Bridging the "missing middle" for green small and growing businesses in South Africa: The case of the Green Outcomes Fund

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by

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ABSTRACT

Climate change poses numerous challenges for emerging economies whilst, if framed as such, also holding promise for economic opportunity. South Africa's economic history has benefitted from abundant fossil fuel resources, with the result that it has grown into Africa's leading greenhouse gas (GHG) emitter and one of the continent's largest economies. Meanwhile, the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Global Warming of 1.5°C* (IPCC, 2018a) argues that the world needs to transition towards a net zero GHG emission scenario by 2050 in order to remain within safe climatic bounds. Transitioning the South African economy towards a net zero emissions orientation is a significant challenge given the country's historical reliance on fossil fuel sources, vested economic interests in the minerals-industrial complex, and socio-economic considerations for South African workers. Realigning capital allocations to achieve this transition is necessary to grow new businesses that can assist in creating net zero emission jobs and production, and to replace existing businesses that are unable to adapt to the net zero emission constraint.

To this end, this study elucidates the barriers faced by South African green "small and growing businesses" (SGBs) in accessing capital to expand. It analyses the typical business lifecycle, financiers' roles within the chain of finance – the J-curve – and the investment gaps that exist which could impede green SGBs from growing into mature, private or publicly listed companies. Through an analysis of primary documentation and key informant interviews, the study outlines the challenges faced by early-stage financiers investing in South African green SGBs using the Green Outcomes Fund as an instrumental case study. The research highlights a gap for early venture capital investments into green SGBs in South Africa between approximately ZAR 5–22 million (USD 360 000–USD 1.584 million) and makes a contribution towards the theory as to how this gap may be closed. South African policy makers can take on board the challenges faced by green SGBs and their financiers to tailor specific funding offerings supported by the public and private sector (e.g. the South African SME Fund). Moreover, failure to nurture and scale green SGBs will impede South Africa's transition to a net zero emissions economy.

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> *"To limit global warming to 1.5˚C, greenhouse gas emissions will need to fall by 45% from 2010 levels by 2030 reaching 'net zero' around 2050."* **IPCC.**

CURRENT SA ECONOMY BUILT ON:

- Coal-based energy
- Mining
- Industrials
- Agriculture
- Exclusivity

South Africa's current economy is built on the minerals-industrial complex & needs to shift to remain competitive in the future.

What hinders green small and growing businesses from maturing into larger ones that can transition the South African economy towards net zero emissions by 2050?

Entrepreneurs are key

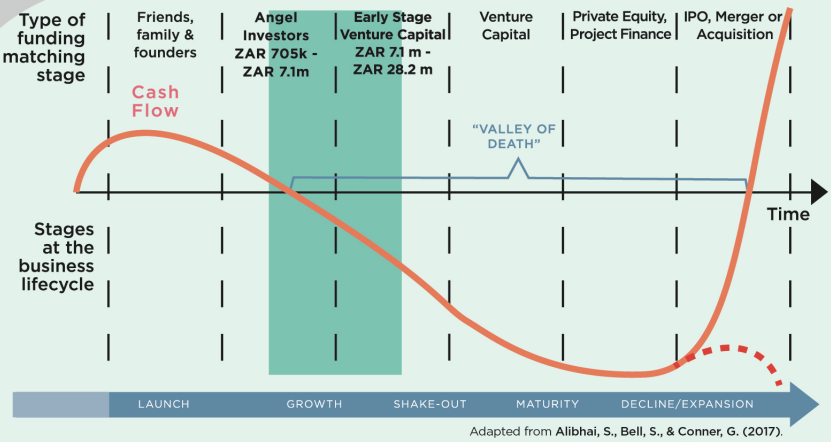
Key Drivers

1. South African National Climate Change Response White Paper
2. South African Climate Change Bill
3. The Paris Agreement Article 2(c)
4. The Intergovernmental Panel on Climate Change
5. The Task Force on Climate-related Financial Disclosures

South Africa's green economy "missing middle" is for early venture capital investments into green small and growing businesses in SA between:

ZAR 5 MILLION - ZAR 22 MILLION

GREEN SGB J-CURVE



Adapted from **Alibhai, S., Bell, S., & Conner, G. (2017).** *What's happening in the missing middle? Lessons from financing SMEs.*

GREEN OUTCOMES FUND

A case study of the Green Outcomes Fund used to show how elements of the gap can be bridged.

SA ECONOMY IN 2050

WHY THE GAP?

1. Sparse early stage capital available
2. Green economy business models are NEW
3. Institutional investors & Regulation 28
4. Due dilligence & valuations are technical
5. Bundling green SGBs is difficult
6. Time & risk horizons do not match up
7. Transition risk & the JSE

BUILT ON:

- Renewable energy
- Waste management (Reduce, reuse, recycle)
- Climate smart agriculture and food systems
- Low carbon infrastructure and human settlements
- Integrated EV public transport
- Inclusivity

Bridging the "missing middle" for green small and growing businesses in South Africa: The case of the Green Outcomes Fund. A minor dissertation, Master of Commerce in Development Finance. By Blaise Dobson under the supervision of Prof. Nicholas Biekpe and Ms. Tine Fisker Henriksen.

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Development finance institutions (DFIs)
Greenhouse gas (GHG)
Green Outcomes Fund (GOF)
Initial public offering (IPO)
Intergovernmental Panel on Climate Change (IPCC)
International Reporting & Investment Standards (IRIS)
Johannesburg Stock Exchange (JSE)
Monitoring and evaluation (M&E)
Nationally determined contributions (NDCs)
National Business Initiative (NBI)
Organisation for Economic Co-operation and Development (OECD)
Renewable Energy Independent Power Producers Procurement Programme (REIPPPP)
Small and Medium Sized Enterprises (SMEs)
Small and Growing Businesses (SGBs)
Southern African Venture Capital and Private Equity Association (SAVCA)
Sustainable Development Goal (SDGs)
Task Force on Climate-related Financial Disclosures (TCFD)
United Nations (UN)
United Nations Framework Convention on Climate Change (UNFCCC)
University of Cape Town (UCT)
Venture capital (VC)

Note regarding currency calculations:

All original currency amounts reflected with ZAR amounts inserted at the exchange rate of ZAR/USD 1:0.072 as at 28 November 2018.

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Firstly, to Professor Nicholas Biekpe and Ms. Tine Fisker Henriksen for their time spent supervising me as I undertook this research, and particular recognition to Tine for sharing her professional network with me, enabling my analysis of the case study. Your guidance through the research process was invaluable.

My sincere thanks and appreciation.

To Taylor: You will be 32 years old when we need to have reached net zero emissions (2050). To make this a reality, we must replace the old ways of doing business with new ones. These businesses need to be incubated, grown and listed in *your* lifetime for us to have a meaningful chance of addressing climate change.

I pray we succeed. This is part of my contribution.

To Louise: You are my partner on life's journeys. We met whilst studying undergrad – our first academic adventure. You have been an invaluable ally on *this* academic adventure – late nights and early mornings. I appreciate your belief in my purpose and for helping me to hear the music in the world, especially when I cannot.

I love loving you. Always.

CHAPTER 1
INTRODUCTION

1.1. Research area

Addressing climate change is a fundamental challenge in ensuring the continued safe existence of all life on planet Earth. Failing to address this challenge will lead to catastrophic impacts and undermine progress being made in the pursuit of the United Nations (UN) Sustainable Development Agenda and Sustainable Development Goals (SDGs). The negotiation of the 2015 Paris Agreement on Climate Change and subsequent ratification of the agreement by 185 signatory parties to the United Nations Framework Convention on Climate Change (UNFCCC) was a watershed moment for the international community. Amongst other provisions, the Paris Agreement records the international consensus that a transition from the use of fossil fuels is required in order to restrict global warming to well below 2°C above pre-industrial levels (United Nations Framework Convention on Climate Change, 2015).

However, the challenge of how to transition away from the use of fossil fuels is an extraordinarily large and complex exercise. The concentration of carbon dioxide in the Earth's atmosphere reached 405 parts per million in 2017, a level not seen in 800 000 years (American Meteorological Society, 2018). Equally concerning is that current and historical greenhouse gas (GHG) emissions are pushing the Earth's systems to the brink of an increasingly rapid and self-reinforcing pathway towards hotter climatic conditions. Steffen et al. (2018, p. 8257) recently wrote of the "Hothouse Earth" scenario whereby the warming pattern would be "propelled by strong, intrinsic, biogeophysical feedbacks difficult to influence by human actions, a pathway that could not be reversed, steered or substantially slowed".

In order to maintain the 2°C temperature safeguard, the global community is required to peak its GHG emissions by 2025, halve them by 2050 and achieve net zero emissions by 2100 (United Nations Environment Progamme, 2015). At the time the writing of this report was being finalised, the IPCC released its Special Report 15, published on 8 October 2018, with hard-hitting findings that overturned the 2°C

safeguards espoused by the Paris Agreement, with compelling findings in support of a 1.5°C upper limit (IPCC, 2018a, 2018b). The overarching principle is clear - the human species needs to enact deep cuts in its GHG emissions to ensure the maintenance of an inhabitable planet, in line with scientific safeguards. The challenge is immense: GHG emissions pathways that would limit global warming to 1.5°C require rapid and far-reaching transitions in energy, land, urban infrastructure (including transport and buildings), and industrial systems of an unprecedented scale both in their speed, scope and the amount of investment required to retool (IPCC, 2018b, 2018a). Part of these actions is the reconsideration of the flows of finance towards sectors, industries and investments that would have made returns through the extraction and use of fossil fuels.

Transitioning to net zero GHG emission economies has profound implications for economic planning and the manner in which development finance is programmed. This is especially the case for Africa, given the continent's relatively low historical emissions, significant fossil fuel endowments and the increasing openness of African economies to global trade (Trade and Industrial Policy Strategies, 2013). Moreover, the Paris Agreement states the need to align *all* financial flows with the 2°C temperature target.[2] Further, the IPCC SR15 notes that "This rapid and far-reaching response required to keep warming below 1.5°C and enhance the adaptive capacity to climate risks needs large investments in low-emission infrastructure and buildings that are currently underinvested, along with a redirection of financial flows towards low-emission investments" (IPCC, 2018a).

Furthermore, Article 2.1.c. of the Paris Agreement highlights the need for society to reconsider how it saves, invests and deploys capital in a manner consistent with the need to keep global temperature increases well below 2°C. Contributions by national governments towards the achievement of the Paris Agreement (in the form of Nationally Determined Contributions, NDCs) create a number of opportunities to redeploy some of this capital with abatement costs being

[2] "2.1. This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: … (c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.…" (United Nations Framework Convention on Climate Change, 2015, pg. 3).

projected at between USD 97–191 billion (ZAR 1.351–2.661 trillion) by 2030 (Hof et al., 2017). In addition, findings by bodies such as the Task Force on Climate-Related Financial Disclosures (TCFD) present an urgent need for the financial sector to consider how it invests the resources entrusted to it in a fiduciary capacity (Financial Stability Board, 2017).

However, climate change cannot be addressed in a vacuum: it needs to be considered in relation to the other socio-economic issues facing developing economies. South Africa has an unemployment rate of 27.2% (as of Quarter 2 of 2018) and, as such, creating new and additional employment is a necessary focus to spur economic growth and reduce inequality (Stats SA, 2018). The South African government has identified small and medium sized enterprises (SMEs) as one of the key drivers of job creation with most new jobs being created by 2030 “in domestic-orientated businesses, and in growing small- and medium-sized firms” (South African National Planning Commission, 2012, p. 39). The National Planning Commission identified the creation of new SMEs and supporting their growth as a core facet of equitable economic redistribution accounting for historical imbalances, sustainable employment opportunities and overall macroeconomic growth in South Africa.

The need to address climate change and grow SMEs may provide an opportunity for synergy. Dalberg Global Development Advisors (2015) estimated that there could be a global flow of USD 160 billion (ZAR 2.229 trillion) per year to approximately 720 000 SMEs working to deliver climate change technologies over the next decade. Furthermore, Dalberg estimated that the credit gap for green SMEs is approximately USD 4–5 billion (ZAR 56.040–70.050 billion) across developing countries worldwide.

This research study will elucidate the role that entrepreneurs play as key agents/actors in the transition towards a net zero emission economy. In making this argument, the research will highlight the barriers that hinder green entrepreneurial endeavour in financing of early-stage South African enterprises that seek to contribute towards positive climate change outcomes. The use of an instrumental case study will focus on the role of the Green Outcomes Fund (GOF) in supporting

green Small and Growing Businesses (SGBs) to drive economic growth, job creation and reduce income inequality (White et al., n.d.).

1.2. Problem statement

The projections of the required reduction in GHG emissions have profound implications for economies and will require significant private and public sector changes to retool and re-imagine the current economic systems upon which society relies. Over and above the political challenges to achieve this, a radical transition away from the business-as-usual reliance on coal, oil and gas as primary sources of energy is necessary in the South African context. The shift presents opportunities to create new products and services to sustain economic growth within South Africa's remaining "carbon budget", given the Peak-Plateau-Decline emissions trajectory espoused in the country's Nationally Determined Contribution to the Paris Agreement (Department of Environmental Affairs, 2015).

However, the shift also presents physical and transition risk for South Africa under a constrained carbon budget. Burton, Caetano, and McCall (2018) highlight three future pathways for South Africa's coal sector under a 2°C-compatible phase-out, including (in the least-cost energy pathway) that "even with limited implementation of climate change policy, coal is no longer South Africa's future" (Burton et al., p. 5).

Alibhai, Bell and Conner (2017) note that in emerging economies globally, SMEs represent more than 95% of registered businesses, provide more than 50% of job opportunities and contribute approximately 35% of gross domestic profit. As a key employment generator within emerging economies, the functioning and financing of the SME sector requires specific attention. Globally, there is constrained access to finance to allow SMEs to start, sustain and grow, with estimates of between 55% and 68% of SMEs being underserved in emerging markets. As formal and informal SMEs make up the majority of private businesses in emerging markets, there is a critical need to address the credit gaps estimated to be between USD 0.9–1.1 trillion (ZAR 12.538–15.325 trillion) for formal SMEs and between USD 2.1–2.6 trillion (ZAR 29.256–36.222 trillion) for informal SMEs (Alibhai, Bell & Conner, 2017). In South

Africa, the SME credit gap has been estimated at between ZAR 86–346 billion (FinFind, 2018.) Moreover, access to capital and access to markets are considered the two primary challenges facing South African SMEs (Botha, van Dijk, & de Rijk-Uys, 2015).

Globally, SMEs typically seek expansion capital, but are often not particularly good candidates for formal financing opportunities; often they are too large for micro-credit and too small for commercial debt or equity. This gap is dubbed the "missing middle" and has been a global challenge that development finance practitioners have been working to solve (Alibhai, Bell & Conner, 2017; Aspen Network of Development Entrepreneurs, 2012; Benink & Winters, 2016; Patton Power et al. 2016; Zuerker et al., 2018).

South Africa has a well-developed banking sector, a robust stock exchange and sophisticated financial services industry that allows for a wide variety of instruments to be put to use to address the challenges faced by climate change (Nair et al., 2017). Moreover, South Africa has made progress in mobilising private sector resources in the renewable energy and energy efficiency sectors through the introduction of incentive mechanisms that encourage investments (primarily through debt instruments) directed towards the renewable energy build programme via the Renewable Energy Independent Power Producers Procurement Programme or REIPPPP (McNicoll et al., 2017).

A 2013 analysis by the National Business Initiative (NBI) and KPMG outlines the broad context of the barriers faced by the private sector in South Africa looking to access “climate finance”. The analysis put forward 11 generic barriers grouped into four broad themes and an analytical framework for assessing these barriers and notes the gap in provisioning of finance to the private sector, impeding its ability to play a positive role in addressing climate change.

However, green SGBs arguably require more considered attention, because of a number of unique characteristics, which may frustrate traditional SME financiers. Nair et al. (2017, p. 2) summarise the primary constraints for green SGBs in emerging economies as “a lack of access to finance, management capacity, and

access to markets". Moreover, South African financial service providers (local fund managers in particular) perceive green SGBs as having greater risk on a risk-to-return measurement than other SGBs and, as such, require additional business development support in comparison to their non-green peers. Nair et al. argue that existing early-stage financiers are not currently providing sufficient capital to green SMEs requiring some intervention to spur interest and/or create further demand.

Indeed, looking more broadly at the international experience of early-stage financing though venture capital, the Brookings Institute reported "clean-tech" venture capital (VC) in the United States of America as being in decline (Frick, 2017). The report notes that approximately 17% of total United States' venture capital portfolios in 2011 reported an exposure to clean technology versus under 8% in 2016.The decline may have a number of causes; nevertheless, the report asks the question whether there needs to be a re-evaluation of the role expected of venture capital to assist the transition towards cleaner economies. The report also indicated that US-based clean-tech venture capital was moving towards later-stage deals, with one hypothesis being that capital-intensive, early-stage projects with unproven technology are not palatable for traditional venture capital. As Saha and Muro (2017, p. 6) note: *"*VC money has not been reaching many promising technologies, especially the riskiest ones, often with the heaviest financial demands, that are urgently required to address climate change."

This research investigates the barriers that green SGBs are facing in raising external growth capital. It also explores what appears to be a "missing middle" in relation to South African green SGBs and how this is limiting a pipeline of scalable businesses that would contribute towards the transition to a low emissions and climate-resilience economy.

1.3. Research objective

The objective of the research is to build theory that can contribute towards increasing the finance available for green SGBs in South Arica. It will do this by presenting and analysing a case study of an outcomes financing mechanism for climate change within South Africa as an emerging economy.

This study's research theme is centred on the role of development finance in supporting SGBs in emerging economies in their contribution towards the SDGs, specifically SDG 13 (i.e. urgent action on climate change).

The research questions seek to understand the theoretical suppositions that may promote the provision of finance for green SGBs (and SMEs) in South Africa via traditional, early-stage financing channels. The research was undertaken in a South African context and was bounded by an instrumental case study on the Green Outcomes Fund (GOF, described in Section 4.2 below).

The objective of the research is to assess the role of early-stage financing in supporting the growth of low-emissions and/or climate resilient SGBs within South Africa. Within this objective, the research will ask why traditional SME financiers in South Africa have faced challenges in the provision of early-stage capital to clean technology SMEs to date and what the mechanisms are by which barriers to finance could be overcome? Specifically, it will look at how traditional early-stage financing models could to be adapted to address the "missing middle" of finance available to green SGBs focusing within South Africa. The proposed GOF will be used as an instrumental case study to show how adapted practices can assist the provision of early-stage capital. A detailed mapping of the research objectives and questions are outlined in 7.1. Annex 1.

1.4. Research justification

South Africa's GHG emissions profile is the highest on the African continent and is the 18th highest global emitter, representing 1.13% of the global emissions. Furthermore, the ratio of emissions per unit of GDP output is one of the highest in world whilst the country is also highly vulnerable to the impacts of climate change (McNicoll et al., 2017). South Africa's economy is carbon-intensive and a transition away from fossil fuels without due consideration would cause significant disruption to the economy (Bertha Centre, University of Cape Town, 2018; McNicoll et al., 2017).

Elucidating the role of the SMEs in making this transition is a key consideration for South Africa, given the structure of the country's economy. There is a general

expectation SMEs will be the engine of job creation within developing economies, given that over 9% of enterprises globally are SMEs and that these employ between 60–70% of the working population (International Labour Office, 2016). Moreover, South Africa's Development Plan states that "small and expanding firms" will contribute 60–80% of GDP increase and 90% of the 11 million new jobs to be generated by 2030 (South African National Planning Commission, 2012, p. 119).

The South African constitution recognises sustainable development as a human right and a number of public policies have been enacted to assist in the realisation of this fundamental right. Pursuant to this, the Green Economy Inventory for South Africa (Partnership for Action on Green Economy, 2017) identified a total of 32 national or provincial level frameworks, strategies, policies or Acts that have been put in place with regards to sustainability and/or the green economy.[3]

South Africa's transition from the current dependencies on the fossil fuel-intensive energy grid and the extractive industries is framed by the need to increase employment and reduce poverty and inequality, whilst redistributing wealth (GreenCape, Impact Amplifer, & UCT Bertha Centre, 2016). Assuming that SMEs are a central pillar of growth within emerging and developing economies, it therefore becomes important to understand how to align these entities towards achieving the 2°C target under the Paris Accord.

1.5. Research assumptions and limitations

The research assumptions are outlined in Chapter 3 below. Importantly, the research assumes that the current rate of climatic change is human induced and therefore can be reduced by actions taken by humans to curb GHG emissions.

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[3] *Inter alia* the Framework for Environmental Fiscal Reform (National Treasury, 2006); Innovation Plan (Department of Science and Technology, 2008)' Medium-Term Strategic Framework 2009 – 2014 (National Planning Commission, 2009); Industrial Policy Action Plan (Department of Trade and Industry, 2011 and 2012); The New Growth Path (Economic Development Department, National Planning Commission, 2010); Integrated Resources Plan 2010 – 2030 (Department of Energy, 2011); National Climate Change Response Policy White Paper (Department of Environmental Affairs, 2011), National Development Plan: Vision 2030 (2011); National Strategy for Sustainable Development and Action Plan (2011-2014); South Africa's Intended NDC to the UNFCCC; Draft Policy and Strategy Framework for Green Economy in the Context of Sustainable Development (2014) and Draft National Adaptation Plan for South Africa (2016)

A significant limitation for the purposes of this study is the access to complete or even partial data sets on SMEs within South Africa. This is particularly difficult when looking to frame quantitative research to understand the financing barriers for SMEs. As noted in the FinFind (2018) analysis, there are a number of data limitations that exist in order to fully assess SME financing barriers and that there should be an increase in the transparency of the data being aggregated by the financial services sector in South Africa (FinFind, 2018; McNicoll et al., 2017).

CHAPTER 2
LITERATURE REVIEW

2.1. Introduction

The literature review will outline the core conceptual issues that frame this discussion and the body of literature already available that address how these issues are relevant to the subject matter introduced above.

2.2. Overview of relevant literature

Limited access to financing is a critical concern for the majority of South African SMEs, which is often exacerbated by a prevalence of low capability in SMEs to access these finances, either through their own limited knowledge and skills or the lack of available information to evaluate a business' credit score effectively (Fatoki, 2014). With this in mind, the researcher covered the following broad areas in reviewing the literature:

- The conceptual framing of the "missing middle" and the definitions used to define the specific type of firm which would fall within this conceptual framing for the purposes of this study.
- The generic barriers and challenges experienced in the provision of risk capital to SMEs.
- The role of green SGBs in a transition to net zero emissions economies and the theoretical importance of this within the South African context.

2.3. Defining small green businesses

GreenCape, Impact Amplifier, & UCT Bertha Centre (2016), drew on the United Nations Environment Programme guidance that "green" businesses referred to that sub-set of businesses utilising "environmentally sound technologies" i.e. those that limit or prevent harm to the natural environment relative to conventional alternatives, because they "protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they were substitutes" (United Nations Environment Programme, 2011, p. 156).

By way of defining “green”, Caprotti (2012) and Cumming, Henriques and Sadorsky (2016), use the words “clean technology” (colloquially termed “clean-tech”). This study uses the term “green” and notes that the definition of the clean-tech industry proposed by Pernick and Wilder (2007) (as cited in Bjornali & Ellingsen, 2014, p. 44), identifies some of the core elements that would also pertain to a consideration of a “green” clean-tech firm that delivers a good or service using “limited or zero non-renewable resources and/or creates significantly less waste than conventional offerings. Clean-tech companies help to protect the environment by facilitating the increased use of clean energy and environmentally friendly solutions”.

Nair et al. (2017) note that within the South African context, the sectors of energy, water, waste, infrastructure and land management were particularly well suited to green SGBs to find growth opportunities. However, they concede that there is little consistency across local fund managers regarding the definition of the “green” investments, with little consistency in the manner in which reporting of non-financial, impact-related metrics is undertaken.

A number of authors have sought to identify what types of investments could be determined as priorities for investors looking to deploy capital into South Africa’s green economy. For example, Nicholls, Vermaak, and Moolla (2015) describe how the NBI and KPMG Initiative identified 136 intervention areas for green economic transformation through a series of workshops with a broad stakeholder base from business, labour, civil society and government. Fifteen areas were prioritised and then narrowed down into a final shortlist of five for consultation with key stakeholders by the NBI/KPMG. The shortlisted five included promoting public transport, protecting critical catchments, derelict mine rehabilitation and a basket of smart grids, storage and distributed renewables (Nicholls, Vermaak & Moolla, 2015).

Meanwhile, the South African Green Economy Inventory (Partnership for Action on Green Economy, 2017) lists eight sectors including energy, transport and infrastructure; agriculture, food production, fisheries and forestry; resource conversation and management; buildings and the built environment; sustainable consumption and production; sustainable waste management practices; and water

management. Ebrahim (2018) recently highlighted five priority sectors and sub-sectors for investments in the green economy in South Africa, as shown in Figure 1:

Potential private sector investment priorities that support South Africa's climate change outcomes		
Sector	**Subsector/ sub-category**	**Projects / Investment Areas**
1. Energy	Energy efficiency	1. Energy efficiency in public infrastructure and buildings
		2. Energy efficiency private sector (industrial/commercial) and households
	Energy generation	3. Small-scale embedded generation
		4. Renewable energy based on non-sovereign-backed power purchase agreements
2. Waste	Waste to energy	5. Waste to energy (biogas/incineration)
	Waste diversion/recycling	6. Diversion of solid waste from landfill / material separation facilities/at source
3. Water	Water resource development	7. Renewable energy desalination plants (seawater, brackish water/other)
	Water infrastructure operations, maintenance and rehabilitation	8. Public Private Partnership (PPP) to rehabilitate, operate and maintain public water infrastructure
	Water harvesting	9. Commercial/industrial water harvesting
	Wastewater treatment and Wastewater to energy	10. Industrial water reuse, recycling and recovery
		11. Wastewater biogas to electricity
4. Agriculture, Food Systems and Food Security	Climate-smart agriculture (incorporating weather, water, seeds/varieties, nutrients/markets)	12. Conservation agriculture (climate-smart agriculture)
		13. Controlled environment agriculture/precision agriculture (greentech/ICT solutions) (energy efficiency/renewables (irrigation, packhouses, cold stores/cellars) (water efficiency)
	Agri-processing, productions and related foods systems	14. Agri-parks (agri-production and agri-processing) and Special Economic Zones (SEZ) for greentech
5. Low Carbon Climate Resilient Built Environment and Human Settlements	Green buildings / human settlements / Infrastructure	15. Green buildings for social, low-income housing (RE/EE, water and waste management, sustainable building materials).

Figure 1: Priority sectors and sub-sectors for Green Climate Fund resources to be channelled towards private sector opportunities within the South African economy (Ebrahim, 2018)

2.4. Defining the "missing middle" for green small and growing businesses

GreenCape, Impact Amplifier, & UCT Bertha Centre (2016) highlight that there is no universally agreed definition for a SME, although there are various measures of type of firm, number of employees, turnover and the balance sheet position. In South

Africa, the National Small Business Act of South Africa of 1996 (as amended in 2004) defines a SME largely in terms of its size, as:

> A separate and distinct entity including cooperative enterprises and non-governmental organizations managed by one owner or more, which including its branches or subsidiaries, is predominantly carried out in any sector or sub-sector of the economy mentioned … and can be classified as a SME by satisfying the criteria mentioned in the schedule of size standards (Department of Trade and Industry, 2004 p. 4).

The focus on the concept of "growing" is of critical consideration for this research. In the context of the case study, the proponents of the GOF (i.e. GreenCape, the University of Cape Town's (UCT's) Bertha Centre and the World-Wide Fund for Nature - South Africa) focused on small and *growing* businesses, noting two core points of differentiation: first, businesses that do not intend to act only as a mechanism to sustain a group of individuals' livelihoods; and second, that they actively sought financial and/or human resources to grow beyond that of subsistence (GreenCape, Impact Amplifier, & UCT Bertha Centre, 2016).

The Aspen Network of Development Entrepreneurs (ANDE) (2012) argues that the literature has raised doubt over the effectiveness of simple SMEs to drive economic growth and reduce poverty. Whilst the majority of employment opportunities globally are created and sustained by SMEs, they are less productive than their larger counterparts in making progress on economic growth (Ayyagari, Demirguc-Kunt, & Maksimovic, 2011). According to ANDE (p. 4) "… while it is mainly small firms that currently employ or engage the poor it is the growing firms that can help them out of poverty by providing them with higher, more stable wages". Therefore, it is argued, a small sub-set of SMEs (SGBs) will seek and achieve rapid growth, and create jobs and economic development provided that they can overcome the challenges of accessing capital and the human resources to do so (Schoar, 2010).

ANDE goes further and defines (p.5) SGBs as “growth-oriented SMEs employing between 5 and 250 people and seeking between USD 20 000–2 million (ZAR 280 200–28.020 million) in investment capital”.

It is these SGBs which fall into what is termed the “missing middle” – they are typically too large for microfinance opportunities, yet too small for any private equity/VC investment and too risky to raise any commercial debt from a traditional bank (Aspen Network of Development Entrepreneurs, 2012, p. 7).

By adapting the definitions presented by ANDE, the Organisation for Economic Co-operation and Development (OECD) and the National Small Business Act, 1996 (as amended in 2004), GreenCape, Impact Amplifier and UCT’s Bertha Centre defined green SGBs within the South African context as meeting the following criteria:

- Growth orientated: those firms which achieved a 20% employment growth within three years.
- Businesses employing between five and 250 people.
- Businesses seeking between R200 000 and R20 million in investment capital.
- Businesses with the potential to grow and generate economic development and job creation.
- Businesses that face constraints to human capital, access to finance, access to markets, and other barriers (GreenCape et al., 2016, p. 107).

2.5. The market for financing for green small and growing businesses

Maelane (2010), Ngwane (2012), Hamnca (2013), Jones and Mlambo (2013) have undertaken in-depth literature reviews of the early-stage financing in South Africa, including the private equity and venture capital sectors. Typically, these have been termed “small cap” financing opportunities, given that they are into businesses that tend to have a capped turnover or revenue. Benink and Winters (2016) define “small cap” financing ticket sizes as between USD 100 000–2 million (ZAR 1.393–28.020 million), and acknowledge that SME financing can be a challenge for ticket sizes between USD 2–5 million (ZAR 28.020–70.050 million) with an argument being

made for challenges being experienced up to the USD 10 million (ZAR 140.1 million) mark.

In order to understand the operational modalities of the SME financing actors within South Africa, the researcher examined a number of papers that have studied the sector. For example, Jones (2003) offers an in-depth analysis of the investment process followed by venture capitalists in South Africa, enabling a good understanding of the stages at which investment decisions are made. Jones identifies seven distinct steps followed by South African venture capitalists, namely: sourcing, evaluating investment opportunities, valuing investment opportunities, negotiating, structuring, supporting/managing investments and then, finally, harvesting. Van Deventer and Mlambo (2009) cite a number of references that outline the processes that venture capitalists follow in order to make their investment decisions. Further research into this subsidiary area (i.e. processes by which venture capital investments are made) is recommended to fully comprehend challenges being faced when considering the investment opportunities presented by green SGBs.

Tyebjee and Bruno (1984) identified 23 criteria in five categories, being market attractiveness, product differentiation, managerial capability, environmental threat resistance, and cash-out potential. Meanwhile, Van Deventer and Mlambo (2009) analysed the key factors influencing venture capitalists' project financing decisions within the South African economy, which may have interesting applications when considering the nuances of green entrepreneurs. Primary driving factors for venture capitalists' decisions to invest in SMEs included the entrepreneur's character (specifically their honesty and integrity), the viability of a good response from the market to a proposed good or service and high internal rates of return.

However, it is worthwhile noting that venture capital remains a niche financing modality for most SMEs within South Africa (Hamnca, 2013). Within the Sub-Saharan Africa region, equity investments (in general) are considered to be a small portion of the capital being contributed towards SMEs: Kuntchev et al. (2012) found that only 6.3% of the investments into Sub-Saharan African SMEs took the form of equity. The

rest comprised 48.5% of formal external debt, 17.4% semi-formal financing and 27.8% informal financing.

On the supply side, there is a large credit gap for SMEs within South Africa regardless of their sectoral focus and regardless of their focus on green outcomes. FinFind (2018) estimates the South African credit market gap for SMEs to be to be in the region of between ZAR 86–ZAR 346 billion (USD 6.192–4.820 billion), with start-ups and micro-enterprises being the most underserved. Generally speaking, a lack of financial literacy, planning and management are constraints on South African SMEs seeking out finance to grow their operations (FinFind, 2018).

GreenCape (2018a) undertook a comprehensive mapping of the green financing available for SGBs. The South African government has noted that this is an underfunded sector, there is little guidance on the nature of the gap, how it can filled and by whom (South African Green Fund, 2017). GreenCape's 2018 Market Intelligence Reports noted the significant need for affordable working capital within the green economy especially in cases where the providers of this facility are able to understand the nuances of green economy business models and can make the necessary due diligence on the repayment of the working capital loans (GreenCape, 2018b, 2018c, 2018d). Furthermore, non-utility scale renewable energy and other capital intensive SMEs remain relatively underserved in comparison to the utility scale renewable energy projects in the country (GreenCape, 2018d).

The GreenCape team noted that funding available for pilot projects was hard to come by given some of the costs involved in investments in clean technology hardware. In addition, small-scale project finance – specifically up to ZAR 50 million (USD 3.6 million) – was difficult to obtain as financers were looking for projects at least at ZAR 50 million, with a preference for greater than ZAR 100 million (USD 7.2 million) to make them investable (GreenCape, 2018d). Also, financing for small-scale projects under ZAR 5 million (USD 360 000) is difficult to come by in the South African market in some niche sectors, such as controlled environment agriculture (GreenCape, 2018c).

A lack of public funding for research and development was also cited as a barrier to enhanced financing of sustainable agriculture enterprises (GreenCape, 2018c). However, in some instances, innovative financing mechanisms like Property Assessed Clean Energy (PACE) are being piloted in order to bundle smaller scale energy projects into larger investment opportunities (GreenCape, 2018b).

Brown (2015) provides a detailed analysis of psychological drivers for South African “angel investors” and provides good insight into a possible framing of the perspective of an early-stage investor operating in the South African SME sector. Furthermore, studies have been undertaken that look at the factors that determine the investment criteria used at various stages of the South African venture capital cycle (Jones, 2003) as well as the factors that are seen as requiring improvement within the South African sector (Jones & Mlambo, 2013). Jones and Mlambo (2013) highlight two key factors lacking in the venture capital sector in South Africa: a dearth of funding targeting early-stage start-up investments and a lack of specialised fund managers for SME investments.

FinFind (2018) reports that recent surveys of the South African SME sector note that limited financial literacy, financial planning and management are factors that hinder financing provision to small business owners. These limitations are coupled with a reduced awareness of the landscape of funding options available which, when combined with limited financial capacities, can lead to a substantial amount of wasted time and energy spent on matchmaking SMEs to financiers. Even in instances where eligibility is established for an SME in terms of an identified financing channel, the SME may not be able to produce required financial documentation (e.g. tax clearance certificates, financial statements, budgets and forecasts, etc.) necessary to meet due diligence considerations or assess the business’ investment prospects. Finally, FinFind asserts that innovation is required to pilot new credit scoring models to overcome the limitations of the two primary instruments used to assess SME lending risk, namely credit records and collateral. Overall, as Quartey et al. (2017) confirm, there are a variety of challenges and barriers faced by SMEs seeking finance.

On the demand side, a number of articles have been written that outline the challenges being faced specifically by entrepreneurs within the green SGB sector (National Business Initiative & KPMG, 2013; White et al., n.d.). Rai et al. (2015) hypothesise a disjunction between the time horizons sought by venture capitalists and the investment opportunities being provided by green SGBs, which the venture capitalists consider entail long payback periods, thereby limiting the solicitation of venture capital. Meanwhile, some authors have pointed to a significant disjunction between the returns that the investments provided by green SGBs and the typical returns that venture capitalists expect (Gaddy, Sivaram, & O'Sullivan, 2016). The paper by Marcus, Malen, and Ellis (2013) offers some initial perspectives on the early research being done to understand how venture capitalists in the United States are adjusting their operational models to accommodate the clean-tech industry (specifically renewable energy in the case of their study). Key adjustments noted by researchers include that venture capitalists are investing larger sums of capital for longer periods of time, whilst avoiding certain capital-intensive clean-tech businesses because of the perceived risk.

Annex 7.6 provides a snapshot of the funds set up to invest into the green economy in South Africa as adapted from McNicoll et al. (2017) and the author's own research.

2.6. Lifecycles in financing SGBs in South Africa and the missing middle

In this study, the researcher makes an argument linking entrepreneurship to economic growth and the need to take urgent action on climate change (SDG Goal 13). Dalberg Global Development Advisors (2015) noted that three primary factors are inhibiting SMEs from accessing climate finance and thereby taking action on climate change, namely, weak enabling environments, limited awareness of investment opportunities and inadequate financial products. Access to finance is one of the inhibitors that prevent green SGBs from scaling innovative business models. Moreover, those fund managers who have a mandate to invest in smaller deal sizes consider these earlier stage businesses as having high transaction costs and higher levels of risk (World Bank Group, 2018).

Access to capital is typically cited as a fundamental challenge for small cap SMEs, especially those in the “missing middle”: SMEs too large for microfinance and too small and/or too risky for commercial banks or private equity firms (Benink & Winters, 2016). Nevertheless, these authors state (p. 4): “In most emerging markets, missing middle SMEs with a convincing combination of collateral, track record, positive cash flow and/or net profit, can generally obtain financing from local banks.” However, SMEs are likely to struggle to raise financing in instances where any one of these factors is missing or is not particularly strong.

SMEs face several additional constraints, including poor access to capital markets, lack of managerial skills, and inadequate financing, equipment and technology, amongst others. The lack of sufficient access to financing is a well-researched area in the literature in relation to supporting SMEs to grow, with studies by Arthur (2003); Aryeetey (1994); Deakins et al (2018); Parker, Riopelle, and Steel (1995). According to Collier (2009), globally investments in larger and more established companies are considered less risky than investments in smaller firms. Additionally, the investments into African emerging markets are considered more risky than other regions. These latter two factors place South African SMEs at a perceived relatively higher risk rating even before the fundamentals of the businesses themselves have been assessed.

Given South Africa’s high unemployment rates and need for economic growth, SMEs are seen as critical enablers for sustainable economic growth, employment and income redistribution to account for historical inequalities (Fatoki, 2014; South African National Planning Commission, 2012). Herrington, Kew, and Mwanga (2017) argue that due to the failure of the established private and public sectors to drive employment, South African public policy-makers have looked to increased entrepreneurship and SME development as employment-generating engines within the economy.

The Global Entrepreneurship Monitor’s 2016/2017 report noted that total early-stage entrepreneurial activity in South Africa was at 11.0%, 4.1 percentage points higher compared to 2016’s score of 6.9% (Herrington, Kew & Mwanga, 2017). However, starting an SME that can scale and grow is not easy in South Africa.

According to Van Scheers (2011), 40% of new SMEs fail in their first year, 60% in their second year, and 90% in the first 10 years of their lifespans. Fatoki (2014) agrees that, generally, the failure rate of South African SMEs is considered to be high, with the inability of SMEs to access debt financing for growth being a particularly noteworthy stumbling block for local entrepreneurs.

Snyman (2012) presents a strong analytical piece on the South African venture capital market, making use of the "J-Curve" as a visual descriptor of a concept that the South African venture capital market is predominately geared towards later-stage expansion investments as opposed to early-stage ones. The J-curve is typically used to map the relationship between the cash flows of a business through the entity's lifecycle, in order to explain the type of capital providers likely to be available to or involved in the various stages of their growth. Figure 2, based on the author's adaption from that sketched in Alibhai, Bell and Conner (2017), is a representation of the J-curve highlighting this relationship between cash flow through the business lifecycle.

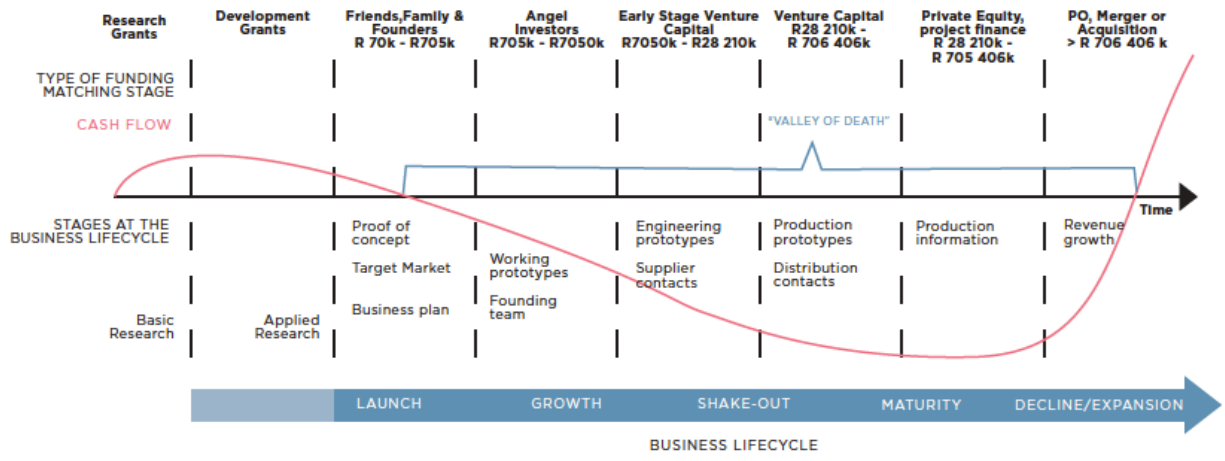

Figure 2: Lifecycle of a venture ***(adapted and compiled by the author using Alibhai, Bell & Conner, 2017, p. 5)***

For example, as Pelly and Krämer-Eis (2011) point out, often debt financing is considered unfeasible for early-stage businesses as they tend to be cash flow negative, face higher risks whilst testing for product/service market-fit and have

limited assets to act as collateral. As such, debt financing is not often preferred, as their ability to repay any loan commitment is difficult and, at times, impossible.

Matching the appropriate financing for the business' progression at each of these is critical to ensuring the success of the enterprise. Wilson and Silva (2013) note that the stages of business innovation can be identified as pre-seed (typically comprising research and development), seed stage (establishing the enterprise itself), the start-up stage (development and testing a product or service within a particular market niche), early-stage growth phase (scaling a product or service where commercialisation has been shown to be possible) and, finally, the expansion phase (rapid and substantial growth with the possibility of new spin-off innovation). The cash flows through an innovative enterprise are typically cash flow negative in the earlier stages of their existence, only to become cash flow positive at early-growth or expansion phase.

Figure 2 assists readers to understand the approximate quantum of funding and the temporal nature of the "missing middle" in relation to one another. Alibhai, Bell and Conner's (2017) indicative quantum of funding has been translated from USD into ZAR for the purposes of this research. Readers can see Pelly & Krämer-Eis (2011) for indicative quantum sizes from a European perspective. The diagram indicates the full range of SME investment requirements over its business lifecycle (start-up to maturity); in financial terms, this ranges from start-up capital of approximately ZAR 750 000 to initial public offering evaluations of ZAR 706 million and upwards. Within this range there will be gaps where access to these scales of SME investment is constrained or limited – denoting a "missing middle" in the finance required to complete the business lifecycle. This research seeks to map the "missing middle" for South African green SGBs within this broad range of financing required by SMEs moving through the business lifecycle.

Alibhai, Bell and Conner (2017) point out that enterprises typically start off with a capital base provided by the founders or the founders' friends and family. However, this capital base is often quickly exhausted and, if not supplemented, can lead to the enterprise stagnating or, at worst, closing.

Typically, early-stage enterprises have relied on the entrepreneur's personal networks and/or networks of high-net wealth individuals (or "angel investors") that are looking to take an ownership stake through an equity position in a new enterprise. Thereafter, venture capitalists seek to grow the company in order to sell on (or "exit") to another firm buying the company, the entrepreneurs buying back their stake, a private equity firm or else an initial public offering (IPO) on a listed stock exchange (Pelly & Krämer-Eis, 2011).

The J-curve also analyses the interactions of venture capital in relation to the stages on the entrepreneurial business cycle, viz. business ideation and incubation, to angel, seed and growth acceleration and finally through to traditional banking and/or IPO options (Alibhai, Bell & Conner, 2017; Snyman, Kennon, Schutte, & von Leipzig, 2014).

The J-curve in Figure 2 seeks to show how the financing requirements for an SME develop according to its changing needs over the life cycle of the business. This accords well with Benink and Winter's (2016, p.5) definition of the missing middle as: "[SMEs] that are too big for microfinance and informal investors, but that are too small or too risky for regular banks and private equity firms".

The "missing middle" has been described as the financing gap between the entrepreneur's own sourced capital (i.e. friends, family and founders) and the post-revenue milestone, where commercial banks are more willing to lend working capital to expand a product or service offering. The "missing middle" is also nicknamed the "Valley of Death" by small business owners, reflecting that SMEs can often find themselves unable to continue to grow because of the lack of capital, yet that very lack of continued growth inhibits their access to working capital from commercial banks given their nascent stage within the business cycle (Alibhai, Bell & Conner, 2017, p. 4).

The current study highlights limited funding for "riskier" early stage projects as a significant barrier and that this could be dubbed the "missing middle" in reference to the J-curve that matches the typical financing cycle of a SME (National Business Initiative & KPMG, 2013). FinFind (2018) notes that its research indicates that

smaller businesses typically have less access to finance than that of medium-sized firms and as such the “missing middle” is more generally considered to the left of the J-curve (i.e. smaller, seed to early-stage growth capital stage).

In Benink and Winters’s view (2016), SMEs that typically fall in the financing range of between USD 100 000–2 million (ZAR 1.573–31.460 million) would require a combination of collateral, track record, positive cash flow and/or net profit to potentially attract the interest of a commercial bank, without which financing for an SME within an emerging economy is typically difficult to source.

SME finance providers outside of commercial banks usually point to high transaction costs, high risks, low returns and high failure rates of SMEs as barriers that create the resulting credit gaps in emerging economies. Without access to growth capital, SMEs in emerging economies are left to rely on internally-generated capital flows that take time to amass and are often necessarily depleted in the ordinary course of business as working capital in order for the SME to survive (Benink & Winters, 2016).

One observation made by the National Business Initiative and KMPG (2013, p.28) study is that:

> The venture capital industry in South Africa is very small and nascent. This results in very limited funds available to invest “at-risk” in early-stage, high risk projects which typically provide breakthrough technologies. The reasons for an under-developed venture capital industry are not immediately clear.

Nevertheless, the venture capital and private equity industry in Southern Africa has grown substantially in recent years – recording a 9.4% growth compound annual growth since the industry body, the Southern African Venture Capital and Private Equity Association (SAVCA) began annual tracking in 1999 (SAVCA, 2018). The value of new investments and follow-on investments equaled ZAR 31.1 billion (USD 22.320 million) in 2017, compared to the previous annual average of ZAR R14.7 billion (USD 105.840 million) recorded over the period 2006–2016 (SAVCA, 2018).

However, South Africa's private equity capital penetration was only 0.7% of GDP in 2017, which is relatively small compared to other developed economies (SAVCA, 2018). South Africa's SJ12 tax legislation has afforded a tax saving to individuals investing in structured venture capital funds thereby increasing flows into the venture capital market (FinFind, 2018).

Gitman (2003) reminds us that debt and equity are the cornerstone instruments making up the capital structure of any SME, with debt generally being considered as cheaper than equity, dependent on the tax structure within which the SME operates. SMEs seeking finance in developing and emerging economies can be faced with equity gaps and debt gaps, where they are unable to access external finance to grow their business or access to working capital to safeguard operational integrity when cash flow constraints exist (Cowling & Harding, 2006).

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In addition, the size of individual SME financing issuances is usually not feasible for institutional investors, who require a large number of SME issuances in order to see an impact of proportionally higher yields being generated from SME investments. Herein lies one of the core challenges for institutional investors – the ability to prepare a healthy pipeline of investment opportunities within the SME sector (Alibhai, Bell, & Conner, 2017). These authors point to a fundamental issue here, that it is often not the quality of SMEs that is the major constraint to the development of these pipelines, but rather the underlying creditworthiness metrics being used on SMEs. Limited credit infrastructure, lack of recognition of movable assets as collateral and poor insolvency frameworks are amongst some of the factors that lend themselves to constrained credit assessments for SMEs and, as a result, a limited number of mid-cap SMEs in the bond markets looking to raise capital from institutional investors.

Moreover, some of the more complex SME securitisation structures require seasoned and strong analytical skills to assess the underlying value, which are not necessarily available to an institutional investor in-house. Additionally, with SME investments some securitisations require external credit enhancements to improve their risk-return profiles in order to fit the institutional investor's profile.

Given the constraints on in-house expertise, experience, legislative/regulatory requirements and, at times, the complex nature of the securitisation mechanism, institutional investors often prefer more traditional investment options (Alibhai, Bell, & Conner, 2017). The authors argue that until SME investments become more mainstream in capital markets, credit enhancement mechanisms (e.g. partial credit guarantees, tenor extensions etc.) will be critical to drive the introduction of new investment mechanisms for SMEs.

Benink and Winters (2016, pg. 7) further note that small cap SME funds set up to emulate the private equity fund model have returned lower-than-expected financial returns "due to currency fluctuations, lack of third party exits, high transaction costs and challenging business environments". They expand on the idea that mezzanine finance[4] has been shown to be a more optimal structuring mechanism than the pure private equity fund model (applying only equity as an instrument).

Another consideration is that the relationship between the entrepreneur and investor is critical for successful investment into SMEs, and requires significant personal contact, especially in the crucial early stages of the enterprise's growth post-investment. Often the travel costs to achieve this type of interaction preclude investments from funds that are not in reasonably close geographic proximity. For this reason, along with the ease of doing effective due diligence and knowledge of local market landscapes, Benink and Winters (2016) note a strong geographical barrier to the manner in which foreign investors deploy capital for SME financing. Alibhai, Bell, and Conner (2017) point out that the issue of transaction costs typically sees a rise in the need for financial intermediaries (e.g. apex on lending institutions channelling funding through commercial banks).

[4] Benink and Winters (2016, p. 8) explain mezzanine finance as: *"Mezzanine is a catch-all phrase of a range of investment structures somewhere between pure equity and straight debt. The more debt-like mezzanine instruments are typically relatively risky, (partially) uncollateralized, flexible and long term loans, and often capture 'upside' - indicating that the finance provider shares in the profits if the company performs well, contrary to a conventional loan which has a fixed interest rate. The more equity-like mezzanine instruments typically involve equity instruments with some sort of self-liquidating mechanism."*

Commercial banks typically use one of four mechanisms to assess the option of lending into a SME: 1. Financial statement lending; 2. Credit scoring; 3. Asset-based lending; and 4. Relationship lending (Berger & Udell, 2002). However, the underpinning criteria to assess the creditworthiness of a SME investment is typically centred around considerations of the lenders' character, capacity, capital, conditions and collateral (Pretorius & Shaw, 2004). Beck and Demirguc-Kun (2006) note several variations on these four core approaches that are innovating the manner in which commercial banks are considering commercial debt-lending to SMEs.

"Climate-smart enterprises" often require higher capital outlays at the inception of their lifecycle, causing the business' break-even point to occur later than in a comparative business (SEED, 2018, pg. 3). Therefore, there is a long tail to start-ups within the green economy that, SEED argues, should garner specialist financing considerations, given their positive impact on the environment. Moreover, entrepreneurs within the green economy often need to integrate costs for public goods, test innovative business models and/or are typically refining their technology through on-going research and development.

Further nuances of the green sector that could pose financing challenges include: the capital intensity of enterprises, technology risks, scalability issues, long-tail pay-off periods and the requisite exit opportunities that match a venture capitalist's time horizon (Bocken, 2015; Cumming, Henriques & Sadorsky, 2016). For example, Morris and Watling (2000) found that the average time of a typical investment being held by a South African venture capitalist was three to four years versus the average five- to seven-year holding period of American venture capitalists. From this, the researcher anticipates that the time horizon mismatch between green/clean-tech sector businesses and venture capitalists could be a significant barrier within the South African context (and perhaps in other emerging economies) (Cumming, Henriques, & Sadorsky, 2016).

In addition, there have been limited IPO opportunities for green businesses in South Africa and, to date, few that have reached that stage of maturity within the South African market that allow for this scale of required capital investment. Alibhai, Bell, & Conner (2017) note that policy makers should take into account that sufficient

financing mechanisms need to be in place to provide financing to SMEs from the seed phase all the way through to expansion and into the an IPO phase, to ensure that a full suite of financing options is available along the business enterprise lifecycle. Early-stage businesses usually lack the institutional capacity or track record to raise publicly listed securities, due to their relatively small size and, at times, informal/emerging operational and financial procedures. Private offerings are an alternative avenue for some SMEs, although this still requires a minimum level of information to be disclosed to the investor which can difficult for some SMEs to prepare (Alibhai, Bell, & Conner, 2017).

Within South Africa, a key study was undertaken by McNicoll et al. (2017) which measured publicly-mobilised private finance for climate action in South Africa between 2010 and 2015 at an estimated value of USD 17.4 billion (ZAR 170.6 billion). Of this amount, the researchers estimated (p. 32) that “slightly over half came from private actors (USD 10.1 billion/ZAR 95.4 billion) and slightly under half from public actors (USD 7.3 billion/ZAR 75.2 billion)”. McNicoll et al. (2017) denote publicly-mobilised to mean the multiplier effect of a quantum of public sector funds and the ability of this quantum to, in turn, cause the private sector to respond with a reciprocal investment having been spurred on by public funds. The renewable energy sector attracted 85% of private co-finance, and the investment in the REIPPPP has dwarfed any other publicly-mobilised private finance within South Africa to date. With this in mind, the report noted that the established REIPPPP process will likely continue to raise project finance if the South African government continues to offer long-term price signals for private investors in the form of multi-year power purchasing agreements. Bearing this and other factors in mind, the authors argue that South Africa should be looking at other (non-energy) key sectors (e.g. water) towards which public-sector finance is likely to move, in order to de-risk the initial outlay in these relatively untested markets (McNicoll et al., 2017).

As previously discussed (Nair et al., 2017) SGBs in South Africa are hindered because of lack of access to financing, management capacity and to a market, given that local fund managers are unlikely to invest in green SGBs, because the risk to return ratios are not high enough owing, in part, to the new business models and/or technologies being employed by these firms. Pelly and Krämer-Eis (2011) note a

prevalent lack of availability of early-stage capital (especially equity finance) for SMEs in emerging economies, as well as the inability for SMEs to access commercial debt. This is echoed within the South African economy, especially with regard to those SMEs focusing on green economy enterprises where risks are perceived to be higher than other sectors (Nair et al., 2017). The authors propose that green economy businesses may also tend towards having higher upfront capital costs to be operational. Further, they argue that green economy enterprises typically face longer pay-back periods on these large upfront capital outlays that potentially further reduces the investment's viability.

SEED (2018) emphasises that the underrepresentation of early-stage capital for green economy businesses is particularly difficult for South Africa. The authors note the need for blended finance instruments to target small-cap deals that aim to progress green economy SMEs in South Africa. Further challenges for green economy SMEs were identified by stakeholders as:

A. Lack of access to information on market potential and opportunities by SMEs and entrepreneurs;
B. Lack of awareness and insights into green business models in existing economies;
C. Lack of tailored finance models for green business models resulting from limited understanding of these business models by decision makers on one hand and lack of understanding of correct financing models by SMEs on the other hand; and
D. Inadequate skills leading to limited ability to make full use of incentives and opportunities which not only stems from the absence of a green economy space but which also simultaneously limits the growth of this space (SEED, 2018, p. 8).

SMEs falling in the "missing middle" are often plagued by higher risk than those businesses that have already established a product-market fit and are generally well post-revenue. Subsequently, the uncertainty in returns combined with the high failure rate of new ventures, alongside the transaction costs associated with the relatively

smaller investment ticket sizes, makes the risk-to-returns balance difficult for more risk-adverse investors (Benink & Winters, 2016).

Furthermore, commercial banks are reluctant to finance technology with they are unfamiliar, given the uncertainty in cash flows from the enterprise's operations. Additionally, early-deal flow is both limited for green SGBs and green SGBs do not typically follow the growth trajectory of seed financiers, venture capital or private equity. Therefore, there is a need for innovative financial mechanisms that blend capital in a manner that allows for longer tenure for payback periods or high initial capital outlays. Within this context, Zuerker et al. (2018) note the absence of early-stage patient-capital financing or financing products that provide below market working capital loans for green enterprises.

Overall, the sectors primed for private sector engagement in assisting delivery of green outcomes (e.g. agriculture, water, energy, waste) are not often seen by the private sector as investable, because of the uncertainty in the revenue models owing to the fact that many of these sectors are deemed to be public goods and services and are subject to varying degrees of policy uncertainty from time to time (Zuerker et al., 2018).

Prior to this, Nair et. al. (2017) had asserted that the barriers for increased investment in green SGBs are significant, because of the perceived riskiness of green sector SMEs in comparison to the universe of other sectors wherein SMEs operate. Contributing to this riskiness are increased technical assessment/support requirements for financiers to assess a green business model, relatively new (and frequently untested) business models that may or may not rely on enabling public sector policy or legislation, and high capital layout costs coupled with longer payback periods than those typically sought by seed and early-stage investors.

Quartey et al. (2017) argued that the emergence of new green-economy SGBs and their stepwise growth towards scaling into listed or large privately held entities is a critical endeavour for South Africa, in order to secure employment in a net zero emissions future. Bell and Farrell (1997) observed that structural changes to the composition of the Johannesburg Stock Exchange (JSE) would be required to bring

full effect to the transition towards a net zero emissions economy, within the context of the historical development of the minerals-energy complex in South Africa. McNicoll et. al. (2017, p. 56) state that "a broader alignment of climate-relevant efforts with other policies (primarily the country's energy, mineral beneficiation and industrial policies) should also be pursued by the South African government". This echoes Quartey et al.'s (2017) assertion that a transition towards a net zero emissions economy is required by science, alongside the need to remain trade competitive in a global market.

Growing South African SGBs into listed entities or large privately held entities is important as this would provide an avenue for institutional investors to contribute towards the green economy, given that unlisted equity positions are generally considered "incompatible" with their "investment universe" (Naude, 2018, pg. 2). FinFind (2018) argues that solving these challenges needs to take into account that the SME sector is varied in size, risk, industry/sectors, geography and according to the various segments of where an individual business is within its growth cycle. As such, a one-size-fits-all approach cannot address these challenges, and the perceived risk to lending into the SME sector remains high. In addition, a further challenge presented by green SGBs is the provision of pre- and post-investment technical assistance to assist investors' decision-making processes (Nair et al., 2017).

However, it is likely that increasingly institutional investors will be required to transition the funds entrusted to them in a manner that takes into account the effective implementation of Article 2(c) of the Paris Agreement, the findings of non-binding panels such as the TCFD, the downstream impact of divestment statements of multilateral development finance institutions (e.g. World Bank Group, 2017),[5]

[5] "The World Bank Group will no longer finance upstream oil and gas, after 2019. In exceptional circumstances, consideration will be given to financing upstream gas in the poorest countries where there is a clear benefit in terms of energy access for the poor and the project fits within the countries' Paris Agreement commitments" (World Bank Group, 2017, pg. 1)

alongside the safeguards that large reinsurers are putting in place to limit their exposure to fossil fuel infrastructure (e.g. Swiss Re, 2018).[6]

Alibhai, Bell and Conner (2017) argue that only pooling mechanisms can be helpful, especially for institutional investors who are looking to deploy capital to SMEs, but are unable to make the risk to return argument on a transaction-by-transaction basis. Benink and Winters (2016, pg. 10) identify two types of small cap SME investment funds, namely, "scaled down private equity funds" or "equity-like mezzanine providers". The issue as they see it is that aggregated SME funds return between 5% to 6% in terms of their internal rate of return (IRR), below the required IRR of between 10% and 20% that a development finance institution (DFI) would typically expect from equity funds.

In summation, the literature reviewed sought to define what a green SGB is and the role it plays within specific sectors of the South African economy. It was argued that the SGB is a smaller sub-set of SMEs (SGBs) which seek and achieve rapid growth and create jobs and economic development. Within this context, financing rapid growth has been a challenge for SGBs especially in emerging economy settings. The J-curve was presented as a helpful visual framework to understand the different financing needs required at the various stages of the business lifecycle in relation to their cash flow position. Furthermore, literature pointed towards the fact that there is a "missing middle" or gap in the chain of financing provided to South African SMEs, green or otherwise. The literature reviewed argued that overcoming this financing gap is particularly difficult for green SGBs given a number of unique characteristics typically found within their business models. However, it was noted that growing South African SGBs into listed entities or large privately held entities is important to widen the job opportunities outside of the minerals-energy complex and to transition the South African economy towards a future net zero emissions scenario by mid-century.

[6] "As of July 2018, Swiss Re will not provide re/insurance to businesses with more than 30% exposure to thermal coal across all lines of business." (Swiss Re, 2018, pg. 1)

CHAPTER 3
RESEARCH METHODOLOGY

3.1. Introduction

The researcher has identified a contribution that can be made to theory with regard to the provision of finance to green SGBs in emerging economies. An instrumental case study approach was chosen as the best approach to make an addition to the academic literature on this subject. In this section, the researcher describes the research methodology used to study this instrumental case, with a view to making a theoretical contribution to the existing literature discussed in Chapter 2.

3.2. Research framework

The literature points towards this subject area being one of emergent theory, where quantitative data is currently rarely available or non-existent. The researcher identified the use of a case study as an appropriate qualitative methodological approach to explore, explain and describe the research questions proposed (Farquhar, 2012). Case studies seek to "derive a(n) up-close or otherwise in-depth understanding of a single or small number of 'cases,' set in their real-world contexts" (Yin, 2012, p. 4). Later Yin (2014, p. 18) defined case study research as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident".

Since the aim of the research is theory *building* (rather than theory *testing*) and, as such, a qualitative approach is more appropriate than a quantitative approach , the researcher opted not to use an explicit conceptual framework *a priori,* but rather use the research process itself to develop relevant conceptual theory and hypothesis as an academic contribution (Dasgupta, 2015). A similar methodological approach was used by Bocken (2015) and Causey (2014).

Empirical qualitative data for this research was gathered through desktop analysis and interviews with key informants, identified using a snowball sampling technique. Furthermore, a pragmatic phenomenology approach was used for the

semi-structured interviews. As the researcher anticipated that the data collection process would be iterative and unlikely to progress in a clear linear fashion, a phased approach was adopted. This approach allowed for documented adjustments to be made to accommodate this. Given the nature of empirical data gathering, triangulating qualitative inputs from key informant interviews was critical to ensure the validity and rigor of the study (Yeasmin & Rahman, 2012).

3.3. Research design

According to Nachmias and Nachmias (1976), the research design aims to provide a logical flow of the steps to be taken by the researcher, in the process of exhausting the intellectual examination of the proposed research objectives and question.

Figure 3 outlines the methodical flow of research tasks for this study, as adapted from Rose, Spinks, and Canhoto (2003). The design consists of sequential steps that flow from an analysis of existing theory and literature. With this basis of existing knowledge from the literature, two phases follow: To undertake a desktop analysis of primary documents (Phase 1) and then to complete a series of semi-structured and open-ended interviews with key informants (Phase 2).

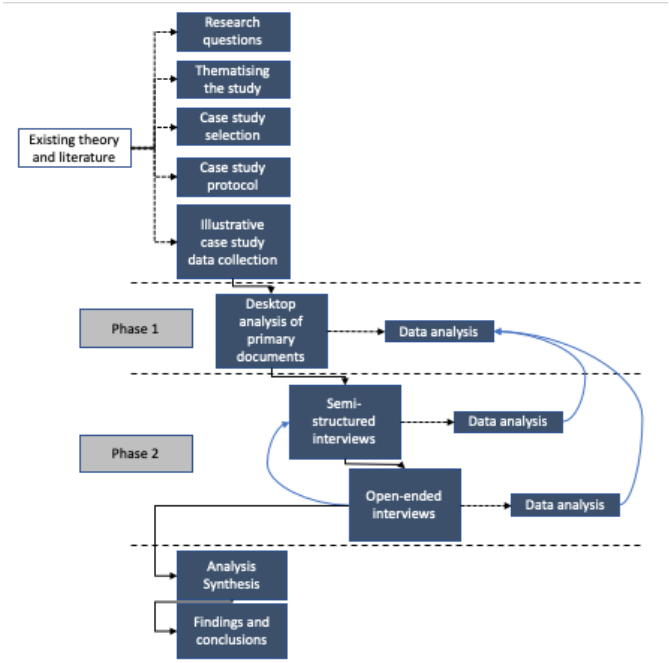

Figure 3: Diagrammatic research design (adapted by the author from Rose et al., 2003)

3.3.1. Case selection

Within the case study approach, a critical step is to define accurately the case study (i.e. the unit of analysis) and the resulting boundaries of the analysis (Baxter & Jack, 2008). Yin (2012) notes that “a case” is generally a bounded entity, but one where the lines between the case and its context are often difficult to determine, because they are interwoven with spatial and temporal dimensions.

The researcher defined the case as the GOF. The GOF was designed by UCT’s Bertha Centre for Social Innovation and Entrepreneurship (UCT’s Bertha Centre), in partnership with GreenCape and the World-Wide Fund for Nature - South Africa (WWF-SA). At the time of this research being written, the GOF was in the process of raising capital.

The case is bounded by a number of contextual markers; namely:

- *The focus on green SGBs:* seeking to provide a financing mechanism for scaling green businesses;
- *Within a bounded geographical location:* who are geographically headquartered in South Africa;
- *Within an emerging economy context:* who operate within an emerging economy context that aims to have a declining GHG emissions trajectory and become increasingly resilient to climate change (Department of Environmental Affairs, 2015); and are
- *Being financed by private sector actors:* via financiers who would likely identify themselves from within the venture capital and private equity industry.

The GOF itself is a single case study with embedded units. The embedded units are made up of the Recipient Funds and their specific financing offerings to SGBs. Figure 4 shows a schematic representation of the GOF’s design.

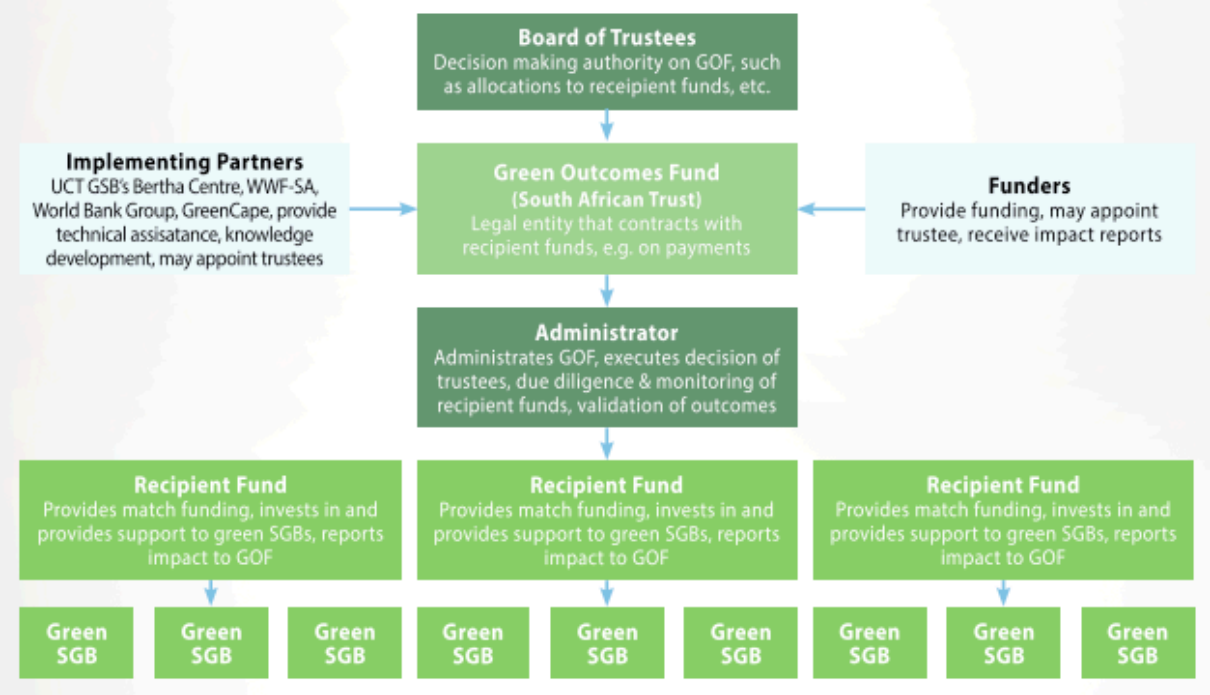

Figure 4: Schematic representation of the structure of the Green Outcomes (World Bank Group, 2018)

Stake (1995) and Yin (2014) recommend locating case study research within a category of case study (i.e. either exploratory, descriptive or instrumental research). The researcher submits that this case study is an instrumental one in that it aims to refine the theory relating to the provision of finance to the "missing middle" of green SGBs. Table 1 outlines the preconceived propositions used to guide the study's conceptual framework.

Table 1: Propositions informing the theoretical framework (author's compilation)

Potential propositions	Source
The "missing middle" of finance for green SGBs will not be bridged solely by venture capital, but rather by a range of actors (including venture capital) working to blend financial instruments.	Discussion with Tine Fisker Henriksen (2018)
Traditional SME financing provisioning does not price in the social and environmental returns that accrue through green SGBs and, therefore, without a pricing mechanism for these positive externalities, traditional pricing methods are ineffective. To this end, "further discussions revealed that fund managers were willing to commit to an outcome-based cost share with an outcome-based funder, particularly if they were engaged in the design and development of realistic payment triggers and expectation" (Nair et al., 2017, p. 8).	Discussion with Tine Fisker Henriksen (2018) and as stated by Nair et. al. (2017, p. 8)
There are a range of barriers that hinder the flow of concessional "climate finance" to encourage the development of new businesses that contribute towards GHG emission reductions and climate resilience. For example, multilateral and bilateral development finance institutions' "ticket size" does not cater for small cap deals of the range suitable for individual green SGBs.	National Business Initiative and KPMG (2013)

3.3.2. Case study protocol

Farquhar (2012) proposes that defining the frame of the researcher's own epistemological approach is an important step outlining the case protocol. The researcher's proposition is that this research falls into a constructivist/interpretivist framing for this instrumental case study (Gray, 2014).

Table 2 outlines the range and split of key informants within the three embedded case study units. The indicative typology of questions asked during interviews is presented in 7.2. Annex 2: Typology of guiding questions for key informant interviews.

Table 2: Embedded units targeted for interviews in Phase 2 (author's compilation)

Embedded unit	Embedded unit description	Sample size
Proponents	The proponents, including representatives of the organisations who conceptualised and set up the GOF. Typically made up of senior staff representing the Bertha Centre, GreenCape or WWF-SA.	4
Recipient Funds	Recipient funds for Phase 1 of the Green Outcomes Fund. Typically made up of senior staff from local SME fund managers or venture capital firms.	5
Ecosystem actors	The domestic/local community of actors who support South African green SGBs. Typically made up of local green SGB entrepreneurs, researchers analysing the green economy or actors from the financial services industry who have worked on matters relating to the integration of climate change with investment.	5
	Total sample size	**14**

In terms of the sample selected, as noted by Eisenhardt and Graebner (2007), the aim of theory-building research is not to test, but rather to build on a theoretical propositions contained in the theoretical model. Further that theoretical sampling is most appropriate for this type of case study approach. The key informants were identified through a purposeful sampling technique based on their respective involvement/experience with the case in question (Patton, 1990).

3.3.3. Data collection

Yin (2012) highlights a number of potential means of data collection under the qualitative case study approach. In the context of this study, empirical data collection was undertaken in two phases**.** A list of the questions to be posed to the key informants within the semi-structured interview is presented below in 7.2. Annex 2: Typology of guiding questions for key informant interviews. A similar approach to data collection was undertaken by Brown (2015) when seeking to assess the factors that influence a South African angel investors' willingness to invest in early stage technology business. Moreover, similar approaches have been used in US-based studies gathering insights into venture capital market for clean technology (Rai et al., 2015), and South African studies into the challenges faced in the provision of early stage venture capital (Jones & Mlambo, 2013).

Data validation was served by the researcher seeking to triangulate all of the sources provided for analysis (Creswell, 1998). According to Denzin (2006), there are four ways in which triangulation can be undertaken in a qualitative research approach: data triangulation, investigator triangulation, theory triangulation and methodological triangulation. In this case study, data triangulation was the primary tool whereby the information gathered in Phase 1 was triangulated through Phase 2 and vice versa (Yeasmin & Rahman, 2012).

All interviewees were afforded anonymity to safeguard confidential or proprietary information disclosed inadvertently during the interview process. Interviews were assigned an alpha-numeric code number derived from the first letter of the embedded unit from which the interviewee was drawn combined with a randomly assigned number between 1–100. The code and interviewee reference sheet were stored separately to the interview transcripts being analysed.

3.3.4. Data analysis

An analysis of qualitative data was undertaken concurrently to gathering new and additional information/interviews (Farquhar, 2012). This format of undertaking the interviews and analysis simultaneously allowed for additional interviews to be more detailed/specific. All interviews were recorded with verbatim transcriptions being written by a third-party transcriptionist with the researcher cross checking the written record against the audio record to ensure accuracy. Thereafter, all quality assured interview transcriptions were uploaded into NVivo for analysis by the researcher.

Of the five analysis techniques identified by Yin (2012), the researcher looked for pattern matching and explanation building linking the data to propositions as primary methods. The researcher used a clustering technique to highlight similar patterns in the narrative and to code these to specific events, triggers or theoretical suppositions (Miles & Huberman, 1994).

3.4. Limitations of the case study

As noted above, the value of the case study approach is the ability to provide detailed and in-depth analysis of a particular context. However, a resulting limitation is that the researcher will be unable to make statements about the case being applicable to any wider population. In this instance, the issue of “generalisability”, or the lack thereof, is a frequent criticism of case study research (Farquhar, 2012).

3.5. Ethical considerations

The UCT’s Graduate School of Business’ Ethics in Research Committee granted ethics clearance (Reference: GSB/MCOM/2018-010; dated 30 July 2018) according to the rules and conditions prescribed by UCT and the UCT Commerce Faculty. The key informants are not considered vulnerable individuals for the purposes of this study and the interview process was undertaken with informed, prior consent by all participants (see Annex 7.3 and Annex 7.4).

CHAPTER 4
FINDINGS

4.1. Introduction

Having outlined the methodological approach, the researcher now discusses the findings of the analysis of the specific instrumental case study selected for the research. First an overview of the case study is provided followed by analysis of primary documentation and key informant interviews.

4.2. Overview of the Green Outcomes Fund (South Africa)

4.2.1. Background

The Green Outcomes Fund was conceived out of collaboration between three South African organisations (GreenCape, the Bertha Centre and World Wide Fund for Nature – South Africa, referred to as WWF-SA) in response to a World Bank request for proposals for the MarketConnect programme issued in August 2015. The MarketConnect programme looked to pilot interventions that could assist small and growing green businesses move from early, nascent stages through to business maturity with a view to accessing international climate finance (Interview P95).

Initially, this team identified 12 interventions for consideration through a design process. From these, five were prioritised for deeper consideration and over the following 18 months were tested with key stakeholders (Interview P12). The five intervention options were:

1. Supporting cross-border investment into local green economies, through international companies looking to set up in South Africa to find local partners, and local South African companies looking to enter other markets to get support.
2. A fund to catalyse and incentivise local investment in green SGBs.
3. A peer-to-peer lending platform to provide for working capital for green economy businesses.

4. An intervention to grow angel investing into the green economy.
5. A support programme for companies leaving incubators and accelerators with tailored technical assistance (Interview P12).

From these, Interventions 1, 2 and 3 were selected for piloting. This involved a detailed process of stakeholder roundtable interviews with paper-based modelling of process and financial flows. The piloting process was run for approximately nine months, with the assistance of the Hasso Plattner School of Design Thinking at the University of Cape Town (known as d-school) which guided the facilitation, iteration of conceptual ideas and formulation of the practitioner interviews that informed each step in the refinement of each of the three interventions (Interview P61).

4.2.2. Emerging focus

During the piloting phase it emerged that the primary issue being unpacked in the process was the concept of “de-risking” investments into green SGBs. As this researcher’s literature review has confirmed, typically there is constrained cash flow for these businesses in their start-up/early phases and often little unsecured working capital in the market is accessible to them. In addition, green economy enterprises frequently use new technologies that are still finding market adoption, need further research and development to make them fit for purpose, and/or are technologies that financiers are not accustomed to financing. In this regard, financiers without technical knowledge of a specific technology struggle to calculate the cash flows from some of the innovative green economy businesses being proposed. Through the design process, the team interviewed green SGBs and investors to identify what the most appropriate de-risking tools could be. The result of these engagements was the conceptualisation of the Green Outcomes Fund (Interview P61).

At the time, the Bertha Centre was already testing a model of an outcomes fund, through an application to the South African Jobs Fund. A number of Recipient Funds that were attached to that application were asked if they would be interested in being included in the pilot version of an outcomes fund for green SGBs. Following

expressions of interest from various Recipient Funds, there were specific design sessions looking at the detail of how a Green Outcomes Fund would be made operational (Interview P61).

The conceptual approach was based on the historical development of social impact bonds in the United Kingdom. Originally, in early 2017, the Bertha Centre envisioned an outcomes fund that was broader than just green outcomes and that the GOF's approach could inform an overarching desire to test results based funding mechanisms in the South African impact investment marketplace (Interview R18). Subsequently, in 2018, the Bertha Centre launched the first early childhood development bond in South Africa and a workforce development outcomes fund. Both initiatives will feed back into the implementation of the GOF once funding is secured and it comes on-stream (Interview P95).

4.2.3. Operation of the Green Outcomes Fund

The GOF is a structure designed to encourage existing fund managers ("Recipient Funds") who already invest into small businesses to place additional early-stage investments in green SGBs. At first, the GOF will work only with Recipient Funds that have their headquarters based in South Africa (however, some of these do have the mandate and ability to invest regionally within Africa). At the time of writing, the GOF was in the process of raising capital from investors on the basis of an incorporated entity (a South African-based trust), established mandate (e.g. target sectors and investment terms agreed) and governance mechanism (board of trustees appointed, advisory committee members identified and the roles and responsibilities of the trust fund administrators signed off) (World Bank Group, 2018). Table 3: Summary of Green Outcomes Fund (World Bank Group, 2018) summarises core details of the GOF.

Table 3: Summary of Green Outcomes Fund (World Bank Group, 2018)

Target fund size:	ZAR 20m – ZAR 50m	**Domicile:**	South Africa
Inception year:	2018	**Target geographies:**	South Africa, SADC
Investment terms:	Grant capital (both returnable and non-returnable grants)		
Target capital providers/investors:	Foundations, governments, DFIs, impact investors		
Recipient investment funds:	A range of local early-stage fund managers (deal sizes ranging from R80 000 to R100m+) with a positive track record, a demonstrable interest in investing in green SGBs, and experience with early-stage impact deals.		
Target sectors:	Green buildings and the built environment; sustainable transport and infrastructure; green energy and energy efficiency; resource conservation and management; sustainable waste management; sustainable agriculture; food production and forestry; water management; sustainable production and consumption; and environmental sustainability.		
Selection of outcome metrics:	Green sector jobs created; CO2-eq sequestrated; Clean energy access connections; Energy generation; Energy efficiency; Waste to landfill avoided; Avoided waste incinerated; Waste recycled/reused; Chemical recovery; Water use reduction; Wastewater treated; Water productivity; Wastewater recycled or reused; Water sourced from an alternative resource.		

The GOF is designed to incentivise the managers of South African Recipient Funds to increase the quantity of investments placed with green SGBs. In the initial phase, a grant will be offered to Recipient Funds in return for the delivery of pre-agreed green outcomes from investments made into green SGBs (Nair et al., 2017). By increasing the incentives given to seek out and invest in green SGBs, the GOF seeks to enhance Recipient Fund managers' appraisal of green business models, technologies and investment cases. Moreover, through the monitoring process the GOF will begin to socialise the use of impact metrics within the venture capital industry, including for example IRIS (the International Reporting and Investment Standards developed by the Global Impact Investing Network), whilst also establishing shadow prices for the delivery of green outcomes as defined by IRIS.[7] The GOF's green outcomes have been developed based primarily off the basis of

[7] The Global Impact Investing (GIIN) developed the International Reporting & Investment Standards (IRIS) as an open access repository of standardised impact reporting metrics and methodologies to ensure harmonisation across impact investments regardless of geographic location or context – https://iris.thegiin.org

IRIS' climate change focused indicators, the South African National Development Plan (Vision 2030) Chapter 5 (i.e. transition to a low-carbon economy) and the UN SDGs with the intention of making fund managers more comfortable measuring, monitoring and managing impact in responding to SDG Goal 13 (i.e. take urgent action to combat climate change and its impacts) (Interview P61).

Figure 5 below is a schematic representation of the relationships between the key actors (the GOF, Recipient Funds and green SGBs), the flow of resources (blue) and matched funds (black), and the reciprocal green outcomes being returned through ongoing monitoring (University of Cape Town's Bertha Centre for Social Innovation and Entrepreneurship, 2017*).* This is followed by a step-by-step explanation of how the GOF will work.

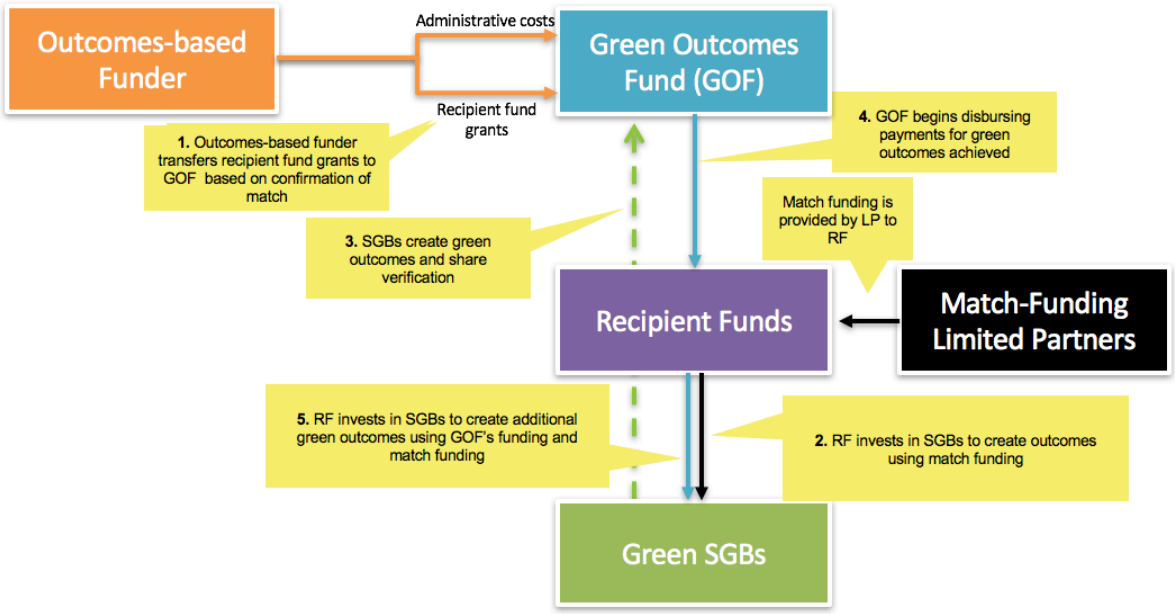

Figure 5: Schematic representation of the key relationships and the resulting flow of funds through the Green Outcomes Fund (University of Cape Town's Bertha Centre for Social Innovation and Entrepreneurship, 2017*).*

The GOF will operate over three phases:

1. Phase 1: As a grant-based outcomes fund, the GOF will negotiate the price (i.e. the grant reward for outcome achieved) of an outcome on an ad hoc basis with predetermined Recipient Funds. This consultation around the

price per outcome will inform implementation in Phase 2. During Phase 1 the GreenCape, Bertha Centre and WWF-SA will capture key learnings to inform subsequent phases (e.g. impact monetisation, how Recipient Funds have made use of the intended de-risking mechanism, etc.)

2. Phase 2: to the GOF will look to introduce an open, competitive auction process to increase the number of eligible Recipient Funds and to allow for a price discovery mechanism to determine the grant value to be returned for specific green outcomes. The auction process is still a conceptual design, but the early model looks to emulate a reverse price auction process. Recoverable grants will also be considered during this phase.
3. Phase 3: at this point the GOF will look to expand beyond simply offering grants, to establishing a blended financing facility i.e. one that uses a mix of concessional finance (e.g. recoverable grants and concessional debt instruments) to achieve risk adjusted commercial returns.

4.2.4. Iterative design enhancements

In an iterative fashion, the lessons from each phase will be used to inform the next round of the GOF's capital allocation (Interview P12, Interview P61). Key considerations for further rounds of funding will include expanding the number of targeted Recipient Funds, diversifying the instruments offered (incrementally adding recoverable grants, concessional debt and further options to blending these instruments) and accurately costing each outcome according to its metric (e.g. ton of CO2e reduced; kWh of energy saved). Nair et al. (2017) suggest that the standardisation of green outcome metrics to measure performance may be helpful for impact measurement within the South African ecosystem of fund managers.

Through this phased approach, a number of definitional concepts will need to be refined through ongoing monitoring and evaluation (M&E) processes utilising the IRIS and other frameworks. For example, what will be considered "green" could in part be a result of technology interventions invested in by the GOF, based on the indicators chosen for a particular outcome according to a specific framework (Interview R21).

The process of mentoring the green SGBs invested in will require consideration and development over the phases. It has been noted that early-stage green SGBs require significantly more mentorship from Recipient Funds and this can be a challenge if the fund managers are not geared with the requisite human resources to provide this support or are not based geographically close enough to provide this support in-person on a regular basis (Nair et al., 2017). Often, venture capital-style investments involve needing to be close at hand to advise the business founders' considerations of growth and expansion opportunities. Some of this support is possible virtually, but often face-to-face discussions are necessary at critical points in the investment cycle. In addition, the earlier the investment the more risk it tends to attract. The risk of being underprepared with the necessary human resources and informed skills to monitor and mentor investments into green SGBs becomes larger as the Recipient Fund's portfolio grows (Interview R21).

Based on the interviews, the researcher noted Recipient Funds would "nudge" towards changing their risk propensity to consider green SGBs especially those with innovative or new business models. Given that most South African fund managers are not (yet) looking for returns on social or green outcomes, the impact of the GOF in the short-term is likely to be more of a "nudge" as opposed to changing a risk tolerance or a risk profile assessment. The GOF's selected Recipient Funds are not typical venture capital funds, but all contribute to the development of a sophisticated SME finance market (Interview R18). The impact of the "nudge" would naturally vary, based on a number of influencing factors such as the size of a particular Recipient Fund, its track record, where on the J-curve spectrum/continuum the Recipient Fund had invested into, and how long it was prepared to hold its investment (Interviews E01, E58).

4.2.5. Metrics, pricing and measuring performance

Currently, the GOF has 15 indicators and a M&E framework that maps against IRIS, the National Development Plan and the SDGs. These indicators were selected based on an analysis of the Recipient Fund's pipelines. The IRIS framework allows

for some international standardisation and for reporting metrics that can be applied consistently across all Recipient Funds.

Initially, the pricing of each of these outcomes will be different, according to the relative perceived risk of the SGBs to deliver the green outcomes and the Recipient Funds to achieve their expected returns. Pricing of outcomes i.e. what the GOF and donors are prepared to pay for a specific metric will be negotiated between the GOF's technical team, contributing funders willing to participate in this exercise and the Recipient Fund (Interview P59). The GOF's design team noted that in this phase, pricing will be a challenging negotiating process. This negotiation would be a process of interacting with the different stakeholders and assessing what they are actually willing to pay for the outcomes. The approach with the GOF will likely be assembling the different stakeholders, investors, service providers, and outcomes funders to agree the menu of outcomes, and attempting to reach a compromise that works for all parties in setting the price. This means that the price might deviate from the intrinsic value of the outcome in terms of the extended benefits that a particular outcome brings.

The team behind the GOF recognises that this may not be the most robust approach, but it does allow the GOF to play a "market building function". In this way, the GOF will facilitate subsequent rounds of impact bonds and outcomes-based contracts so that they can draw on data from the preceding round and the initial pilot to better inform their pricing approach going forward. Furthermore, it will also inform the best way of incentivising/de-risking investments in green SMEs (e.g. the second phase might have strong components of de-risking in local currency) (Interview P95).

In the first, pilot round, the GOF's price discovery process for each of the outcomes will be an engagement process. In other instances, national benchmarks (the incoming carbon tax price) and international benchmarks (e.g. certified voluntary emissions reductions) may be used (Interview P12; National Treasury, 2018).

More theoretical or analytical approaches require a significant amount of data in order to run specific models. For the GOF's purposes limited data is available. The lack of data in developing country contexts is a significant barrier to being able to run computer-generated price discovery models. In some instances, there may be shadow prices that can be used as price floors: for example, should the South African government introduce a carbon tax then there would be a proxy price for a ton equivalent of GHG emissions reduced. Another mechanism to determine the price for a particular outcome is to back-cast the costs involved in achieving the outcome from the businesses' cost structures. The use of shadow pricing may give the GOF a normative sense of what a particular outcome could cost initially which would need to be benchmarked against data on the real costs of delivering a particular outcome. This could be adjusted through the course of the GOF's lifespan based on the actual cost of delivery. During the later phases of the GOF, it is planned that it will undertake a reverse auction process to determine the price of outcomes (Interview P59).[8]

4.3. Analysis of primary sources

4.3.1. Availability of primary documentation

Two internal (unpublished) reports were made available to the researcher for the purposes of the study. The majority of the analysis thereof has been captured in the analysis in Section 4.2.

4.3.2. Analysis of secondary documentation

The case for the GOF's approach is made in publicly available reports published by the proponents and the World Bank.

The need for South African SMEs to have access to greater amounts of risk capital to grow business has been well documented, however, the flexibility and/or special consideration for green SGBs is less articulated in literature. In relation to the

[8] More information on the Green Outcomes Fund is available at the following link: https://goo.gl/88uFq9

GOF, the role of early-stage financiers from the venture capital or private equity sectors is limited, but does have the potential to grow. Nair et al. (2017) point to this when stating that 66% of the South African SMEs that have been operating for less than 10 years have been bootstrapped by founders, friends and family, with a mere 7% indicating that they had raised finance through venture capital and/or angel investors.

Nair et al. (2017) also raise the concern of insufficient technical assistance being provided to entrepreneurs looking to make innovative business models or new technology work in emerging markets. They cite a number of service provisions that have been used within traditional development finance institutions (DFIs) to enhance the viability of a target investment through concessional technical assistance programmes that are often packed as part of the DFI's investment proposition.

During the pilot phase, the GOF would look to provide flexible financing, available specifically for the attainment of the agreed metrics (Nair et al., 2017). The provision of additional capital to recipient funds could either:

- Enhance their risk profile;
- Be used to encourage additional follow-on investments in their funds for the same purpose; and/or
- Nudge funds that would have otherwise not have chosen to invest or specialise in green SGBs.

McNicoll et al. (2017) report that, to date, private sector investments in climate change in South Africa have been directed towards the energy sector, with a significant contribution being mobilised by public sector resources. Given this is the case and that climate change-orientated investments into the energy sector are now becoming increasingly commercially viable, they argue for public sector funds to be directed towards other vulnerable sectors (e.g. water conservation, efficiency and demand-side management) where the risk and return viability has yet to be unlocked for the private sector to invest at scale.

Based on the researcher's analysis of the primary documentation, it appears that outside the utility-scale renewable energy sector, South Africa's large-scale

institutional investors (greater than ZAR 275 million/USD 19.800 million) struggle to find programmatic and scalable investment opportunities in the green economy. South Africa's REIPPPP has attracted debt finance for renewable energy projects from a number of large local and international private sector investors. Many of the projects are already operational and are now seeking subordinate debt financing. However, outside of the over-subscribed REIPPPP projects, there are few opportunities though listed companies that offer scaled, low GHG emission and/or climate-resilient project pipelines (e.g. Growthpoint's green bond offering of 2018).

Considering how finance is typically structured in South Africa and the availability of finance matched to the various levels of risk appetite across an investment's lifecycle, the researcher argues that there is both an under-supply of investment opportunities available to large-scale financiers and an under-supply of financing available for green SGBs. In addition, there are structural barriers that prevent the deployment of large-scale capital into individual SGBs. Analysing South Africa's J-curve for green SGBs, the researcher observes that the hypothesised chain of finance that would avoid a "missing middle" could comprise of the following:

- Seed (or "first loss") finance (less than approximately ZAR 2 million) should be taken up by the entrepreneurs themselves, angel investors, philanthropic funds or corporate social responsibility investments. Typically, this is where most risk exists.
- Thereafter, early-stage venture capital financiers should step in to finance projects between ZAR 5–22 million where a green SGB is attempting to grow a service or product offering that has established some traction within the market. From this research, it appears this category exhibits the most need with few investors willing to step into this stage of the business where substantial risk of business failure remains.
- Private equity and late-stage venture capital would then take on the growth phase (typically between ZAR 22–275 million/USD 1.584–19.800 million). As argued by NBI and KPMG (2013) and Finfind (2018) above, generally the South African private equity and venture capital markets are themselves nascent and, so far, have exhibited limited appetite for green economy projects. However, from this research it appears that there is interest in green economy businesses *provided* that they can make an investment case similar

to that of conventional economy businesses (i.e. the business model will need to make the necessary returns for the Recipient Fund concerned) in similar timeframes as that of conventional businesses.

- Large-scale investors (pension funds, institutional investors, hedge funds etc.) would be looking to fund established pipelines of projects (typically larger than ZAR 275 million/USD 19.800 million) and seek to expand these to reach maturity. The investments in the REIPPPP show that there is appetite for investments in the green sector where the returns and risk make sense for large-scale investors. However, the transaction costs for institutional investors to deploy capital into single green SGBs is too high; therefore, bundling of portfolios of SGBs will be required. Furthermore, there are legislative restrictions/thresholds of unlisted investment positions, including Regulation 28 of the Pension Fund Act (National Treasury, 2013).

4.4. Analysis of key informant interviews

4.4.1. Observations on South Africa's green economy "missing middle"

4.4.1.1. Sparse early-stage capital available with a risk adverse venture capital market

Early stage challenges versus a risk-averse capital market

Some interviewees note that during the design phases of the GOF there was evidence of seed capital being available for green SGBs (Interview P12). However, obtaining early-stage growth equity and debt remain challenges for green SGBs as a number of Recipient Funds reported focusing on late-stage venture capital and early-stage private equity. Furthermore, they were looking at relatively large deals (USD 10 million in annual revenue) (Interview R21).

Commercial banks also typically do not favour new technologies, untested business models and unsecured lending. Commercial banks tend to limit high-risk lending given that their mandate is to safeguard the day-to-day savings of their clients. Generally, green SGBs that have successfully managed to obtain a line of

credit from their commercial bank cannot necessarily count on this being useful when it comes to expansion plans for the business. Expansion typically involves taking on increased risk with the promise of greater return. Commercial banks typically do not price risk well, nor do they have a strong appetite for risk (Interview R77).

Immature and poorly development venture capital ecosystem

The experience of entrepreneurs is that South Africa still has an immature and poorly developed venture capital ecosystem. The early-stage investor in South Africa can be considered to have a conservative outlook and is generally risk-adverse in comparison to the atypical US-based venture capital investor. Typically, US-styled venture capital funds are set up with a five-to-seven-year time horizon between the initial round of investment and the "harvest" of their positions within a company (i.e. their exit). As such, they are betting on the enterprise solving a big problem; that the business has a solution that can be implemented at scale, with reliable cash flows resulting from this; and that the business has a reliable exit strategy for the venture capital fund, at a pre-determined point in the venture capital's life span. In the South African context, investors still want multiple times their money back, but without the same level of risk appetite. Furthermore, looking at the research, development and innovation funding available in South Africa, the majority of this is supplied by the government, which can make accessing the funds complicated and cumbersome. This informant argued that most venture capital funding available is still caught up in the private equity paradigm i.e. wanting to see an established business, average to good financials and, preferably, positive cash flow.

Innovation versus risk appetite

Interview P12 remarked that most of the companies are small and emerging and the underlying technology is still being refined through research and development. Further, the policy environment that enables the South African private sector to be involved in delivering public goods that are subject to climate change is only starting to mature enough for business models to be viable. If you look at them as SMEs, we know that there is a "missing middle" – in fact, this informant argued that the *entire* green economy could be classified as falling into the "missing middle".

This was even more so in South Africa, where the market is dominated by small companies, purely because of how the economic sector developed, where very limited overheads were needed. In addition, businesses need to be very flexible, so larger companies that tried to enter the market actually failed relatively quickly and these smaller companies are the ones that have succeeded. Therefore, it is quite different to other green economy circumstances, where these SGBs are the entire green economy, barring a few exceptions.

The space for true innovation funding and assisting entrepreneurial intent is nascent in South Africa (Interview E13). The green sector involves a greater perceived risk of not achieving a viable return, making it relatively more unattractive in comparison to other SME investments. People who achieve any degree of substantive traction largely bootstrap their own businesses.

The case for having a venture capital industry is made precisely because there is a gap, because institutional investors cannot or choose not to invest in unlisted equities. The JSE-listed equities offer relatively risk-free, slightly larger companies (scale), the liquidity is higher (shares can be traded on the open market) and transparency, supposedly meant to be higher than that of a privately held company. This is the real reason the VC space was created and has thrived, albeit it is still nascent in South Africa. In many cases, smaller unstructured investments are expensive, time consuming and legally difficult to bundle, and they are riskier investments if not held in a portfolio that balances the risk to returns (Interview P12).

Constraints on institutional investors

The constraint on fund managers, in particular, as institutional investors, is being able to invest in anything other than standard, listed (i.e. JSE) equities. At this scale, it was reported during interviews that there has been a dearth of capital supporting green SGBs. A number of reasons were cited for this. The earlier an investment is made in the business lifecycle the higher the risk, and the higher the expected return by the investing party. Institutional investors need mature companies with proven business models and steady dividends from recurring and predictable

cash flows. Often green economy businesses simply do not offer these qualities and characteristics (Interview E13).

A number of the interviewees, including E90, noted that the composition of the JSE (at least in the top 20 shares), comprises shares that the various funds should invest in to meet their index tracking standards, meet investor's expectations and, ultimately, trigger their performance fees. Most performance indexes track aggregates of the JSE and therefore a significant deviation from the mainstay, profit-sure stocks would likely lead to fund managers underperforming against benchmarks set with their clients. The JSE is carbon-intensive and is a proxy for how emissions-intensive South Africa was and, in many ways, still is. Interviewee E90 pointed out that when your benchmark of assets is carbon-intensive it is very difficult to structure a risk-adjusted portfolio that competitively tracks an index like the JSE. Therefore, there is a limited universe of stocks that they have access to invest into.

The dearth of scaled, de-carbonised and climate-resilient listed investments

Further to this is the consideration of scale, which is especially relevant for smaller scale opportunities of the likes of green SGBs. By their nature, if unbundled, these will remain standalone investment opportunities for institutional investors that would be prohibitive, because of the high transaction costs involved in assessment and financing. In addition, Regulation 28 of the Pension Fund Act limits the percentage of unlisted equity investments that institutional investors can hold for certain purposes. Moreover, outside of the REIPPPP process, where many opportunities at that time were almost completely taken up by asset financiers, there have not been many scalable green economy investments available for institutional investors. As a result, it leaves a predicament for institutional investors who do want to reduce their exposure to GHG emission risk (Interview E90).

4.4.1.2. Temporal disconnect with green SGBs and traditional venture capital models

Fundamentally, all the Recipient Funds noted that, first and foremost, green SGBs would need to present an "investment sense" and would compete on the standard investment criteria relating to any (non-green) investments being considered by their respective teams, including:

- expected time taken to reach profitability,
- the scalability of the business,
- how sustainable the cash flows and revenue streams from the business are,
- whether the underlying technology has been tested in the South African market,
- what the collateral and/or credit guarantees available for a specific investment into a green SGB are,
- what the composition of the management team is and how well equipped they are to scale the business,
- whether there is a demonstrated track record with the business model within the core markets and a strategic plan to expand into other markets (Interview R71).

Additional considerations include the management team's track record, an assessment of the business' financial projections, cash flow projections, the impact of the business, an assessment of the legal and policy environment, intellectual property protection, governance, competitor analysis, the type of technology being deployed and whether this has been tested in the South African market (Interview R77; Interview R71).

These map against Tyebjee and Bruno's (1984) five overarching categories of market attractiveness, product differentiation, managerial capability, environmental threat resistance (the extent to which the venture is able to resist and deter threats from the external environment) and the cash-out potential. Often these factors are

not aligned, or some are present, with others still taking time to develop, which creates underlying challenges to the investment case for these green SGBs (Interview E81).

Interview E13 was very instructive on the temporal challenges SGB investments face. In many instances, some of the unique characteristics of green SGBS (e.g. long tail profits due to high capital outlays, combined with relatively large research and development costs, market adoption risk, etc.) make it relatively difficult for traditional venture capital to assess the fundamental investment case. Indeed, often the time horizons of the traditional South African venture capital fund (looking to harvest investments after four to six years of involvement) and those of green SGBs (typically requiring eight to 10 years of operations to achieve growth margins that would interest traditional venture capitalists) are misaligned (Interview E13). [The problem points towards a temporal disconnect between the traditional model of how venture capital is set up to function and the implicit, long-tail nature of clean-tech start-ups. This is supported by literature such as Saha and Muro (2017) and it can be seen in the US, for example, with the waning of venture capital interest in clean-tech due to the waning of federal support for the subsidising of the clean-tech industry.]

The green economy and the need for patient capital

Typically, green economy businesses are high capital cost outlay at the beginning and relatively slow to pay back, which makes them difficult to finance unless the capital being put forward is willing to be patient. Traditional venture capital funds are set up to harvest the investments into companies between four to seven years, depending on the timeframe between when the fund was established and when the investment is made within the business. Given that a typical green economy business has a higher capital outlay, and long tail-off payback period, often the investment only makes economic sense after 10 years or more. Therefore, green economy businesses are currently not aligning well with the traditional venture capital fund set up and require an investment from a capital source that is inherently more patient than the current market. This is especially the case in the early- and late-stage venture capital phase of business investment (Interview P12).

The majority of South African green economy investment opportunities are currently not listed on the JSE. Regulation 28 places limitations on the amount of investment that pension funds can invest in unlisted positions. Regulation 28 of the Pension Fund Act allows funds to hold no more than 10% of their investments in unlisted preference and ordinary shares in companies (excluding shares in property companies) incorporated in South Africa and no more of 5% in offshore unlisted shares (Stanlib, 2018). The result is that a number of institutional investors are hamstrung by having to invest into the JSE (which remains primarily a composite of fossil fuel-intensive industry) with limited, scalable opportunities to deploy their capital into unlisted, alternative investments. Pension funds are investments that individuals are putting away for long-term future savings and are, in theory, the most patient capital available. However, South African legislation does not allow this patient capital to flow at scale into the unlisted equities and debt as a precautionary measure. The ironic result is that the most patient capital available in the market continues to reinforce investments that undermine the viability of the future climate that pensioners will retire into.

The two primary instruments being put to work by the Recipient Funds are debt and equity and, in some isolated examples, a combination of the two (i.e. mezzanine finance). The combination of debt and equity into single deals results in more complex deal structuring than that of the typical, single instrument financing arrangement. Within these instruments, a typology according to the business cycle can be added, namely, “early-stage” and “late-stage”. Recipient Funds spoke about the differentiation of a financier offering “early-stage equity” as opposed to “late-stage equity” and “early-stage” debt as opposed to “late-stage” debt. The references to stages also refer back to the reasons for the financing being requested (i.e. early-stage finance is typically being used to enhance the product or service offering by, for example, hiring new research staff, whereas late stage financing is typically being used to scale the business by, for example, buying new manufacturing equipment to increase production) (Interview R77).

The interviews of the Recipient Funds found that only two out of the five were focusing on early-stage seed investments into green SGBs, which is where early-stage venture capital (typically between ZAR 5–20 million/USD 360 000–1.579 million) would play a role in picking up follow-on rounds of investment with a view to pushing a business into a growth phase. The point raised by the Recipient Funds was that providing this early-stage capital was high-risk within the South African SME market, let alone for the new business models or technologies being considered by green SGBs. Furthermore, the early-stage venture capital investments were at the scale that would see Recipient Funds with relatively small envelopes of funding being fully committed after taking only a few SGB investment positions. The situation would not favour a diverse portfolio of investment positions and could lead to potential concentration risk for the Recipient Funds concerned (Interview R71, Interview R18 and Interview R21).

These Recipient Funds sought to enhance their deal pipeline by partnering with accelerators and incubators (e.g. the Innovation Hub), but still saw professional networks as the primary avenue for deal sourcing. In addition, it was highlighted that these types of early- and late-stage venture capital investments typically require a significant amount of involvement from the venture capitalist to guide their investment to a successful exit point. Green SGBs are typically testing new business models or technologies but the sector-specific skills required to mentor these types of businesses often are not pooled into a single venture capital firm in the South African market (Interview R71; Interview R21).

One Recipient Fund indicated that they are later-stage venture capital investors and sometimes see themselves more as private equity investors than venture capital investors. For example, this Recipient Fund would only finance businesses that had concluded their spending on research and development, resulting in a tested technology already showing market traction (Interview R77).

These indicators of temporal disconnects are stark and the implications are wide-reaching on a systemic level, especially if looking at how institutional investors

are able to drive economic growth through their decisions on capital allocations. Added to this, an interviewee (R21) could name only two funds (WWF and Prescient's Living Plant Fund) dedicated to investing in a manner that matches the need to consider climate change and the future of the South African economy, highlighting again the "missing middle" of funding to green SGBs.

4.4.1.3. Missing finance for green SGBs to scale into private or publicly listed investments

Interviews E01 and E58 were the primary source of insights into the investment constraints faced by institutional investors. There are significant legal and institutional impediments to unblocking institutional investors' ability to invest in unlisted assets that make up the currently available proportion of green, alternative assets in the South African economy. Further consideration needs to be given by the SGBs seeking investment to the scale at which institutional investors are required to deploy their capital. In nearly all instances, a single green SGB investment will never warrant institutional investment, because of the transaction costs and the liquidity required, often at short notice. Therefore, listed equities are the mainstay of South African institutional investors and as a result form their primary "universe of investments". The "investment universe" for institutional investors is limited by legal provisions such as the Pensions Fund Act and Regulation 28, leading to stock picks from the JSE as the most legally viable and scalable mechanism to seek returns for investors.

These interviewees explained further that unpacking the roles of each of the capital providers, especially within the South African green economy, is a critical endeavour required to comprehend the financing needs for the composition of businesses required in a scenario of net zero emissions economy by 2050. The roles played by the various capital providers across the J-curve cannot be underestimated, especially when looking at the business lifecycle. If one was to assume that the JSE is one of the primary markets for wealth and capital distribution, then the pathway for firms to reach an IPO requires a chain of financiers to hand over to one another to reach the point of an IPO, noting that an IPO may not necessarily be the end stage for all scalable green businesses. Indeed, in South Africa, there are a number of

unlisted scalable companies. However, the unlisted nature has implications for how easily institutional capital can be deployed to grow their businesses.

Other interviewees noted that it was unlikely that the JSE would diversify rapidly from its historically-focused minerals and industrial listings without alternative businesses being nurtured through to the maturity stage in the business lifecycle. Interview 86 argued that the "inertia" of the fossil fuel-heavy JSE could be disrupted, but not without significant changes to the businesses being funded through the Exchange.

Interviewees E81 and R86 nevertheless did see an upside, despite some caveats. Investing in early-stage venture capital is risky, especially in emerging economies where one needs to ensure that policy, business model, consumer behaviour and financing align. Venture capitalists identify a portfolio of businesses where the risks are balanced so that at least one company in their portfolio can achieve extraordinarily, thereby balancing out the high risk they take on other investment picks that may not achieve at all. Therefore, venture capitalists tend to be relatively risk-tolerant, provided they structure their portfolio correctly. Given the urgent need to reduce GHG emissions, develop climate resilience (especially in supply chains), the science being communicated on climate change impacts and pressure being exerted on the finance systems to transition from fossil fuels, there is a large potential upside if a venture capitalist were to undertake the correct picks with the backing of patient capital.

4.4.2. Observations on the challenges of financing South African green SGBs

4.4.2.1. Dynamics of the green economy: risk tolerance and tenure extension

A number of other impediments result in challenges to unlocking significant amounts of institutional capital for South African green SGBs. In relation to institutional investors, Interviewees E01and E58 detailed the restrictions imposed by the South African Pensions Fund Act and the Collective Investment Schemes Control

Act on investments into assets outside of listed equities and bonds. Investing in stand-alone green SGBs is extremely limited because of these legal provisions. Alongside this, single investments at the scale required by institutional investors is difficult and there are no known institutions yet aggregating equity positions in a portfolio of green SGBs, with a view to listing this type of instrument on the JSE.

Even where the law permits institutional investors to commit funds, the availability is limited and, where investment opportunities do exist, the scale is too small and the transaction costs (e.g. due diligence procedures) too high for institutional investors. However, there have been attempts in South Africa to bundle green asset (e.g. renewable energy installations) investments in a similar way to how real estate investment trusts (REITs) are structured, with a view to listing. Interviewees reported that this approach had not resulted in product offerings materialising because of the lack of sufficient available assets, however it was not possible to verify this independently (Interview E01, Interview E58).

Regulation 28 of the Pension Fund Act was referred to in Interview E01 and Interview E58. It places caps on the various types of asset allocations that are permissible for South African domiciled pension funds to hold. However, the JSE as an index is very concentrated, leaving a small universe of options for institutional investors to choose from: Approximately 60% of the index is dominated by the top 10 listed shares whilst 80% of the index is dominated by the top 40 listed shares. Therefore, trying to pick a risk-adjusted green portfolio from this universe, that outperforms benchmarks linked to this index, is “impossible” given the underlying emissions intensity of the current JSE listings.

Furthermore, it was noted that positioning an investment within the so-called “impact investment” community also has its complexities and can be more time-consuming than traditional commercial financial arrangements. A key informant noted that green SGBs often position themselves as good candidates for impact investors, but forget that impact investors also have their limitations, which by way of mandates

and governing theories of change, that are as, or even more restrictive than those of commercial financiers (Interview E13).

The Recipient Funds put forward key considerations about the green economy that the GOF will need to take into consideration when programming resources, namely, the increased risk owing to the new and, at times, innovative approach coupled with the tendency for green economy businesses to take longer to pay back investors. By allowing for slightly more risk and increasing the payback on investments, the GOF would provide a key niche financial service to green SGBs that is currently not provided in the market (Interview R18).

Interview R77 noted that while payback periods on some traditional green economy businesses are longer than conventional payback periods on loans extended to small- and medium-size enterprises, technologies are getting more efficient and cheaper, leading to payback periods becoming shorter; it seems that there may be maturing green economy business models which are breaking with this trend.

With the development of new clean technologies, a number of the business models within the green economy will begin to unlock themselves and become financially viable over time. In tandem to this, increased product innovation in the financial systems will also allow green SGBs to unlock new ways of financing acute resource needs like working capital constraints (e.g. Yoco Capital's ability to provide invoice factoring through a small business card facility) (Interview R18).

The notion that, to be successful, a green SGB would require funding from the GOF alone is unlikely. In order for the GOF to be able to match the flexibility required for green SGBs to survive, it will be important to consider how it is able to match and crowd in other financing mechanisms/funding rounds from complementary sources of capital (Interview R18).

In doing so, a number of the interviewees noted competition from South Africa's development agenda and the plethora of development needs that are considered equally or more important to solving climate change. For example, employment, poverty eradication, education, health, housing and crime reduction are, it is argued, core to the modern South African development agenda and any subsidies available should be driven towards addressing these issues. Therefore, green economy initiatives often compete for scarce public resources against these development priorities. This is even more acutely felt in the global community, where there is an increasing expectation by developed countries that middle income countries should not be receiving grants to address climate change issues (Interview R18; Interview E01, Interview E58).

Interviewee R18 foresaw a challenge arising with regard to the tenure of the investments being placed into green SGBs. One of the interviewees noted that even with open-ended funds, investors still have a set time horizon and it is unlikely to look beyond 10 years. Therefore, the GOF may need to consider how it would approach re-financing some of the portfolio, in instances where the green SGBs require investments to look beyond 10 years and, especially, in instances where the business model or technology itself has a "market creating" function.

The GOF will need to keep in mind the profile of Recipient Funds and aim to recruit those that are focused on and equipped to work with earlier stage green SGBs. However, it was noted that a number of the Recipient Funds have positioned themselves as late venture capital or private equity because of the human resources required to mentor emerging green SGBs in the early venture capital phase. Nevertheless a few of the current cohort of Recipient Funds are focusing on early-stage venture capital positions within green SGBs. Going forward, the curation of various types of Recipient Funds will become extremely important in order to match the GOF to the financing needs and opportunities in the market (Interview R71).

Furthermore, within the GOF, there are Recipient Funds looking to play the function of private equity with a view to carrying green SGBs all the way to an IPO

exit. This is extremely promising for the GOF's theory of change. However, the ability of a Recipient Fund to have a portfolio solely based on South African green SGBs was considered to be challenging given the need to balance out the risk and return ratios in an emerging sector such as clean technology (Interview R21).

The composition of Recipient Funds being used to channel resources will be fundamental to how the GOF progresses within the pilot phase. Interview R71 recommended that the GOF attach M&E provisions to the capital being seeded into Recipient Funds to supply relevant data for designing subsequent phases of the GOF's implementation (e.g. data to inform how to run a reverse auction process with South African fund managers and/or shadow pricing used to price efficiently specific outcomes that do not have a fixed market value).

Interviewee R71 also noted that some of the business models and technologies within the green economy would require significant investor education in order to overcome hesitancy in traditional investors, especially given South Africa's tendency to track towards investors with a lower propensity for risk-taking.

In these instances, investor education is required in relation to new business models, because traditional financiers do not understand the underlying technical aspects of the investment. The GOF or Recipient Funds could partner with organisations who have undertaken this function as part of their core responsibilities at a national level (Interview R86).

Institutional investors look at share prices with a view to understanding the intrinsic value of the price of the share against the price it is trading at. This assumes they are incorporating all the relevant information into their analysis and that the market has not badly underestimated the price of the stock. In the coming months and years, the TCFD mandate for listed companies to undertake scenario analyses will start to provide investors with a greater level of transparency into how listed equities are impacted by climate change. It is unlikely that these disclosures on their

own will lead to significant devaluation of core shares on the JSE. However, a significant, underlying issue that will surface through the process is that the JSE is extremely vulnerable to the impacts of climate change. It is likely that corporate and sovereign bond offerings/ratings will incorporate climate change in increasing amounts in the future and will use TCFD data to assist in this process (Interview E01, Interview E58).

4.4.2.2. Limits to the deployment of institutional capital

Some key informants noted that South Africa's foreign currency regulations made inward investment difficult for green SGBs. In this regard, using foreign direct investment to scale South African businesses typically requires incorporation of the intellectual property outside of the country and significant red tape in dealing with the South African Reserve Bank in relation to foreign currency transfers. Attracting foreign capital into South Africa to invest in SMEs is difficult. Interviewee E13 maintained there is macroeconomic risk around exchange rates and political uncertainty, coupled with a punitive intellectual property environment. In addition, to mitigate new market risk it is critical to have a local investor who knows and has worked with the foreign investor. Often, aligning the criteria of both entrepreneur and financier is an elaborate matchmaking exercise made more difficult in the green economy, because frequently the businesses are introducing new models or technologies that financiers need to understand in order to fund.

Furthermore, there is an established venture capital and private equity industry in South Africa, even though this has some way to go in order to provide a thriving ecosystem for small- and medium-size enterprises in the country, as it is still relatively small in comparison to the needs of local SMEs. Coupled with this, Interview E81 argued that the enabling environment for SME owners is not supportive and does not take into account that often founders/entrepreneurs are not trained in business, but in other proficiencies. By way of example, Interviewee E81 raised the attitude towards failure amongst financiers. In the US venture capital industry, a prior failure in business was considered as good experience for an

entrepreneur, whereas in South Africa this can be terminal for any future investment proposition from an entrepreneur.

4.4.2.3. Building investment pipelines and effectively pricing projects

Building the project pipeline is critical. Often there is a focus on the need to supply more capital into the market and less attention is given to the need to build businesses that can make strong investment cases. In certain instances, venture capital firms do acknowledge this dichotomy. An example of this is Knife Capital and their Grindstone Accelerator, working to support deal flow and generate data to assist effective due diligence on any investment made by the capital arm. In the researcher's experience, there is no specialised green economy model of a similar nature. Interviewee E81 made the point that green economy businesses are made just that much more complicated, because the social benefit of the businesses is typically a public good and the private sector's involvement in delivery of that good is usually regulated by law or policy (i.e. an externality to the underlying business).

Deals are sourced by the Recipient Funds personal networks (including transaction advisors, lawyers, other financiers, etc.) and being directly approached by the founders/entrepreneurs through online channels or referrals. In some instances, Recipient Funds have set up relationships with business accelerator and incubator programmes, especially where these exist for the green economy (Interview R 21).

Looking at the experiences of the green SGBs themselves, there was feedback that the pipeline of investments within SGBs would be materially improved by focusing on the skills sets of the entrepreneur, providing greater access to working capital (especially for those that do not require traditional collateral for securitisation), and improvements to intellectual property provisions and exchange control regulations in favour of SMEs attracting foreign direct investment. Interviewee P12 noted that access to working capital remains a significant challenge.

The green economy (and its businesses) are new and there is a learning/adoption curve required in order for them to be mainstreamed in the economy. This is exceptionally important for the investment community, including those within the venture capital and private equity industries. For example, the rapidly reducing cost of solar energy equipment and availability of technical expertise in the local market has advanced the investment case in non-utility scale, off-grid energy companies (Interview P12).

South Africa's macroeconomics play a part in how capital is used within the economy and the GOF will need to be flexible in taking this into account when programming the resources in its pilot phase. For example, recently listed equities and bonds have not been performing well and there has been a large outflow of capital from the country. A dearth of foreign capital may make local investors more risk-adverse than usual, which may have implications for how the GOF allocates its funding in the first phase (Interview P59).

The GOF will develop an allocation model in the pilot phase to ensure that the larger Recipient Funds do not swallow up all the capital, leaving little available for early-stage investors. Each of the Recipient Funds has its own specific niche, be it in ticket sizes, instruments or how soon in the business lifecycle the financier chooses to be involved. However, the majority of the Recipient Funds are more late-stage venture capital and private equity investors, showing little sign that there will be demand from the Recipient Funds for early-stage venture capital resources. The GOF proponents are aware of this and would like to persuade Recipient Funds to greater support of early-stage green SGBs. In making these investments, there would need to be a good climate rationale for why the investment is additional to what would otherwise have been business as usual (Interview P61).

Ahead of making these investment decisions, the financier would usually build a financial model that would allow for discounted cash flows in the valuation process, creating a standardised mechanism to assess the required rate of return for a certain underlying investment relative to the risk that the opportunity exhibits (Interview R86).

4.4.3. Observations on climate-induced transition risk for South Africa and the role of green SGBs

4.4.3.1. Challenges in bundling green SGBs to adjust for a risk portfolio

There are a number of challenges inherent in bundling green SGBs into any form of listed investment option for institutional investors. However, the potential for bundling South African-domiciled green SGBs in later phases of the GOF should not be excluded. This was highlighted by the analogy made in regard to the use of Real Estate Investment Trusts as a vehicle for asset managers to gain exposure to unlisted investments in property (Interview E01, Interview E58).

However, the impact of Regulation 28 on the ability of institutional investors to deploy capital into unlisted equity and debt is significant, as is its implications for the time horizons set by investors. Further analysis of the implications of Regulation 28 on the ability of institutional investors to reduce their exposure to climate-related risk could be undertaken Interview E01, Interview E58).

Currently, a positive perceived intrinsic value remains for fossil fuel assets listed on the JSE. The TCFD scenario analysis required during 2019/20 may have an impact on the intrinsic value of some of these assets (e.g. SASOL). However, overall there seems to be little impetus for institutional investors to change their investment approach or to fundamentally reconsider investments into the JSE's composite index (Interview E01, Interview E58).

Even if a fundamental reconsideration occurred, the current universe of alternatives in South Africa is relatively small compared to international stock exchanges because of climate-induced impacts on underlying asset values. Should the listed JSE stocks be assessed against its preparedness for a net zero emissions scenario, it is likely that the underlying value of each stocks would be discounted accordingly. The ability of international capital to realign is easier given that their

universe of investment alternatives is much larger. Test cases in managing divested funds include the Investec TDI fund (late 2005/early 2006) and the WWF Living Planet Fund. These two cases point to just how small the universe of alternatives in the South African economy is (Interview E90, Interview E01, Interview E58).

If they want to be successful green SGBs must consider four challenges:

- financial products,
- business models,
- policy, and
- consumer behaviour (Interview E81).

Government incentives do exist for green SGBs, but the actors who require them find it difficult to connect with them. In addition, there are inconsistencies in the National Development Plan (specifically Chapter 5) which make the transition to the green economy particularly difficult to coordinate. Therefore, for the GOF to be successful, it needs to pay particular attention to developing its pipeline while taking into account the overarching difficulties in coordinating the green economy in South Africa. Currently, outside of the REIPPPP, there is a lack of scalable investment opportunities in the green economy even if an institutional investor was interested in transitioning their portfolio (Interview E81, Interview E13).

Looking at the investment community within South Africa, interviewees reported significant levels of inertia and climate change denial as the pervasive mindsets in top fund managers in the early 2000s. It appears that there has been a shift, but the ability for fund managers to change the path of institutional capital remains guided by legislation that restricts most of it from flowing into green economy investments. The formalisation of the United Nations Principles of Responsible Investment (UNPRI) has assisted in pushing forward the discussion amongst institutional investments locally and abroad. The public endorsement of the UNPRI by Martin Kuscus, previous chair of the Government Employers Pension Fund, was a significant milestone in the adoption of the principles in South Africa (Interview E90).

As we have learned, in the majority of the Recipient Funds the green economy is not a specific focus of their pipeline or deal origination. Therefore, in some instances a searching function will be needed to generate a pipeline of investment opportunities that map well to the outcomes being sought by the GOF. However, interviewees confirmed that the potential of the "risk-reducer" and "returns-enhancer" was a significant incentive to assist in making investment cases at Recipient Fund investment committees and with fund principals/trustees (Interview R18, Interview R21, Interview R86).

4.4.3.2. Mismatch of capital time horizons, especially institutional capital

Traditional venture capital funds are set up to harvest an investment in five to seven years. Whilst the green economy in South Africa is growing, green SGBs are currently unable to meet this return requirement for traditional venture capital funds, thereby making them an unattractive investment (Interview E13).

Institutional investors are precluded by law from deploying substantial capital towards green SGBs, especially unlisted entities because of the perceived and real risk involved in unlisted investments. The outcome of this is that institutional capital continues to underpin the JSE's current listed entities without allowing for diversification. Furthermore, institutional capital (especially pension funds) should be the most patient capital available in the market, yet these fund managers are dissuaded from investing in the green economy because the returns are uncertain given that often the business models and technologies are new. One interviewee notes that these risk and return decisions linked together in cycles could lead to an overvaluation of the JSE when considering the underlying productive capacity of the economic assets listed on the Exchange (Interview E81).

4.4.3.3. Latent and unpriced transition risk in the Johannesburg Stock Exchange

Indeed, Interviewee E81's perspective was that the current composition of the JSE is carbon-intensive and is a proxy for the minerals-industrial complex that has

been the framing of the South African economy in the 20th century. Yet the IPCC Special Report 15 signals that the global community needs to transition to net zero emissions by mid-century, as an essential requirement to continued safe existence on planet Earth (IPCC, 2018). Using the lexicon of the TCFD, the "transition risk" for the majority of JSE-listed equity is massive. According to both these frames of reference, there is a strong likelihood that the JSE of 2030, 2040 and 2050 will look materially different to that which we know today. The institutional investors interviewed confirmed that they are already applying recommendations of the TCFD to their decision-making criteria (Interviews E01, E58, E81).

However, given national policy on climate change (and the emissions trajectory) set out in the NDCs, there is also the need to consider the impact on employment and tax revenue through the curtailment of emission-intensive businesses (Department of Environmental Affairs, 2015). When looking at the emissions-intensity of South African businesses relative to some of their global peers, in many instances there will be a trade-off on the social implications of employment and development (e.g. Sasol) (Interview E01; Interview E58).

Currently, there is a dearth of quantitative information and data on the transition risks applicable to listed South African equities. From the interviews, it appears that institutional investors are aware of these, but unlikely to change their investment approach given the regulatory environment (especially Regulation 28). However, the TCFD requirements may change this. There are a number of underlying issues in relation to the TFCD, the transition risk and the South African balance of payments (considering South Africa's imports and exports).

In the interim, one approach could be to assess the supply chains to the large JSE listed firms, with a view to smaller companies providing solutions to reduce their GHG emissions and reporting through the Carbon Disclosure Project and under new legislation (e.g. the Carbon Tax) (Interview E81).

The transition risk will also need to take into account the social implications of job losses and the need to realign employment opportunities in the heartland of the

current South African economy, focused on the gold and platinum reefs. Over and above transition risk, there is physical risk and liability risk that investors should keep in mind when considering their investments into fossil fuel assets (Interview P59).

CHAPTER 5
DISCUSSION

5.1. Introduction

The objective of the research is to assess the role of early-stage financing in supporting the growth of low-emissions and/or climate resilient small and growing businesses (SGBs) within South Africa. Within this, the research sought to ask why traditional SME financiers in South Africa faced challenges in the provision of early-stage capital to clean technology SMEs to date and what are the mechanisms by which barriers to finance could be overcome. This chapter seeks to discuss the outcomes of the findings with a view to summarise this paper's theoretical contribution.

5.2. Theoretical contribution on the "missing middle" for green SGBs in South Africa and the role of development finance institutions

As outlined in the literature review, the Paris Agreement and associated climate science requires nationally-led action to reduce GHG emissions significantly and to adapt to life on a warmer planet. Article 2(c) of the Paris Agreement requires all financial flows to become consistent with the 2°C target, which effectively requires the global community to be net zero GHG emissions by mid-way through this century (United Nations Framework Convention on Climate Change, 2015).

For GHG-intensive economies like South Africa, the transition to net zero emissions and the realisation of Article 2(c) is of critical importance in planning future economic growth and safeguarding societal development gains already achieved. Over the coming years, financial assets will need to be directed towards net zero emission outcomes, through productive investments in businesses delivering goods and services that are more efficient and cleaner than those currently available.

The researcher posits that the shift of financial assets (e.g. assigning funds to safeguarding crops on a seasonal basis) will be pre-emptive to the impacts of climate change, responsive to policy measures (e.g. corporates responding to the fiscal

incentives and disincentives of mechanisms like a carbon tax) or reactionary (e.g. reactions to the overstatement of current investments, in the wake of key economic assets becoming stranded by their GHG emission intensity and/or inefficiency).

Capital markets will require productive, climate-smart assets to invest into, and these assets will need to be placed on the JSE to allow institutional capital to invest at the scale and with the liquidity needed to match their purposes. In 2019, the JSE continues to reflect the dominance of mining and industrial stocks in a South African economy that is inherently a GHG emissions-intensive one. With the need for capital to shift to align with the scientific safeguards outlined by science (typified by the IPCC's Special Report 15) and to meet the Paris Agreement's Article 2(c) target, the composition of the JSE will need to change fundamentally by 2050 in order to offer opportunities for investors to channel their financial flows consistent with the net zero emissions.

The findings of this paper show that traditional early-stage financing models could to be adapted to address the "missing middle" of finance available to green SGBs focusing within South Africa. The proposed GOF is one example of how traditional early-stage financiers could be incentivised to offer provision of early-stage capital for green SGBs. Herein lies the importance of the GOF. There are barriers for early-stage green SGBs to raising capital to grow themselves: these have been outlined in this research, the literature reviewed and the inputs from key informants. Historically, most listed entities on the JSE started as small businesses which grew through the business lifecycle and gathered finance from appropriate sources along the way (as put forward by the J-curve). The current companies listed on the JSE all reached the point of IPO in order to become publicly-traded companies and the mainstay South African institutional investors and retail investors alike. In order for the South African economy to transform, a number of new, green businesses need to reach a similar size and scale in order for them to progress to being listed and publicly traded in order to allow for alternative "green" assets to be available at scale.

The listing and public trading of a range of "green" businesses, with all of its subsidiaries delivering goods and services aligned to net zero emissions, will afford institutional investors one avenue to start deploying capital as a result of the

requirements of the TFCD and reduce the risk of being exposed stranded, carbon-intensive assets.

A start-up enterprise typically requires high-risk capital from founders or angel investors, or investors that have a mandate that allows them to have a high-risk propensity and take decisions on risky investments (e.g. philanthropic/impact investors). From this stage, once the business has proved viable and shown product-/ service-market-fit, it moves from the start-up phase into a growth phase where venture capitalists and then private equity begin take positions. Thereafter, the continuum of the finance stages takes the business ultimately to a mature phase that either sees the business move into decline or expansion by way of a scaled, privately-held company or by being taken to an IPO via an exchange like the JSE. This research, in looking at the chain of finance (i.e. the J-curve) for South African green SGBs, noted that there remains a gap for early-stage green SGBs in South Africa.

It should be noted that the literature coupled with the interviews revealed that, generally, there is sparse early-stage capital available in the first instance – whether for a green or non-green SGB. In particular, whilst the South African venture capital industry is growing, this avenue of finance remains relatively niche for the wide spectrum of businesses looking for expansion capital within the local economy.

Coupled with this constraint on the availability of capital for early-stage venture growth, green SGBs tend to bring new business models and technology to the fore requiring entrepreneurs to take additional risk in testing new products and services within the local market conditions. The additional risk (or perception of this risk) within early-stage venture capitalists creates an additional hurdle for green SGBs looking for expansion capital.

More often than not, green SGBs are typically capital intensive or require significant research and development in order to see a technology adapted to the local context. This time horizon usually sees green SGBs profitability spike further in the business development cycle and often later than the typical seven year invest-and-harvest venture capital model.

Furthermore, due diligence and valuations of green economy businesses are technical in nature often lending themselves to SME financiers requiring niche skills/ expertise to evaluate buy and sell positions. In addition, institutional investors in South Africa are restricted in terms of what Regulation 28 allows them to invest in unlisted equities and other assets perceived to be more risky than listed equity. By their nature, bundling green SGBs has challenges because of the various sector varieties, time horizons and technology maturity. More often than not, the listed equity options currently making up the core of the JSEs value are those represented by fossil-fuel intensive businesses which can no longer perform as the backbone of the South African economy if the climate science on has put forward emissions trajectory that see the country needing to rapidly decarbonise its growth pathway.

It is unlikely that the GOF alone will fill the entire gap for early-stage finance for green SGBs, but it will go some way to addressing the gap by nudging a group of Recipient Funds that are considering investments within or on the fringes of this range. Whilst the GOF is a necessary and encouraged intervention, it is by no means a panacea for the dearth of early-stage capital available for green SGBs in South Africa. This is especially the case for early-stage venture capital investments, where green SGBs are looking for investments between ZAR 5–22 million (USD 360 000–1.579 million).

Figure 6 summarises this paper's theoretical findings that supporting green SGBs through their expansion to becoming large scale publicly or privately listed companies allows for the growth of employment opportunities in sectors of the economy that support the transition towards a South African economy that can support net zero emissions as a steady-state by mid-century. Tapping into the enabling policy environment supporting SMEs to be the driving force of job creation is important to frame a just and equitable transition away from the historical mineral-energy complex that has framed the South African economy of past 100 years.

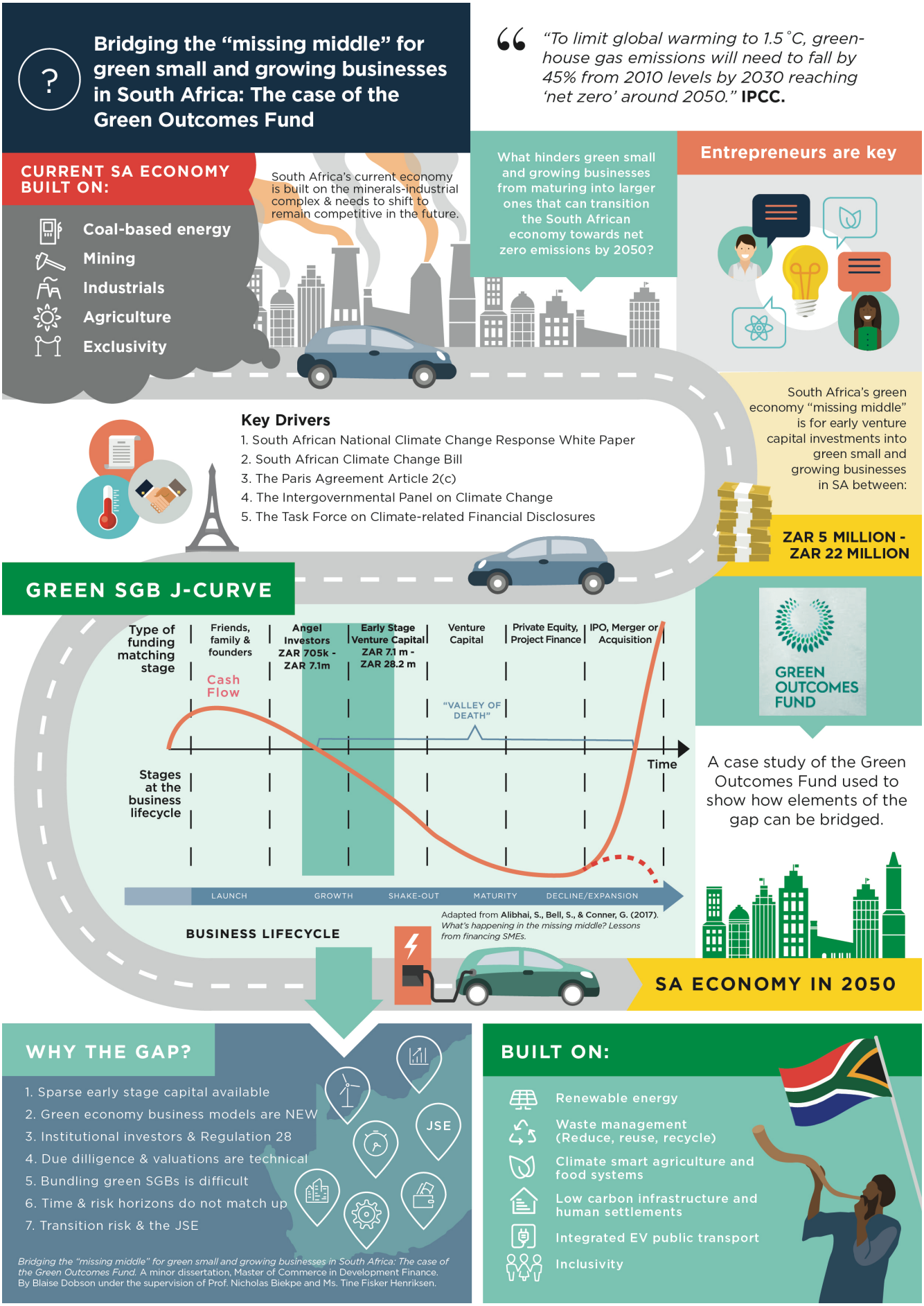

Figure 6: Schematic representation of the key theoretical contribution on bridging the "missing middle" for green SGBs in South Africa (author's own compilation).

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1. Introduction

Following the analysis of the instrumental case study, the researcher looks to summarise findings of the literature reviewed read in conjunction with the primary documentation reviewed and perspectives shared by the key informant interviews conducted.

6.2. Conclusion

The analysis in this study expands on the notion of a “missing middle” in the chain of financing available within the South African economy for green SGBs. In the framing of the problem, it was noted that a credit gap exists for SMEs in South Africa in general, i.e., this is not a problem specific to green SGBs only. Early-stage SMEs are particularly underserved given the risks associated with this stage in the business life cycle, often based on their inability to pass credit risk assessments (FinFind, 2018). Whilst there is a growing venture capital industry in South Africa, opportunities for early-stage funding remain limited and opportunities for less scalable SMEs remain stunted (FinFind, 2018).

The analysis shows that a “missing middle" remains at the early stages of the business lifecycle (or "first loss” finance) where green SGBs are looking to progress from seed funding towards acquiring early stage venture capital. Typically, these investments would be between the ZAR 5–22 million (USD 360 000–1.579 million). The green SGBs within the range would entail a relatively high risk in comparison to alternative investments available in the market (e.g. those available on listed positions within the JSE).

Private equity and venture capital should then take on the growth phase (typically between ZAR 22–275 million/USD 1.579–19.736 million). However, the South African private equity and venture capital markets are nascent and appear to have limited appetite for green economy projects at present. Nevertheless, from this

research it appears that there is some interest in green economy businesses provided that they can make an investment case similar to that of conventional economy businesses (i.e. the business model will need to make the necessary returns for the Recipient Fund concerned). Assuming that private equity and venture capital investors are able to see the investment case, then businesses should progress through the business lifecycle to opportunities that large-scale investors (pension funds, institutional investors, hedge funds etc.) would be looking to fund: established pipelines of projects, typically larger than ZAR 275 million (USD 19.737 million).

A transition towards net zero emission economies is required in order to maintain a 1.5°C to 2°C world. A coordinated effort from all economic actors will be required for South Africa's transition to be a successful one. Economic growth is still required in order to increase incomes, drive human development and reduce inequality. This study makes the argument that entrepreneurs are implementing agents who are indispensable to provide new goods and services that can deliver low emissions and climate-resilient growth. This is especially the case within emerging economies.

However, as highlighted by the analysis from the key informants related to the case study (i.e. the Green Outcomes Fund), a number of barriers remain that hinder green entrepreneurial endeavours, especially in emerging economies, including access to finance in the green sector that remains elusive for entrepreneurs. A number of DFIs have been, or are, in the process of aligning their portfolios to the Paris Agreement. Part of this process should involve looking at ways to best support green growth, and in particular, providing finance for green SGBs in emerging economies.

This research argues that the Green Outcomes Fund provides one mechanism to nudge existing role players in the chain of SME financing towards investing in green SGBs. However, there needs to be a number of financiers playing various roles throughout the green SGB J-curve in order for businesses to scale. The ability to bridge the missing middle and transfer green SGBs towards either listing on the

JSE or existing as scaled privately held companies is essential to ensure the South African economy is resilient in a net zero emissions 2050.

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6.3. Areas for further research

This research has highlighted a number of subsidiary questions that are of interest for research, but outside of the scope of this study. The researcher notes them here for other researchers to consider:

- Research to differentiate any changes from the investment decision-making process by which venture capital investments are made when considering the opportunities presented by green SGBs in comparison to traditional ("vanilla") SGBs.
- Analysis of the price discovery mechanism employed by the GOF in Phases 2 and 3, where the delivery of outcomes will be apportioned on a competitive basis and via auction.
- Tracer studies measuring the outcomes of resources deployed by the Development Bank of Southern Africa's Climate Finance Facility and the impact on South African green SGBs.
- Research into the methodological approaches to measure the scale and effectiveness of private sector investment in the achievement of climate change outcomes in developing country economies, building on the discussions by McNicoll et al. (2017)
- The latent and unpriced risk in the JSE in light of the recommendations of the TFCD, the findings of the IPCC Special Report on 1.5°C and the steps required of listed entities in response to the TCFD.

ANNEXURES

7.1. Annex 1: Table of research objectives linking to research questions

Research theme	Research objectives	Research questions
The role of development finance in supporting emerging economy small and growing businesses in the contribution towards the SDGs, specifically SGD13 (i.e. urgent action on climate change).	1. Assess the role of early-stage financing in supporting the growth of low-emissions and/or climate resilient small and growing businesses (SGBs) within South Africa	- What is the role that innovative finance can play in supporting green SGBs in addressing urgent action on climate change & what are inhibiting factors to this within the South African context? - What are the barriers that currently inhibit your fund from investing in green SGBs and why is this the case? - What are the current financing gaps for green SGBs in South Africa & who is best placed to address these gaps?
	2. Based on literature, the research paper will look to investigate why traditional SME financiers in South Africa has faced challenges in the provision of early-stage capital to clean technology SMEs to date and the mechanisms by which barriers to finance could be overcome. Specifically, it will look at how traditional early-stage financing models could to be adapted to address the "missing middle" of finance available to green SGBs focusing within South Africa. The proposed Green Outcomes Fund will be used as an instrumental case study to show how adapted practices can assist the provision of early-stage capital.	- How would the Green Outcomes Fund assist in addressing the challenges / barriers of both green SGBs and traditional SME financiers within the South African context? - Do green SGBs require a specific intervention of the nature of the Green Outcomes Fund in order to spur investment in the sector? - What role do SGBs play in current and future economic growth within South Africa & why is this important?
	3. Through semi-structured and open-ended interviews of key stakeholders of an instrumental case study, the researcher will assess the manner in which traditional techniques for financing and valuing funding deals for SGB could be altered by way of innovative mechanisms (e.g. shadow pricing of outcomes).	- What could be some of the best practices that the Green Outcomes Fund could efficiently and effectively price various non-market commodities being provided by green SGBs? - What are the valuation procedures currently being utilised by SME funders and how it would (if at all) differ if a mechanism like the Green Outcomes Fund would be in place? - What is the role of concessional finance in growing green SGBs in South Africa and what is the impact of this finance on how SGBs make their business models work?

Source: Author's own compilation.

7.2. Annex 2: Typology of guiding questions for key informant interviews

Link to the research objectives	Proponent stakeholder	Recipient fund	Ecosystem stakeholder
1. Assess the role of early-stage financing in supporting the growth of low-emissions and/or climate resilient small and growing businesses (SGBs) within South Africa	Discussion on Proposition 1: The identification of the "missing middle" being provided by traditional "venture capital" is a misnomer and in fact is bridged by a range of actors (including VC funds) working to blend financial instruments.		
	What is the role that innovative finance can play in supporting green SGBs in addressing urgent action on climate change & what are inhibiting factors to this within the South African context?	What are the barriers that currently inhibit your fund from investing in green SGBs and why is this the case?	What are the current financing gaps for green SGBs in South Africa and who is best placed to address these gaps?
2. Based on literature, the research paper will look to investigate why traditional SME financiers in South Africa has faced challenges in the provision of early-stage capital to clean technology SMEs to date and the mechanisms by which barriers to finance could be overcome. Specifically, it will look at how traditional early-stage financing models could to be adapted to address the "missing middle" of finance available to green SGBs focusing within South Africa. The proposed Green Outcomes Fund will be used as an instrumental case study to show how adapted practices can assist the provision of early-stage capital.	Discussion on Proposition 2. Traditional SME financing provisioning does not price in the social and environmental returns that accrue through green SGBs and therefore, without a pricing mechanism for these positive externalities, traditional pricing methods are ineffective.		
	In your view, how would the use of a Green Outcomes Fund assist in addressing the challenges/barriers of both green SGBs and traditional SME financiers within the South African context?	More generally, do you think that green SGBs require a specific intervention of the nature of the Green Outcomes Fund in order to spur investment in the sector? (Could you expand on your views?)	What role do you see green SGBs play in current and future economic growth within South Africa & why is this important?
3. Through semi-structured and open-ended interviews of key stakeholders of an instrumental case study, the researcher will assess the manner in which traditional techniques for financing and valuing funding deals for SGB could be altered by way of innovative mechanisms (e.g. shadow pricing of outcomes).	Discussion on Proposition 3: The "ticket size" of larger development finance institutions who typically channel climate finance (e.g. multilateral development banks) do not cater for small cap deals of the range suitable for green SGBs.		
	What could be some of the best practices that the Green Outcomes Fund could efficiently and effectively price various non-market commodities being provided by green SGBs in Phase 2?	Could you describe your current valuation procedure and how would it differ if a mechanism like the Green Outcomes Fund were to be in place?	What is the role of concessional finance in growing green SGBs in South Africa and what is the impact of this finance on how SGBs make their business models work?

Source: Author's own compilation.

7.3. Annex 3: Sample consent for interview participants

Title: Bridging the "missing middle" for small and growing businesses in South Africa: The case of the Green Outcomes Fund

Principal researcher: Blaise Dobson

Supervisors: Prof. Nicholas Biekpe and Ms. Tine Fisker Henriksen

Declaration of consent:

I have been furnished with the purpose and intent of the proposed research outlined in the associated information sheet.

I agree to participate in this research project and my organisation is aware of my participation.

I have read this consent form and the information it contains and had the opportunity to ask questions about them.

I understand that I am under no obligation to take part in this project. Participation is voluntary.

I understand that I may withdraw from the study without penalty by advising the researcher, and any data already recorded will be discarded.

I agree to my responses being used for research on condition my privacy is respected.

I understand that my personal data will be treated in total confidence, kept securely in a password-controlled server. The audio files will be kept for 36 months after the end of the project, at which time they will be destroyed. The audio files and transcripts will be used for the purposes of this research assignment only. Your identity will be kept confidential and you will not be identifiable in any report of the results. Where we consider publishing attributable quote, we will ask your permission first, which you are free to withhold.

I understand that this research might be published in a research journal or book. In the case of dissertation research, the document will be available to readers in the UCT library in printed form, and in electronic form as per UCT's Open Access Guidelines.

Kindly indicate with an "X" in the appropriate box below next to the closing statements. Thank you very much for your consideration.

Yes	No	
		I agree to voluntarily take part in this interview.
		I have read the associated information sheet and understand the purpose of this research.
		I agree that data captured by this research can be shared among the research team on this project.

Participant information:
Name:
Contact number:
Email:

Signature:

Date:

Researcher information:
Name: Blaise Dobson
Contact number:
Email:

Signature:

Date:

7.4. Annex 4: Sample letter with information for prospective participants

Title: Bridging the "missing middle" for small and growing businesses in South Africa: The case of the Green Outcomes Fund

Principal researcher: Blaise Dobson

Supervisors: Prof. Nicholas Biekpe and Ms. Tine Fisker Henriksen

Dear Prospective Participant/Interviewee,

This letter serves to elucidate my request to you to schedule an interview in order to explore a Masters research topic as titled above and outlined below. In addition, there are some further information regarding to your potential participation.

What is the problem statement, rationale and aims of the research?
Climate change a global issue requiring significant action in order for it to be effectively addressed. This research study will seek to unpack the role that entrepreneurs play as key actors in a transition towards net zero greenhouse gas emission economies. Within this argument, the research aims to highlight the number of barriers that hinder green entrepreneurial endeavour in relation to the financing of small and growing businesses (SGBs) that seek to contribute towards climate change outcomes.

Moreover, the research will focus on the particular barriers/challenges within the South African context. The research will extrapolate the theory regarding the barriers for financing green SGBs in emerging economies through the use of a case study that will be used to further build on the theory already articulated in the body of academic literature. The study has identified the Green Outcomes Fund as a case study. The case study will be used to build theory to enhance the understanding of effective development finance mechanisms that can be used to bridge the "missing middle" in the chain of finance for green SGBs. The case study in question will look to identify how some of these challenges have been tackled within the South African context and how innovative approaches can be used to assist with the provision of adequate financing for entrepreneurs falling within the "green" sector. Two phases of enquiry will be undertaken: an analysis of literature (Phase 1) furthered by a series of semi-structured and open-ended interviews with key informants (Phase 2). We seek your involvement in Phase 2 as a potential interviewee for this research. Detailed knowledge of the Green Outcomes Fund itself is not a requirement for your involvement.

What will the research involve and what happens to the results?
Your participation in this research is voluntary. You can choose to withdraw from the research at any time. The data will be gathered through desktop analysis of documents and key informant interviews at a convenient location (or virtually dependent on the interviewees preference) for the interviewee. Interviews are anticipated to be 60 minutes long and will be audio-recorded. The transcript of the interview will be used by the researcher to summarise findings that can inform the body of literature on this topic. The interview, as well as any non-public project documents, will be treated as confidential. Any identifiable information for an interviewee will be removed from the research to ensure anonymity. The feedback elicited from participants will form the basis of a dissertation being written pursuant to the completion of a Masters in Commerce in Development Finance here at UCT. While the dissertation will become publicly available in due course (as per UCT's Open Access Guidelines), your identity will be kept confidential and you will not be identifiable in any report of the results. All names attached to data will be assigned an alpha-numerical code and the coding index will be stored separately. All data will be kept securely in a password-controlled server. The interview's audio file will be kept for 36 months after the end of the project, at which time they will be destroyed. The audio files and transcripts will be used for the purposes of this research assignment only. Where we would consider publishing an attributable quote, we will ask your permission first, which you are free to withhold.

Further information
It is entirely your decision to participate in this research and you may, without penalty, withdraw from the study at any time. If you choose to withdraw from the study, any data already recorded will be discarded. Before commencing the interview process, you will be requested to sign a consent form to acknowledge that you are willing to be part of this research. This research has been approved by the UCT Graduate School of Business Ethics Committee.

Contacts of main proponents
The research is under the primary supervision of Ms. Tine Fisker Henriksen (UCT) with Prof. Nicholas Biekpe (UCT). However, if you have any further queries or concerns, please contact the researcher Mr. Blaise Dobson. We look forward to your response and thank you for your consideration.

7.5. Annex 5: Summary of research themes, objectives and questions

RESEARCH THEMES		RESEARCH OBJECTIVES		RESEARCH QUESTIONS
The role of green SGBs in a transition to net zero emissions *Highlighting the role of start-up enterprises to meet the goals of the Paris Agreement especially within emerging economies.*	>>>>>	1. Assess the role of venture capital in supporting the growth of low-emissions and/or climate resilient small and growing businesses (SGBs) within South Africa.	>>>>	P.1.1. What is the role that innovative finance can play in supporting green small and growing businesses in addressing urgent action on climate change & what are inhibiting factors to this within the South African context? R. 1.2. What are the barriers that currently inhibit your fund from investing in green small and growing businesses and why is this the case? E. 1.3. What are the current financing gaps for green small and growing businesses in South Africa & who is best placed to address these gaps?
Pricing of outcomes for green SGBs delivering clean technologies *Elucidating price discovery mechanisms that could overcome barriers for both SMEs and financiers looking to invest in net zero emissions/climate resilience within South Africa.*	>>>>>	2. Based on literature, the research paper will look to investigate why traditional SME financiers in South Africa have faced challenges in the provision of early-stage capital to clean technology SMEs to date and the mechanisms by which barriers to finance could be overcome. Specifically, it will look at how traditional early-stage financing models could to be adapted to address the "missing middle" of finance available to green SGBs focusing within South Africa. The proposed Green Outcomes Fund will be used as an instrumental case study to show how adapted practices can assist the provision of early-stage capital.	>>>>	P.2.1. In your view, how would the use of a Green Outcomes Fund assist in addressing the challenges/barriers of both green SGBs and traditional SME financiers within the South African context? R.2.2. More generally, do you think that green SGBs require a specific intervention of the nature of the Green Outcomes Fund in order to spur investment in the sector? E.2.3. What role do you see green small and growing businesses play in current and future economic growth within South Africa & why is this important?
Case study on innovative financing approaches to reduce financing barriers for green SGBs *Providing a case study on an outcomes financing mechanism within the South African context to build on the emerging theoretical understandings.*	>>>>>	3. Through semi-structured and open-ended interviews of key stakeholders of an instrumental case study, the researcher will assess the manner in which traditional techniques for financing and valuing funding deals for SGB could be altered by way of innovative mechanisms (e.g. shadow pricing of outcomes).	>>>>	P.3.1. What could be some of the best practices that the Green Outcomes Fund could efficiently and effectively price various non-market commodities being provided by green SGBs in Phase 2? R.3.2. Could you describe your current valuation procedure and how it would (if at all) differ if a mechanism like the Green Outcomes Fund would be in place? E.3.3. What is the role of concessional finance in growing green SGBs in South Africa and what is the impact of this finance on how SGBs make their business models work?

Source: Author's own compilation.

7.6. Annex 6: Overview of known climate-related funds in South Africa

Fund name	Sector	Region	URL
Lereko Metier SolarAfrica Fund, REIPPP Fund, Sustainable Capital Funds	Renewable energy, energy efficiency, waste and water management	Regional Sub-Saharan Africa	http://www.metier.co.za/private-equity/sustainable-capital-practice
African Infrastructure Investment Fund II & Apollo	Resilient infrastructure & renewable energy	Regional Africa	www.aiimafrica.com/funds/funds_aiif2/ & www.aiimafrica.com/funds/funds_apollo/
GEF Africa Growth Fund	Renewable energy/Demand-side energy efficiency	Regional Sub-Saharan Africa	www.afdb.org/en/topics-and-sectors/initiatives-partnerships/global-environment-facility-gef/
Africa Sustainable Forestry Fund II	Agriculture, forestry and fishing	Regional Sub-Saharan Africa	www.cdcgroup.com/The-difference-we-make/Case-Studies/Africa-Sustainable-Forestry-Fund/ http://www.criterionafrica.com/
Vantage GreenX Fund	Renewable energy/Demand-side energy efficiency	South Africa	www.vantagecapital.co.za/what-we-do/vantage-greenx
Energy Access Ventures	Renewable energy	Regional Africa	www.eavafrica.com/
KLP Norfund Investment AS	Renewable energy	Regional Africa	www.norfund.no/investmentdetails/klp-norfund-investments-as-article10656-1042.html
Moringa SICAR, SCA	Agriculture, forestry and fishing	Regional Sub-Saharan Africa	https://www.moringapartnership.com/moringa/
African Renewable Energy Fund	Renewable energy	Regional Africa	www.afdb.org/en/news-and-events/article/african-renewable-energy-fund-aref-launched-with-100m-committed-capital-and-anchor-investments-from-afdb-and-sefa-12901/
Silverlands Fund	Agriculture, forestry and fishing	Regional Africa	www.silverstreetcapital.com/Groups/106322/SilverStreet_Capital_Home/Agricultural_Investment/Agricultural_Investment.aspx

Green Fund (under the Development Bank of South Africa) financed by the South African Government	Multi-sectoral with three funding windows – green cities & towns; low carbon economy; and environment & natural resources management	South Africa	http://www.sagreenfund.org.za
The Industrial Development Corporation (IDC) is also a significant local stakeholder through initiatives like their Green Energy Efficiency Fund.	Energy efficiency	South Africa	https://www.idc.co.za/home/idc-products/special-schemes/geef.html
The Climate Finance Facility (under the Development Bank of Southern Africa)	Energy generation and access Transport Buildings, cities, industries and appliances Health, food and water security Livelihoods of people and communities Infrastructure and built environment	Lesotho, Namibia, South Africa and Eswatini	https://www.dbsa.org/EN/DBSA-in-the-News/NEWS/Pages/20181022DBSA-to-set-up-Climate-Finance-Facility.aspx https://www.greenclimate.fund/projects/dbsa-climate-finance-facility
Nedbank Green Savings Bond	Renewable energy	South Africa	https://www.nedbank.co.za/content/nedbank/desktop/gt/en/personal/save-and-invest/investment-accounts/green-savings-bond.html
Anglo American's Zimele Green Fund	Renewable energy, energy efficiency, water efficiency	South Africa	http://www.angloamerican.co.za/~/media/Files/A/Anglo-American-South-Africa/Attachments/anglo-zimele/Anglo-American-Green-Fund-criteria-Mar-2013.pdf
Business Partners Limited Green Fund	Renewable energy providers, waste recycling, green building services, natural resource management (including ecosystems and biodiversity protection), food systems	South Africa	https://www.businesspartners.co.za/en-za/media-centre/media-releases/south-africa/business-partners-approves-over-r1bn-in-sme-funding-over-the-last-12-months https://www.biznisafrica.com/green-fund-launched-to-advance-ecopreneurship/

ACP Investment Managers (Pty) Ltd	South African Energy & Infrastructure Fund		https://acpi.com/expertise/institutional-solutions/acpi-horizon-ucits-fund/
GAIA Fund Managers (Pty) Ltd- GAIA Infrastructure Equity Fund	Energy, road infrastructure, water and sanitation	Regional Southern Africa	http://gaiape.co.za/
Grovest Energy Limited	Embedded small scale solar energy	South Africa	http://www.grovest.co.za/energy/
Inspired Evolution Investment Management (Pty) Ltd - Evolution II Fund	Clean energy infrastructure development & finance, growth equity in energy and resource efficiency	Regional Sub-Saharan Africa	https://inspiredevolution.co.za/funds/evolution-two-fund/
Mergence – Debt, equity Funds with a Mergence Renewable Energy Debt Fund	Renewable energy and water provision	Regional Southern Africa	http://www.mergence.co.za/expertise/unlisted-investments/our-unlisted-investment-products/
Public Investment Corporation - Isibaya Fund	Energy, including renewable energy, water, transport and logistics, construction and housing, health care, education, manufacturing, broadband infrastructure, skills development, SMMEs, services	South Africa and Regional Africa	https://isibayafund.pic.gov.za/Pages/Home.aspx
Third Way Investment Partners - TWIP Core Plus	Renewable energy and other	South Africa	https://www.thirdway.co.za/institutional-investment/core-plus-fund/
TriVest	Renewable energies	Regional Sub-Saharan Africa	http://www.trivest.co.za/Portfolio
Agrivie Fund II	Agri-processing, food systems and agriculture	South Africa	http://agrivie.com/

Sources: Author's own research, SAVCA membership register (2017) and McNicoll, L., Jachnik, R., Montmasson-Clair, G., & Mudombi, S. (2017). Estimating publicly-mobilised private finance for climate action: A South African case study. *OECD Environment Working Papers, No. 125*, OECD Publishing: Paris. https://doi.org/10.1787/a606277c-en

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