate change legislation, policies and guidelines which support integration of climate change into core operations (LR139) and consider and incorporate the frameworks of other climate guidelines (LR129).

In the retail sector, there is top-level involvement and/or oversight in climate change agenda (LR127j) and various committees/teams mandated with climate change imperatives (LR127k). There are various policies and plans to drive different climate change imperatives (LR127m), like incentives for good environmental performance (LR127l).

Risk management

The financial sector has well-defined processes in place for identifying, assessing, and responding to climate-related risks and opportunities (LR125a). As such, various climate risk types have been identified and considered (LR125b). Climate risk is integrated into existing processes (LR125c) and their climate risk appetites have been approved by the board (LR125d). Scenario analysis and stress testing is incorporated in actuarial models and risk management (LR125e), and they are putting in place business continuity plans to address serious emergency incidents (LR125h). In the financial sector they are reviewing industry trends to provide guidance on ESG matters (LR125f) and assessing all clients' exposure to climate-related risks and opportunities (LR125g).

In the mining sector, they analyse strategic and emerging risks and macro-trends to develop registers and actions (LR126c). Furthemore, climate change risks and vulnerability assessments are yet to be conducted and integrated into business planning and risk registers (LR126a). There are rigorous processes to determine, define and manage different risk types, material matters and opportunities throughout the value chain (LR126d). Risk management

processes are embedded into all processes, functions, and systems (LR126e). The sector has a mature risk management culture which is central to responding to climate change (LR126f) and is part of top-level objectives (LR126g). Contextual risk assessment, identification, and mitigation are objectives for management at all levels (LR126b). Within the sector, they are conducting scenario analysis (LR126j) and climate related risks are considered low in the short to medium-term but expected to increase significance in the long-term (LR126h). Mining companies are experiencing pressure from consumers, activists, and shareholders for greater visibility and transparency of carbon footprint and emissions reduction strategies (LR126i).

In the retail sector, companies reported having processes for identifying and quantifying climate change risks and opportunities, which are integrated into business processes and strategies (LR127a). Various risks and response strategies have been identified (LR127d). They are conducting scenario analysis (LR127c) and climate related risks are not considered significant in the medium-term (LR127b) and not considered amongst the top risks in the sector (LR127e). For the retail sector, unreliable electricity supply has been identified as a material issue (LR127f).

Metrics and targets

The overarching ambition for the financial sector is Net Zero by 2050 (LR125k). They are aiming for divestment from fossil fuel projects over time (LR125l) and to eliminate single use plastics in retail portfolio (LR125r). They have set baselines for energy use, water, business travel and increase of recycling (LR125i) and are using the carbon budget construct to develop science-based targets to help clients across all sectors transition (LR125m). Additionally, they use metrics for assessing climate-related risks and opportunities in line with strategy and risk management processes (LR125n). In the financial sector, they measure scope 1&2 and if appropriate scope 3 GHG emissions (LR125o). The financial sector met various reductions targets (LR125p), targets for financing climate related projects (LR125q) and emissions and waste management targets (LR125j).

Within the mining sector, companies are aiming to transition to Net Zero by 2050 in a practical and cost-effective way (LR126k). They aim to leverage opportunities in renewable energy, clean sources of fuel and electric vehicles (LR126n). There are various reductions targets (LR126l) which are aligned with science-based targets (LR126o) and recycling and reuse

targets (LR126m). There are plans for more reporting in alignment with climate frameworks (LR126p). In the retail sector, companies are aligning targets with international guidelines (LR127h). There are various reductions targets (LR127g) and targets for phasing out single use plastics and replacing with reusable and recyclable options (LR127i).

Energy, water, waste, and emissions

Within the financial sector, there were reports of driving energy efficiency within the organisation (UR105b) and reducing impacts on the environment and addressing the climate change requirements – especially relating to water, energy, waste, and emissions (UR105d). Furthermore, they reported on measurement, monitoring and disclosure of water, energy, waste, and emissions (UR105k) and the use of an internal price of carbon (UR105n). One of the organisations within the financial sector reported being carbon neutral for a decade through offsetting (UR105c). There was a reduction in travel during lockdown resulting in decreased costs and pollution (UR105i).

In the mining sector, it was reported that they are looking into and investing in electrification, renewable energy, automation of mines and remote operation (UR106e). Furthermore, there is a commitment to improve preparedness for climate impacts and improve climate-related reporting as well as drive positive performance in water, energy, and emissions – prioritising decarbonisation and water stewardship (UR106a). They are monitoring their footprints and looking at options for closure (UR106d) and are also determining an internal carbon price (UR106h). Mining companies achieved reductions and savings goals (UR105m) and are continuing to reduce impacts on the environment and addressing the climate change requirements (UR106u).

The retail sector reported that they are focusing on and investing in energy, water, and waste efficiency and emissions reduction projects (UR107b). There is a great emphasis on recycling, phasing out single use plastics and transitioning from virgin materials to recyclable materials (UR107c). There is a short to long-term agenda focusing on understanding climate impacts on and implications for operations, managing and reducing environmental footprints (UR107i), investment in mitigation (UR107k). Furthermore, they are focusing on measurement, monitoring, and management of footprints across value chains (UR107j) per the suggestions of the sample climate change legislation, policies, and guidelines (LR128).

Aligning operations, products, and services with the transition to a low carbon economy

The sample climate change legislation, policies, and guidelines stated that they aim to support a transition to a low carbon economy (LR134). Within the financial sector, companies are strategically transitioning from investments implicated in GHG emissions (UR105j), investing in and supporting the transition through various new instruments and products (UR105f) and looking into and investing in new technologies (UR105e). In the mining sector, climate-related reporting aligns with various climate frameworks (UR106b) and they acting to improve operational efficiency for mitigation and adaptation (UR106c). In the mining sector there is awareness of the growing concerns of investors on ESG performance (UR106j) and they reported aligning environmental efforts with climate resilience (UR106l). One gold mining company outlined how gold can be used in technology for a low carbon future (UR106k). Mining companies are maximising value of assets in the shortest possible period to minimise stranded assets in transition (UR106q). They are leveraging critical competencies while securing new revenue opportunities in renewable energy and minerals with potential to contribute to low carbon world (UR106t). Companies currently mining coal are not seeking further growth opportunities in thermal coal, in line with the ending of financing of new coal projects which is forcing the transition from coal (UR106r).

Currently, in the retail sector, climate change is usually considered in sourcing (LL33d). Furthermore, companies in the retail sector reported that climate change is considered as a long-term issue (LL33c). The retail sector within the sample JSE listed companies is addressing climate change in terms of food safety, food security, packaging, and ethical sourcing (UR107d). They are committed to increasing the penetration of eco-friendly products (UR107l). Furthermore, they are committed to international climate protocols and report in alignment with climate frameworks (UR107e), subscribe to various environmental guidelines (UR107f) and include climate change considerations in business processes (UR107m). The retail sector is also doing work to determine an internal price of carbon (UR107n) and investing in CSI (UR107o).

Environmental ratings and certifications

Within the financial sector and mining sector, companies are striving for and achieving positive business related and environmental ratings (UR105h) (UR106n) and factoring in ESG certification when appointing service providers (UR105m).

Raising awareness and education

Within the sample climate change legislation, policies and guidelines, the need to enhance climate change awareness, education, and communication was highlighted (LR143). The financial sector reported that they are raising awareness on climate change issues and opportunities throughout value chain and sphere of influence (UR105a) and are continuously upskilling their board, management, employees, and clients (UR105o). Companies in the retail sector reported that they are raising awareness on and advocating for sustainability in supply chains (UR107a). One company specifically reported engaging with the media on climate related issues as a means of raising awareness UR107p).

Stakeholder engagement and collaboration

Within the financial sector, it was reported that companies are getting involved in stakeholder engagement and collaboration with other groups such as government, NGOs, and society (UR105g). They commission and partner on research (UR105p) to better understand climate-related opportunities and formulate strategies to leverage these opportunities (UR105l). In the mining sector they reported engaging with the community on climate change risks and opportunities (UR106f) and engaging with governments, peers, and NGOs for development of effective climate change policies and to lobby for appropriate regulations (UR106g). They are collaborating as peers (as part of the ICMM working groups (LR126t)) and with other organisations to drive environmental and climate imperatives (UR106i). Furthermore, they are involved in local and international business climate action networks (UR106s). The retail sector is engaging and collaborating with their value chains, government, research institutions and environmental organisations (UR107g) to influence public policy, drive clarity and simplicity in climate change related regulations and deepen transformative capabilities and connectivity (UR107h). Some sample climate change guidelines offer support for value chain engagement (LR 138).

c) There is potential for a low carbon economy:

Globally, climate change can present business opportunities totaling R12trillion – it has the potential to lead global growth (LR38). Therefore, it is key to develop new low carbon economic sectors and industries and avoid resistance to the transition due to the perceived threat on certain sectors and jobs (LR64). Trade union groups think about job creation and job protection in a low carbon economy (UL27a) because they worry about losing jobs (LL1). However, the low carbon industry is slowly growing with an industry being built around understanding carbon footprints and how to reduce them (UR75). The Department of Science and Innovation is doing great work with universities and some companies in looking at pilot programmes and projects for future industries (UR32) and jobs are being developed for sustainability departments or some link towards being sustainable (UR59). This potential can be leveraged.

d) Businesses have ample support for climate action:

International agencies and environmental organisations are expected to create awareness and momentum on the ground, influence policy and societal behaviour (UL27b) (UL29) and continually hold everyone accountable to the dictates of what is needed for climate action (UL27c). Interviewees state that there are several local and international organisations, advocacy groups, guidelines & frameworks, policies, structures, and programmes to get businesses to understand their impacts, responsibilities, roles and rights and change behaviour (LR83). The sample of climate change guidelines analysed outline different standards, protocols, and methodologies for climate action (LR130), identify and describe different climate change risks and opportunities (LR131) and suggest mitigation and/or adaptation measures (LR133). Knowledge based and legalistic support (LR85) from different experts and carbon specialists (UR88) is readily available to listed companies (LR85).

NGOs such as Business Unity South Africa (BUSA), the National Business Initiative (NBI), Banking Association South Africa and World Wide Fund for Nature (WWF) have been championing climate action and creating a lot of awareness on the ground (UR24). Some NGOs have taken the DEA and some companies to court and stopped certain projects (UR28). Particularly, BUSA is driving companies to retrofit to be less dependent on coal, more dependent on renewable energy (UR25). NBI brings businesses together for businesses to start

collaborating (UR26a) and pushes companies to think of the SDGs as a way of reorientating their business to create business value and grow the business in a sustainable way (UR26b). The Banking Association South Africa ensures that their members make informed risk decisions (UR27a). They are involved in the training and reporting space up to board level and are working on upskilling staff on how to manage climate risk (UR27b). In addition to the abovementioned knowledge based and legalistic support (LR85), there has been guidance, support, and funding from international agencies and overseas governments for projects in South Africa (LR89).

In terms of financial support, there is funding from the German fund, global climate fund, global environment and different pots of money that could be used (LR87). Climate bonds are coming through very strongly (LR48) and through carbon trade/carbon offsetting companies could invest in climate change projects like renewable energy to offset their carbon footprint (LR49). The government has done well in terms of providing a stimulus in incentives (LR72) and most of these government incentives are financial because financial incentives are a key trigger to business. However, not all the incentives are grants and handouts, a lot of them are tax incentives (LR82). There are certain renewable energy and energy efficiency incentives in place as critical enablers of behaviour (LR73). There is a concession for solar PV up to 1 megawatt without requiring a generation license (LR74) and the 12 L energy efficiency tax incentive, which achieved 24 terawatts hours energy savings and allotted R3,30 in private sector investment per rand of tax (LR75). In addition, there are manufacturing (LR80) and production incentives (LR81).

On another note, companies have the option to support themselves by forming partnerships within business to drive change through networking with other organisations around the world and people within their sector (LR84). Furthermore, they can band together to create their own portfolio to finance climate action (LR54). Within the sample climate change related legislation, policies, and guidelines, the use of public and/or private sector finances to support climate action was suggested as a strategy for driving climate action in South Africa (LR146).

e) Climate change research is well supported:

Tertiary and private research institutions were named as key stakeholders in climate action in South Africa (UL26). Interviewees stated that they expect these institutions to conduct

research on different aspects of climate change (UL26a) to generate data and help different stakeholders take informed decisions (UL26b) and to integrate their different initiatives (UL26c). Universities are expected to push transdisciplinary approaches in research and courses (UL21). It was noted that there is a lot of funding and interest in climate change research in universities and private research institutions (LR90) and there are very well-developed centers for research and centers for sustainability working on climate related issues (LR118).

Local and international bodies are conducting climate change related research and producing more information to be used in climate action (UR14). The Department of Science and Innovation is doing great work with universities and some companies in looking at pilot programmes and projects for future industries (UR32). Some companies in the sample JSE listed companies reported that they commission and partner on research (UR105p). Companies have also been asking the researchers/academics to to come talk to them about climate change (UR97).

4.6 Misalignments

The following analysis was undertaken by seeking out statements in one quadrant that were incongruent with statements within the same quadrant and/or one or more other quadrants. This means that these statements contradicted each other, and the contradiction must be remedied to address the barriers of corporate climate action. It should be noted that statements are unverified perceptions of interviewees and reports of businesses.

a) Climate action can be stressful and exhausting:

Consciousness, awareness and understanding of climate issues gives a sense of responsibility and simultaneously induces the fear of the consequences of inaction which can be stressful (UL10). On the other hand, climate action requires passion and compassion because it can be exhausting dealing with systems that cannot be fought (UL11). Interviewees reported that they battle to find facilities and infrastructure to process waste and make recycling easy (LR104). Furthermore, even though public transport was stated as the preferred means of travelling over driving a car because of the convenience and for environmental reasons (LL28), in South Africa there is a lack of enough safe public transport (LR98). South African cities were designed

without proper investment in public transport, so people drive their personal, combustion engine vehicles everywhere (LR99). Some people want to cycle (LL27) but cannot because the cycling routes that were put in place have been ignored which makes cycling risky (LR100). Even if someone strives to be efficient in their use of water, they are faced with the reality that 30% of water is lost through broken pipes and stolen water. There is a lack of infrastructure and technology to reduce the amount of water that is wasted (LR105).

In terms of businesses, they are expected to support the aspirations of government and align their plans with set policy (UL41), but government programmes are often complicated and cumbersome, sometimes requiring hiring someone full-time to sit and do the paperwork, which does not make business sense (LR13). The above can discourage climate action.

b) There is coal and energy conundrum:

It well known that climate change is due to the to greenhouse gases caused by human activity (UL1). However, about 30% of South Africa's stock exchange is made up of resource intensive companies or those that supply products to the resource intensive sector, which means that South Africa needs to restructure its economy (LR36). About 70% of the coal sector's revenue comes from exports, however, India and China, the two biggest recipients of our coal are both transitioning (LR62). The South African electricity grid is still very carbon intensive, with ~95% of our power generated at coal-based power plants, which subjects businesses to high emissions because of consuming coal-based power (LR101). The industrial sector is the biggest culprit, contributing 30-50% of the national energy use (UR50), however, businesses obviate responsibility because they believe that the energy issue is out of their control (LL3). Mines in South Africa have a higher emissions intensity than other regions due to the exclusive use of coal fired electricity – one company sold their South African mine due to high emissions (UR106o).

The challenge with this coal and energy conundrum is that South Africa is a developing country, yet South Africa contributes 1.5% of the global emissions (UR15). South Africa is the 14th/15th worst emitter in the world which calls for mitigation as a key for South Africa's transition to low carbon economy (UL14). For the most part, it will require the decarbonisation of the energy sector, certain industries, and the transport sector (UL16). These sectors need a

massive change, but it requires a huge budget, and it is difficult to find that kind of commitment and to make it last because they require maintenance (LR106).

There has been some renewable energy developed at a national scale (UR11), but it has taken the government a long time to realise that they have to open up for independent power producers (UR37). There have been difficulties managing the issue of people in the coal sector trying to protect their jobs (UR12). Eskom (South Africa's monopoly power utility) which is not being fixed quickly enough, allegedly because government is trying to defend that outdated model because Eskom is a R450bn stranded asset (UR36). Additionally, harsh decisions will not be made because the interministeral committee are conflicted – the minister of energy and mineral resources firstly has a conflict in his portfolio but secondly, he is there to promote the mineral resources sector making it difficult for him to accept the need to transition from fossil fuels (LR16). The energy policy needs to change because businesses are sitting with excess energy, they could put back into the grid, however, at the moment that is a difficult and costly process (LR21). It was found that the policy coverage for energy in industry in South Africa was extremely low or non-existent (LR22). When merging the departments of energy and the environment was tabled, the cabinet resisted the merger, and this could have changed the mindset in the country (LR26).

The latest IRP states that by 2050 the expectation is that 20% of our electricity will still be generated by fossil fuels while the world is talking about transitioning from fossil fuels by 2035 and being carbon zero by 2050 (LR14). One coal mining company within the sample JSE listed companies reported that they will be continuing to provide coal to Eskom in alignment with IRP-2030 (UR106p). While the country needs to keep generating enough electricity to grow the economy while considering climate impacts (LR5), unless we move to diversify our energy mix and have a much stronger renewable energy content in our electricity grid, it will be difficult to meaningfully reduce emissions (LR102). The CSIR-NCPC has shown government that it could be a very meaningful implementation agency through various research projects and successful case studies resulting in large energy savings (UR40). Furthemore, Sasol being the biggest producer of fuel from coal in the world, has such great infrastructure and chemists to easily create a biofuel industry (LR103). This could be leveraged to aid in the coal/ energy conundrum.

c) Climate change is scientifically proven but uncertainty and ignorance breed inaction:

Climate change is scientifically proven and attempts to discredit it are based on vested interests, poor science, or a lack thereof (UL5). In South Africa there is a need to drive simplified education initiatives to create awareness and conscientise people about climate change issues and opportunities so as to change thinking and behavioural patterns (UL19) because some companies have refused to accept that they should improve some environmental issues (UR54) and for some people, it is so big that they cannot relate to it, so they ignore it (LR94). On the other hand, there are no definite answers about what is coming, which makes it difficult to manage because it is essentially unknown (LR92) and largely unseen, so many people cannot connect all the dots (LR93). There is uncertainty around timeframes which has created a feeling of comfort within business which impacts people's commitment and results in understating the risk (LR97). Furthermore, there are arguments about whether one can attribute local impacts or the local experience with certainty to the impacts of climate change (LR91).

d) Businesses are only taking opportunities that are easy and quick to return benefit:

Some business leaders have a much deeper sense of climate change issues (LL15) and are realising the potential impacts on their operations (UR57). Additionally, the financial community is starting to see climate change as a risk to the global economy (UR52). However, with that, most businesses have not shown the willingness and the needed impetus to make changes (UR44). By large corporate climate action is still a poorly understood, accepted, and adopted attitude and way of doing business (UR48), therefore, there hasn't been a significant transformative change as a lot of companies have just taken the low hanging fruit (UR42). As a result, businesses are perceived to be performing poorly, and that climate action is very slow in general (UR41), even though there have been some improvements in behaviour in the developing space of corporate climate action (UR43). There just hasn't been real momentum around getting business to advocate for climate solutions with government or figure out ways of participating (UR68).

Companies beginning to broaden their operations internationally are either in the early stages of integrating climate change into operations or have not taken it up (UR80). There are multinationals with good learnings and experiences from other countries that can be implemented here, however, it needs an enabling environment (UR95). At the moment

multinationals operating in Africa that have a long history of engaging in climate change initiatives are operating contrary to that (UR81). Companies have a tendency of making excuses like "we know it already; we are doing our best" or "we don't have money" or "we don't really know about these things very well" (LL12) instead of ensuring that their employees and managers are educated on climate change issues (UR82). Climate change guidelines are becoming more onerous, so companies need to be aware and can no longer use the "I didn't know" excuse (LR65). Businesses are responsible for finding out about climate change information and regulations (LR122).

e) "Strong states need strong markets and strong markets need strong states" (UL22) and the South African government is not effectively enabling climate action:

If we have a strong state that has effective management, oversight, compliance monitoring and enforcement as well as a good enabling environment, the private sector can thrive, and they can also solve the challenges in society that need to be addressed (UL22). The sample government climate action strategies encourage and/or outline the role of government in supporting climate action (LR140). The government is expected to act at national, provincial, and local level (UL24b) to set policies that inform certain practices and decisions to create change (UL24a). However, there is a lack of certainty and information from government, who have been deemed the facilitators (LR17) and the government has created a "bureaucratic red tape" because they have not succeeded in creating an enabling policy environment for companies to respond positively (UR35).

Government policy is not clear in terms of how mitigation and adaptation plans will be achieved and vagueness creeps in through the nuances like political will, buy-in and unlocking funding – the finer details are not clear and realistic strategies haven't been formulated (LR18). Additionally, climate change legislation, guidelines, regulations, and programmes that are available are not strong enough to push the climate change agenda to where it needs to be, thus are of minimal encouragement for businesses (LR20). There is a need for a better-informed government policy community (LR11).

Government is expected to model leadership and shape opinions (UL24c), however, there has been a lack of leadership and political will in government (LR10), and they are known to not sustain climate change programmes they table (LL30). Furthemore, they are expected to

support investment in climate action initiatives (UL24d) and fulfill a market maker role by enabling and translating sub-commercial, social lens deals into bankable/commercially viable and sustainable deals (UL24e). However, from scale to maturity to make a project commercially viable requires a lot of interventions – such as equity – which government has not produced to entice a private sector response (LR40). For example, the Department of Science and Innovation is doing great work with universities and some companies in looking at pilot programmes and projects for future industries, however, they have experienced challenges in scaling up (UR32).

There are government departments and agencies that are tasked with and working on climate change imperatives (LR20) like SANEDI, the NCPC, DFFE and DTI (UR39). For example, the mitigation chief directorate in the DEA conduct climate change mitigation research and analysis (UR31) and at a point the City of Johannesburg (COJ) had a gas-powered taxis initiative (UR33). The government is looking at the Integrated Resource Plan climate change strategies, Carbon Tax Act, and the Climate Change Bill (UR34). However, the sample government legislation, policies and guidelines call for better coordination across government departments (LR142). The different governmental agencies have not given a clear vision in terms of growing new sectors of the economy (LR29). The environmental ministry is not an oversight department, therefore, its efforts to support the transition to a low emissions economy are thwarted by other departments such as the Department of Energy and the Department of Trade and Industry (LR25). There is the challenge of contradicting policies from different departments – there is a good set of policies that are all pulling in different directions (LR23). Some policies are enabling, some punitive and some just get you lost, not knowing what exactly is expected of you as a corporate citizen (LR24).

f) The pervasive economic system and low growth economic climate impede corporate climate action:

The roles of businesses may vary based on their specific impacts (UL30), however, all businesses are called to acknowledge the problem, the scale of the crisis and the impact (UL31) and take a leading role and quite drastic measures to understand and reduce their environmental footprint (UL32). Businesses are expected to lend their powerful weight and voice to climate change projects (UL35), but they are driven by profit and the bottom line, and therefore, prioritise investment in capitalist projects over climate projects (LL4) as well as issues they

perceive to be immediate which often shift climate change off the agenda (LL8). Business policy and purpose for existence has always been for profit – what generates profit, you continue doing (LR66). Companies need a little bit of pressure from the government and from investors to change (LL43), however, the investor community in South Africa is not as engaged with climate change issues as they should (LR59), instead shareholders continue to put pressure on companies to give them the bottom line and rewards relating to shares (LR47).

Being an honest, compassionate CEO – not trying to just make profit – is a hard struggle (LR30) because businesses operate in perverse capitalist economic system with business models that sacrifice human capital and needs and environmental capital to promote profit (LR33). Businesses are driven to minimise costs as they operate in a global competitive environment (LR52). Even though the triple bottom-line allows companies to still make profits at the same time responding to the needs of the community and the environment (LR53), the current economic growth indicator does not account for socio-ecological bad – which should be subtracted from the bottom line (LR31). Climate change is not incorporated into market prices because internalising climate change is difficult and attempts like the carbon tax do not send a high price signal (LR61). Companies operating in the current financial system struggle to balance being successful financially in terms of the bottom-line but damaging the environment and saving the environment but not being financially viable (LR55). As a result, companies externalise the cost of the environment to the society, of which they would look at it differently if the government forced them to internalise these costs (LL29).

Business transformation needs to happen faster (UL43), where businesses, especially the financial sector are the engine of economic growth, creating markets, and change by divesting from fossil fuels and investing in new technologies, research & development, and platforms where climate change is taken up (UL34). However, if the transition happens too quickly or slowly it can create systemic risk not only to the financial sector but to the whole economy (LR37). Investors get nervous when companies move early or are seen to be moving too early (LL2) and investor shock is a big challenge and risk for businesses thinking about climate action. It is very difficult for a company to think outside of what the investors want and what they need to do to drive their own profitability, especially in the current economic climate (LR42). For example, a mining company announced that they were moving away from coal and got “hammered” by their investors (UR76). CEOs are accountable to shareholders and do

what the shareholders expect, and shareholders are only concerned about the share price (LR68).

In South Africa, companies are operating in a low growth economy and some companies do not have big budgets for research and development, new programmes, new investments, and new ideas (LR57). The climate change conversation is catching companies where they have invested a lot of money in relatively old and archaic systems (LR51) and have very ad hoc, and project related work styles – once off – while climate action requires long-term, sustainable solutions (LL13). In some cases, the transition to a low carbon economy will require that businesses re-engineer their whole business which costs a lot of money that businesses cannot invest in a short space (LR39). Globally, funding for climate change still sits at 2% (LR77) and there is a view that because South Africa is a middle-income country, it does not see any of climate action financial aid from the developed countries (LR63), the international stakeholders expected to lend a hand in climate action in South Africa (UL29).

g) Companies do not align business value to climate action initiatives:

Businesses need to reconsider their business models and align operations with environmental governance and social dynamics to gain profits of the triple bottom line (UL33), but business do not see the value and are compliance driven instead (LL6). They should be setting policies to join the transition to a low carbon economy to avoid business failures (UL42), but boards and investors do not view climate change as a business survival or business sustainability issue (LL16). As a result, they tend not to respond voluntarily and proactively but respond to seismic events, punitive legislation, or economic consequences (LL7). Furthermore, culturally, South African businesses do not sign up for commitments in the same way that other countries do (LL11).

South African companies hold to an ideological position that Africa's contribution to climate disastrous activities is very miniscule in comparison to the global north and some of the east (LL9), which does not promote a sense of responsibility or value for climate action. Furthermore, climate imperatives are often driven by big multinational institutions made up of governments so companies may not necessarily see that as part of their mandates (LR28). Within the retail sector of the sample JSE listed companies it was noted that climate change is

not a top risk (LL33a) and that it is just one part of a bigger environmental sustainability engagement (LL33b).

h) Climate action does not properly align with some of the social dynamics in South Africa:

Civil society were noted as one of the key stakeholders for climate action in South Africa (UL25). Their perceived roles include getting involved in green activism to put pressure on companies and government to trigger urgency for action in government and the private sector (UL25a). Civil society is expected to put forward climate action options and work as a key partner (UL25b), being aware of the products and services they purchase and holding those companies accountable (UL25c). Furthermore, they have a role in driving optimisation and improvements of energy performance in the residential sector (UL25d).

The abovementioned do not align with the consumerism mindset that government and businesspeople are perceived to be driving (LL17). Furthermore, they do not align with the aspirational goals of some South Africans (LL22) who for many years have been aspiring for certain things that are now within their reach yet are now being told that getting that fancy car that tells everybody that you've arrived is not such a good idea (LL23). There are beliefs such as that growing one's food is a sign of poverty, that if you have moved up in life, you do not have to do those kinds of things (LL24). Additionally, there is a belief that people want BMWs and see cycling as demeaning (LL25). On the other hand, South Africa has many people that are not concerned about climate change because they are battling poverty and are too worried about what they are going to eat to be concerned about things such as holding businesses and government accountable for climate change issues (LR7).

Subsequently, while there is some consumer awareness around climate change, it needs to be strengthened (UR4) as consumers are not being made quite aware of these issues (UR49). Consumer activism is at a low level in this country unlike other countries (LL19). The society can be a very powerful force; however, they are not using that power enough (UR7) and the social movement basis for climate change management in this country is not strong nor organised (UR5).

i) The young and pro-climate change vs the old and skeptical:

There is a perception that young minds need to replace the old generation of climate change leaders (UL20). The younger generation led by Greta Thunberg are more aware and conscious (LL18) and there has been a big youth movement to make the older people to make changes (UR6). However, while people participate in climate change strikes (UR19), it has been very difficult to get older people to change their minds about things and see the value of climate action (LL21). In the pathological environment of corporate institutions (LR32) there has been tension due to differing mindsets between those that are pro-climate and the sceptics (LL10). There is tension between those that want to change in the companies – the environmental specialists – and CEOs that may not listen to them (LR44). The top executives make decisions based on financial flows and do not engage creative thinkers who think differently (LL14). Businesses need to foster young ideas and allow them to be heard much more in the companies (LR45).

j) The media are not playing their part in climate action:

The media were noted as one of the key stakeholders for driving climate action in South Africa (UL28), however, even though the media is viewed as a very critical stakeholder, they have not fully come to the party (UR29). There are very few experienced environmental journalists who are skilled at critically analysing company statements (LR124), therefore, journalists mostly just take company public relations press statements and publish them as news reports without critical analysis (UR30). This is a problem because of the greenwashing culture in business CSR/I and reporting (LL5).

k) Different groups are working in silos:

The sample climate change legislation, policies and guidelines call for the breaking down of silos to foster collaboration (LR135) because different groups in society work in silos (LL20). There are a lot of different, splintered groups – NGO communities, small communities, people working on gender and climate change, people working on climate justice and climate change – that are all driving their own climate agendas. As such, there is a lack of coherent and very sharp focused strategies on what we should be doing (UR13). Within the NGO community it was noted that there is a need for the Climate Action Network (CAN) to bring together all the

different NGO's that are working in the climate space because the NGO sector can ask for many different things that are not necessarily cohesive (UL23). Within business, NGOs still have to fight their way in, to get businesses to understand why it is important to fund climate projects (UR73). On the other hand, there are some companies that have their own support, their own mechanisms, their own media campaigns, and research groups (LR56). While this may be positive in its nature, it perpetuates the silo approach to climate change work.

l) There is greenwashing in company CSI/R and reporting:

Companies are expected to report factually along the lines of ESG (LR34), however, it is a complex space where companies could report one thing but do the other (UR66). All the sample climate change legislation, policies, and guidelines allow for a scope for negotiation and leave some aspects open to interpretation (LR149) with the TCFD being the only climate change framework that is actioned by an expert independent to the company (LR145).

There has been a lot of reporting since 2007/8/9 and a lot more recently through the CDP and sustainability/integrated reporting (UR86). Big businesses in the stock exchange are responding to compulsory sustainability reports and recognising the risks around climate change (UR92). Additionally, about 80 companies (between 70 and 80 companies each year) respond to the CDP (UR91). However, businesses have been known for their culture of greenwashing in CSR/I and reporting (LL5). They could leverage this and mainstream climate change adaptation and mitigation through such things as CSI and BEE work (UL45) which can be an enabler for climate action (LR15). Additionally, they could use these platforms to inform investors of climate-related CSI projects to increase their awareness (UL46). However, reports are very often just stories, and they are not doing enough (UR84) and what companies report compared to what communities perceive companies to be doing are not properly aligned (UR85).

Businesses are generally quite good at reporting and disclosure but beyond that there isn't activity to back up the reporting (UR87). Companies have been very good a risk assessment but there is a gap between talking about what the issues are and acting on them very quickly (UR88). Ultimately, there hasn't been any significant climate change work being done outside of the sample of approximately 80 companies that file with the CDP (UR51) and even within these, there hasn't been a growing pipeline of carbon emissions reductions projects (UR77). In

fact, it was noted that analysts are starting to see an increase in emissions in the sample (some of the biggest emitters) of approximately 80 companies with the CDP (UR78). On another note, companies have been using misleading practices and metrics to report energy performance leading to the underestimation, under-reporting, or confusion (UR90).

m) Businesses resist government pressure:

When it comes to government pressure to change, businesses are obstructionist (UR55). There is lots of resistance to regulations like a Carbon Tax, and the business sector is very powerful (UR83). Business engagement has often been through industry businesses, who have very powerful voices in some of the government mitigation plans despite their aversion to change (UR69). The sample climate change related legislation, policies and guidelines highlighted the need for businesses to align with national strategies on climate action (LR144).

n) Support and incentives have been made available but have been deemed insufficient and not been used:

There is a perception that businesses are challenged with limited resources, limited time, and limited space to deal with initiatives (LR46). Furthemore, they are facing challenges accessing capital for new, big investment projects in the renewable energy and energy efficiency space (LR60). However, companies are perceived to have adequate resources to address climate change in tandem with the bottom line (LR53) and have financial support through some options that have come through and have not always been used (LR86) such as incentives that corporates have not been taking advantage of (UR58). In terms of the abovementioned incentives, there is a view that these incentives are not strong enough incentives or drivers for businesses to change their practices at this point (LR78). The tax incentives are good, but they are probably not going to allow these massive capital refurbishments or new builds that are needed to slow the carbon pathway (LR78). Furthermore, companies need more in terms of information, awareness, and guidance on how to begin to comply or change (LR123). The sample climate change legislations, policies, and guidelines also highlighted the need to enhance climate action capacity in terms of finances, skills, expertise, or policy (LR147).

o) There is a lack of consequence for irresponsible corporate behaviour:

Some regions in the world incentivise, and in some it is a stick not a carrot, however, for a developing economy like the South African economy, sticks drive people away, therefore, South Africa cannot be too punitive (LR76). With that said, the penalties are small in comparison to what businesses can gain and there needs to be far greater consequence for not being more responsible (LR79). But as it stands, it is still too easy for mining companies and industries to pollute (UR74), and some companies are still producing products that generate waste (UR56) and are failing to understand the need for life cycle costing (UR89).

p) Social issues in South Africa vs climate change impacts:

There are contextual social issues that need attention at the same time as global environmental targets for climate change (LR1). As it stands, we have not succeeded in changing or deflecting the emissions trend (UR1) and have not been able to make strides to meet the expectations of the Paris Accord (UR2). Furthermore, our Nationally Determined Contributions (NDCs) are not enough to stick below 2°C (UR3) and the SDGs have taken a few years to get traction (UR10). At the moment, government is quite rightly working on service provision, immediate issues communities face and the energy crisis, all which have roots in the apartheid era (LR4). The focus is far more on issues such Gender Based Violence (GBV) and youth unemployment than climate change (LR2). Even government interventions like the Just Transition are more focused on the social lens (LR8).

The issue with this course is that we are already seeing the impact of climate change globally (UL4), and in South Africa we have reached certain thresholds making adaptation a top priority because the impacts are already here (UL13). The southern African experience of the rate of global warming is expected to be double the global average, which is very significant for the South African economy and society (LR97). This is raising concerns that vulnerable and poorer communities will not be able to deal with climate change impacts and about how they can be supported (LR6) because South Africa will get it worse in terms of water, food security and weather-related impacts (UL3). Therefore, it is critical that adaptation needs in water, agriculture, health, and disaster management (UL15) are met, as well as the restoration and protection of natural capital – ecosystems (UL17) and sequestering carbon (UL18).

The development of farming techniques, promotion of agriculture, urbanisation, industrialisation, digitalisation and the expansion of the population and resource extraction all occurred under a stable climatic regime. Therefore, climate change is a significant threat to humanity (LR95) and will impact our ability to sustain our current style and quality of living (UL2). With that said, climate action in South Africa must consider socio-economic aspects (LR3) and consider climate change from a lens of inequality, to understand what creates and perpetuates inequality – looking at for profit business principles and the legacy of the colonialism (LR9). These considerations align with the contextual considerations of the sample climate change legislation, policies, and guidelines (LR137), their socio-economic aspects (LR141) and their concern with resilience (LR148).

q) There are gaps in technology, knowledge, and expertise:

Digitalisation can usher in incredible opportunities of maximising performances (LR108), but while technology is key for climate action, it is not going to be enough on its own (LR107). Nonetheless, businesses are expected to invest in new technology (UL34) and there are companies that are already looking into and investing in new technologies (UR105e). There are systems that businesses can sign up to and use to see their carbon footprint on a live basis (LR112) and overcome the issue of having tons of data and tables without a dashboard to be able to see trends (LR113). However, there are challenges with money for the technology and the skills to install the technology and run businesses differently (LR114). Some businesses are keen to move but they lack the technical capacity (LR109) and technical expertise (LR115). In some cases, the capital investment for some technologies is very significant therefore it has been a struggle for many businesses (LR110). In other cases, the required technology options are not always available (LR111).

In terms of knowledge there is perception that knowledge is all available but there is a lack of practical understanding (LR116). Big companies are said to be using the existing information to forecast climate change impacts while smaller companies have less capacity to do this (LR120). On the other hand, there is a perception that there's a lack of enough scientific data that gives a good view of the history and can be trusted in terms of future predictions (LR121). Furthermore, there is uncertainty relating to whether the available data can be used to inform the understanding of the local risks (LR119). Another issue that companies may face is that of

climate change expertise tending to reside with individuals rather than more broadly, meaning that when those individuals leave, the business is right back to square one (LR117).

r) Climate change campaigns have not been effective:

Climate change campaigns have not been effective in driving climate action except to open up a conversation for broader environmental stewardship (UR9). For example, despite the plastic crisis, its impact on the biosphere and the campaigns around it, there is very little change that is coming from the people (UR8). If you have good governance, then you will have good multilateral platforms made up of governments that champion environmental questions (LR27), however, the current global climate of politics and negotiation strategies are not effective in driving climate action (LR12).

Chapter Five: Discussion

Considering that the private sector is the leading contributor of GHG emissions, this study aimed to use a holistic framework – the AQAL framework of the Integral Theory – to explore the personal and cultural values and beliefs, behaviours, and systems that foster or impede – the opportunities for or challenges in – corporate climate action in South Africa. Eleven climate change legislation, policies, guidelines, and climate change related business reports of a sample of nine JSE listed companies were analysed along with interviews with 15 environmental/sustainability specialists practicing in government, the private sector, academia, and business and environmental organisations. In the analysis of the above-mentioned, various themes emerged which were further analysed using the AQAL framework of the Integral Theory to determine alignments and misalignments between different themes.

The data revealed that corporate climate action in South Africa is still a developing space in which businesses in general and the sample JSE listed companies are beginning to consider climate change in relation to the their operations. There are various actions that businesses have been noted to be doing, however, the perception is that what businesses are doing is not good enough and there is room for more transformative action. Businesses are perceived to be only taking opportunities that are easy and quick to return benefit and not doing all that they can do.

Table 7 provides a summary of the challenges, opportunities and recommendations. The section following that, will elaborate on the various challenges and opportunities relating to corporate climate action in South Africa in tandem with recommendations for the potential reduction of challenges and enhancement of opportunities.

Table 7. A summary of challenges, opportunities and recommendations

Section	Challenges	Opportunities and Recommendation
5.1	Perceptions of climate change being complex and far removed	Climate change education and awareness raising.
	Perceived lack of reliable, contextual data	Integrative collaboration.
5.2	Ineffectiveness of climate change campaigns and guidelines in driving and	Develop better mechanisms within climate change frameworks and policies to

	enforcing transformative climate action	enforce accountability and transformative action. Conducting further studies layering in contextual considerations.
5.3	Perverse economic system and socio- economic priorities that trump climate action requirements	Increasing adaptive capacity by taking a holistic approach, embedding climate change considerations in development plans and acting across the board, not just acting on the development part of the plans.
5.4	Poverty Aspirations that do not align with climate action requirements	Leverage the opportunity presented by existing climate change awareness and activism. The Climate Action Network (CAN) could bring together various environment organisations to spearhead raising awareness and holding government and businesses accountable. Environmental organisations can collaborate with conscious civil society members to unify the civil society voice and put pressure on the government and private sector to address the issues of poverty and start a climate action movement.
5.5	Lack of capacity for climate action	International aid. Taking a less ambitious approach and leveraging available public administration resources. Linking academic research with policy and nationally determined contributions.
5.6	Exclusion of young, creative thinkers in decision making causing tension within organisations	Put in place platforms and governance structures to ensure that the voices and ideas of young creative thinkers are heard much more in companies.
5.7	Lack of infrastructure for climate action	Government ought to invest in and incentivise the private

		sector for the development of better infrastructure. Conduct research to ensure that infrastructure development plans account for local social and political nuances and resource availability.
5.8	The coal and energy conundrum	Companies should continue investing in renewable energy options. The financial sector is shifting from fossil fuel investment. There needs to be collaboration for the formulation of solutions that suit multiple stakeholders.
5.9	Issues in national governance	Government needs to improve coordination between its departments, exercise political will and review policies that are negating transformative climate action. South African leadership need to work together and ethically to build confidence for international aid.

5.1 Overcoming uncertainty through collaboration, education, and awareness raising to drive transformative action

There is uncertainty around climate change because it is largely unseen, however, even with certain climatic experiences that are evident, there are arguments about whether they can be attributed to climate change. The data revealed that people are struggling to connect the dots and manage what is essentially unknown, therefore, they tend to ignore it. For businesses in South Africa, the uncertainty has also come from a lack of information and clear directives from government. According to interviewees, this uncertainty has bred a certain level of comfort and understating of the risk which negatively impacts commitment to taking action. These findings are congruent with those of Bouman *et al.* (2020) and Harth (2021) in which it

was discovered that because climate change is generally viewed as a complex and far-removed phenomenon, there is poor risk perception and action relating to it. In a contextual study on urban environmental challenges and climate change action in the city of Durban, South Africa, Roberts and O'Donoghue (2013) found that one of the most significant hurdles to municipal climate action was a perception that climate change is a distant and unlikely threat.

It is therefore understandable that even though the sample JSE listed companies reported to be undertaking various climate related actions as part of their response to climate change, their metrics and targets showed that they did not view climate change as something that needed their immediate attention. Targets around climate change were for the most part long-term as companies focused on maximising current assets and competencies or did not see climate change as a material matter in their sector (retail). According to interviewees corporate climate action thus far has been compliance driven and not driven by value alignment. According to Vannoni and Bank (2020), compliance to regulations and a kind of fiduciary duty are important factors, amongst other factors, that motivate the decision to align with ESG principles.

There is an underlying issue of the perceived lack of reliable scientific data to inform understanding on local risks, while on the other hand, there is a perceived lack of practical understanding of available data and in some cases a lack of technical capacity and expertise. The need to pay attention to local causes and impacts of climate change has been a matter of concern since the 90's (Baker *et al.*, 2012). Furthermore, it was discovered that amongst other factors, a lack of local resources, information and expertise were key constraints in local climate action plans (Baker *et al.*, 2012). According to Baker *et al.* (2012), to develop effective local plans that can translate into mainstream policy, it is critical to establish formal evaluation methods.

According to interviewees, listed companies are still grappling with global data to try and understand local impacts and drive local actions. Considering the aforementioned, the solution would require collaboration to produce contextual data for application, education and awareness raising to improve contextual understanding and climate action capacities. Collaboration in the South African context can address breaking down silos to deal with the lack of coherent and sharp focused strategies, address the issue brought up during interviews that government has often not sustained climate change programmes that they table and also

address the issue of business obstructionism towards government pressure. Through integrative collaboration, knowledge and understanding can be shared across sectors and there could be production of well-informed, multistakeholder backed, comprehensive strategies to improve corporate climate action in South Africa. A case study in Oslo conducted by Vedeld *et al.* (2021) revealed that a pathway to climate transformation could be established with multiple stakeholder backing and integrative and interactive interventions. With these variables for an integrative and collaborative approach in place, there is potential for synergies, linkages and innovation in terms of co-creation of climate change related projects and practices and subsequent self-governance by both public and private actors (Downs *et al.*, 2022; Vedeld *et al.*, 2021).

Businesses and government could rally to promote transformative corporate climate action and climate change education and awareness raising to increase adaptive capacity in South Africa. The South African media could be educated and begin playing a significant role in educating and raising awareness on climate change. According to Schrot *et al.* (2021) and Ranney & Velautham (2021), climate change education has the potential to significantly increase acceptance of, raise alarms about and begin to remedy denial of climate change, thus improving climate action endeavours. Furthermore, in a study assessing environmental discourse in developing countries, specifically, stakeholder collaboration on ecotourism development in developing countries, Wondirad *et al*. (2020) noted that effective collaboration was important for promoting effective communication and negotiation, trust, and understanding between stakeholders, leading to comprehensive solutions that have a good chance of succeeding. Strategies formulated in collaboration of different stakeholders tend to be more sustainable (Fouché & Brent, 2019).

Interviews and climate change related business reports revealed that companies – in general and the sample JSE listed companies – are increasingly engaging across sectors on platforms like the NBI which is promising. Furthemore, it was reported that climate change research is well supported and different ideas have been emerging. It is evident that there is an opportunity for contextual understanding and the formulation of strategies and solutions to leverage, as businesses and other stakeholders engage and collaborate with academics to make well-informed decisions relating to climate change. According to Downs *et al.* (2022), universities are in a unique position to facilitate, integrate and catalyse an integrative and collaborative approach to dealing with climate change.

5.2 Addressing the ineffectiveness of climate change campaigns and guidelines in driving and enforcing transformative climate action

Interviewees stated that companies tend to respond to seismic events, punitive legislation, or economic consequences and according to interviews, climate change campaigns and the current global climate of politics and negotiations around climate change have not been effective in driving climate action. It was stated that climate campaigns seem to have succeeded only in opening a conversation on broader climate change stewardship as opposed to driving action. Looking at the sample climate change legislation, policies, and guidelines, all of them lacked an enforcing element as they were voluntary with a lot of room for interpretation and a scope for negotiation. The nature of these climate change legislation, policies, and guidelines can be linked to the overarching climate change framework – the Paris Agreement – which leaves a lot of room for interpretation and is unenforceable, according to Cherry *et al*. (2021). Furthemore, Puertas & Marti (2021) also noted the translation of allowances that exempt stakeholders from the obligation of transformative action, from the Paris Agreement into various other climate change frameworks.

Sample JSE listed companies reported aligning with the sample climate change guidelines and using them to determine organisational climate change metrics and targets and reporting in compliance with investor and listing requirements. Considering this, it is no surprise that companies' metrics and targets revealed a lack of urgency and companies in general were perceived to not be transformative in their climate action endeavours. This is in line with a study by Megura and Gunderson (2022) in which they found corporates to be focusing on compliance to current regulations and standards and looking into developing technologies for mitigating emissions and establishing 'sustainable' ways to continue using fossil fuels, instead of focusing on the transformative, adaptive shifts in operations and business models that are needed to transition to a low carbon economy. They also found that corporate sustainability reports failed to acknowledge the root cause of climate change – fossil fuels – and that companies resorted to framing their operations as necessary for maintaining the standard of living as we know it (Megura and Gunderson, 2022).

Businesses were perceived to be greenwashing in terms of corporate social responsibility and investment and climate change disclosure. Climate change related business reports focused on reporting good compliance performance and justifying or omitting deviant behaviour.

According to Megura and Gunderson (2022), corporates use sustainability reports to strategically redirect the attention of readers by rhetorically framing activities under a positive environmental light through emphasising a small green attribute and ignoring other attributes that are often harmful. Furthermore, companies tend to emphasise compliance to regulations and standards to conceal past negative impacts and those currently occurring even as companies meet standards (Megura and Gunderson, 2022). Companies offset their negative environmental impacts through partnerships with and investment in institutions that are involved in positive environmental endeavours which often does not directly address the companies' environmental issues (Megura and Gunderson, 2022).

Within sample climate change reports, there was a lot emphasis on investment in renewable energy and other technologies for energy and water efficiency and introducing eco-friendly products and services as a means for climate action. Additionally, sample JSE listed companies reported doing work in waste management. While these actions are considered to be significant in moving towards reaching Net Zero by 2050 – as per the Paris Agreement – however, they are not sufficiently transformative. According to Puertas and Marti (2021), the deployment of renewables for example, is not transformative enough to stop the increase in emissions because they do not fulfil the entirety of climate action requirements. Environmental management systems ought to be embedded in the core of business operations to effectively reduce negative environmental outcomes of operations, especially businesses in developing countries (Zemigala, 2021). Companies need to adapt their core operations to align with a transition to a low carbon economy and within the sample JSE listed companies, companies reported that they were beginning to integrate climate change into their governance structures and processes, therefore, there is an opportunity therein to transform the way that business is done to move the economy towards a low carbon state.

Considering the aforementioned, it is evident that there is a need to develop better mechanisms within climate change frameworks and policies to enforce accountability and transformative action. Cherry *et al*. (2021) in their study assessing the effectiveness of the Paris Agreement in delivering ambitious climate cooperation, concluded that more mechanisms need to be layered onto the recommendations of the Paris Agreement to improve its effectiveness. Further studies must be conducted to ascertain the most effective approach to strengthening climate change frameworks and layering in contextual considerations for improved and transformative corporate climate action in South Africa.

5.3 Dealing with a perverse economic system and socio- economic priorities that trump climate action requirements

Reducing resource use and GHG emissions are green growth objectives embedded in climate change policies as the nationally determined contributions of developing countries, however these are not priorities for these countries which are concentrating on the growth of their economies (Baniya *et al*., 2021). With South Africa being a developing country, the government has continued to prioritise socio-economic improvement over environmental issues. The South African government is concerned with economic growth and addressing social issues such as poverty eradication and job creation and falling behind on climate related commitments.

The private sector is expected to support the ambitions of the country in which they operate, therefore, it is to be expected that businesses in South Africa would also prioritise economic development endeavours. According to Kim & Jo (2021), in a context where there is low capital availability, it is likely that companies will prioritise capital gain over socio-economic endeavours. In addition to the aspirations of the government, businesses are subject to a capitalist economic system in which businesses are pressured by shareholders to prioritise making profit over the environment and society and deliver economic wins. Interviewees reported that businesses in South Africa are in fact continuing to prioritise capital gains over the greater good of society. Furthermore, because of the low growth economic climate in which businesses in South Africa were reported to be operating in, some businesses cannot afford to invest in anything that is not perceived to contribute to the bottom line. According to Leck & Simon (2018), environmental investment is considered a luxury in South Africa.

According to Jakučionytė-Skodienė & Liobikienė (2021), the level of economic development is a significant determinant of the extent of responsibility taken for climate change and the degree and types of climate actions taken. This was not only evident in the aforementioned but also in the ideological position noted during interviews that Africa's contribution to climate disastrous activities is very miniscule in comparison to the global north and some of the east thus perpetuating a mindset that this somehow absolves African businesses from taking responsibility and acting to respond to climate change issues. The penetration of such a belief is particularly dangerous because, despite the fact that developed countries are the

leading emitters, it does not absolve South Africa of the responsibility to take action, more so because the impact of climate change is forecasted to be far more pervasive in southern Africa than other regions (Ntarmah *et al*., 2021; Sono *et al*., 2021; Samuels *et al*., 2022). While this belief may be valid, it must be taken seriously and addressed with contextual considerations to ensure that the people of South Africa and the private sector have the capacity to respond to climate change because capacity to cope and adapt to climate change impacts significantly diminishes with delay as costs and consequences accumulate over time (Nelson, 2010; Glenk *et al*., 2021).

A focus on economic growth and addressing socio-economic issues is an important aspect of enhancing adaptive capacity in developing countries. Failure to address underlying contextual issues will most likely hinder the progress of climate action endeavours (Filho *et al*., 2019). Filho *et al*. (2019) found that in cities of developing countries where the unemployment rates were low, the lack of adequate infrastructure negated the adaptive capacity afforded by low unemployment rates. Therefore, in the case of developing countries like South Africa, the achievement of a positive economic status is important because it means that climate policies that are developed can also be sustained. However, the best approach to increasing adaptive capacity is to take a holistic approach by embedding climate change considerations in development plans and acting across the board (Weiler *et al*., 2018; Filho *et al*., 2019), not just acting on the development part of the plans.

5.4 Addressing South African social dynamics that may be impeding climate action

It was reported that while there is climate change awareness among society, the activism culture is at a low level in comparison to other countries. The social movement basis for climate change management is perceived to not be strong or organised enough to hold government and businesses accountable. According to interviewees, the requirements for climate action do not align with some of the social dynamics in South Africa. There were two underlying social issues perceived to be at the core of this perceived lack of activism in South Africa. Firstly, it is believed that people are struggling with poverty and are too worried about what they are going to eat next to be concerned with whether government and businesses are taking climate action. Secondly, there is the issue of aspirations, where it is believed that there are those who for many years have been aspiring for certain things that signify that one has made it, who believe that certain climate change related actions are for those who have

not moved up in life or are contrary to their aspirations. Going green is a culture/trend that is perceived to be prevalent amongst white people.

The aforementioned social issues were also noted in a study about what it means to flourish by Cele *et al*. (2021), in which they found that the ambitions of low and middle class residents of Soweto (a township in Johannesburg, South Africa) related to material or status markers. It was noted that their goals related to working to gain financial stability to cover all basic needs, education, and even to possibly change circumstances enough to move to better communities, buy bigger houses and nice cars (Cele *et al*., 2021). This is contrary to the climate actions in Europe noted by Jakučionytė-Skodienė and Liobikienė (2021), which included buying electric vehicles, switching energy providers or even installing one's own solar panels, using public transport instead of private cars, and carefully assessing and managing the products that one buys. In South Africa, the low and middle class majority is in pursuit of a good life, fuelled by the ever-growing need for financial and material security as well as moral obligations relating to intergenerational relational dynamics known as 'Black Tax' (Cele *et al*., 2021).

In the interviews it was frequently mentioned that the voice of civil society is a powerful and influential voice with potential to exert significant pressure on government and businesses to address issues of poverty and climate action but it is currently unused. In their study on corporate social responsibility (CSR) in Africa, Kim and Jo (2021) stated that businesses in Africa do not face significant pressure from government, civil society and NGOs causing a reluctance by businesses to invest in environment related CSR because there are little or no external benefits for action. This study shows that the concern of society or the lack thereof influences climate action endeavours of businesses and that an improvement in concern and action by society could result in positive climate action within business.

To begin remedying the abovementioned misalignment it is important to recognise and leverage the opportunity presented by existing climate change awareness and activism. Firstly, organisations like the Climate Action Network (CAN) could bring together various environment organisations to spearhead raising awareness and holding government and businesses accountable. Furthermore, these environmental organisations can collaborate with conscious civil society members to unify the civil society voice and call the government and

private sector to order. As these civil society movements gain traction, it is likely that other members of society may join in.

5.5 Increasing the capacity for climate action

Climate change frameworks like the Paris Agreement encourage countries to set ambitious targets and make an effort to achieve goals without obligation to fulfil their commitments (Cherry *et al*., 2021). Even developing countries – which are chronically underfunded and facing an array of social issues – committed to these ambitious targets with little to no capacity to implement goals for coping and adapting with the impacts of climate change (Weiler *et al*., 2018; Filho *et al*., 2019).

In this research, the data revealed compromises in a number of areas, including climate change expertise, institutional capacity, clear policy guidance, data, technology and technical skills and funding. In their study on the on urban environmental challenges and climate change action in the city of Durban, Roberts and O'Donoghue (2013) also confirmed the lack of financial and human resource capacity for climate action. Fouché and Brent (2019) confirmed the lack of knowledge and shortage of skills and expertise. Particularly, companies complained of the lack of funding and good enough incentives, data, and policies to back transformative climate action.

Climate action in developing countries requires international aid, especially if goals are to be achieved timeously. Therefore, as agreed on at the United Nations Framework Convention to Climate Change (UNFCCC) in 1992, developed countries need to help strengthen the climate action capacity of developing countries through financial aid, policy and technical support. In turn, the government could leverage the synergies between development and adaptation to incorporate climate action plans into the development plans and act in a manner that is feasible and sustainable considering the available resources. To increase the probability of climate action, it is best to consider an approach that is less ambitious and can be sustained with the available public administration resources such as staff, time, and general public services (Filho *et al*., 2019). For example, the government could leverage available funds from state-owned enterprises and sovereign wealth funds such as the Public Investment Corporation (PIC) – worth $160bn in 2016 – to support positive environmental endeavours

through investments in climate positive projects and incentives for climate action, especially corporate action (Kim & Jo, 2021).

Academics also have a significant role to play in building the government's and businesses' capacity to make informed climate action decisions through the data produced in research. In their research on linking policy, nationally determined contributions and academic research, Jenkins *et al*. (2020) concluded that effective climate action research should be structured and conducted in a manner that is embedded in socio- political considerations, whereby research samples and methodologies produce a holistic view that can be directly fed into national and international decision-making.

5.6 Integrating the ideas of young creative thinkers in business strategies to foster transformative climate action

Interviews revealed that one of the leading hurdles to innovation and transformation in business is that leaders in these spheres are often old and operate on old perspectives while excluding or not taking seriously young, creative thinkers – often environmental specialists. It was stated that it is difficult to get the older people to make changes from making decisions based only on financial flows to incorporating the creative ideas of the younger generation who are perceived to be more climate change conscious. This perspective aligns with the perspective that in the case of climate action, stability – associated with older leaders – would align with the standard economic model based on the exploitation of existing resources and knowledge, while transformation – associated with young leaders – would align with exploration of new, green alternatives (Roberts & O'Donoghue, 2013; Spisak *et al*., 2014).

As previously mentioned, collaboration is one of the potent tools for achieving transformative corporate climate action. Therefore, to combat the tension between the younger generation and older generation, it is paramount that platforms or governance structures are put in place to ensure that the voices and ideas of young creative thinkers are heard much more in companies.

5.7 Addressing infrastructural hurdles

Efficient infrastructure is one of the key indicators of resilience and adaptation capacity (Filho *et al*., 2019). In many developing countries, there are pervasive challenges relating to poor infrastructure and poor services hindering adaptation efforts (Filho *et al*., 2019). According to Thambiran and Diab (2011), the road transport sector in South Africa contributes the largest percentage of GHG emissions in the transport sector due to the lack of clean transport infrastructure. Due to this, interviewees – who are environmentally conscious – reported that they are forced to continue to rely on their private cars for transport, diminishing their climate action outcomes.

Sound waste management endeavours –recycling and removal of single use plastics – are gaining traction in the private sector and interviewees reported that recycling is one of the ways in which they take personal action in response to climate change, however, they complained about the lack of convenient recycling infrastructure in South Africa which makes recycling cumbersome. This is confirmed by the apparently dismal recycling culture as seen in Issock *et al*. (2021) in their research on domestic waste recycling, in which they stated that close to ~90% of waste in South Africa ends up on landfills. In terms of energy and water, the sample JSE listed companies reported retrofitting their buildings for energy and water efficiency, however, in some instances, companies reported facing architectural limitations due to old building infrastructure.

Along with economic development, the government ought to invest in and incentivise the private sector for the development of better infrastructure. However, the infrastructure development plans must be properly researched to ensure that they fit well into the South African context, accounting for but not limited to cultural, economic and political aspects. For interventions to be successful and yield expected results, it is paramount to account for local social and political nuances (Filho *et al*., 2019). In South Africa, it is important for climate actions to align with post-apartheid priorities relating to the redress of social and environmental inequalities (Leck and Simon, 2018). Furthermore, infrastructure development endeavours must be carefully pursued, accounting for resource availability, as Kim and Jo (2021) found that in African countries that invested in high quality infrastructure with low

financial capacity yielded poor economic and social returns which may explain the reluctance to invest in climate related projects (Filho *et al*., 2019).

5.8 Addressing the coal and energy conundrum

While many opportunities are available for the integration of renewable energy solutions at local government level, barriers to implementation posed by aging infrastructure, legislation and finances, as well as local aspects of governance, energy regulation, institutional stability, and mechanisms for supporting policy were noted (Fouché and Brent, 2019). Interviews revealed a belief that the government is holding onto Eskom – a poorly managed, debt-ridden South African power utility and R400bn stranded asset that is subjecting South African businesses to the production of high GHG emissions by virtue of relying on Eskom for electricity. Due to this, companies are being pushed to consider alternative energy solutions such as generators for loadshedding and renewable energy sources to supplement or replace the current energy source.

According to Folly (2021), over the past three decades, the government has invested large sums of money in improving the power generation capacity of Eskom. However, due to poor operational management and a lack of proper maintenance, the power plants have aged and continue to regularly break down. To address the issue of costs and debt, the government put forward an idea to restructure, unbundle and sell parts of the power utility to private companies, but they faced opposition from unions over the fear of loss of jobs (Folly, 2021). In 2011, the government introduced the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), however it has been challenged by Eskom which owns most of electricity transmission networks in South Africa. Eskom's sole right to power supply restricts open access to the national grid (Fouché and Brent, 2019). In addition, municipalities also challenged the programme because they derive large portions of their income from the sale of Eskom-generated power (Fraser, 2021; Fouché & Brent, 2019).

The Renewable Energy Policy of South Africa White Paper (2003) states that the amount of renewable energy in circulation within a decade of its establishment (by ~2013) would be a function of positive outcomes – amongst other factors –in regulatory frameworks, affordability of renewable energy technologies and ease of access to national electricity

infrastructure. However, according to Mbungu *et al*. (2020), fossil fuels and coal still make up 93% of South Africa's energy, which shows the low infiltration of renewable energy thus far. Despite the resource intensive nature of the South African power infrastructure, according to a coal mining company assessed in this study, the Integrated Resource Plan (2010-2030) stipulates that coal will remain the primary source of electricity for the foreseeable future, with new coal projects extending as far as 2030. With that said, investment in coal will continue over the current decade. Companies in the financial sector allege to be entering an era where they will no longer be investing in new fossil fuel projects and will attempt to aid existing fossil fuel portfolios in transitioning while they continue to invest in them. But for now, many companies are continuing to operate business as usual with resource intensive businesses such as mining companies maximising current assets due to large investments that were made years ago.

There have been many proposed solutions for dealing with the energy crisis however there has been a lot of pushback. Therefore, there is a clear need and opportunity for collaboration, to formulate solutions that suit the multiple stakeholders involved.

5.9 Addressing issues in national governance to create an enabling environment for corporate climate action

A compromise in climate action capacity at government level negatively affects the entire system – including the private sector – as it speaks to the government's inability to lead climate action and create an enabling environment in terms of policy, technology and financial support for corporate climate action (Puertas & Marti, 2021). Institutions and governments play an important role as facilitators of effective adaptation policies because it is national level policies that tend to be adopted in various spheres, therefore strengthening government capacity improves the chances of success across the board (Weiler *et al*., 2018; Filho *et al*., 2019). Corporate behaviour aligns with the context in which they operate, therefore an empowered and acting government can empower its private sector to achieve these goals (Kim & Jo, 2021).

In interviews and climate change documents, the South African government was named the leader of the transition. The government is supposed to lead engagement and aid in the

alignment of different interests (Kim & Jo, 2021). In this study however, interviewees reported a pervasive lack of political will to make decisions and put systems in places that will drive climate action. Roberts and O'Donoghue (2013) found similar results and stated that this lack of political will is in part linked to a lack of understanding of climate change interdependencies. In recent years, the government has produced a number of climate change related legislation and policies, some good, but mostly perceived to be unclear, lax, limiting/ discouraging and unrealistic. While interviewees noted some good policies, they highlighted a lack of coordination among government departments, stating that sometimes departmental policies differ and can pull in different directions to climate change policies which can diminish effectiveness.

In the National Climate Change Adaptation Strategy, it was noted that there is institutional rigidity that limits the extent of collaboration between different government departments. For example, according to Fouché and Brent (2019), the Integrated Resource Plan depicts policy and energy mix scenarios that differ from other guiding documents such as the White Paper on Renewable energy and the National Climate Change Response White Paper. While the national government is responsible for the determination of policy for transitioning to a low carbon economy, authority for implementation is scattered across departments/ institutions, therefore it is paramount for the government to foster collaboration across departmental boundaries (Msimanga & Sebitosi, 2014).

In their study on the challenges of transboundary governance in responding to climate change in South Africa, Leck and Simon (2018) noted that integration across departments for the coordination of policies and actions was indeed challenging. However, in spite of the challenge, Fouché and Brent (2019), in their study on the journey towards renewable energy in a municipality in South Africa, emphasised that, for effective implementation of strategies, coordination among policies and institutions is an absolute necessity and that better coordination was required in South Africa.

In attempts to diversify the energy mix by feeding in renewable energy into the national grid, interviewees from the sample JSE listed companies complained that grid feed-in regulations were challenging and that adhering to government programmes/policies is cumbersome, complicated and resource intensive. According to Fouché and Brent (2019), policies supporting small scale energy generation are limited, which has stymied the growth of this

industry. Diversifying the energy mix presents a great opportunity to shed some load off Eskom and aid in reducing the country and businesses' emissions which are largely due to a reliance on coal for energy. Therefore, the government needs to improve coordination between its departments, exercise political will and review policies that are negating transformative climate action endeavours such as those relating to energy production and grid feed-in.

In addition to the regulatory issues, the country is also at risk of being disadvantaged in terms of international aid. The lack of political will and ethical leadership may put South Africa out of favour with developed countries. According to Filho *et al.* (2019), developed countries critically consider the countries they assist based on good governance – among other criteria – as a well-governed country offers a guarantee that aid will be utilised judiciously. Unfortunately, in developing countries like South Africa, leadership, governance, and coordination problems are common (Filho *et al*., 2019). Therefore, it is important that South African leadership work together and ethically to build confidence for international aid as it is unlikely that developed countries will offer financial and technical support to poorly governed countries in fear of misuse of donated resources (Filho *et al*., 2019).

5.10 Conclusion

Over the years, the world has been experiencing a variety of problems that have either not existed before or have been growing over time. One of such problems is climate change which relates primarily to industrialisation, population growth, urbanisation, and globalisation that the world has undergone in the past few centuries. Climate change is the result of the warming of the earth due to the production of Greenhouse Gases that are trapping the sun's radiation in the earth's atmosphere. World leaders have tried to congregate and come up with solutions for capping emissions and some like the Kyoto protocol have failed. In 2015, the Paris Agreement was established with the primary goal of keeping the global temperature increase well below 2°C by reducing GHG emissions and achieving Net Zero emissions by 2050. Almost a decade later, it appears that nothing has changed, even in the South African context. Economies and industries continue to grow as business as usual continues. Despite great strides in trying to address climate change, there has been no

significant changes in the way the world operates, therefore, the assumption was born that there must be underlying factors that are at play in inhibiting the progress of climate action.

This led to the conducting of this study which aimed to uncover the factors affecting climate action, more specifically, corporate climate action in South Africa. The private sector are the leading emitters, yet there is little to be seen in terms of their responses to climate change. Due to the complexity of social problems in general and the complexities of the South African context, it was clear that the approach to research needed to be different and holistic, addressing all aspects of reality entailed in the South African corporate system. As a result, this study used the AQAL framework of the Integral Theory (Section 2.5.). By using this framework, this research identified several personal and cultural values, beliefs and perceptions and behaviours and systems that enable or impede the progress of corporate climate action in South Africa. It emerged that, while there may be ample support for corporate climate action in South Africa within climate change legislation, policies and guidelines, business and environmental organisations and academia, socio-economic issues relating to economic growth and poverty alleviation, contextual cultures and beliefs, the lack of adequate infrastructure, skills and expertise, finances, technology, and an enabling policy environment are significantly impeding climate action endeavours. Borrowing from observations and some literature, some recommendations for remedying the challenges and leveraging the opportunities were made.

The overarching recommendation is that there needs to be a lot more collaboration between different stakeholders, namely, the government, the private sector, business and environmental organisations, academics, and civil society. Not only do each of the abovementioned groups have a critical role to play, but they also have a perspective of reality that is unique which is crucial in building up the big picture of corporate climate action in South Africa. As the leader of the nation, government needs to find effective ways of bridging the gaps/misalignments between their different departments and levels. While this may be a challenging thing to do, it can be done if leaders can find the political will to make those hard decisions that will benefit the nation in the long run. At the same time, government can work with other key stakeholders to come up with comprehensive solutions that take into account different facets of reality and can address challenges within and without government.

Through collaboration, there government can begin to create an enabling policy environment for companies to respond positively. Misalignments in policy can be addressed, in addition to the formulation of new policies that will be supported by businesses and other stakeholders. Layered on that, government, and business can rally together and combine resources to streamline corporate climate action in South Africa. They can leverage private and public funds to invest in climate change related projects and infrastructure that can move the country into a low carbon economy.

They can also share capacities in different areas such as technology and technical expertise, for example, businesses generating own energy could feed into the grid and shed some load off Eskom. In terms of expertise, other stakeholders such as business and environmental organisations can be given mandates to run with certain climate change agendas, for example, the NCPC has shown government that it could be a very meaningful implementation agency or unit to drive a lot of the green economy imperatives in dealing with climate change issues. In that way, government and businesses can focus their resources and capacities on other climate actions that may require their specific attention.

Within businesses, there needs to be transformation through the re-engineering of core business operations. It is not enough to be doing various climate related projects when the core operations are still business as usual. The results showed that companies are beginning to consider climate change in relation to their operations and are slowly putting systems in place to address climate change issues within their organisations. The sample JSE listed companies reported having established or establishing sustainability teams to carry their climate change mandates, however, it was also reported that these environmental specialists are not being heard. Therefore, it is recommended that companies open up communication pathways for bottom-up influence on and embed climate change considerations into their decision-making processes.

Regarding the social issues that emerged in the research, the government and the private sector ought to serve society by addressing the socio-economic issues that society are facing, ensuring that they educate society on and raise awareness about climate change issues, as well as rally behind organisations who are doing this work daily. As opinion shapers and with business having massive influence through marketing, government and businesses can shift mindsets and reframe aspirations to align with the transition to a low carbon economy.

5.11 Limitations to this study and recommended future studies

Even though, this study was comprehensive and holistic in approach, results only represent a small sample. Nevertheless, while results cannot be broadly applied, these findings form a solid foundation for future studies. Securing interviews was one of the most difficult tasks of this research as many people did not respond to emails. There were some who did respond but were not willing to participate in the study as they believed they weren't well versed on the subject or did not want to get permission from their organisation or sign the consent form due to perceived legal risks. In 2020, due to COVID-19, many people began to work from home and became harder to reach. Therefore, interviews were difficult to set up, limiting the scope of this study. Future studies could enlarge the sample size to get a bigger picture of corporate climate action in South Africa. Furthermore, future studies could take to examining individual issues that emerged in this study and/or formulate well-researched interventions that can be broadly applied to improve prospects in South Africa.

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Appendix A
Participant information sheet

Dear Sir/Madam

My name is Neliswa Dhlamini and I am a Master's student in the School of Animal, Plant and Environmental Sciences at the University of the Witwatersrand (Wits) in Johannesburg. To fulfil the requirements of this degree, I am required to conduct research and produce a dissertation.

I am conducting research on the *Challenges and opportunities for corporate climate action in South Africa: An investigation using the Integral Theory.* This research aims to use the integral framework to identify the personal, cultural and institutional values, beliefs and behaviours that compromise and/or foster the progress of corporate climate action in South Africa. Furthermore, from the acquired information, key opportunities will be identified and presented as easily accessible recommendations that can be understood from diverse perspectives to promote the progress of corporate climate action in South Africa.

As part of the research, I would like to invite you to take part in an interview which consists of 15 questions and will take approximately 45 minutes. With your permission, the interview will take place at your offices and I would like to audio-record the interview using a digital device, however if you are not comfortable with being recorded, I will simply write down a few notes. Data collected during the interview (audio recordings and notes) will be stored in a secure computer using encrypted file names that only I will know. Furthermore, the data collected during the interview will only be analysed by me, however, in the future it may be used for secondary analysis. It is difficult to guarantee anonymity during interviews because interviews will be conducted in person (using a voice recorder if permission is granted). Furthermore, other members of the organisation may be aware of your participation in the research. However, you can be assured that your identity and that of your organisation will remain anonymous in any presentation of my research (i.e. my final dissertation/presentations).

Please note that your participation in this interview is voluntary. You may withdraw at any time or not answer any question if you do not want to. If you experience any distress or discomfort, we will stop the interview or resume another time.

If you have any questions afterwards about this research, feel free to contact me or my supervisor, Dr Ute Schwaibold, on the details listed below. If you have any queries, concerns or complaints regarding the ethical procedures of this study, you are welcome to contact the University Human Research Ethics Committee (non-medical), telephone + 27(0)11 717 1408, email Shaun.Schoeman@wits.ac.za

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Yours sincerely,
Neliswa Dhlamini

Appendix B

Interview questions for government officials, academics, and specialists in environmental and business organisations

1. What is your understanding of climate change?
2. What measures do you think can be taken today to improve future prospects for South Africa in the face of climate change?
3. Do you believe that you have a role to play in responding to climate change and do you believe that you are able to make a meaningful contribution towards promoting climate change awareness and responding to climate change?
4. Who are key stakeholders that you believe should be in the forefront of responding to climate change in South Africa?
5. What do you think is the role of businesses in fostering climate action in South Africa?
6. Currently, how do you think businesses in South Africa are performing with regards to responding to climate change?
7. What are businesses in South Africa doing right in regard to climate action?
8. What forms of support do you think South African businesses have to promote their response to climate change?
9. Do you think businesses are facing challenges in their attempts at responding to climate change? If yes, what are the challenges that businesses in South Africa are facing in their attempts at responding to climate change? What do you think are the hurdles that may be impeding corporate climate action?
10. Is there anything else you would like to add?

Appendix C

Questions for specialists in JSE-listed companies

1. What is your understanding of climate change?
2. What measures do you think can be taken today to improve future prospects for South Africa in the face of climate change?
3. Do you believe that you have a role to play in responding to climate change and do you believe that you are able to make a meaningful contribution towards promoting climate change awareness and responding to climate change?
4. Who are key stakeholders that you believe should be in the forefront of responding to climate change in South Africa?
5. What do you think is the role of businesses in fostering climate action in South Africa?
6. Currently, how do you think businesses in South Africa are performing with regards to responding to climate change?
7. What are businesses in South Africa doing right in regard to climate action?
8. What forms of support do you think businesses in South Africa have to promote their response to climate change?
9. What are the challenges that businesses in South Africa are facing in their attempts at responding to climate change? What do you think are the hurdles that are impeding corporate climate action?

Organisational Questions

10. Is climate change perceived to be a significant factor to the organisation (in terms of risks and/or CSR)? If yes, what is your organisational culture relating to climate change and climate action (patterns of behaviour, emotions, assumptions and mindsets relating to climate change)?
11. What measures does your organisation take to respond to climate change?
12. What structures exist within the organisation to support and encourage climate action?
13. What structures are you aware of that are outside the organisation to support and encourage your organisations response to climate change?
14. In what way has your organisation incorporated external regimes relating to responding to climate change into core business operations?

15. Do you think that your organisation is facing challenges in their attempts at responding to climate change? If yes, what are the challenges that your organisation is facing in their attempts at responding to climate change? What do you think are the hurdles that may be impeding corporate climate action?
16. Is there anything else you would like to add?

Appendix D
AQAL framework (interviews and business reports): Draft 2

Upper Left Quadrant

Perceptions on climate change:

- Climate change is due human activity such as the burning of fossil fuels and releasing of GHGs into the atmosphere creating the greenhouse effect.
- The key issues in the world are India, China and US which are the top three emitters by a huge amount – with the US at some point pulling out of the climate change agreement.
- A global assessment of all countries' NDCs, it just seems not enough to stick to below 2°C trajectory.
- Climate change is one of the most significant challenges that we face, and it has the potential to upend most of the progress that we have made and that the impacts thereof are real and will be felt by the least developed countries while other more developed countries will be able to do that better.
- Climate change has a huge impact on our ability to sustain our current style and quality of living.
- Climate change is not just a biophysical problem – we need to work on deep consciousness-raising and behavioural change.
- For SA we are going to get it worse in terms of our water supply, we are already a water scarce country – with that the issue of food security and the issue of weather-related impacts, increased temperatures, veld fires, greater intensity storms, floods, and droughts.
- Scientists are saying that we only have about ten years in the 1.5 report, but we are already seeing the impact of climate change globally – we can't sit around and talk about this anymore, we have to really think smart and so we need champions to rise up and take us forward on this.
- Generally, we have not taken climate change seriously – there is still a lot that is not addressed.
- Climate change has been a major challenge for quite a number of decades.
- Climate change is scientifically proven and all attempts to discredit it are generally based on vested interests or poor science or lack of thereof.

Climate action interventions:

- Specific interventions will be looking at decarbonising the energy sector, certain industries and the transport sector – government should focus on renewable energy.
- At the global level what countries are focusing on bringing down carbon emissions as well as other gas emissions
- We are at a point where adaptation is a top priority because the impacts of climate change are here already – as much as mitigation is one of the key things as South Africa is the 14th/15th worst emitter in the world, reversing the impacts would take a while so we have to work on adaptation.
- We have already reached certain thresholds and caps and so should be focusing on adaptation – our critical adaptation needs are water, agriculture, health, and disaster management.
- We have to restore and protect our natural capital – our ecosystems – because they also provide the water we need.
- We will probably have to desalinate sea water to provide for some of our water needs.
- We need to consider the effects on human health from changes in temperatures e.g., food safety, spread of malaria, water-borne diseases like cholera from things like flood events but also drought events that cause things like schistosomiasis.
- We need an effective public health response.
- Disaster management will be about preparing ourselves for more droughts and flood events – better management of our flood plains and zones for flooding in a city planning.
- There is an opportunity for all of us to work together to ensure that we adapt well to the impacts of climate change.
- It is not just stopping emitting the emissions, but it is also capturing them – looking after the soil can help sequestrate some of the carbon.
- The challenge is to change that behavioural pattern of individuals which would go a long way to actually change corporations.
- If society boycott certain products and make a clear demand for products that eco-friendly, then they will be forced to make those products.
- The more we educate and create awareness with people that do not know of climate change – not a scientific high-level thing – what climate change is and what they can do to live more efficiently and have less of an impact on the environment and to protect the societies in which they live – the more they will realise the power they have to change things.

- Drive initiatives where people are more conscious about what type of energy they are using and more knowledgeable about renewable energy initiatives and saving water (water conservation and water reuse).
- The more we elevate awareness the more companies will care.
- Start with the fundamental education system which is terribly outdated. It doesn't include key skills such as looking at climate change and technology and wrapping up these skills from an early age - we would see development rather than activism.
- Stop thinking only about ourselves or per day-to-day scenario – we need to be thinking long-term and for generations to come.
- The private sector needs to be held accountable for their own business actions – making profit by compromising the earth and it doesn't have to be this way.
- We need a much deeper systems approach/view and radical shift.
- You have to deal with it on a number of levels or layers so you can't just give a magic bullet answer.
- Government won't be able to solve this problem alone – we all need to become powerful agents of change – we need young people, everybody in the community, civil society.
- Climate action requires passion and compassion because it is tiring – there are blocks, people don't get it, it takes ages to turn the ship a little bit.
- There is a belief that the people who've been traditionally leading the climate change debate are a little bit old and now we need a new thinking.
- We need a lot of communicating and sharing to try to get common understandings for this thing to really ramp up.
- We have to push transdisciplinary approaches in universities and courses.
- Think about adapting our farming approaches – embrace conservation agriculture – plant the right crops, heat-resistant crops, drought resistant crops, plant them in the right areas and use little water and fertiliser.
- Countries need to continually pay attention to deforestation and think about how to replenish with new trees.
- Waste management will require new technologies and new ways of doing to avoid infrastructure and environmental damage resulting from the interactions of waste and rain.
- Need to address the aviation industry – Covid gave insights into what the world could look like without a lot of travelling.

- We need to hold companies to far more account than we are able to in terms of their role in environmental degradation, emissions and the role that they play in communities.
- We can sequester some carbon in grasslands, catchments and in low tillage agriculture and conservation agriculture.
- Take advantage of methane emissions in landfills and wastewater treatment plants to produce biogas.
- Using Sasol chemical processes to produce zero-carbon fuels.
- Unless we move to diversify our energy-mix and have a much stronger renewable energy content in our electricity grid it will be difficult for companies to meaningfully reduce their emissions.
- We need responsible customers because responsible customers will demand responsible products.
- There needs to be a stronger emphasis from all sectors whether it is the banking sector or government to make people aware and comply with some of these regulations.

Key stakeholders and their roles:

- Civil society:
  - To remind government and remind industry what different options there are.
  - Needs to be aware of what they are purchasing, change behaviour and hold companies they patronise accountable.
  - Communities can hold companies accountable especially through the social license to operate.
  - They can certainly drive optimisation and an improvement of energy performance in the residential sector.
  - They must be able to work as a key partner.
  - They are a key part for understanding the need for urgency for action and what needs to be done.
  - When civil society talks, government listens.
- Tertiary institutions and private research institutions:
  - Tertiary institutions and the research institutions like MinTech and CSIR.
  - There's a lot of funding and interest in academics to do research on different aspects of climate change.
  - Scientists who are generating data and helping different stakeholders, government, and others to take informed decisions.

  - Great value to be gained by integrating different initiatives
- Government/ politicians/policymakers:
  - To set policy that informs certain practices and decisions to create change.
  - At national, provincial, and local levels.
  - To model leadership because if the government takes the environment seriously you will see that the people will follow suit.
  - Opinion shapers.
  - Government can support investment in climate action initiatives and projects.
  - Government could fulfill a market maker role where it actually enables and translates sub-commercial/ social lens deals into bankable/commercially viable and sustainable deals.
- NGOs/advocates:
  - Trade union groups - the labour movement has to think about job creation, job protection in a low carbon economy.
  - That are creating a lot of awareness on the ground.
  - Environmental organisations – WWF, CER to create awareness, momentum, influence policy and societal behaviour.
  - we need people who are continually holding everyone accountable to the dictates of what is needed to save the environment and the climate.
- Private sector :
  - Need to lend their powerful weight and voice to climate change projects.
  - They have a huge impact through their marketing campaigns and can raise awareness.
  - To align its processes, equipment, and interventions with the understanding that they have to report through their environmental governance and social dynamics.
  - they are the engine of economic growth, they are the investors, they are the people who put in place different technologies and have a critical role in research and development.
  - Banks and investors are a critical engine of change in a modern economy – globally, there's a whole movement to divest from fossil fuels – they influence company behaviour.
- Leaders of faith-based movements – increasingly this thing of spirituality and conscientisation is becoming very big.

- Traditional leaders – we need indigenous knowledge not to be romanticised but to be taken seriously.
- International stakeholders:
  - international funders
  - international agencies like the UN, UNEP.

The role of and opportunities for businesses in climate action:

- Companies need to take a leading role and quite drastic measures.
- Firstly, businesses need to acknowledge the problem, the scale of the crisis and the impact that it is already having and how it will keep getting worse especially in SA.
- Companies can be more innovative and look forward instead of being stuck in what makes them money today – we need new things that have not been tested and haven't been tried to shift to a lower carbon economy.
- Businesses provide services and products for society and influence through advertisements – they need to be driving products and services towards sustainability.
- To change and not be driven by profit but by the greater good then they can influence us in as much as we can influence them.
- Businesses should create awareness with their staff, clients, and supply chain and ensure that people are adequately trained to identify what climate change risks are in those different spheres and to drive mitigation through the leverage they have.
- Staff implement business strategies iso it's important that they understand climate change to move it forward.
- To collaborate as businesses to drive change, to drive policy change within government, to promote better understanding of global initiatives.
- If we are not going to reduce our environmental footprint, come up with products for our customers and look at potential risks as an organisation then we will not only fail as an organisation, but we will fail humanity in general.
- Investing in sustainability allows companies to gain in profits of the triple bottom line – businesses should achieve their profit goals in a responsible manner that ensures that our sustainable lifestyle for those that follow.
- Invest in the right technologies, the right people and good governance structures to drive a corporate culture of good and ethical practice.

- Making sure that climate change is a board issue, and that the board has oversight for climate change.
- Companies need to provide sufficient responsibility for climate change within the organisation – assign climate change responsibility to somebody who is senior.
- They are essential to rolling out technologies and helping build markets.
- Private sector needs to do more research and development into innovative technologies.
- They can invest in different forms of renewable energy – wind power, solar power and other new forms of technology – to reduce their contributions to climate change and improve their business and economic resilience.
- Work on energy efficiency within industry, government, public works, and municipalities.
- Not neglecting the mundane and the boring things as it relates to energy efficiency e.g., switching off idle machines.
- Not just provide a service but build with the community to allow a platform for mutual trust and mutually moving along the agenda of sustainability.
- We are responsible corporates, and we need responsible and ethical leadership to make a profit with a purpose and the purpose is to leave a lasting legacy.
- Once policy is set, industry and the private sector want to be supporting the aspirations of government – we want to be a good corporate citizen.
- We should be able to develop plans/ to implement roadmaps to align with the policy aspirations of government.
- The role of businesses varies and is complex based on a business and their impacts – the approach is not one size fits all.
- From a philosophical and moral or ethical point of view – they need to reconsider entirely the model of business into the future – e.g., diversifying products and services.
- Working on understanding their own footprint as a contribution to the challenge and working hard to minimise that by being resource efficient holistically and offsetting remaining emissions.
- The retail sector has a variety of suppliers so retailers are in a unique position to influence change.
- Companies need to set ambitious targets – hope for technology to catch up and work on business efficiencies to get there.

- Financial institutions investing in coal mining companies must consider the kind of coal policy they are setting to ensure that they join the transition to a low carbon economy and avoid business failures.
- The transformation can't take a long time - they've got to do it fast.
- Using their leverage to make change across their operations and across their value chains – investing in different practices and working with suppliers and other partners across their ambit.
- Some companies should be in the forefront of championing the imperatives of saving the environment especially those whose existence and future fortunes are very much dependent on the viability of the environment e.g., agricultural companies.
- There are financial resources that companies can put in place to champion current platforms where climate change and environmental issues are taken up.
- Adopting systems/integrating environmental programmes in the way they manage and operate their businesses.
- People entering into business have the opportunity to prioritise society, communities and the environment with far more emphasis than is currently happening especially by big international companies.
- They do need to get more involved with education – environmental education and quality education – it is a key to addressing inequality.
- The most important players in the private sector are banks and investors in terms of where they put their money and what they invest in – if they decide not to invest in certain areas and certain technologies that could have a huge bearing on the make-up of our society.
- Engaging constructively in climate change policy to try and get workable solutions – not being obstructionist.
- Providing finance for new technologies.
- Depending on the sector, they could mainstream climate change adaptation and mitigation through CSI and BEE work.
- Need for more transformative investment and existential reevaluation.
- Making their investors more aware of climate change through letting them know about their CSI projects that are supporting climate change or climate action initiatives.

Sense of agency and agency relating to climate action:

- Absolutely everyone has a role to play and the potential to make a difference.

- We all have to contribute – transport and waste is something we can do at home.
- I try to think about it, but I also acknowledge that there are such systems we cannot fight.
- Because I work in the environmental field, I am well versed – people see me as some kind of expert, so I have more influence than others.
- In the environmental field we have a duty to keep abreast everything that is going on and to try and implement that.
- The sense of responsibility to get climate actions done is stressful because the awareness of the connections and understanding of the problems makes one feel not just motivated but in fear of the consequences of inaction.
- But a test is to do it personally otherwise, you cannot do this outside with authentic power.
- It is absolutely critical that each of us take ownership and I see myself as one who is conscious of the climate change impacts and feel that I have a responsibility to play.
- Climate change is part of my everyday life and I'm trying hard to look at my own lifestyle of privilege, how can I play a role?
- We can get involved in the green activism space to put pressure on companies and government – use social media and join movements/ environmental organisations.

Lower Left Quadrant

Business concerns:

- Trade unions are still worried about losing jobs for example in the coal sector.
- If companies move early or are seen to moving to early sometimes their investors get nervous.

Business cultures:

- CSR is mainly greenwashing – they believe that and treat climate actions as something that will not derive them any profit, just branding rights or branding improvements which is totally wrong – a lot of public relations.
- What companies say in their sustainability reports at times is not what is actually happening on the ground.
- Global leaders and businesspeople only wake up when there is an economic consequence.
- Climate change is often shifted off the main point of the agenda for more immediate issues.
- Maintaining profits, products, output, and market share/earnings/ earnings yield or share price will always prevail/dominate.
- Companies are willing to do things at a superficial level that doesn't cut away at their shareholders pay-out or minimise their top executives salaries.
- All companies are after is the bottom-line.
- An argument that Africa's contribution to climate disastrous activities is very miniscule so we are being asked to clean up the mess of major powers – an ideological position that says blame must go to the global north and some of the east operations.
- Businesses are not proactive enough to act without the need for punitive legislation.
- It is very evident in my assessment that the companies are driven by profit and their practices are about the bottom line.
- Until something seismic comes and disrupts business operations, then businesses tend to look outside –when there is a tax imposed or other forms of regulations then they respond so that's where government has to step in.
- There are different groups within a company, some are pro-climate, and some are still sceptics - when we give talks there are still people that say there's no such thing as climate change.

- Businesses tend to respond when they are obliged to - very few voluntarily respond.
- There are various platforms and movements for climate action but don't have a lot of traction because culturally South African businesses don't sign up for commitments in the same way that other countries do.
- "We know it already; we are doing our best" or "we don't have money" –are all very common excuses we pick up in industry that highlight the lack of understanding or the unwillingness to explore solutions.
- In businesses there is enough money for a lot of the capitalist projects, it is the way they prioritise energy performance or energy efficiency or climate change projects that very seldom see them see the light of day.
- A lot of those challenges are internal – it is within the mindsets of businesses.
- A lot of the work they do still tends to be very ad hoc, and project related – the problem about projects is that they have a start and an end and are not sustained long-term, so businesses find themselves back at square one a couple of years later.
- They don't have people with a creative mindset to think differently that have access to the top executives because the decisions are made based on financial flows.
- Companies are still compliance driven – it hasn't come down to value alignment.
- Some companies like black rock and other financial groups have a much deeper sense than they did ten years ago when it was more of CSR.
- Boards and investors see climate change as a sustainability issue rather than a business survival issue or business sustainability issue.

Societal cultures:

- The consumer mindset is encouraged by government and businesspeople because they want to increase revenue and increase profit.
- The younger generation led by Greta Thunberg are more aware and conscious about these issues and there's been a rise in climate change protests.
- Consumer activism is at a low level in this country unlike other countries.
- We can't be in our silos anymore.
- It is very difficult to get older people to change their minds about things or to see the value of reducing emission or supporting climate adaptive strategies.

- In South Africa, climate action is difficult because for many years we were aspiring for certain things and now that they are within our reach, we are told that it's not such a good idea to get that fancy car which tells everybody that you've arrived.
- There's a belief that growing one's food is a sign of poverty – farming for consumption is for the poor and if you are wealthy and you have moved on in life, you do not have to do those kinds of things.
- For the white population in SA, urban farming is a new trend – being green – it has always been a practice that black people have done but when they move up (financially) they abandon it for the life of doing things that show your status.
- It's only the middle class that wants to cycle, the working class has got the idea that it is demeaning to go cycling and the people want to have BMWs and they aspire to all those sorts of things.
- Public transport is preferred to driving a car just because of the convenience and for environmental reason

Government cultures:

- In terms of some climate change programmes, we've gone on and off in this country which is very dangerous cause there's no sustainability/continuity.

JSE-listed companies' cultures:

J1:

- The purpose of the organisation is doing good through our expertise to clients, shareholders, and society.

J2:

- We take sustainability to heart to understand the risks and opportunities of climate change and change how we do business to align ourselves to be a more responsible organisation.
- We understand our role in society that we are a change enabler for people that bank with us and for organisations that require funding – we fund in a responsible way that will move the climate change agenda forward.

J3:

- We talk about climate change in terms of climate related risks.

- As a global corporate citizen, we believe it is the right thing to do our bit and contribute to the reduction of the emissions while we are building resilience of our assets because investors are now wanting to know whether their money is safe.
- For us it is embedded and integrated holistically into the life cycle from operations to looking at options at closure.
- All of our climate actions are voluntary – we do it because our board, CEO and executives believe that as a responsible mining company whose aspiration is to become a global leader in sustainable gold mining, we have to do it.

J4:

- Climate change is not a top risk.
- Climate change is one part of a bigger environmental sustainability engagement.
- Climate change is a long-term focus.
- Climate change in retail is usually considered in sourcing.

J5:

- We are trying to instil a culture of reusing by using a glass bottle for water.
- We want our portfolio to be responsible and sustainable.
- It is important for us to model what our business will look like if we do operate in certain conditions of climate change.
- We do business right not because we have to but because we believe it is the right thing to do.

Upper Right Quadrant

Performance in general:

- We have not succeeded in changing or deflecting the emissions trend towards a global temperature rise of above 2°C.
- There is consumer/citizen awareness around climate change, but it can always be strengthened.
- We don't have a strong social movement basis to manage climate change in this country, it is not as organised.
- The youth see the necessity to have to make the older people to make those changes – there's a big youth movement at the moment.
- Society can be a very powerful force, but they are not using that power enough.
- The media is a very critical stakeholder and they have not fully come to the party.
- Despite the plastic crisis and its impact on the biosphere, nothing has changed or there is very little change that is coming from the people.
- Campaigns for climate change – like the plastics campaign and the carbon tax – don't quite change the dial but they open up a conversation for broader environmental stewardship.
- The SDGs took a few years to get traction.
- There has been some renewable energy developed at a national scale.
- There are big difficulties at the moment with people trying to protect jobs in the coal sector and how we are going to manage that in the future.
- SA signed the Paris Accord, yet we have not been able to make strides to meet the expectations.

NGOs performance:

- There are a number of initiatives and people trying to work – NGO & small communities, people working on gender and climate change and climate justice and climate change –a lot of different, splintered groups.
- NGOs ask for many different things that are not necessarily cohesive – Climate Action Network (CAN) must bring together all the different NGOs.

- A lot of work being done by BUSA, NBI, Banking Association SA.
- NGOs that are creating a lot of awareness on the ground.
- Within BUSA there's a great drive for companies to retrofit for energy efficiency – less dependent on coal, more dependent on renewable energy.
- NBI brings businesses together for businesses to start talking to each other.
- Energy project recorded verifiable energy savings of 5.7-terawatt hours – enough electricity drive 800k South African middle-income houses for 1 year as well as significant emissions mitigation.
- Work being done to raise climate change awareness and the need for energy management systems aligned with the energy management standards ISO50001.
- Industrial symbiosis programme which seeks to reduce raw material extraction through recycling the biproduct of one plant or one activity or one sector as an input product to another.
- The NCPC has shown government that it could be a very meaningful implementation agency or unit to drive a lot of the green economy imperatives in dealing with climate change issues.
- Case studies conducted alongside the German development institute showed that that involving operators and technicians at the floor level in decision-making promotes a sense of ownership that contributes to the success of the business in terms of climate actions.
- In SA today, some of our best achievements have shown that operator and technician involvement in decisions-making could yield energy savings as high as 30% - highlighting the merits of behaviour change in sustaining implemented systems.
- We started working with industry to capacitate them to report their energy performance more accurately through normalisation and multi variant regression analysis.
- We try to push companies to think of the SDGs as a way of reorientating their business to create business value and grow the business in a sustainable way which is actually an opportunity.
- We ensure that our members make informed risk decisions.
- We are doing a lot in the training and reporting space up to board level and are now working on upskilling staff on how to manage climate risk because they are going to have to report this in their financials in terms of TCFD.
- NGOs have taken the DEA and some companies to court and stopped certain projects – this can set a new precedence and define new boundaries.

Government performance:

- The mitigation chief directorate in DEA conduct climate change mitigation research and analysis – doing research on how SA can reduce GHGs.
- Our department of science and innovation is doing great work with universities and some companies in looking at pilot programmes and projects for future industries, but the challenge is scaling up e.g., the Hydrogen South Africa programme where they have tried and tested green hydrogen production from solar energy and given it to Anglo and some non-electrified communities.
- COJ had a gas-powered taxis initiative.
- Government is doing a lot, looking at the integrated resource plan climate change strategies, carbon tax act and the climate change bill.
- Government's ability to provide a meaningful, enabling environment for climate change mitigation or adaptation has been relatively mixed.
- Eskom = 47% of our emissions in this country so it is mammoth – fixing it is not going quick enough because it is premised on an outdated model and government is trying to defend that outdated model because Eskom is a R450bn stranded asset.
- It has taken the government a long time to realise that they have to open up for independent power producers.
- There is a government and private funded organisation that trains teachers to be able to teach climate change.
- Different government departments and agencies like SANEDI, the NCPC, DFFE and DIT amongst others.

Personal actions influenced by a sense of agency:

- Efficiency in energy, water, food, recycling and going for zero waste.
- Investment in renewable energy.
- I am an avid gardener – produce my own food which helps to reduce GHG emissions and production.
- My daughter today is participating in a virtual strike on climate change.
- Create awareness within families, communities, and friends and modelling behaviour.
- I will probably buy an electric car, but I made a conscious choice and bought an energy efficient vehicle.

- I use my engineering skills to make an environmental impact and because of that I have taken my entire family and the organisation on this journey – we've all seen the benefit of it, both financially and actual reduction of our environmental footprint.
- I use the Gautrain whenever I can but it's not always possible to do as much as I would like.
- Use a worm farm and compost bin for organic waste to reduce waste and emissions in landfills.

General business performance:

- Businesses are performing poorly, and it is very slow in general.
- There are pockets of excellence.
- Some businesses in SA are doing sterling work in the degree of attention they bestow on climate change and the way they manage climate change.
- But it is still by large a poorly understood, accepted, and adopted attitude and way of doing business.
- There is a lot more that can be done.
- Consumers are not being made quite aware of these issues, so they are not putting pressure.
- The industrial sector is the biggest culprit – contributing 30-50% and at times in some countries as much as 70-80% of national energy use.
- They are investing in renewable energy and were critical for a particular renewable energy programme.
- Some businesses do try and have some recycling stands but they don't make it a major priority.
- An exercise conducted on big companies found that there wasn't any significant climate change work being done outside of the sample of ~ 80 companies that file CDP reports.
- The financial community are seeing climate change as a risk to the global economy – it should get companies to now start using the language of finance in thinking about climate change.
- During the period of 2010 to about 2018/19 we have seen meager response from the mining sector – it was slow and rare – but in the last year or two we have seen an acceleration of interest.

- There are some companies like Sasol that have refused to accept that they should improve some environmental issues.
- When it comes to government, businesses are obstructionist, and they push back quite a bit – they don't want to have too much of pressure on them to change.
- There's a company producing biogas from waste and provides a BMW plant with clean energy.
- A bank in central Joburg that uses solar PV and gas to supply electricity and also sells to Transnet.
- Makro has a great energy efficiency system – natural light in their stores to reduce energy use and solar PV in their parking lots.
- Woolworths has a good programme with farmers to improve conditions.
- Solar Exchange to allow crowd funded solar PV establishments to help schools, retirement homes and commercial centers to offset their energy costs.
- In the energy sector we have not done as much as we can.
- Somehow in the whole value chain of a product, it is made to generate waste.
- Currently, businesses in SA have not shown the willingness and the needed impetus to make changes.
- Pre-Covid there were some companies that were making progress through cosmetic changes like solar on their buildings and rainwater harvesting systems.
- There hasn't been a significant seismic change and now with the Covid you can see that things are changing quite drastically.
- Companies are realising that there are potential impacts on their operation.
- There are incentives that were launched a long time ago that corporates did not take advantage of such as when Eskom incentivised behaviour to reduce energy consumption.
- Companies place sustainability teams in different departments depending on their focus even though these teams drive the same agenda – we need to drive awareness of what these teams can bring for the organisation.
- A lot of jobs are being developed for sustainability departments or some link towards being sustainable.
- There have been early adopters not only of sustainability departments but teams that cut across organisations – organisations where the sustainability agenda cuts down from the CEO through operations and the supply chain make a larger difference.

- The establishment of sustainability teams has driven ethical and social improvement – winning in the environment, economy, society, and good corporate governance – making them more competitive in terms of branding, efficient operations resulting in environmental reductions.
- In retail, there is now a promotion for the removal of single-use plastics or making them expensive.
- Some retailers use marketing to influence activity around climate change.
- Behaviour is improving – however it is still a developing space with a long way to go.
- Smaller businesses have a long way to go by virtue of development.
- A lot of international work with ESG.
- Because of the global awareness and pressures, some major banks are saying they are no longer going to be funding fossil fuel projects – the World bank has shifted its focus so companies seeking funding now need to take climate change into account – but I still think they are not doing nearly enough.
- Health shops, small local businesses like organic farming producers are more conscious about climate change – they undertake climate action because of the personal beliefs of the owner.
- I cannot think off hand of any company that has done anything substantial.
- I wouldn't want to nail my colours on the mast on business performance because it is a complex space where companies could report one thing but do the other – they could be leading a campaign yet in their operations it's a different story and also due to segmentation into different outfits where one could be damaging the environment while the other one is cleaning so those things are a bit complex.
- A lot of companies in the mining sector have modernised their technologies – that make for blasting efficiency resulting in lower dangers and pollution.
- There hasn't been real momentum around getting business to advocate for climate solutions with government or figure out ways of participating.
- A lot of the South African business engagement has often been through industry businesses – chemicals, mining, fossil fuels – who have very powerful voices that are more active and louder in some of the government mitigation plans and understandably don't want to change the way that they operate.

- South African businesses have been pretty good at trying to integrate water issues into their strategies and responding quite strongly on water, but they are not always tying it back to climate, they always see water as a separate issue.
- Nedbank put in their own climate resolutions through the AGM and ABSA did the same a few weeks later.
- Early adopters and market leaders have clearly defined long-term, medium-term, and near-term goals and everyone in the organisation is aware of them.
- Standard bank has done work through their natural resources office.
- SASFIN bank is one of the first banks to drop its ceiling limit for funding – funding projects from as low as 10k Rands.
- There is now some movement from ABSA, Nedbank and FNB.
- Climate change is not something that most businesses immediately know about, understand or want to promote.
- For some organisations they want to be funding or putting some CSI money towards climate action because they recognise that it is important but it is not a common trend – NGOs still have to fight their way in to get people to understand why it is important to fund climate projects such as climate change education.
- In terms of waste, for mining companies and industries it is still too easy for them to pollute – the big problems are not getting solved.
- A whole industry has been built around understanding your carbon footprint and how to reduce it.
- We have not seen the really transformative change – a lot of companies have taken the low hanging fruit – resulting in cost reductions, carbon reductions and other benefits – but they have struggled to address more existential questions.
- A mining company in South Africa announced that they were moving away from coal, and they got hammered by their investors saying they wanted them to stay in coal.
- Companies are going to have to make transformative shifts over time and some of them are starting that journey, but we haven't gone far.
- Tracked companies' emissions over time and tracked what they said they are investing in and how much they are investing, and we didn't see a growing pipeline of carbon emissions reductions projects.

- We are starting to see an increase in emissions in the sample of 80 companies – a relatively small sample including some of the biggest emitters in the country but not large private companies which are big emitters.
- We are increasingly seeing big businesses starting to embrace the SDGs.
- Standard bank shareholders have put pressure on them not to finance any fossil fuel related projects going into the future which resulted in a policy shift within standard bank.
- A lot of the tourism companies are transforming purely because the market is asking for it – Europeans patronise hotels of particular rating.
- There is no insurance company that will fund a coal company going forward, knowing that they may come under a lawsuit and take them under.
- A study found that companies that are beginning to broaden their operations internationally haven't up to now taken climate change issues seriously in their operations and those that have done so are just in the early stages of putting in place appropriate responses and programmes.
- Multinationals operating in Africa have a long history of engaging in climate change discourse but their operations on the ground in Africa are different.
- Companies making excuses – "we don't really know about these things very well" – when they can send their employees or their managers to courses to learn about these policies and tick the boxes quite literally if it is EIAs for instance.
- The low hanging fruit has been taken advantage of and now they are at the point where they have to consider changing their businesses.

Compliance and Reporting:

- There is lots of resistance to a carbon tax and the business sector is very powerful.
- There are documents that some companies sign called the social neighbour plans, and those SNPs have a particular emphasis on the environment.
- Reports are very often just stories, and they are not doing enough – maybe it's just process for them to start thinking about it more and when it comes to action maybe in the future they'll start doing more.
- What companies report and what communities perceive companies to be doing are not properly aligned.

- There's a lot of reporting since 2007/8/9 – there's a lot more reporting coming out of businesses by pressure – through the CDP and sustainability/integrated reporting which has forced them to think differently and articulate their climate change stories.
- Sustainability reports give a sense of what companies are doing in response to environmental questions and how their operations are contributing to that.
- South African businesses are generally quite good at reporting and disclosure.
- The businesses in this country have been quite good and transparent in reporting but beyond that there's not really been the activity to back up the reporting.
- Very good a risk assessment but there is a gap between talking about what the issues are and acting on them very quickly.
- There's a failure to understand the need for life cycle costing in procurement – failure to adopt and include energy and water considerations.
- For years, globally, we report performances completely wrongly – we are using misleading practices and metrics to report energy performance leading to the underestimation of the impact of energy performance, under-reporting or confusing that.
- About 80 companies (between 70 and 80 companies each year) respond to the CDP – South African companies have been very good with corporate climate disclosure over the last decade, good at measuring their carbon footprint and knowing what it is, putting it out there, getting it verified.
- Big businesses in the stock exchange are responding to compulsory sustainability reports and recognising the risks around climate change.
- More companies are seeing the benefit of building this into their financial systems – disclosing on climate change risk.

Deepening transformative capabilities:

- Use science-based data to understand climate change and identify major risks to the organisation, especially within the financial services sector.
- Most businesses in SA are multinationals with a lot of good learnings and good experiences from other countries that can be accelerated/implemented here however, it needs an enabling environment.
- It's a lot of engagement.
- Businesses were asking us (academics) to come talk to them and not us trying to force our way into business.

- Boards are starting to do inward thinking and having frank discussions around climate change and are beginning to see and understand that with good corporate culture and ethical behaviour you will get the profits out.
- Post-Covid there has been a clear shift in terms of company policies as Covid forced companies to think differently and adapt and those who have not been able to adapt have fallen by the way.
- There is a clear understanding of climate change and climate change impacts and with that many companies have put systems in place to better understand these impacts in relation to the operations.
- The financial sector is looking at the financing of projects up to three decades ahead and need to price for climate change risks – they are looking at theirs and their clients' operations to determine business sustainability considering potential climate change impacts and business impacts on communities.
- Listed companies are still grappling with the data – using global data to understand local impacts and drive local actions.
- Retail companies are engaging on sustainability forums to pull the weight of the sector.
- Engagement on NBI platform – ironing out imperative and focus on climate change action (global policy integration).
- Companies are starting to ask these very hard questions and it is not easy.
- As academics we are getting invited to give talks to boards – CEOs that are really thinking come up to me afterwards and ask me to come back.
- It's been quite positive; I have been quite surprised – more company engagement and conversations e.g., on NBI forum.
- I have been impressed with investors – I have been asked to go and give talks on climate change and what can be done about it to a lot of big fund managers like Rand Merchant bank, KPMG, the banks.
- People are flying into SA and running workshops at the stock exchange – it is becoming a big issue for fund manager and others.

JSE-listed companies' performance:

J1:

- Everybody has been made aware of the potential impacts of climate change.
- Energy efficiency is driven through all our staff, and they also do it in their homes.

- There are publications on the website for clients and non-clients.
- Have been carbon neutral for a couple of years.
- Set baselines for energy use, water, business travel and increase of recycling.
- Reducing impacts on the environment and by implication addressing the climate change requirements of less electricity and less water.
- Putting water back into the ecosystem through work being done with the WWF on the water stewardship programme.
- Putting in place business continuity plans to address serious emergency incidents such as the water scarcity incident in cape town – the business provided water for staff in the offices and to take home.
- Looking into sustainable transport – to invest more on electric vehicles and move away from petrol and diesel.
- There's a project within business banking where they've put solar panels on a dam – less water evaporation and energy generation.
- Involved in embedded energy where shopping centers are starting to put solar panels on their roofs and parking areas.
- Currently assessing all clients in high impact industries on environmental compliance and ethics – yet to incorporate a set of climate change questions to form part of the assessment.
- 7 green star rated buildings rated by the green building council.
- A lot of stakeholder engagement.
- Our shareholders and board have been informed on what we are doing on climate change which we are driving through our clients and supply chain.
- We participate in initiatives like the CDP and the Dow Jones Sustainability Index which influence our thinking on sustainability and are integrated into our environmental policies and our social-environmental management systems.
- Working through BUSA to look at how to encourage government and municipalities to streamline the process of linking embedded energy operations to the Eskom grid.
- Looking at the TCFD as part of our reporting framework – planning to do more scenario building around climate change impacts on the different high impact industries that we are financing - the reserve bank is starting to require us to do so.
- Recently we submitted a report on agriculture and the potential impacts of climate change.

- Created products for people to start increasing their house bonds to invest in renewable energy projects which have a very short payback period considering the costs of electricity.

Reports:

J1: CDP & TCFD

Governance:

- Board level oversight on climate-related risks and opportunities.
- Management's role is assessing and managing climate-related risks and opportunities.
- Continuous upskilling of board, management, employees, and clients.

Strategy:

- Climate-related risks and opportunities identified over short – medium and long-term.
- Climate-related risks and opportunities impact business strategy and financial planning throughout value chain.
- Working on resilience considering climate-related scenarios.
- Analysed carbon budgets, focusing on implications for energy system transformation & informing organisation's energy policy.
- Finance renewable and embedded energy solutions.
- Define position based on the principles of the UNFCC, Paris Agreement and IPCC.
- Over-arching ambition is to achieve net zero by 2050.
- Using carbon budget construct to develop science-based targets to help clients across all sectors realise a net zero economy.
- Strategic transition from physical capital implicated in GHG emissions.
- Using the SDGs to inform how to close financing gaps and capture new business opportunities.
- Recognition of opportunities in energy, water & sanitation, nature-based solutions, sustainable cities, climate resilient infrastructure, resource efficiency and digital technology.
- Committed to transparent disclosure in alignment with best practice with King IV, Dow & Jones World Sustainability Index, JSE Social Responsibility Index, TCFD, and CDP.
- Enhancing remuneration policy to incentivise leadership behaviours to align with climate change position.

- Completed scenario analysis relating to power generation and upstream fossil fuels.
- Monitor carbon footprint.
- 50% of company portfolio is assessed for exposure to climate-related risks and opportunities.
- Assess exposure via carbon footprint, energy and water use and experience.
- Climate-related due diligence on some clients.
- Involved in research to better understand opportunities and formulate strategies to realise opportunities.
- Board approved the use of scenario analysis in core operations.
- Factors ESG certification when appointing service providers.
- Internal price of carbon to inform off-setting of residual footprint.
- GHG protocol to collect data and calculate emissions.
- Information sharing with suppliers.
- Approved energy policy.

Risk Management:

- Well-defined processes in place for identifying, assessing, and managing/responding to climate-relate risks and opportunities.
- Climate risks spread across various risk types – carbon pricing mechanisms, reputational risks due to shift in consumer preferences and chronic physical risks relating to water stress.
- Integration of climate risk processes with existing processes.
- Board approved internal climate risk appetite.

Metrics & Targets:

- Metrics for assessing climate-related risks and opportunities are in line with strategy and risk management processes.
- Scope 1&2 and if appropriate scope 3 GHG emissions and related risks.

Targets:

- To decrease thermal coal metrics to 0.5% by 2030.
- Disclose energy lending portfolio metrics.
- New reduction targets on 2019 base year.

- To support net zero carbon economy by 2050 through divestment from fossil fuel projects.

Performance:

2019:

- Water star rating certificate.
- Green star rating on buildings.
- Launched product to support renewable energy projects.
- Launched a multidisciplinary team.
- Established climate risk leadership group.
- Assessed investment managers on ESG integration and identifying best practice.

2020:

- 100% vote on tabled climate-related solutions.
- Decade of carbon neutrality through off-setting.
- Multiple 5 green star ratings.
- Established climate risk/resilience unit to manage climate-related risks and opportunities.
- New instruments to support innovation of sustainability linked products and services.
- Launched green capital instrument.
- Approval of provisions for renewable energy investment.
- Updated responsible investment policy in alignment with UN SDGs and 1.5°C global warming scenario.
- Met 42% emissions targets.
- 89% of waste management target achieved.
- Energy projects – solar PV project underway (limited by government tariffs) and space optimisation for energy efficiency in buildings.
- Reduced travel – decrease in costs and small pollution reduction.

J2:

- We are driving awareness within our own colleagues, developing new products aligned with climate change and making sure that our customers come onboard on this as well.

- We are making sure that our supply chain also moves with this because we understand that there are risks and opportunities with supply chain – we cannot afford to have unethical suppliers supporting services.
- We have an internal social media site where we drive sustainability awareness.
- We take our colleagues on sustainability tours within our own offices – showing how we generate our own electricity, how we save water, how we manage our waste.
- Our canteens and coffee bars have biodegradable materials instead of plastic because we as an organisation took a decision to fight plastic pollution.
- In 2019 the organisation signed up to the principles of responsible banking.
- Take over 1000 employees on sustainability tours every year.
- Take clients on sustainability tours to showcase what we consider a global best practice, and we finance some these projects for their own businesses.

Reports:

J2: TCFD

Governance:

- Board oversees risk management framework which includes climate-related risks.
- UN principles for responsible banking is overarching sustainability framework.
- Group Risk and Capital Management committee and Social and Ethics committee assist in monitoring climate risks.
- SEC reviews progress of implementation of PRB and impact areas in terms of SDGs, exposure to climate-sensitive sectors, renewable energy, agriculture, and fossil fuels.
- CEO accountable for climate-related risks and opportunities within broad ESG matters.
- Sustainability function reports to financial director who steers sustainability steering committee.
- Sustainability risk team appointed to manage direct and indirect environmental, climate change and other risks.

Strategy:

- Board approved group sustainability policy and coal financing standard – requires strategy to align with SDGs and Paris Agreement.
- Board elevated sustainability risks which include climate change risks.

- Identified numerous climate-related risks and opportunities: transitional risks (policy and legal actions, technology, market response and reputation) and physical risks (lending to high emissions sectors, direct damage to assets, disruptions in the supply chain and increase in costs to respond).
- Aim to provide services that enable customers to transition and for adaptation.
- Sustainable finance team – multi-departmental collaboration.
- Advice and finance for wind, solar and energy storage solutions for transition.
- Playing a shaping role in Africa's growth and sustainability.
- Incorporates ESG, PRB and TCFD in strategy.
- Measuring and monitoring exposure to climate-sensitive sectors.
- Implementing environmental and social management system over two years.
- Partnering with external groups to build climate change scenarios.
- Actively assisting their customer transition.
- Completing sustainable bond framework.
- Expanding climate related solutions for customers.
- Supporting building climate smart businesses.
- Measuring, reporting, and reducing carbon emissions.
- Sustainability policy for mitigation strategy aligned with SDGs, Paris Agreement, national plans and/or regional legislative frameworks.
- Raising awareness and training with employees to integrate climate risks and opportunities into activities.
- Training conducted by academics and experts on SA energy sector and long-term climate forecasts.
- Engagement sessions on SDGs with employees.
- 25 sessions on renewable energy and funding mechanisms.
- Various podcasts on sustainability.
- Commission research at the GCI at Wits.
- Will be rolling out a sustainability awareness module to employees.
- Extending reach of awareness to customers, business leaders, regulators, and civil society.
- Scenario analysis and stress testing to be incorporated models and risk management over medium-term.

- Use UN environment programme finance initiative to consider the sectors that require scenario analysis and the organisations risk profile and develop the environmental and social management systems.
- Partnered with council for scientific and industrial research in SA to assess climate-related physical risk in agriculture – it was a success to be expanded on.
- Clear understanding of risks.
- Strategy is aligned to risk appetite.
- Support renewable energy and clean technology as solutions for transition.
- Disclose GHG emissions and energy use.

Risk Management:

- Identifying and assessing climate-related risks.
- Stress-testing and scenario planning.
- Identified sectors and respective impacts.
- Climate-related risks managed by Group Enterprise Risk Management Framework (board approved).
- Three lines of defence risk operating model and management process of evaluation, response and monitoring.
- Reduce environmental and social risk exposure.
- Managing and reporting risks.
- Publish sector financing standards to guide decision-making for numerous sectors.
- Adhere to equator principles.

Metrics and targets:

- Monitoring and reporting to improve over time.
- Reporting on climate-sensitive sectors, high emissions sectors, and exposure to fossil fuels.
- Smaller direct environmental footprint than indirect – operational footprint = building occupancy and business travel.

Targets:

- Aim to arrange R100bn for ESG projects by 2025.
- Business banking SA aims to finance 250MW or R2.5bn of renewable energy.
- Aim to finalise sustainability principal risk framework by June 2021.

- Aim for 51% reduction in carbon emissions by 2030.
- Energy target – 30% reduction by 2030 through driving efficiency in internal behaviour and technology change.

Performance:

- Largest funder of renewable energy in SA by MW financed.
- Financing 33 projects, R80bn, 2916MW capacity and 46% of all renewable energy projects in SA.
- Loans for solar PV for small-scale generation went up by 30% in 2020.
- Partnered with real estate organisation to provide first eco home loan to create more access to green homes.
- Participate in awareness raising events and sponsor awareness conference on solar power.
- Included climate-related scenarios in annual budgeting and capital stress-testing in 2020 – will expand horizon and incorporate science-based targets.
- Renewable energy accounts for 2.2% of loans = 69% of energy funding.
- Involved in the refinancing of concentrated solar power projects under department of mineral resources and energy's Renewable Energy Independent Power Producer Procurement Programme.
- In 2020, 21% decrease in carbon emissions – overall decrease so far is 34%.
- Increase in intensity ration for scope 1 and 2.
- Continued reliance on fuel generators due to load shedding.
- Decline in scope 2 and 3 emissions in the past year due to COVID-19 lockdown that resulted in employees working remotely and a decrease business travel.
- 23% energy reduction as of 2020 – anticipate surpassing target.

J3:

- Released policy statements committing to improve our preparedness for the unwanted climatic events, disclosures and to drive quantitative performance in water management, energy, and carbon emissions.
- In the last 11 years we've been reporting with the CDP until this year.
- We committed to disclose under the recommendations of the TCFD – we were the first JSE listed mining company to publicly support and publish our report this year.

- We were beaten on the JSE by SASOL which is a chemicals company.
- We take it from both mitigation and adaptation.
- We are keeping our eyes sharply on this considering our emissions come from the fuel and electricity that we use.
- We are beginning to look into what could happen to that footprint when we have to close – can we turn it around into an asset and use it for generating power or to plant trees for carbon sequestration.

Reports:

J3: TCFD

Governance:

- Board oversees climate-related strategy, performance, risks, vulnerabilities, and opportunities.
- Board assisted by Safety, Health & Sustainable Development, Social & Ethics and Transformation and Risk committees.
- SHSD committee benchmark ESG reporting and performance relative to peers (with SET) and approves and recommends environmental, sustainable development and climate change policies.
- SET committee works with SHSD on ESG.
- Risk committee considers and approves regional and emerging risk registers including climate-related risks.

Management:

- CEO is a conduit between board and management to oversee and implement board-approved climate change strategies and policies as part of hers/his balanced scorecard.
- Executive committee develops and implements board-approved climate change strategies and policies and reviews performance against objectives and KPIs.
- SD function is a multidisciplinary group of experts covering overarching sustainability strategies to provide strategic guidance and support. Part of ICMM biodiversity, water and climate change working groups.
- Working committees including ESG steering committee, water working committee and energy forum.
- Regional energy managers support implementation of energy and carbon management strategy.

Strategy:

- Sound water management.
- Looking to introduce electrical vehicles underground and above – collaborating with manufacturing companies and mining peers.
- Exco is developing ESG charter including decarbonisation and resilience to climate change and water stewardship.
- Energy forum aiming to provide direction to drive regional decarbonisation plans in line with 2050 net zero targets.
- Decarbonisation is a strategic priority.
- Committed to Paris Agreement net zero target by 2050.
- Context-specific adaptation and mitigation.
- Group water stewardship strategy approved, and regional plans developed.
- Engage host communities on climate change risks and opportunities – set out engagement framework.
- Scope1 & 2 emissions reporting including reduction targets.
- Engage governments, peers, and NGOs for development of effective climate change policies and lobby for appropriate regulations.
- Innovation and low emissions technology, energy efficiency projects and renewable energy – part of ten working groups.
- Carbon pricing and least-cost pathways – developing different regional shadow carbon prices.
- 5-year water strategy focused on security of supply, water efficiency, and catchment management.
- Water management stakeholder forums formed.
- Collaborations with neighbouring mines to restore river.
- Aware of growing concerns of investors on ESG performance.
- Gold considered to be relatively lower in contributing to GHG emissions and can transition to net zero in a practical and cost-effective way.
- Outline how gold can be used in technology for low carbon future.
- Operational efficiency to mitigate.
- Increase offsets.
- Adopted an integrated approach to climate change mitigation and adaptation.

- Modernisation roadmap developed around 3 ESG plans to enable transformation culture, organisational effectiveness in transitioning to future work.

Risk management:

- World economic forum identified failure of climate action as the number one global risk.
- Climate change risks and vulnerability assessments to be conducted every 5 years and incorporated into Group and regional business planning and risk registers.
- Working towards electrification, renewable energy and automation of mines and remote operations.
- Identified extreme weather conditions as the 2nd most impactful risk and second most likely long-term risk after infectious diseases.
- Risks assessed by management at all levels as a collective effort.
- Identifying the appropriate mitigation actions to reduce potential impacts of identified risks.
- Risk mitigation included in management scorecards.
- Analyse strategic and emerging risks and macro-trends to develop registers and actions.
- Risks are reviewed and updated quarterly and presented to board bi-annually.
- Risk management is shaped by dynamics of context of operation.
- Developing time-bound roadmap for biodiversity.
- Aligning conservation efforts with climate resilience.
- Financialising natural resources and the impacts on them
- Annual ESG materiality analysis including environmental material matters.
- Clearly identified climate change risks and impacts to business as well as impacts, levels of vulnerability and affected business processes.
- Clear adaptation plans.
- Clear understanding and stipulation of why certain climate actions are top 5 priorities.

Targets:

- 15% reduction in carbon emissions through initiatives in 2021 business plan.
- Initiate solar plant for 2022 completion.
- 5% energy saving through energy saving initiative.
- Recycling/reuse 68% water used.

- 3% freshwater intake reduction.

Performance:

- 4% reduction of energy/electricity purchased.
- 3% reduction in diesel consumption.
- Slight increase in scope 1-3 emissions.
- Achieved 110% of GHG emissions targets for 2020.
- Achieved 126% of targets for energy savings in 2020.
- 71% recycling and reuse of water.
- 4.6GL less freshwater withdrawal than target.
- 17% reduction in water withdrawal per tonne processed.
- Significant reduction in freshwater withdrawal since 2017 – from 3.3GL to 1.1 GL.
- A ranking for CDP water disclosure programme.
- Water stewardship strategies developed at group and regional level.
- Mitigation efforts by energy saving and energy efficiency has resulted in cost savings.
- Third TCFD report.
- Numerous environmental and climate change policy statements.
- Achieved 80% of 2017-2020 cumulative carbon emissions reduction target.
- Have a mature GHG emissions reporting culture.
- First CDP report in 2008.
- 2016-2020: cumulative energy savings of US$144m.
- SA mine had higher emissions intensity than other regions due to EXCLUSIVE use of coal fired electricity.
- Obtained generating licence from NERSA for 40MW solar plant to provide ~20% of electricity needs.
- All mines are ISO14001 certified.
- No high-level environmental incidents in 2 years.
- Reduced level 2 environmental incidents from 131 to only 12 in 4 years.
- 60% recycling of all non-mineralised waste.
- Committed to 20% renewable energy generation over the life of mine of new projects and extensions.
- All mines on track to progress to ISO5001 certification by 2023.

J4:

- Advocating for sustainability in supply chain.
- We focus on energy efficiency as this accounts for 75% of our emissions (electricity).
- Ramping up renewables/ solar PV (not required by law).
- Programmes in place to address climate change (sourcing) directly and indirectly.
- We are part of global commitments (Paris agreement) and engage in GHG reporting.

Reports:

J4: GRI sustainability report

Governance:

- Board involved in sustainability agenda.
- Social & Ethics committee discusses sustainability risks including the environmental dimension relating to climate change, energy use, water security and waste generation.
- Risk committee is responsible to the board for overseeing the Group's risk management programme – including strategic/ environmental risks.
- 3 full time recruits responsible for identifying key environmental risks.
- Group corporate affairs executive identifies and quantifies climate change risks.
- Each divisional executive committee discusses the division's exposure to climate change.
- Group risks and reprioritise risks if appropriate and reflect specific divisional concerns.

Strategy:

- Short – medium-term agenda focusing on sustainable supply and consumerism and reducing group environmental footprint.
- improve energy efficiency, recycle & create recyclable packaging and rainwater harvesting.
- Tackling plastic waste and addressing single use plastics.
- Transitioning from virgin materials to post-consumer recycled materials.
- Limiting size and quantity, types and colours of ink used.
- Actively participating in environmental workshops.

- 10-year-old programme for supplier environmental packaging, screening of high-risk products and environmental assessments – programme stopped in 2020 to resume in 2021.
- Provide feedback to suppliers on their performance in relation to set standards and peer performance for environmental issues including climate change.
- Recognise good performing suppliers through awards.
- E-waste recycling project – take back from customers.
- Operational energy efficiency – to drive down costs and emissions related to grid electricity energy which is a significant portion (75%) of the organisations GHG emissions.
- Monitor supply chain through 3 initiatives.
- Member of/subscribes to: FTSE/JSE responsible investment index, CDP, KING IV, GRI, and BUSA.
- Multiple stakeholder engagement programme – WWF, UNDP, DOE, DEFF, and other environmental groups.
- Mitigation – R60m so far.
- Calculate and verify carbon footprint annually.
- Track and monitor impact of interventions and identify further opportunities.
- Reduce energy and water requirements of products and services.
- Tracking and monitoring water usage at higher consumption facilities.
- a
- Collaboration with WWF and Wits to promote/ ensure accuracy.
- Improving recycling rate by circulating online waste assessment, working closely with waste service providers and monitoring waste generation.

Risk management:

- Environmentally responsible merchandise.
- Committed to increase the penetration of energy rating labels for appliances.
- Engagement with DOE, suppliers and, UNDP for energy efficient appliance labelling.
- Risks are prioritised based on probability and potential impact to operations and current business structures and consequences of acting or not taking action.

- Climate change risks are identified and quantified through desktop research, consultation with experts, workshops with internal managers (such as risk managers), and consultation with business unit senior managers.
- Risks are also discussed with external groups such as NBI.
- Risks identified not considered significant in the medium term.
- Risks are tracked and updated on an ongoing basis and reported in CDP of international parent company.

Metrics and targets:

- Clear emissions reductions targets.
- In pursuit of 100% recyclable private label packaging by 2025.

Performance:

- Identified by FTSE-JSE Responsible Investment Index in December 2019.
- Installed energy efficient lighting, smart building management systems, efficient refrigeration and HVAC systems, and energy meters in stores.
- Group store energy intensity decreased by 14.5%.
- Achieved 200% target reduction in electricity intensity and saved R100m.
- 9 solar plants.
- Use rainwater and refrigerant condensate to supplement non-potable water needs – in 2020 achieved 25 million litres of water.
- Water saving devices in stores and water-wise indigenous plants.
- Engage in separating and recycling in 93% of stores.
- 4% decrease in waste diversion in 2019.
- Decrease in total volumes of waste recycled – since 2015.
- Decrease in the generation of non-recyclables.
- Increase in volumes of hazardous waste generated between 2018 and 2019 and reduction in 2020.
- No recent data on E-waste generated but e-waste recycling has been made available to customers.
- 92% of private label packaging is recyclable.
- 7% made of recycled content.
- 17% compostable.
- 8% biobased.

- No environmental non-compliance fines.
- Significant increase in delivery vehicles emissions.
- Business air and road travel emissions account for 0.26% of total emissions.

J5:

- If the government brings something good for the environment like the Carbon Tax, we make sure that we are compliant and that businesses we invest in are interested and making a change.
- We are trying on the awareness side, a lot of employees care about it and there's a lot that are not so sure so we are trying to educate them.
- This year our education focus is plastic because obviously that's the flavour of the year so we've removed specific single use plastics and polystyrene cups from our offices.
- We are taking an ambitious route of targets – Net Zero targets.
- We set Net Zero to landfill waste by the end of 2020 targets.
- Net Zero water targets – we are capturing all our water onsite and storing it, reusing and recycling it within the building.
- We do our best to watch the new technologies that come.
- From the responsible investment side we are interested in companies that are taking a stance on changing and reducing their impact on climate change.
- In our canteen, we have switched over from all polystyrene take away containers to environmentally friendly ones that we can compost.
- Coffee lids are compostable and come at an extra cost to instil the understanding of post-life costs.
- Working with the WWF.
- Looking at improving waste separation and education of the separators so that plastic is separated properly into the different types and sent to the right factories.
- At our large shopping centres we have two large composters that deal with a few tons of waste a week and we put all organic waste in there.
- We have installed solar on this building and the parkade across but it doesn't account for 100% of our energy use.
- We've implemented a water conservation project – we've double piped the building, done water balances, added water tanks that catch rain water and we use a combination of

borehole water and a backup of municipal water – that produces ~ 1 million litres of water onsite which can sustain water needs for three days with no municipal water.

- Looking at TCFD and improving responsible investments – like getting a coal policy to help with management and having very specific scorecards for evaluating investments.
- We attend industry events and discuss that with key players in our field about how we can collaborate with government.

Reports:

J5: TCFD and sustainability report

Governance:

- Report to a variety of frameworks – GRI, King IV, FYSE/JSE, CDP, and others.
- Board is responsible for effective governance of risk management.
- Clearly defined roles of CEO pertaining to risk management.
- Group Risk Committee oversees risk and capital management.
- Social ethics and transformation committee is responsible for the management of approach to issues of good corporate citizenship and sustainability including environment and climate change.
- ESH committee: guidance on ESG matter, appointed and accountable to CEO, and monitors and reviews ESG investment processes and outcomes.
- Several committees that discuss ESG matters in detail as part of investment considerations.
- Broad set of ESG guiding principles for investment decisions.

Strategy:

- Monitor, measure and analyse electricity supply, water usage, and waste management monthly – also for tenants to raise awareness and suggest action.
- Part of FTSE/JSE indices.
- Active management of carbon footprint.
- Implementation of decarbonisation strategy (net zero targets).
- Extensive resource management programme to ensure effective of Group's impact on climate change.
- Invest in assets with significant ESG focus.

- Taking up opportunities to finance more sustainable investment such as renewable energy.
- Launched fund for impact investing.
- Will not allow funding of new coal power plants that don't meet the OECD protocols in international and development association rated countries.
- Coal projects and those that derive part of their revenue from coal should meet supercritical and above technical specifications

Risk management:

- Assess environmental impacts on supply chain and find measures to enhance SEE.
- Unlikely impact of physical climate change risks in the short-term.
- Clear assessment of physical and transitional risks.
- Reputational risks – regulatory developments around climate change disclosures.
- Monitor and report SEE aspects and activities to feed into business decisions.
- Initiatives monitored by SET committee to ensure ethical and responsible management of climate change related issues.
- GRES department implements infrastructure-related sustainability projects focused on energy, water, and waste.
- Review industry trends to provide guidance on ESG matters.
- Risk management framework is supported by 4 policies, processes, and activities relating to management and reporting of risks (ESG-related and climate change).

Metrics and targets:

- Net zero targets for waste (2021), water (2025), and energy (2030).
- Aligned to GBSA targets.
- Aim to eliminate single use plastics in retail portfolio – currently raising awareness and conducting research to achieve target.

Performance:

- Investing in solar power for buildings, harvesting rainwater, composters, and rooftop gardens and urban farming.
- B rating for CDP in 2019.
- 4.2 score on FTSE/JSE index – high achievement.
- Part of top 30 FTSE/JSE responsible investment index in 2020.
- Funding infrastructure development and the transition to green, low carbon economy.

- Greywater system used to flush toilets.
- 6-star green rating for one of buildings, 5-star rating for 4 buildings and 4-star for one.
- Single use plastics reductions and awareness campaigns.
- Disclosure with TCFD.
- 73% waste recycling rate – appoint responsible and reputable waste contractors who also educate employees and encourage responsible behaviour.
- Offset 7% of buildings water consumption by harvesting.
- Reduced reliance on municipal water by 10% for building.
- Decrease in electricity consumption in 2020.
- Saved R2.3m in energy use due to solar PV project.
- Implemented rezone project (heating, ventilation, and air conditioning) in 2020 – expect to save 2245tCO_{2e} annually from 2021.
- Carbon footprint is reducing.
- Main emissions – business travel, waste to landfill, purchased electricity – scope 3 emissions which are 60% of footprint.
- Introduced reverse vending machines to encourage and educate customers on recycling.
- Reduced 3.6tCO_{2e} emissions.

J6: Climate Change Response Strategy & TCFD

Governance:

- Meets all 7 TCFD governance requirements.
- Board oversight of pathways to follow to remain sustainable in dynamic climate policy environment and transitioning economy.
- Board and its subcommittees are mandated to address climate change among other ESG and integrate into business process.
- Board subcommittees and management committees with climate change mandate.
- At board level: Sustainability, risk and compliance committee, Social and Ethics committee, Remuneration and nomination committee, audit committee, and investment review committee.

- At executive level: sustainability forum to ensure climate change integration by managers and sustainability committee to track performance against climate change KPIs and ensure technical support.
- At operational level: sustainability committee tracks performance and ensures operational controls are in place for mitigation of risks.

Strategy:

- 2020 strategic direction was re-evaluated through multistakeholder engagement to support transition while meeting immediate energy needs.
- Will continue to provide coal to Eskom in alignment with IRP-2030.
- Trying to maximise value of coal assets in shortest possible period.
- Align with Just Transition principles which consider the triple bottom line.
- Accept science-based climate change evidence.
- Support implementation of Paris Agreement.
- Not seeking further growth opportunities in thermal coal.
- Transition requires partnerships with government, communities, businesses, and academia.
- Will establish multistakeholder Climate Change Technical Advisory Committee to improve mitigation and adaptation efforts and effectively address climate change issues throughout business processes.
- Active involvement in local and international business climate action networks – to share knowledge, seek bold – new approaches toward portfolio resilience.
- Market dynamics and COVID are good reminders of the need for good financial performance to support in low carbon initiatives/innovations.
- Role of businesses is to adopt low carbon technologies and drive innovation in product design to achieve objectives of the Paris Agreement.
- Reviewing organisational approach to leverage critical competencies while securing new revenue opportunities.
- Meets 6/7 TCFD strategy recommendations.
- Developing climate change scenarios using IPCC and IEA data to guide strategic response.
- Basing portfolio resilience strategies on 1.5°C world.

- New Sustainability, growth and impact strategy is well positioned to take advantage of the climate related opportunities in energy sector.
- Business portfolio will shift to more sustainable businesses mainly: renewable energy and potentially minerals contributing to low carbon world.
- Multicore business building on existing skills and infrastructure.
- Optimising coal reserves to minimise loss/stranded assets in transition.
- Main objectives are to transition at speed & scale and be carbon neutral by 2050.

Risk Management:

- Clearly defined transitional and physical risks.
- Risks of stranded assets due to transitional and physical risks of climate change.
- Scenario analysis.
- Clearly defined opportunities presented by climate change.
- Material matters determined through rigorous process.
- Process incorporates business sustainability considerations to ESG aspects.
- Materiality determination includes assessing stakeholder reports, analysing external sources (media), analysing per reports and internal documents.
- Mature risk management culture which is central to responding climate change.
- Pressure from consumers, activists, and shareholders for greater visibility and transparency of carbon footprint and emissions reduction strategies.
- Meet 6/7 risk indicators with greater emphasis on mitigating carbon price and water security risks.
- Well-defined and integrated processes for identifying and managing climate related risks and opportunities.
- Integrated into current decision making and strategy formulation.
- Embedded in all processes, functions, and systems.
- Risk and crisis management both Board objectives.
- Risk scores based on likelihood and impact of eventuality – climate change is a long-term concern and risks share interdependencies with other risks.
- Credit and insurance risks.
- No more financing of new coal projects as well as phasing out of coal is forcing transition – seen an increase in insurance of assets in the past 5 years.
- Carbon pricing risk – increase in carbon pricing and operating costs of compliance.

- Scenario analysis of carbon pricing and resulting effects on operating expenditure.
- Water security risk: net positive water contribution to natural system, collaboration with government to supply water through augmentation of infrastructure and developing water conservation plans (treatment plants and optimisation of water storage infrastructure).
- Physical risks: scenario analysis of worst-case scenario.
- Clear understanding of potential impact of physical on entire value chain.
- Aware of risks on production if they fail to mitigate the physical risk.
- Clear prediction of risks of heatwaves, droughts, and extreme rainfall.
- Clear awareness and some experience on potential impact of some extreme weather events.
- Will be focusing on investments in adaptation in and around current business operations.
- Proactive reduction of air pollutants from operations and creating awareness with local communities.
- Constructing new water infrastructure, modelling climate risk in water planning and infrastructure design, repairing, and retrofitting facilities for efficiency, and plan for climate change.
- Ecosystem protection through maintenance and restoration of wetlands, preservation of land and partnering with farmers to promote climate smart agriculture development, and preservation of habitats by integrating protected natural habitat in operations.
- Supply chain protection – partner with supply chain partners to create early warning systems and long-term climate resilience plans based on climate risk model.
- Encourage GHG reduction.
- Climate related risks are low in the short to medium-term but expected to increase significance in the long-term.

Metrics & targets:

- Meet 9/9 TCFD metrics and recommendations.
- Carbon neutral by 2050 by reducing GHG emissions and developing partnerships to promote offset programme.

- In the next decade will leverage opportunities in renewable energy, clean sources of fuel and electric vehicles.
- Aligning GHG emissions reductions targets with science-based targets.
- Aim to report with CDP to verify alignment with science-based targets.
- ESG metrics for energy intensity, GHG intensity, CDP performance and ESG performance.
- Identifies additional metrics and targets to reduce GHG emissions.

Performance:

- Aligned with TCFD in 2019 – assessment done by independent consultant.
- Been transitioning since 2010 – increasingly responsive to climate change risks and opportunities.
- Transition encouraged - R1.5bn investment in wind energy generation.
- Water intensity increased between 2019 and 2020.
- Historical GHG emissions intensity has been on a decline since 2013.
- Already began aligning strategy to support mitigation of climate related risks and harness opportunities.

J7: CDP

- Have experience in climate change impact – impact on sales due to ongoing droughts.
- Increase in bottled water sales during drought and subsequent decrease after drought subsided.
- Operational costs of water increased significantly in some areas due to droughts – short to long-term impacts.
- Data limitations and complexity in calculating total emissions from purchased goods and services – but relevant.

Governance:

- Board level oversight of climate relate issues and give guidance on strategy.
- Director for transformation deals with CSR and climate change related projects and initiatives.
- Management is responsible for climate change mandate.
- Climate change performance objectives and strategies reviewed by board quarterly.
- Sustainability committee and sustainability/environmental manager is responsible for assessing and managing climate related risks and opportunities.

- Climate change lies with executives and senior management
- Sustainability steering committee made up of CEO, transformation director, director of corporate affairs and GM sustainability – review progress of climate related initiatives and approve the implementation of new projects.
- Ethics committee involved in climate change discussions.
- Operational steering committee – operational divisional general managers and heads of business units – review activities and engagements to ensure consistent alignment with overall climate change strategy.

Strategy:

- Monetary incentives for select management of climate related issues like emissions reduction and energy efficiency.
- Opportunities must align with solid business case and be in line with climate change strategy before implementation.
- Scope of strategy review is organisational operations, supply chain and customer – engage suppliers and customers on climate related issues.
- Increasing and deepening transformative capabilities and increasing connectivity to other businesses and stakeholders.
- Sustainability integrated into internal audit process.
- Improving sustainability data capture and management across all departments.
- Reviewing procurement policy to drive responsible practices throughout supply chain.
- Have developed a low carbon transition plan.
- Scenario analysis by NBI to inform strategy.
- Scenario analysis explored 4 scenarios – status quo, state-led, consumer-led, and partner-led (government &business) – and found that the collaborative partner-led scenario is the most effective.
- Scenario analysis also informs energy strategy.
- Drive investment in emissions reduction activities – dedicated budget for energy efficiency driven by regulations such as carbon tax.
- Using the Greenhouse Gas Protocol: A corporate accounting and reporting standard to collect activity date and calculate emissions.

- Use carbon tax carbon pricing as internal price of carbon to navigate GHG regulations and change internal behaviour – expect to pay R300k a year during phase 1 with 60% tax free allowances.
- Collect climate change and carbon information annually from 27% of suppliers – will expand initiative.
- Engagement focused on managing food security in the face of water scarcity and drought through education and access to market strategies for farmers.
- Engagement in Trade Associations to influence public policy on climate related issues.
- Aligned with NBI, BUSA and Sustainable retailers forum.
- Engaging with business and government on climate change issues to drive clarity and simplicity in climate change related regulations.
- Make commentary on drafted legislation at NBI facilitated workshops.

Risk management:

- Climate change is recognised as a material concern that is likely to affect company strategy adoption, operation, and value creation.
- Process in place for identifying, assessing, and responding to climate related risks and opportunities.
- Physical and reputational risks are used as examples of risks with substantive financial and strategic impact – changes in precipitation patterns, extreme variability of weather conditions leading to increased capital expenditure.
- Clear description of potential impact of risks.
- Above risks are considered short-term risks.
- Description of response strategy and cost calculations.
- Reputational risks hinge in the preferences of clients and have the potential for financial impact, however, it is difficult to quantify.
- Climate related risks and opportunities are integrated into multidisciplinary, company-wide risk management process and addresses in strategy– covering short to long-term.
- Detailed and clear understanding and listing of potential risks and risk types relating to the business.
- Identified opportunity to increase revenue due to extreme weather events.

- Identified opportunity to be proactive and lead change by addressing issues relating to climate change to improve sales and share price.
- Climate related risks and opportunities influence financial planning, revenues, direct cost, and capital expenditures.
- Sustainable seafood sourcing leading to improvements in credibility of sources.
- Supply chain risk study to identify sustainability risks faced by specific product categories and prioritise based on category.

Metrics & targets:

- KPIs are emissions reduction targets, renewable energy targets and energy efficiency targets.
- Working on aligning targets with Paris Agreement.
- Planning to register carbon offset administrative system.
- Targets in use are not science-based.
- Energy efficiency through lighting – requires R6m investment resulting in R2m per year savings.
- Company policy or behavioural change in terms of resource efficiency – investing R1.5m in technological and behavioural interventions for total of R200m savings.
- Track online shopping emissions.
- Breakdown emissions by greenhouse gas type and by activity for scope 2.

Performance:

- R874m invested in store refurbishment with energy efficient lighting and refrigeration.
- Variety of initiatives to minimise carbon footprint.
- Investing heavily (R3m) on energy efficiency retrofitting and exploration of renewable energy – wind and solar.
- Investing in measuring impact and communicating actions.
- Investment in raising awareness - excess of R3m.
- Increased climate change communication internally and externally through sustainability newsletters and reports.
- Identified an opportunity to save between. 50k and 200k as tax concession for energy efficiency.
- Planning to register carbon offset administrative system.

- Green range of products.
- Investing in CSI activities to support those vulnerable to climate risk.
- Installed back -up water tanks at at-risk stores and incorporated these as part of new store development specs.
- Increased capital expenditure on new developments.
- Launched a project with all suppliers to mitigate climate change and drought related risks included in financial planning process.
- Installing online water meters in all stores to be completed in 2021 – will impact direct costs of water usage.
- Achieved -71% of absolute emissions reductions targets.
- Achieved -32% of emissions intensity targets.
- Targets failed due to expansion and increase in SA carbon factor in the past year.
- 4 implemented emissions reduction initiatives – 2 in the process and two already done.
- 5 initiatives haven't been implemented – 4 under review and 1 yet to be implemented
- Initiatives have clearly defined total reductions targets.
- Low carbon products in lighting technology causing 3rd party GHG emissions avoidances - <1% of revenue.
- 17063.3tCO_{2e} energy related activities emissions excluding fuel.
- 49104.84tCO_{2e} emissions from upstream transport and distribution.
- 14800.1tCO_{2e} waste generated from operations – track waste generated closely in environmental accounting and operational efficiency.
- 4548.8tCO_{2e} business travel emissions.
- Gross global combined scope 1& 2 emissions increased by 16%.
- Change in methodology and boundary resulted in an overall increase in emissions despite decreased emissions due to renewable energy investment and energy saving initiatives.
- 10% < total operational spend on energy<15%.
- Third party verification or assurance in place – not all reported information is verified yet.
- Running an engagement campaign to educate ~ 10% of customers about their climate change performance and strategy – difficult to determine the reach of communication from various platforms.

- Increase in sales of environmentally friendly products.
- Multiple reports published.

J8: Integrated report

Governance:

- Internal climate change working group as of 2019/2020.
- Mandate of internal climate change working group is secured by executive committee who lead development on an updated climate change response.
- Climate change working group is not part of risk governance structure.

Strategy:

- Internal climate change working group is tasked with developing objectives for climate change resilience.
- Developing climate mitigation targets aligned with business plans and supported by internal climate change performance incentives.
- Implementing TCFD recommendations.
- Virtual workshops by Acclimatise.
- Still developing appropriate climate change strategy with related targets.
- Identify and align corporate targets with SDGs and other guidelines.
- TCFD 2021 disclosure in the works.
- Maintain compliance with variety of frameworks, standards and guidelines.
- ESG principles integrated into every aspect of business.
- Demonstrating responsible environmental stewardship critical for social license to operate.

Risk management:

- In 2020 the focus was reviewing climate related risks integration into core business.
- Updating knowledge on physical risks in locations of operation.
- Climate risks assessment and using current climate models under 3 temperature scenarios.
- Outlining of climate adaptation plans but haven't yet been initiated.
- Robust materiality process that accounts for economic, social and environmental matters that present risks.

- Considers the input of stakeholder and the external environment.
- Climate change was identified as a risk cutting across disciplines.
- Climate change rates 7.5/10 in terms of significance to stakeholders and 6.5/10 in terms of significance of impact on organisation's ability to create value.
- Water, climate change and energy use were material matters of 2020.
- Climate change is low on the list of material matters posing risks in long-term although acknowledged as potentially affecting multiple dimensions – natural capital, manufactured capital, financial and social and relationship capital.
- Climate change and decarbonisation efforts, management of water as a scarce resource and increasingly comprehensive reporting and disclosure requirements pose a risk to the organisation's ability to create and preserve value.

Metrics and targets:

- Long-term emissions reductions through changes in asset mix.
- 2021 setting new medium-term targets and possibly progress to working towards net zero emissions.
- Will maintain and improve ESG performance and set targets and transparently report progress – due to increase in stakeholder/societal expectations for ESG performance.
- Aim to mitigate carbon footprint through gains in energy efficiency.

Performance:

- Sold assets in SA resulting in an overall reduction of GHG emissions – as SA was a high emitting asset.
- In 2018, reached target of 30% reduction in GH emissions intensity between 2008 and 2022.
- Increased GHG emissions intensity in 2020 but still su43% below base year.
- 48% reduction in absolute carbon emissions since base year.
- Material reductions achieved through energy efficiency and fuel switching projects.
- Decrease in GHG emissions and energy consumption between 2010 and 2020.
- Decreasing trend since 2016 but slight increase in 2020 in GHG emissions intensity and energy intensity in 2017, 2019 and 2020.

J9: Integrated Report

- Stakeholders influence and interest matrix:

- Government and regulators, customers and shareholders are high on the influence and interest quadrant.
- NGOs and activists have a high interest and low influence.

Governance:

- Climate change overseen by Social and Ethics committee – monitor activity relating to legislation and other legal requirements and prevailing codes of best practice relating to including the environment.
- Board and executives are involved in risk review.
- Group risk and compliance committee not in climate change mandate.
- Board is accountable for the direction of risk management and mitigation strategies.
- Executives control and manage risks – individual executives responsible for specific risk.
- 83% of board and Executive committee have expertise in steering responsible environmental practices and social responsibility initiatives.

Strategy:

- Consumption of natural capital is carefully managed under well-established Good Business Journey.
- Contribute towards public policy formulation for conducive regulatory environment for business sustainability.
- Participate in academic research for future of sustainability.
- Engage with various media sources.
- Immediate priority is to stabilise business, protect liquidity and strengthen balance sheet.
- Board focus area in 2021 is to consider the effects of climate change and long-term impacts on operations and oversee strategy implementation.
- Sustainability committee focus for 2021:

- Evaluate the effects of climate change and impacts on value chain.
- Focus on packaging and evolution of targets beyond 2020.
- Water in value chain and development of a roadmap to 2050 target.
- Renewable energy sourcing.

- Comply with governance principles of King IV and requirements of JSE listing.
- Encourage the development and diffusion of environmentally friendly technology.

- Initiatives to promote greater environmental responsibility – support a precautionary approach to environmental challenges.
- Sustainability scorecards rolled out bi-annually in alignment with Good Business Journey goals and commitments, KPIs, objective, and targets.

Risk management:

- Integrated risk management approach.
- Climate change is not listed as one of the 12 main principal risks – it is listed under business resilience risk amongst other influences.
- Unreliable electricity supply is a material issue in SA.
- Climate change is a concern for Group, stakeholders, customers, and suppliers – food safety, food security, packaging, and ethical sourcing.

Metrics & targets:

- Zero packaging waste to landfill by 2022.
- Phasing out single use plastic bags and replace all packaging with reusable/recyclable options.
- Net zero carbon impact by 2040.
- Source 100% of energy from renewable energy sources by 2030.
- Work with suppliers and partners to create net positive water impact by 2050.
- All private label products to support regenerative farming practices by 2030.

Performance:

- Profits were lower in 2020 due to COVID.
- 5 plastic bag free shops.
- Rollout of reusable bags, paper bags, coffee cup recycling bins at 36 stores and 2 reverse vending machines.
- Paper straws, paper stem earbuds and wooden cutlery.
- One of founding members of SA plastics pact.
- Part of 3 prestigious sustainability indices including FTSE/JSE responsible investment index and Dow Jones World Sustainability Index.

Lower Right Quadrant

Considering the social dynamics in South Africa:

- SA context is more complex as the country is faced with social issues that need attention at the same time as global environmental targets for climate change.
- Climate change cannot be focused on alone, we have to look at socio-economic impacts and do a scenario that also increases jobs and the economy at the same time.
- The challenge is that South Africa contributes about 1.5% of the global emissions and is a developing country.
- At the moment government is quite rightly working on service provision, immediate issues that many communities face and the energy crisis, all which have roots in the apartheid era.
- We have to make honest and hard decisions about generating enough electricity so that our economy keeps growing so everyone can access an income and a livelihood at the same time we've got to weigh that up against what we are doing to the planet.
- There are concerns around the inability of especially vulnerable communities, and poorer communities to deal with climate change impacts and how does one actually support those families.
- Climate issues cannot be solved if people are unable to take on and hold accountable businesses and government because they are worried about what they are going to eat the next day – we need to tackle it through the lens of inequality alongside the environmental strategies.
- There are many social issues of concern in SA – a GBV march or a youth unemployment march will have a much greater focus than a climate march.
- The just transition is all about jobs – it has a social lens rather than a blend of the economic and social lens.
- People who fall at the bad end of the inequality scale will be the most affected by climate change impacts – the wealthy and well of are probably going to be able to do what they need to do to carry on with their lives even with the rising temperatures and increasing food prices etc.
- We need to look at it from a lens of inequality and understand what perpetuates and creates inequality – looking at for profit business principles and the legacy of the colonialism.

Politics and Government systems:

- At the moment, the government is not as good a support because a lot needs to be done.
- We have a lot of things going, they are not coordinated/sequenced.
- We need a much better-informed government and policy community, so they get an expanded notion of what is needed and that to cascade down to local level.
- We have no coherent and very sharp focused strategies on what we should be doing due to a lack of leadership in this country.
- Government don't have the political will.
- Government doesn't give that much information.
- The current global climate of politics and negotiations strategy for getting people to commit to different things is not effective.
- BEE can be an enabler for climate action.
- Renewable energy bidding programme is currently slowed down and it's quite difficult for companies to set up their own independent power producer – it's complicated and cumbersome.
- There is a need for government certainty.
- Global pressure will be placed on us as a country to actually comply with our international commitments.
- Our latest IRP states that by 2050 the expectation is that 20% of our electricity will still be generated by fossil fuels while the world is talking about transitioning from fossil fuels by 2035 and being carbon zero by 2050.
- Harsh decisions will not be made because the interministeral committee are conflicted – the minister of energy and mineral resources firstly has a conflict in his portfolio but secondly, he is there to promote the mineral resources sector making it difficult for him to accept the need to transition from fossil fuels.
- We had cycles of government policies – May used to be the energy savings month and there was transportation month, all which government was at the forefront of, but it stopped.
- Projection models looking at GHGs across the country and ways to reduce – mitigation.
- DTI offered a process to help companies increase energy efficiency.
- There will be a carbon offsetting project and depending on how it will be regulated and governed there might be access there for more funding

- In some areas, there could be improvements in policy that allow companies to respond positively to climate change.
- Government policy is not clear in terms of what the country is striving towards, and the government facilitates that.
- A company trying to go green and be efficient get stuck in the bureaucratic red tape and climate action becomes a loss-making exercise because of moving soon while their counterparts and competitors are continuing business as usual.
- Generally, there is some hinderance in terms of companies wanting to do certain things but there is no enabling environment.
- Municipal capacity – it seems to be very difficult and costly to link renewable energy initiatives to the grid through municipalities.
- A business producing energy for their operations wants to feed that extra electricity into the grid and the CoJ is charging R250k to be able to do that.
- Environmental specialists in companies ask the DEA for more regulations because then their CEOs will take them seriously.
- Business get support through the DEA through the Carbon Tax and Climate Change Bill and other environmental regulations which are still at a low level – so there's very minimal encouragement of business.
- We will have corporates that just want to meet legislation and legislation is not strong enough to push this agenda to where it needs to be.
- The policies from government are fairly weak.
- State owned enterprises and departments are trying to keep wealth for themselves – for example, the energy sector is crumbling at the knees of Eskom whilst many corporates and businesses are sitting with excess energy, they could put back into the grid, but legislation does not favour that.
- Government policies around energy need to change.
- The funding of specific projects should be open to corporate and public interrogation where funds are placed for the benefit of the country and not for individuals or individual departments.
- We need policies that are aligned, based on evidence, promote progression at the same time giving options.
- In SA we are challenged with contradicting policies – one department's policy may incentivise doing the wrong thing while another department has different policies.

- We have a very good set of policies that are all pulling in different directions, and they leave you wondering what exactly is expected of you as a corporate citizen.
- You can't – with relative ease – go and implement a renewable energy solution to reduce your emissions because the one policy doesn't allow you to yet the policy from the other department says that is the direction we want to go.
- At the forefront of leadership, policies need to be straightened out to create and stimulate the market for new technologies and long-term behavioural change at a personal level.
- If you don't have that forward looking direction at a country level it becomes difficult for people to have to get going.
- We have the 12L energy efficiency scheme which has proven very cumbersome to administer and to get right – you almost have to hire someone full-time to sit and do the paperwork and that's not how business should be.
- Some policies are enabling, some punitive and some just get you lost.
- Integrating step change solutions like renewable energy is punitive – the policies and mechanisms required are not in place and the costing just throws one off.
- Some companies are saying they are able to pull the decline journey sooner, but they are not enabled to.
- The government has not put the fundamentals in place – such as legislation to collect GHG emissions data to create a repository – to then be able to put a carbon budget law or carbon tax.
- The environmental ministry is always subordinated to trade and industry, treasury and mining and energy – cabinet resisted the merging of energy and environment.
- If government would have the political will and put those two departments together, you'd have a whole different mindset in the country.
- You have got the department of energy doing one thing and the department of environmental affairs trying very hard to support the transition to a low emissions economy, but they are not an oversight department.
- If you have good governance, then you will have good multilateral platforms made up of governments that champion environmental questions.
- Saving the environment is usually driven by these big multinational institutions which are made up of governments – so companies may not necessarily see that as part of their mandates.
- Support can easily be marshalled, it's a question of political will and leadership.

- Legislation has brought issues through the carbon tax, air quality emissions reporting and hopefully soon reporting on energy consumption data annually and energy management plans – forcing businesses to direct greater focus to and resources on the need to operate more responsibly environmentally.
- A study conducted by the energy agency found that the policy coverage for energy in industry in SA was extremely low or non-existent.
- In SA we have certain commitments that we've made, wonderful plans and our national climate change response policy but if you look at our energy policies at the moment it is still not very clear how we are going to achieve those outcomes – it is largely politics that determines whether we get there.
- There are some grey areas if you look at our climate change response policy in terms of our green transport/ urban sustainable transport strategy – it requires a lot of commitments and changes from government and business and realistically speaking what is to say that we will meet our targets if we have not been meeting them to date.
- The pathways and outcomes are clear but vagueness starts to creep in through the nuances like political will, buy-in and unlocking funding –the finer details are what is not clear or realistic strategies haven't really been formulated to achieve that objective.
- "Strong states need strong markets and strong markets need strong states", so if we have a strong state that has effective management, oversight, compliance monitoring, enforcement and good enabling environment, the private sector can thrive, and they can also solve for the challenges in society that need to be addressed.
- There's not a very high price signal through the carbon tax neither is there a very large-scale renewable energy bidding programme underway at present.
- Different governmental agencies have not given a clear vision in terms of growing new sectors of the economy – hopefully we'll see it coming through in the revision of the NDP.
- If you read our latest IRP by 2050 the expectation is that 20% of our electricity will still be generated by fossil fuels and this is problematic because of the commitment to Net Zero by 2050.
- Government is not creating that enabling environment and a lot of the work that is being done are societal driven projects rather than economically driven and commercially viable projects.

Business and financial systems:

- Being an honest, compassionate CEO – not just trying to make profit – is a hard struggle.
- We need reconsider how we view economic growth – the economic growth indicator does not account for socio-ecological bad which should be subtracted from those figures.
- The capitalist system risk models sacrifice human capital/ needs and environmental capital to promote profit and ultimately that is what is at the core of the problem.
- Companies are expected to report along the lines of ESG – companies should be encouraged and there should be a way to ensure that they report factually.
- Early signs through the CDP data suggest that when companies financially quantify this risk and opportunity, they find that it will be significant and really start to drive change internally.
- We have to talk the language of risk and finance with companies because that's the language they understand.
- About 30% of our stock exchange is resource intensive or companies that supply products to the resource intensive sector – South Africa needs to restructure its economy.
- If we transition too quickly or slowly it can create systemic risk not only to the financial sector but to the whole economy.
- Globally, climate change can present business opportunities totaling R12trillion – it has the potential to lead global growth.
- Businesses will never transition quick enough because the reality is that to re-engineer your whole business costs a lot of money and they just don't have the way to do all they need to do quickly.
- From scale to maturity there are a lot of interventions needed – be it equity to enhanced deals, provision of guarantees and risk enhancers – to make a project commercially viable.
- The government has not produced these interventions therefore when they come forward what they want to do, the private sector does not respond because they are good social projects but are not commercially viable and sustainable.
- If you can't get companies to direct change, there is the other lever which is the financial sector or investment sector to really drive that change.
- Companies need to look at new business models and new opportunities to shift to a low carbon economy.

- Company success is based in investors – if investors see a drop in profits or a potential profit reduction, they become concerned and pull out – therefore, investor shock is a big challenge/risk for businesses thinking about climate action.
- They need to foster young ideas and allow them to be heard much more in the companies.
- Companies need a little bit of pressure from the government and from investors to change.
- There is tension between the people that want to change in the companies (the environmental specialists) and CEOs that may not listen to them.
- Businesses are challenged with limited resources, limited time, and limited space to deal with initiatives.
- There will always be a problem as long as in the system of the market, shareholders put pressure on companies to give them the bottom line and rewards relating to shares.
- If there are no government policies, standards etc. then the company will not proceed and pursue those goals.
- The financial sector can leverage their financing to ensure that financed companies identify the risk, manage the risk, and put systems in place to mitigate against climate change impacts.
- Climate bonds are coming through very strongly – money invested into a climate bond must be used to promote either mitigation or adaptation measures.
- Carbon trade – investment in projects that have a climate change benefits like renewable energy, to offset their carbon footprint.
- JSE listed companies are required to have sustainability teams.
- The various rating systems of the JSE look favourably on companies that disclose on aspects of climate change – for listed companies there's global visibility and raising of funds.
- The climate change conversation is catching us where have invested a lot of money in relatively old and archaic systems and it is not easy to go and change that today.
- Businesses do operate in a global competitive environment, so they try to minimise the costs.
- Businesses externalise the cost of the environment to the society – if government forced them to internalise these costs, they would look at it differently.
- Environmentally conscious CEOs face pressure from the shareholders to cut corner to produce high ROI.

- It is a perverse economic system where the incentive is to do as little as possible for workers, consumers, and the environment.
- Corporations are pathological institutions – they have to behave the way they are because they are pathological against the environment, against human beings.
- From a financial and resource point of view – all companies that have adequate resources are to address this in addition to the real reason they are around, which is the bottom line.
- The triple bottom-line allows companies to still make profits but at the same time responding to the needs of the community and the environment.
- Companies on their own can also create their own portfolio where they can collect funds to finance climate action from their own budget, it is not such a big problem in my view.
- Companies struggle with balancing being successful financially in terms of the bottom-line but damaging the environment and saving the environment but not being financially viable.
- Some businesses have to rethink their whole business framework and operations because their current business model is based on benefitting from a fossil fuel sector and that has played out for generations in SA – it is hard, practically, and otherwise
- Some companies have their own support, their own mechanisms, their own media campaigns, and research groups, they are not waiting for us academics.
- A lot of them are doing their own research, their own carbon investigations, their own climate modelling.
- We saw a very slow transition where banks initially sought to fund very large projects with the floor limit of 100 million.
- It is very difficult to get a company to think outside of what the investors want and what they need to do to drive their own profitability, especially in the current economic climate.
- A lot of the traditional investors are not as engaged with climate change issues as they should – internationally yes, but domestic investors aren't.
- Challenges accessing capital for new, big investment projects in the renewable energy/ energy efficiency space.
- Climate change is not incorporated into market prices – it is an externality and attempts to internalise the externalities is quite difficult and the carbon tax is there, but it doesn't send a high price signal.

- Path dependency – for a long time we've been minerals and energy intensive economy with cheap electricity, and we built our economy on that basis – our national utility needs support so we can't just easily turn it into a renewable energy producer.
- In a low growth economy, companies do not have big budget for research and development, new programmes, new investments, and new ideas and so the innovation side is not as good as it could be.
- The most important potential change in the private sector is the TCFD – we can no longer talk about environmental issues and climate change in non-financial terms.
- The importance of the TCFD (driven by very senior people internationally) is now giving companies the ability to quantify in financial terms the influence that climate change has on them – both in terms of risk and opportunity.
- To report that in their financial statements it becomes part of thinking about the business financially.
- CLI report stated that the transition risk from energy and coal alone in this country over the next 20 years is about R1.8 trillion Rands.
- The transition risk relates to stranded assets.
- India and China are the biggest recipients of our coal and are both transitioning out of coal.
- The reality is that 70% of that sector's revenue comes from exports.
- Some directors and board members can be held accountable in their personal capacity for some of the decisions have taken.
- While it is voluntary, the reality is that the investors are going to demand that climate change be put into financials.
- 30% of our stock exchange is susceptible to climate change/climate risk.
- Businesses globally are facing huge challenges around climate change.
- In the COP2, one of the commitments made was that the developed world would provide the developing world with $100million every year to help them transition – as well as in the form of technology and skills.
- SA is a middle-income country, so we don't see any of that money.
- It is key to develop new economic sectors and industries that are green or low carbon – to create new jobs and new opportunities and avoid resistance due to the idea that climate change could potentially threaten certain economic sectors and certain jobs.

- For listed companies, the FTSE Russel index, and other reports such as the KING IV are becoming more onerous, demanding transparency so, companies need to be aware and can no longer use the "I didn't know" excuse.

Business governance:

- Their policy and their purpose for existence it has always been for profit –what generates profit, you continue doing.
- According to the King IV every business in South Africa needs to have an environmental and social governance policy and committees to manage these additional lenses that they may have not factored in ten years ago which are absolutely critical for sustainability.
- CEOs are accountable to shareholders and do what the shareholders expect – shareholders are only concerned about the share price.
- Companies that are managing their environmental footprint probably have good governance.
- Within the organisations of early adopters and market leaders, there is a top management commitment and involvement – they communicate down and allow communication upward and disseminate key performance metrics broadly within their organisations, so it is well understood by everyone.
- Early adopters and market leaders support energy initiatives and incentivise energy improvements – either through incentive targets they set or through promotional opportunities within the business.
- The ESG lens is being implemented in all levels of business.
- Behavioural economics has shown that much is achieved with a top down and bottom-up focus of work, communication and recognition in industrial plants and the private sector.

Incentives or disincentives:

- Government has in terms of policy fallen short but in terms of providing a stimulus in incentives has done well.
- Concession for solar PV up to 1 megawatt without requiring a generation license.
- There are key awareness activities but there are no incentives or drivers.
- Some regions in the world incentivise, and in some it is a stick not a carrot.
- For a growing/developing/ struggling economy like ours, sticks drive people away – cannot be too punitive.

- Funding for climate change globally still sits at 2% compared to the other areas that attract large amounts of funding.
- There is a need to create incentives for change – there is no incentive for businesses to change their practices at this point.
- The penalties are small in comparison to what they can gain – there needs to be far more/ greater consequence for not being more responsible.
- There are certain renewable energy incentives and energy efficiency incentives in place as critical enablers of behaviour.
- Tax incentive for energy efficiency – the 12 L tax incentive – to provide a stimulus for these projects.
- Government has made available a wide range of incentives to industry or the private sector to implement responsible energy measures.
- Manufacturing incentive to replace MSEP.
- Production incentive.
- Most of these government incentives are financial because financial incentives are a key trigger to business.
- Not all the incentives are grants and handouts, a lot of them are tax incentives.
- The 12L energy efficiency tax incentive is one of the biggest successes of government, achieving 24 terawatts hours energy savings and allotting R3,30 in private sector investment per rand of tax.
- renewable energy incentive.
- The tax incentives are good but they probably not going to allow these massive capital refurbishments or new builds that are needed to slow the carbon pathway.

Support for corporate climate action:

- There are some frameworks and programmes for trying to get businesses to understand their impacts and change behaviour.
- Just Share promotes investor awareness in companies – they go to board meetings to promote the improvement of and the inclusion of climate change into their business models.
- Local and international organisations that are helping businesses change the way that they are doing things.

- The WRI and their local partner NBI work with their member companies to help set science-based targets.
- WBCSD and UN compact.
- WWF:
  - looking at different ways that companies can change their ways and offering more information on how firms can reduce their emissions.
  - the WWF steps into communities on behalf of businesses to drive social initiatives.
  - Businesses can sign up with the Alliance for Climate Action in partnership with WWF to take leading roles with working with communities.
  - Trying to get businesses and cities to align around a vision of net carbon zero by 2050.
- NCPC have a free energy efficiency auditing service.
- In terms of financial support, there a few smaller things and companies are not willing finance things themselves – that's why we haven't seen big changes.
- There's also been some options that have come through and not always used –German offer of support to nitric acid plants to reduce their emissions and pay for the process.
- There is funding, there's the German fund, global climate fund, global environment and different pots of money that could be used.
- The CSIR is a resource of untapped intellectual wealth that we as tax-paying businesses and individuals of the country need to tap into as they have developed solutions in South Africa for South Africa.
- A lot of the support at this stage is legalistic, there isn't that platform necessarily especially if you are not listed.
- Trade industry groups – have realised that we need to transition to a low carbon economy and they have started what is called the Just Transition.
- WWF and other environmental advocacy groups.
- CDP – predominantly focused on JSE listed companies.
- We Mean Business:
  - A global business coalition which also provides a framework for companies to think about what they need to do, what they need to commit to and how they can get international recognition for their efforts,
- Partnerships within business – networking with other organisations around the world and people in your sector to change.

- Support is mainly knowledge based.
- Different Experts and carbon specialists.
- There is a climate change fund that a lot of groups get their funding from, and I think it does fund governments too.
- We cannot ignore the guidance, support, and the funding that we receive from international agencies for projects in SA:
    - the World Bank through the global environmental fund
    - the global environmental facility for funding the green climate fund
    - the GIZ the German government in particular (they have been channeling a lot of resources and funding programmes in SA)
    - the EED supports projects in municipalities
    - the Swiss government has for many years been a strong supporter of environmental and green climate change programmes in SA through the Swiss secretariat for economic development.
    - the British government.
- Industry associations and environmental advocacy groups like BUSA.
- NBI:
    - provides a lot of information and support to and raises awareness and facilitates understanding for businesses.
    - provide training, capacity building and support research and run programmes.
- There's been an argument: "Do you need support when it is a good thing that you are doing? Do you need support when it is going to improve your bottom-line anyway"?
- We have the cleaner development mechanism, the green and brown fuels development programmes, the black industrialist scheme.
- The funding mechanism is an important cog along with policy and technical support.
- There are a lot of policies and guidelines and structure that supports businesses to understand their responsibilities and roles and rights when it comes to environment, waste, water and all of those sorts of things.
- C40 is a cities programme but it also branching into supporting industry.

Environmental system dynamics:

- Arguments about whether one can attribute local impacts or the local experience with certainty to the impacts of global climatic patterns changing – the fact that change is happening, everyone agrees, it's the attribution that most people struggle with.
- It's like navigating into a blind alley, no one knows what's coming –there are no definite answers and that's the hard thing, you've got to manage the known-unknowns and the unknown-unknowns.
- It is largely still unseen for many people, so they don't connect all the dots.
- It is so big that people can't relate to it, and they sort of ignore it as a result and it makes it a hard thing to communicate.
- Climate change is a significant threat to humanity because it is under a stable climate that we were able to develop farming techniques, promote agriculture, urbanise, have an industrial revolution, have a digital revolution expand the population and expand all resource extraction under a stable climatic regime.
- Our experience of the rate of global warming is double the global average which is very significant for our economy and our society.
- The NBI suggest that we are the 14th most vulnerable country in the world to climate change.
- There is an uncertainty around timeframes – it is very difficult to foresee when things will happen.
- Uncertainty creates a feeling of comfort within areas of business which impacts people's commitment.
- Uncertainty result in understating the risk and the time frame of the risk.

Infrastructure:

- In transport we are yet to see innovators – there is a lack of enough safe public transport unlike in Europe where they don't need cars because of their efficient tram systems.
- Sasol is the biggest producer of fuel from coal in the world and they have such great infrastructure and chemists and could easily create a biofuel industry and I'm not sure why they haven't.
- 95% of our power is generated from coal-based power plants.
- We need to embrace renewable energy to supplement our difficult energy and energy security situation.

- Unless we move to diversify our energy-mix and have a much stronger renewable energy content in our electricity grid, it will be difficult for companies to meaningfully reduce their emissions.
- Cycling routes were put in place but have been ignored – I wouldn't risk it.
- There isn't an enabling environment to recycle – no infrastructure, no systems in place and there is no financing – I battle to find facilities and infrastructure that will be able to process and make recycling easy for me.
- There are structural things that we do struggle with – we designed out cities for an urban sprawl, American model which means public transport was not well invested in, so I still drive a combustion engine car.
- 30% of water is lost through broken pipes and stealing water – and we need to bring in infrastructure and technology to reduce the amount of water that is wasted.
- There are one or two factories that can actually recycle tetra pack.
- Limited roof space that can handle solar panels.
- Old buildings are quite difficult to retrofit .
- A lot of the time business feels like the energy resource in SA is out of their control, so they obviate responsibility.
- For majority of businesses in South Africa, their emissions come from their electricity consumption because our electricity grid is still very carbon intensive.
- In key areas like transport and the electricity sector, to make a massive change requires a huge budget and it is difficult to find that kind of commitment and to make it last because they require maintenance.

Technology:

- Science and hard technical solutions like AI and 4th generation technology are not going to be enough – we will need to work on the softer things, personal, spiritual, intellectual aspects of humanity.
- Digitalisation ushers in incredible opportunities of maximising performances in being able to respond to anomalies a lot quicker in terms of automating activities and functions that were manual and to save a lot of R&D costs in achieving some of the goals.
- Some businesses are keen to move but they lack the technical capacity.
- The capital investment for renewable energy technology like a solar system is very significant therefore it has been a struggle for many businesses.

- Technology is another key for climate action.
- Technology options that can respond quickly and reduce your emissions are not always available.
- There are systems that businesses can sign up to and use to see what their own carbon footprint is looking like on a live basis.
- The big issue for most companies is that they don't have it on a dashboard so they have tons of data and tables but they can't see trends.
- Businesses in SA face challenges with money for the technology and the skills to put the technology in and to run businesses differently.

Information, knowledge, and expertise:

- There is a lack of understanding
- A focus on production where expertise on climate change resides with individuals rather than more broadly and when that individual or group of individuals leave the business is really right back to square one.
- Information is becoming more available (scientific studies) through the international climate change task team and also local bodies like our SANBI who've done a climate change vulnerability atlas that is very useful in defining which jurisdictions will be impacted the most.
- Big companies are using the existing information to forecast climate change impacts and the smaller the company the less capacity they have to do this.
- A lack of data to inform the understanding of the local risks.
- We need enough scientific data that gives a good view of the history and can be trusted in terms of the predictions forward.
- There are issues around expertise from a technical point of view that exist in these companies.
- Knowledge is all available.
- There are very well-developed centers for research and centers for sustainability.
- Businesses are responsible for finding out about climate change information and regulations.
- Need more in terms of information, awareness and guidance on how to begin to comply or change.

Media:

- We have very few experienced environmental journalists – they just take company public relations press statements and publish them as news reports without critical analysis.