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REPUBLIC OF SOUTH AFRICA

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

GREEN ECONOMY INVENTORY FOR SOUTH AFRICA: AN OVERVIEW

UN environment

International Labour Organization

UNDP Empowered lives. Resilient nations.

UNIDO United Nations Industrial Development Organization

unitar United Nations Institute for Training and Research

The report is published as part of the Partnership for Action on Green Economy (PAGE) – an initiative by the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), the United Nations Development Programme (UNDP), the United Nations Industrial Development Organization (UNIDO) and the United Nations Institute for Training and Research (UNITAR) in partnership with the South African Government.

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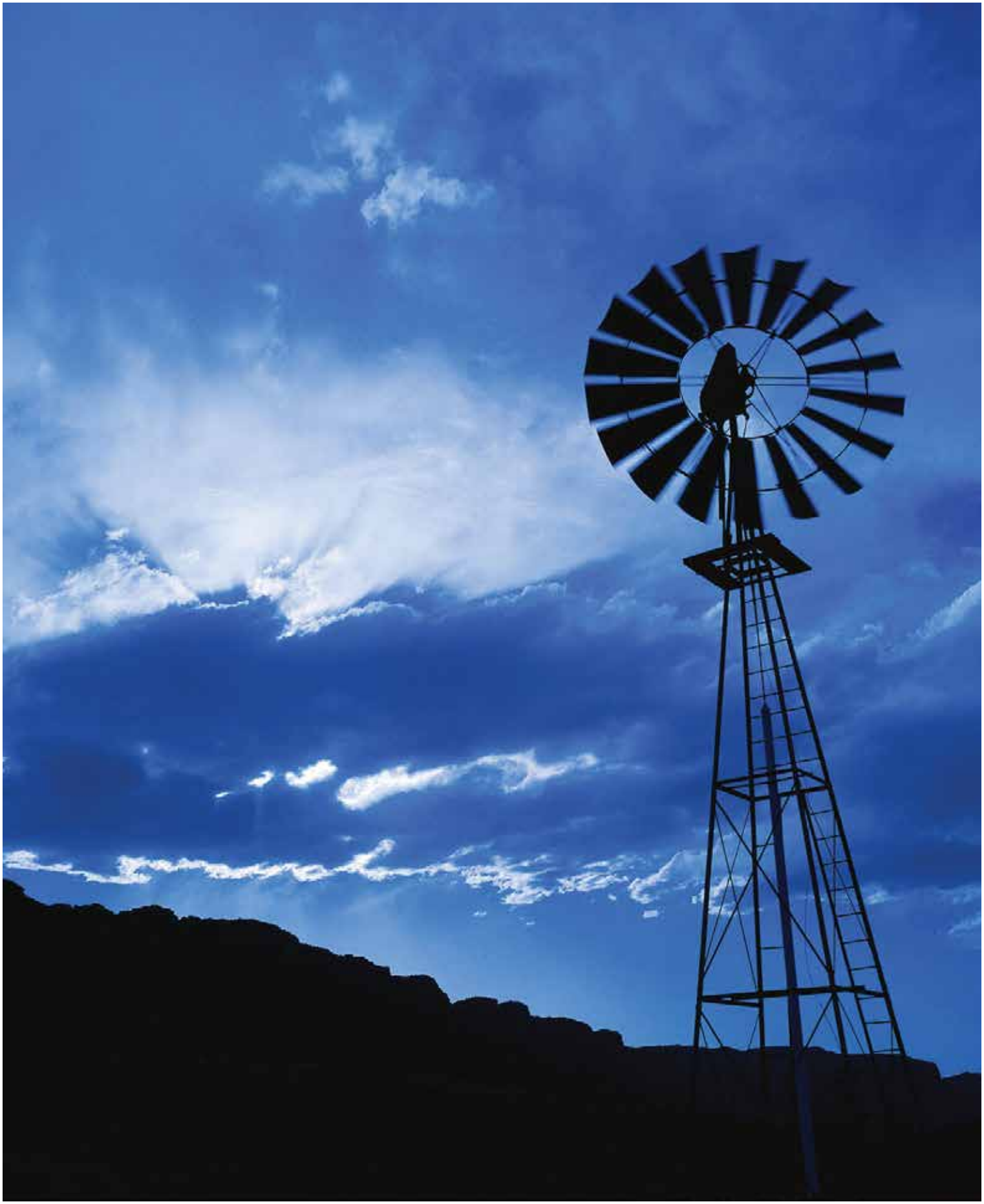
DISCLAIMER

GREEN ECONOMY INVENTORY FOR SOUTH AFRICA:

AN OVERVIEW



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ABBREVIATIONS AND ACRONYMS

ARC	Agricultural Research Council
BRT	Bus Rapid Transit
BRICS	Brazil, Russia, India, China, South Africa
CDM	Clean Development Mechanism
CEPF	Critical Ecosystem Partnership Fund
CPSI	Centre for Public Service Innovation
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Fisheries and Forestry
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs
DFID	UK Department for International Development
DoE	Department of Energy
DoT	Department of Transport
DPW	Department of Public Works
DST	Department of Science and Technology
DTI	Department of Trade and Industry
DWS	Department of Water and Sanitation
EDD	Economic Development Department
EELN	Energy Efficiency Leadership Network
EEP	Energy and Environment Partnership
EPIP	Environmental Protection and Infrastructure Programme
EPWP	Expanded Public Works Programme
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
GEISA	Green Economy Inventory for South Africa
GELA	Green Economy Learning Assessment
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
IDC	Industrial Development Corporation
ILO	International Labour Organization
IPP	Independent Power Producer
ISP	Industrial Symbiosis Programme
KZN	KwaZulu-Natal
MAFISA	Micro Agricultural Financial Institutions of South Africa
MW	MegaWatt
MWh	MegaWatt hour
NBI	National Business Initiative
NCPC-SA	National Cleaner Production Centre of South Africa
NDP	National Development Plan
NGO	Non-Governmental Organization
NRM	Natural Resource Management
NT	National Treasury
PAGE	Partnership for Action on Green Economy
PSEE	Private Sector Energy Efficiency Programme
PPP	Public-Private Partnerships

PV	Photovoltaic
REA	Rapid Evidence Assessment
REIPPPP	Renewable Energy IPP Procurement Programme
RMEL	Research, Monitoring, Evaluation and Learning
SANParks	South African National Parks
SANBI	South African National Biodiversity Institute
SANEDI	South African National Energy Development Institute
SCP	Sustainable Consumption and Production
SDG	Sustainable Development Goals
SME	Small and Medium-sized Enterprise
SMME	Small, Medium and Micro-sized Enterprise
SWH	Solar Water Heating
TIA	Technology Innovation Authority
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
UNITAR	United Nations Institute for Training and Research
WESSA	Wildlife and Environment Society of South Africa
WWF SA	World Wide Fund for Nature South Africa

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In March 2015, South Africa joined the Partnership for Action on Green Economy (PAGE), an inter-agency United Nations (UN) programme which brings together the expertise of five UN agencies – United Nations Environment Programme (UNEP), International Labour Organization (ILO), United Nations Industrial Development Organization (UNIDO), United Nations Development Programme (UNDP) and United Nations Institute for Training and Research (UNITAR), to support countries and regions to put sustainability at the heart of economic policies and practices. The Green Economy Inventory for South Africa (GEISA) was undertaken at the request of the South African Government by PAGE and is one of the inception activities of PAGE in South Africa.

A task team of Government partners and PAGE agencies supported the development of the terms of reference for this study, and was responsible for overseeing the implementation of the study and completion of the report. The Task Team included Cecilia Njenga from UNEP, Devina Naidoo, Jenitha Badul and Leanne Richards from the Department of Environmental Affairs (DEA), and Kees van der Ree, Jens Dyring Christensen and Najma Mohamed from the ILO. The report also benefited from contributions from the ILO Green Jobs programme. The PAGE National Steering Committee, including representatives from the Departments of Environmental Affairs, Economic Development, Science and Technology, and Trade and Industry, also provided inputs to the GEISA.

A consortium of research organizations collected data, drafted the report and managed the comprehensive stakeholder consultations conducted throughout the compilation of the GEISA. The research team was composed of the following trans-disciplinary sustainability specialists: Elize Hattingh from Green Talent; Prof. Mark Swilling, Blake Robinson, and Mbali Mabaso from the Sustainability Institute; Nicola Jenkin from Pinpoint Sustainability; Mike Ward from Creating Sustainable Value; and David Baxter from EnigMatrix.

PAGE gratefully acknowledges the support of all its funding partners: the European Union; the Ministry for Foreign Affairs, the Government of Finland; the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Germany; the Ministry of Environment, Korea; the Norwegian Ministry of Climate and Environment; the Government of Sweden; and the Swiss Secretariat for Economic Affairs.


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FOREWORD

2015 saw the adoption of the "Transforming our World: 2030 Agenda on Sustainable Development" (a set of goals to end poverty, protect the planet, and ensure prosperity for all) and the Paris Agreement, (a global climate agreement and action plan), putting the world on a path to a sustainable future.

The promotion of greener economies has been identified as an effective response to multiple developmental challenges and integral to sustainable development, as enshrined in the 2030 Sustainable Development Goals (SDGs). South Africa has embraced the green economy as a means to achieve inclusive and equitable growth that leads to sustainable development, poverty eradication and (green) job creation.

The vision of transitioning South Africa towards a green economy has been declared at the highest political level and the green economy agenda is articulated in the macro-economic policy framework and national development vision. The core objectives of the Partnership for Action on Green Economy (PAGE) – to achieve inclusive and just sustainable development – are also core objectives of the South African government.

In March 2015, South Africa joined PAGE, a global inter-agency UN programme, which brings together the expertise of five UN agencies (UNEP, ILO, UNIDO, UNDP and UNITAR) to support countries and regions in reframing economic policies and practices around sustainability. PAGE programmes aim to contribute to better policy coordination and collaboration and to develop capacities of government institutions and social partners.

The Green Economy Inventory for South Africa (GEISA), one of the first outputs of PAGE in South Africa, takes stock of some key initiatives that are being implemented by a wide range of public and private sector partners. GEISA seeks to establish a knowledge base and a mechanism for enhanced collaboration and coordination to support the country's green economy transition. It provides a snapshot of the country's progress towards a green economy and an overview of the key sectors driving South Africa's green transition. It also draws out insights to inform and help prioritise future and additional green investments.

PAGE is a model of joint implementation. With national partners, it currently operates in five African countries – Burkina Faso, Ghana, Mauritius, Senegal and South Africa – as well as across Asia, the Caribbean and South America. PAGE demonstrates the importance of joint action for sustainable development. Increasingly, we will have to operate in the framework of joint programmes as a way of reaching scale and enhancing synergy amongst development partners as well.

We would like to take this opportunity to thank our partners in implementation, PAGE agencies and government departments who have supported the programme to date. PAGE offers South Africa the tools and expertise to demonstrate the viability of transitioning to a greener economy, but it is also a means of implementing collaborative partnerships, which are central in delivering on our sustainable development visions.

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EXECUTIVE SUMMARY

Historically, South Africa's development path centred on the greenhouse gas (GHG) emission-intensive mining and energy industries. The present-day South African government is committed to addressing climate change through a just transition towards an inclusive, environmentally sustainable and climate-resilient economy. The transition to a greener economy is embedded in national policy which is driving the greening of economic sectors to support the creation of green and decent jobs, more energy and material efficient production processes, significantly less waste, pollution and GHG emissions.

South Africa's Green Economy Accord, signed in 2011, was the outcome of social dialogue between government, business and labour. It is the first multi-stakeholder effort to identify the tangible benefits of a green economy transition. Since then, the enabling policy environment put in place by the South African government and public and private sector green investments have resulted in an increase of initiatives that seek to deliver environmental, social and economic outcomes across the country. These initiatives are innovative, practical and implementable, and are built on existing best practices in key sectors. They have real potential to bring about significant change and respond to critical issues such as resource inefficiencies in the water and energy sectors.

Upon request by the South African government, the Green Economy Inventory for South Africa (GEISA) was commissioned to assist with tracking, monitoring and evaluating existing green economy initiatives and programmes, to foster sector-wide coordination and coherence, and to help identify gaps and areas requiring further support. The GEISA is a first attempt to capture a selection of green economy initiatives and provide a knowledge base of existing activities and help to prioritize work streams and actions under PAGE in South Africa.

South Africa's vision of transitioning to a greener economy has been put into action through an extensive policy and regulatory framework. An overview of this policy framework indicates that a total of 32 sub-frameworks, strategies, policies or Acts enshrine environmental sustainability. Within this framework, key actors in green economy initiatives in the country were identified; they tended to fall into one of seven groupings: Government, International Agencies, Non-Governmental Organisations (NGOs), Private Sector, Educational, Research and Training Institutions, and Organised Labour. Most projects involved a variety of stakeholders to develop, implement and monitor green economy initiatives.

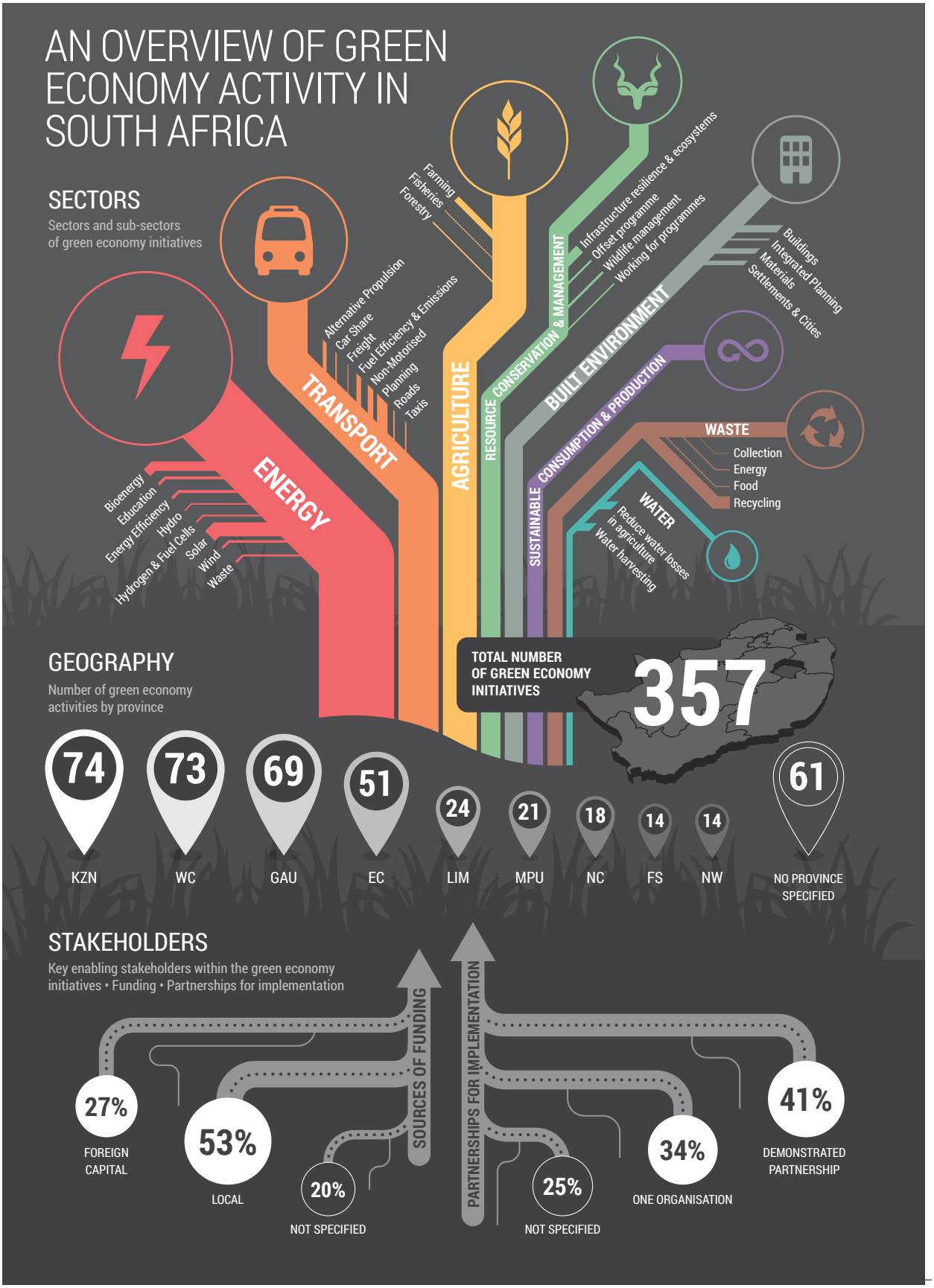
A Rapid Evidence Assessment (REA) method was used to review and assess a broad range of information on green economy initiatives implemented or on-going from 2010 – 2016. The REA helped to make the initial identification of initiatives and, through a sifting process, extract data. A set of criteria (for example, the number of jobs created, geographical location of projects, funding sources and project partners, economic, environmental and social indicators, cross-cutting themes and circular innovation) were applied to identify green economy initiatives. Of the almost 1000 initiatives that were initially identified, 667 green economy initiatives were selected for further analysis. 357 initiatives had sufficient data and met the research criteria and were earmarked for analysis. While the Inventory does not capture the full extent of ongoing green economy activities in South Africa, it does provide an indication of where activity is taking place and in which sectors.

The GEISA, developed over a three-month period in 2016, is a high-level inventory of green economy initiatives across sectors, spheres of government and service categories. The eight thematic areas outlined in the National Strategy for Sustainable Development and Action Plan (DEA, 2011) provided a framework to examine and understand the characteristics of green economy initiatives, including their contribution to job creation, skills development and finance. An overview of these sectors, their funding sources, stakeholder base and regional spread is illustrated in Figure 1.

GREEN ECONOMY ACTIVITY IN SOUTH AFRICA: GENERAL FINDINGS

- Green economy initiatives have sharply increased since 2010
- All key sectors in South Africa's economy and all provinces are active in or associated with the green economy in some way
- 60% of green economy initiatives are located in the Gauteng, Western Cape and KwaZulu Natal (KZN) provinces
- Energy, transportation and agriculture are the most active sectors, with initiatives in solar and bio-energy, non-motorised transport and planning, and farming
- Western Cape dominates the energy (21) and built environment (14) sectors; Gauteng focuses on the transport sector (18) and KZN focuses on agriculture (21)
- Agriculture has the largest number of job-creating initiatives; 26 surveyed initiatives report the creation of 50 or more jobs
- Agricultural initiatives (primarily farming) are most prevalent in KZN, the Eastern Cape, Limpopo and Western Cape
- Nexus initiatives, where water efficiency is addressed as an input to other sectors such as agriculture, resource conservation and management and energy, were common
- 53% of the green economy initiatives surveyed are locally funded; 27% are internationally funded. 20% of initiatives did not specify their source of funding
- 80% of the surveyed green economy initiatives were funded by domestic public finance; of which 50% were funded by national government departments
- 41% of surveyed initiatives are part of multi-stakeholder partnerships that cross an entire value chain from research and development to funding, capacity development, coordinating, implementing, and monitoring
- Due to the varied scales and agendas of green economy initiatives, a wide and diverse range of project partners operate horizontally and vertically throughout the country

FIGURE 1 | AN OVERVIEW OF GREEN ECONOMY ACTIVITY IN SOUTH AFRICA INCLUDING SECTORAL, GEOGRAPHICAL REPRESENTATION AND RELEVANT STAKEHOLDERS [1]



[1] The number of initiatives will not add to 357 as some initiatives are implemented across provinces.

KEY FINDINGS BY SECTOR

Energy | South Africa's coal-intensive energy sector will require an ongoing shift from coal to renewable energy to meet national greenhouse gas (GHG) emissions reduction commitments. The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has had a significant impact on greening the energy sector in South Africa; it is suggested that a careful analysis of success factors is conducted and that insights are communicated to other sectors, where appropriate. Greater support is needed for decentralised renewable energy generation in residential and commercial sectors, prioritising areas that do not have access to electricity.

Transport and infrastructure | Bus Rapid Transit initiatives are receiving substantial funding and are linked to large-scale transport planning at national and municipal levels. A number of projects addressing non-motorised transport were also identified. It is recommended that support in this sector focus on greater integration of non-motorised transport into spatial planning, and to support Small, Medium and Micro-sized Enterprises (SMMEs) that provide eco-mobility solutions.

Agriculture, food production, fisheries and forestry | This sector has huge potential to create direct jobs (relative to other sectors surveyed in this Inventory). The KZN and Eastern Cape provinces are particularly well represented with implementation of initiatives in this sector. Innovations that support more integrated systems that link the food, energy, waste and water components of agriculture, including sharing of good practices, should be shared widely. Advocacy initiatives could help make the case for implementing more sustainable forms of agriculture.

Resource conservation and management | The sustainable management of natural resources is critical to biodiversity-rich but water-stressed South Africa. The largely publicly-funded Expanded Public Works Programme (EPWP) has significantly improved ecosystem health throughout the country, notably through initiatives in the Environment and Culture sector. Funding for these types of programmes should be more strategically linked to emerging global environmental funding mechanisms for climate change adaptation. Policy and financial structures to operationalize and up-scale private investments in ecosystem services is also required.

Buildings and the built environment | South Africa was recently identified as global leader in green buildings. From an initial focus on commercial buildings, increasing investment is now being directed towards green residential property development and public buildings. Social housing also presents an opportunity to implement green design principles, building on existing environmental guidelines for low-income housing.

Sustainable consumption and production (SCP) | Activities in this area are largely focused on energy efficiency and are largely domestically funded. Key programmes, oriented towards the private sector, have been successfully implemented. There is limited financial support to implement energy efficiency measures in both the private and public sector, and access to finance is key to change in this sector. Emerging concepts such as the circular economy have substantial potential for further development. A focus on water efficiency is already visible in face of South Africa's ongoing drought.

Sustainable waste management practices | The waste sector has immense potential to create work opportunities across the value chain. Several surveyed initiatives in this sector focus on employment creation and reduction of GHG emissions. Although there is a significant focus on employment creation through waste collection, employment opportunities along the entire value chain – from recovery at source through to waste beneficiation opportunities – have to be explored to maximise the economic potential of sustainable waste management.

Water management | This sector has high potential for taking existing innovations to improve efficient water use, including local-level initiatives, to scale. It is recommended that mechanisms for investing in catchment, water management and ecological infrastructure are investigated and put in place. The activities of this sector are relevant to resource conservation management, SCP, agriculture and energy.

Although the energy, agriculture and transport sectors are driving South Africa's green economy at present (notably, through investments in the solar and bio-energy, farming and planning for non-motorised transport), the GEISA identified all eight sectors as key areas for growth. The knowledge base on each sector can be considerably expanded.

The following are seven key policy messages that emerged from the Inventory.

KEY POLICY MESSAGES

1. GEISA reveals that South Africa has **over 32 green economy-related policies** and strategies; if streamlined and well-coordinated, these would attract additional investment in green economy sectors and initiatives and effectively transition South Africa to a green economy.

2. The potential to green South Africa's economy exists in **all provinces and sectors** surveyed. Key sectors are driving the transition to a green economy, but there are concrete opportunities to invest in greening of all economic sectors. Green economy investments at sub-national level should be aligned with priorities identified in provincial green economy strategies.

3. A green economy **creates jobs**. According to GEISA, the agriculture, food production, fisheries and forestry sector has a very high potential to create direct jobs. The Inventory also affirmed that additional investment in resource conservation and management and sustainable waste management can deliver substantial social and environmental benefits.

4 A green economy contributes to the **reduction of GHG emissions**. An intervention in the energy sector to both improve energy efficiency and diversify power supply with renewable energy, and increased use of low-carbon options in other sectors (notably transport and the built environment) is projected to create synergies that will help lower GHG emissions.

5 Innovative low-carbon and resource-efficient technologies have had **significant uptake** in South Africa. South Africa should invest in localising the production and manufacturing of clean technologies.

6 **Public finance** plays a leading role in catalysing investment for transitions in key industries including renewable energy and sustainable transport for instance. Access to private capital and international environmental and climate finance will have to be up-scaled considerably to invest in economy-wide transitions.

7 Partnerships and collaborative design and implementation across a wide range of national and global, public and private sector and civil society stakeholders **create shared value** in South Africa's green economy transition and can help take green investments to scale. These should be fostered and deepened.

South Africa is progressing in its transition to a low-carbon and green economy. South Africa's commitment to greening the economy is expressed in its policy vision, and was made evident through the level of green economy initiatives accounted by the GEISA. In light of the country's recent ratification of the Paris Agreement and adoption of the 2030 Agenda on Sustainable Development, South Africa has embraced the view that economies and societies can develop while reducing adverse impacts on ecological systems.

To advance the Agenda for Sustainable Development, existing green economy activities and investment will have to be considerably expanded and up-scaled. Insights drawn from the GEISA could be instrumental in understanding how national targets created within the context of the SDGs and Nationally Determined Contributions (NDCs) could be met.

1 INTRODUCTION AND CONTEXT

In March 2015, South Africa joined the global Partnership for Action on Green Economy (PAGE), a UN programme which brings together the expertise of five UN agencies – UNEP, ILO, UNIDO, UNDP and UNITAR – to support countries and regions to reframe economic policies and practices around sustainability. In partnership with the South African government, PAGE commissioned the development of an inventory of green economy initiatives to support improved collaboration and coordination of South Africa's green economy transition. The Inventory was one of the initial activities of PAGE in South Africa.

In South Africa, the green economy is seen as an important means to respond to some of the critical and intertwined development challenges that range from unemployment, poverty and inequality to energy security and climate change. The government of South Africa – and increasingly organised business and labour – are embracing the green economy as a means to attain inclusive and equitable growth that leads to sustainable development and promotes poverty eradication and the creation of (green) jobs. The desire to transition to a green economy has been articulated at the highest political level, and the green economy transition agenda is evident in public policy frameworks including South Africa's long-term development policy, the National Development Plan: Vision for 2030 (NDP) (National Planning Commission, 2012), which endorses a just transition to a low-carbon economy. The National Climate Change Response White Paper also provides high-level parameters for the reduction of carbon emissions in line with the peak-plateau-decline methodology (SA Government, 2010).

South Africa's Department of Environmental Affairs (DEA), continuously seeks to entrench the green economy agenda and practices across government functions and spheres, and acknowledges that a green economy transition cuts across all economic sectors and socio-political and economic themes. The broad framework of green economy key thematic areas in the National Strategy for Sustainable Development and Action Plan (DEA, 2011), which built on the Green Economy Summit held in 2010, identified 9 key areas of focus, which were used to organise the Inventory data:

- Buildings and the built environment
- Transport and infrastructure
- Resource conservation and management
- Clean energy and energy efficiency
- Sustainable waste management practices
- Water management
- Agriculture, food production, fisheries and forestry
- Sustainable consumption and production including mining and manufacturing
- Cross-cutting themes include: governance and partnerships, trade, finance and investment, research, awareness, training, skills development, knowledge management.

All government departments have a role to play in supporting the implementation of the green economy transition; most have developed programmes, policies and strategies to guide and inform the transition within their respective remits. Progress is evident in the rollout of the Bus Rapid Transit (BRT), the Expanded Public Works Programme (EPWP) and the Renewable Energy Independent Power Producers Procurement (REIPPP) programme, amongst others. Departments are tasked with translating their policies and strategies into action and collaborating to build capacity and increase the pace of change.

South Africa has a dynamic investment landscape and a mature financial services sector. In order to remain competitive as a BRICS member country and to promote growth opportunities within the African context, it is beneficial for the country to monitor and evaluate the impact of its achievements in transitioning to a greener economy. As such, the Green Economy Inventory for South Africa involves a sector-wide assessment to gather data on green economy initiatives and insights to provide a snapshot of the South African green economy landscape. It is envisioned that the Inventory will become an important tool to facilitate improved collaboration and coordination in support of the country's longer-term green economy transition.

1.1 OVERVIEW

The Green Economy Inventory for South Africa (GEISA) set out to undertake and develop an inventory of green economy initiatives across sectors, government spheres and service categories. This initial mapping exercise aimed to provide information on key activities (initiatives), actors and services that can serve to enhance communication, information exchange and coordination amongst the various green economy initiatives, enhance synergies, avoid duplication and help identify areas that require further support.

The objectives were to map and capture information to track South Africa's progress towards a green economy, and to provide useful information to policy-makers, practitioners and stakeholders. Such information may assist with the monitoring and evaluation of existing green economy initiatives and programmes, foster sector-wide coordination and coherence between various players, and help

identify gaps and areas that require further support. The GEISA further sought to gather insights and information to inform priority areas and areas for future and additional green investments, building on existing analysis such as the South Africa Green Economy Modelling Report (UNEP, 2013).

It is anticipated that the information collected during this exercise will support knowledge sharing and collaboration among green economy initiatives.

1.2 RESEARCH SCOPE, OBJECTIVES AND METHODOLOGY

The research objective was to gather data on the green economy initiatives implemented in South Africa since 2010 in order to answer the following questions:

- What are the key sectors in South Africa's green economy?
- Who are the key actors in South Africa's green economy?
- Which services can enhance communication, information exchange and co-ordination in South Africa's green economy?

The following parameters were guiding the research:

- Applying a Rubik's cube concept of mapping (highlighting critical areas, themes or issues) from which infographics and priorities could be developed and identified;
- Aligning to identified sectors and including geographical coverage;
- Identify funders and stakeholders;
- Inform the identification of priority sectors and interventions.

UNEP defines a green economy as "An economy that values nature and people and creates decent, well-paying jobs" (UNEP, 2011:4). GEISA reflects the South African Government's vision of a green economy, which is "A system of economic activities related to the production, distribution and consumption of goods and services that result in improved human well-being over the long term, while not exposing future generations to significant environmental risks or ecological scarcities" (DEA, 2010).The South African green economy is characterised by substantially increased investment in green sectors, supported by enabling policy reforms (DEA, 2011; NPC, 2012). It implies the decoupling of rates of resource use and negative environmental impacts from the rate of economic growth.

South Africa's National Strategy for Sustainable Development and Action Plan provided information on nine thematic areas which helped to constructively categorise and analyse information gathered through GEISA. Cross-cutting themes, such as job creation, skills development, finance, and research and development, were used to further investigate and understand the characteristics of green economy initiatives. Since the ninth thematic area is cross-cutting by nature, the Inventory focused on the eight thematic areas below:

- Clean energy and energy efficiency
- Transport and infrastructure
- Agriculture, food production, fisheries and forestry
- Resource conservation and management
- Buildings and the built environment
- Sustainable consumption and production (SCP), including mining and manufacturing
- Sustainable waste management practices
- Water management

A number of overarching themes were also identified. These are:

- Governance and partnerships
- Trade
- Finance and investment
- Research
- Awareness
- Training
- Skills development
- Knowledge management

GEISA data was collected using a Rapid Evidence Assessment (REA) method. REA is a recognised systematic method for reviewing and assessing a broad range of information that is particularly appropriate for time-sensitive research required by policymakers. The data analysis was complemented with interviews and sector-specific best practice case studies. The organisational framework of the research is detailed in the Appendix.

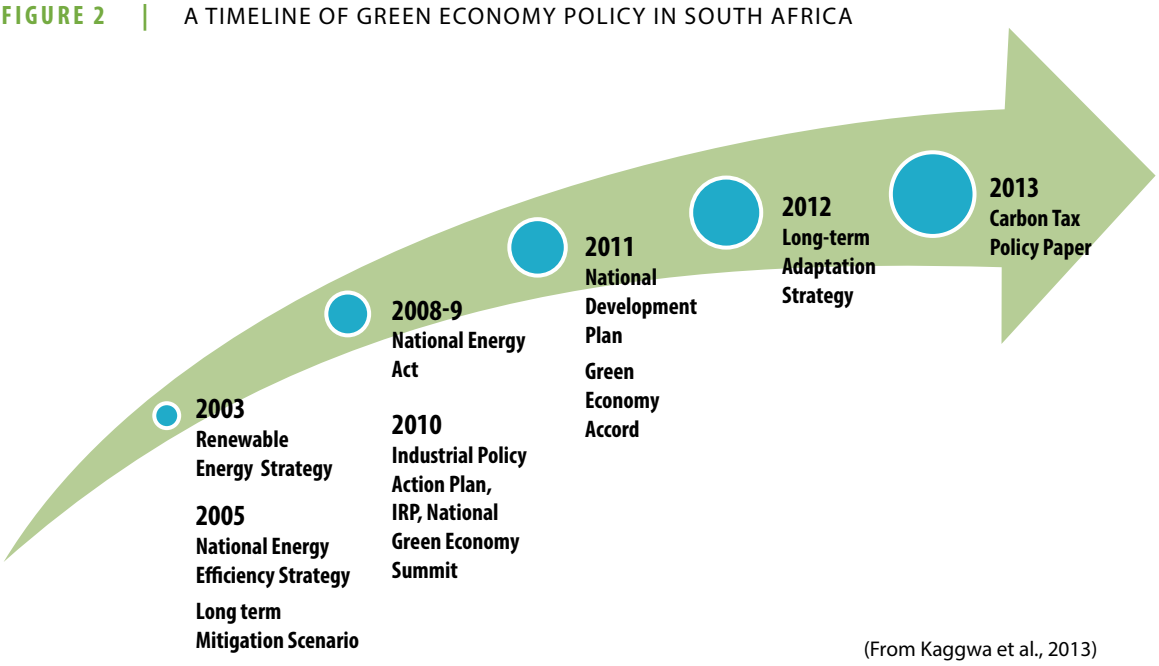
From approximately 1,000 initiatives scanned in this first phase of sifting, a total of 667 met the criteria for further assessment and analysis. In the next Phase, 357 initiatives were selected for in-depth review and data extraction. Initiatives that did not fully meet the study purpose or lacked key data were excluded.

1.3 GREEN ECONOMY POLICY FRAMEWORK

South Africa's transition towards a green economy has developed within a specific policy context in the last few years. GEISA identified a total of 32 national or provincial level frameworks, strategies, policies or Acts support sustainability and/or the green economy. This intricate web of activity within the political structures of South Africa makes understanding the policy landscape difficult. In addition, the supporting metrics and measurement systems to monitor the success of the various activities are often insufficient or simply absent (for example, no substantial progress reports on the implementation of the Green Economy Accord have been undertaken to date (Swilling et al. 2016). However, several authors have provided comprehensive analyses of green economy policy development in South Africa (Rennkamp, 2012; Kaggwa et al., 2013; Nicholls et al., 2016; Swilling et al., 2016).

South Africa's green economy needs to be supported by an enabling policy environment (Kaggwa et al., 2013), GEISA notes that that transitioning to a greener economy is among the stated aims of the South African government's development vision. A simplified view of a portion of South Africa's green economy policy framework is shown in Figure 2 below.

FIGURE 2 | A TIMELINE OF GREEN ECONOMY POLICY IN SOUTH AFRICA



(From Kaggwa et al., 2013)

Clear definitions of the performance metrics of these policy components and the measurement of policy performance against these metrics is a critical part of the policy development process. In Greening the South African Economy (2016) Swilling et al. argue that the environmental sustainability imperatives of the Green Economy Accord and the National Development Plan are marginalised due to the focus on economic growth measured by the Gross Domestic Product (GDP) indicator. Until South Africa and other nations consider a more meaningful measure of success that encompasses social, environmental and economic measures of well-being, they argue that progress towards inclusive, job-creating growth will be hampered.

Swilling et al. (2016) and Nicholls et al. (2016) note other challenges or obstacles to transitioning to the green economy, including policy incoherence. According to Swilling et al. (2016), perhaps the most glaring gap is the lack of a strategic centre within government that creates coherence among the various components of South Africa's green economy policy framework, including the visions embodied in the National Strategy for Sustainable Development and the NDP.

Rennkamp (2012) and Swilling et al. (2016) both highlight the 'unsustainability' of the mineral and energy sectors in South Africa. While these sectors contribute to job creation, they contribute significantly to GHG emissions, threaten scarce water resources and have severe social impacts (particularly the mining sector). According to Swilling et al. (2016), the interests and power of these sectors pose a challenge to policy reforms that could help South Africa's economy shift away from 'business as usual' and transition toward a greener economy.

Others don't consider policy incoherence to be a primary challenge to South Africa's green economy. The National Business Initiative (NBI) conducted two exercises to evaluate policy coherence (Nicholls et al., 2016). While they did identify some degree of policy incoherence, they argue that education related to policy symbiosis could help overcome some of dissention between funders and project implementers. The NBI study identified specific interventions that could help guide policy and investment action (and coordination) for greening the South African economy. These are listed in Table 1.

TABLE 1 | THE TOP GREEN ECONOMY INVESTMENT AREAS

CATEGORY	DESCRIPTION
Energy efficiency	Smart grids and smart meters
Clean energy generation	Small scale solar photovoltaic (PV)
Energy efficiency	Energy efficiency in the public, private and household sectors
Transportation and infrastructure	Promote public transport
Water and wastewater management	Protect South Africa's critical catchments (high value catchment) areas
Ecological infrastructure	Biodiversity economy
Clean energy generation	Small-scale embedded renewable energy generation
Clean energy generation	Waste-to-energy
Transportation and infrastructure	Rail expansion for freight and passengers
Water and wastewater management	Reducing water losses in distribution in municipalities by replacing water infrastructure
Ecological infrastructure	Restoration and rehabilitation of derelict mines
Agriculture, food production and forestry	Small scale farmers and food systems
Education and behavioural	Address service delivery of municipalities (waste and electricity) through PPPs
Water and wastewater management	Rainwater harvesting
Waste reduction and industrial symbiosis	Improve waste separation at source
Energy distribution and storage	Energy storage
Clean energy generation	Expansion of the Renewable Energy Independent Power Producer Procurement (REIPPP) Programme

(Source: Nicholls *et al*., 2016)

The positive impact of well-designed policy is powerfully illustrated in the Renewable Energy IPP Procurement Programme (REIPPPP), which aligned policy with feasible action plans, political will, collaboration and effective stakeholder engagement. In 2011, the Department of Energy began informally engaging with stakeholders in the renewable energy sector. By August 2011, an initial request for proposals was made. By the time this report was written, an R193bn investment was approved for 6,327MW of renewable energy generating capacity across 92 projects (South African Wind Energy Association, 2016). South Africa has now been identified as having one of the fastest growing renewable energy markets in the world (Creamer Media, 2016). The scale of the REIPPPP programme suggests that real inroads can be made in achieving a greener economy in the country, and illustrates the key role of policy as a driver of green economy transitions.

2 KEY INSTITUTIONS AND ORGANISATIONS

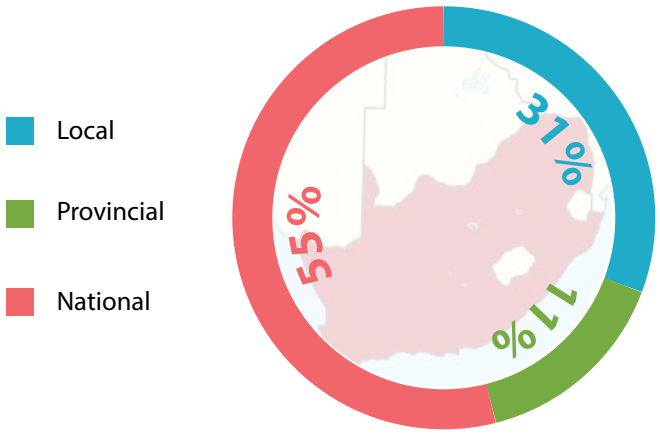
The GEISA showed that a wide and diverse range of stakeholders are involved in funding, supporting, coordinating, implementing, and monitoring and reporting on a myriad of initiatives in South Africa's active green economy. Project partners operate horizontally and vertically throughout the country on multifarious projects and initiatives that are helping to progress the green economy transition. This section provides an overview of the actors that are stimulating and engaging with South Africa's green economic activities.

2.1 GOVERNMENT

The South African government provides an enabling policy and regulatory environment for transitioning to a green economy and harnesses public finance in support of this vision. Of the 357 initiatives identified for analysis, approximately 50% were funded by national government departments, most notably the DEA (which funded a third of all nationally funded initiatives) and Department of Transport (DoT). 31% of green economy initiatives are municipally funded.

Certain municipalities stood out as active in this space, both as project partners and funders, including Cape Town, eThekwini, Tshwane and Johannesburg. Johannesburg became the first municipality to list a green bond to finance green initiatives at the Johannesburg Securities Exchange (JSE) in 2014. eThekwini Metropolitan Municipality (greater Durban) made the greatest contribution of all municipalities, funding 62% of all identified municipal green economy projects.

FIGURE 3 | DISTRIBUTION OF GOVERNMENT AND MUNICIPAL-FUNDED INITIATIVES



Provinces were notably less active than municipal-level governments, with the exception of the Western Cape government, which launched the Green Cape initiative in 2010 and the 110% Green initiative in 2012. Both initiatives are a direct call for a green economy transition in the Western Cape (Western Cape Government, 2016).

Three government funding and financing programmes appear to play a significant role in driving investment into green projects and acting as catalysts to South Africa's transition to a greener economy:

- The Green Fund – a programme set up by the Department of Environmental Affairs (DEA) to provide financial support to green initiatives to assist the transition to a low-carbon, resource efficient and climate resilient development path
- The Jobs Fund – a National Treasury initiative set up to address unemployment in South Africa
- The Industrial Development Corporation (IDC) – a national development finance institution owned by the South African government under the supervision of the Economic Development Department (EDD) that has invested in low-carbon technologies

Pockets of excellence are beginning to emerge, whereby public finance is used to catalyse private sector funding into the green economy space. The strategic green economy investment fund, otherwise known as the Green Fund, is a prime example of integrated financing approaches. To further enhance the uptake of public sector investment, it is imperative that the Green Fund be strategically positioned to address crowding in private investment, co-financing, on-lending and related innovative financing mechanisms which, in the medium to long term, will sustain the Fund and make it less reliant on public financing. Section 3.1 further elaborates on green financing.

2.2 INTERNATIONAL AGENCIES

While the Inventory does not provide an exhaustive account of South Africa's green economy landscape, it clearly demonstrates that bilateral donor agencies play a significant role in funding green economy initiatives in the country. Support from Germany, Austria, Denmark, Finland, France, Germany, Norway, Switzerland and the United Kingdom (mainly through their Department for International Development (DFID)) was delivered primarily through embassies and country-specific aid agencies within government departments. Within the 'Sustainable Consumption & Production' (SCP) sector, DFID and European Union (EU) support was notable (EU support was provided primarily through the 'Switch Africa Green' programme).

Global and regional entities including the EU and the United Nations (UN) also play an important role. Various UN agencies provide funding and other types of support to a variety of green economy initiatives, including the International Labour Organization (ILO) (green jobs and just transitions), UNIDO (transport and SCP), UNDP (through implementation of the Global Environment Facility's (GEF) Small Grants Programme and their energy and environment support programme), UNFCCC (solar and bio-energy) and UNEP (biodiversity, agriculture, transport). The World Bank provided key support to a number of 'Renewable energy' and 'Built environment' initiatives in collaboration with municipalities and state entities.

2.3 NON-GOVERNMENTAL ORGANISATIONS (NGOS)

The GEISA shows that South African non-governmental organisations (NGOs) play a key role as facilitators between funders and stakeholders and as coordinators and project managers (examples include Conservation SA, Wildlands Conservation Trust, Wildlife and Environment Society of South Africa (WESSA), and World Wildlife Fund (WWF) South Africa). This might be a product of interest in seeking out funding opportunities for their own organizations or to advance progress in their areas of interest (particularly in the agriculture and resource management sectors). Many NGO-managed projects involve multiple stakeholders (see Grasslands Programme in Box 1 below), which illustrates their strategic networking role in brokering collaboration between international institutions, government institutions, donors and other NGOs.

BOX 1 | THE GRASSLANDS PROGRAMME

The Grasslands Programme was a national initiative funded by the Global Environment Facility (GEF), managed by the United Nations Development Programme (UNDP) and implemented by the South African National Biodiversity Institute (SANBI). It involved 25 other project partners from government, NGOs and the private sector to mainstream biodiversity into the Grassland Biome, with the aim of balancing biodiversity conservation and development imperatives in a production landscape.

Further information on the programme can be found at http://www.sanbi.org/biodiversity-science/science-policyaction/mainstreaming-biodiversity/grasslands-programme

Further commentary on the funding mechanisms for green economy initiatives in South Africa is covered in Section 3.1.

2.4 PRIVATE SECTOR

The GEISA focused predominantly on initiatives funded by public, international aid and NGOs, mainly due to the fact that private sector initiatives were not visible as distinct projects in the data selection process of the Inventory. For this reason, privately funded initiatives perhaps merit further research. Nonetheless, GEISA showed that the private sector is an important catalyst for green economy initiatives, and that certain sectors and businesses are more active than others in the private sector.

Mining companies were identified as partial funders or project stakeholders on a variety of green economy projects, including conservation (BHP Billiton), fuel cell technologies (Impala Platinum Holdings) and SCP (Anglo American). This is perhaps unsurprising in a country where mining plays a key role in the national economy and has significant environmental and social impacts. South African retailer Woolworths was shown to be at the forefront of business and sustainability through their Good Business Journey programme. In collaboration with WWF SA, they aim to drive greater sustainability through their products and operations. The GEISA also showed that financial institutions including Nedbank and Investec play a role in funding green economy initiatives.

It is recommended that private business activities in the green economy be further investigated to form a more comprehensive view of green economy activities in the country. The National Cleaner Production Centre (NCPC-SA), for instance, tracks a large number of initiatives related to cleaner production, and has been effective at quantifying the impact of its work particularly with regards to cost savings, increases in resource efficiency and waste reduction in the private sector.

2.5 EDUCATIONAL, RESEARCH AND TRAINING INSTITUTIONS

Due to the innovative nature of many green economy initiatives, research institutions are often central actors. They play a key role in developing and piloting technological solutions and fostering innovations, or observing and monitoring the outcomes and implications of transitioning to a green economy. Within South Africa, these institutes are often government-aligned or public entities, such as the Council for Scientific and Industrial Research (CSIR), the Water Research Commission (WRC) and Agricultural Research Council (ARC).

Universities use funding to leverage innovations or to provide academic support or research; their involvement appears to be in trialling solutions within the agriculture, renewable energy, and water and waste sectors. Universities identified as active in this space include Mangosuthu University of Technology (agriculture and green technologies), Stellenbosch University (renewable energy, forestry), University of Cape Town (renewable energy, recycling), University of Johannesburg (renewable energy), University of Pretoria (waste beneficiation, agro-processing), University of Zululand (agriculture), and Vaal University of Technology (waste/water).

The importance of developing skills to support a transition towards a low-carbon and climate resilient economy is recognised but is not reported in-depth in this report as this is being covered by another assessment, Green Economy Learning Assessment for South Africa, supported by PAGE. However, skills development and training was identified as a cross-cutting theme in the initiatives identified in GEISA and are reported on in the sectoral analysis in Section 3.3.

2.6. LABOUR

The relationship between trade unions and the green economy in South Africa has shifted since the launch of the Green Economy Accord. Although labour organisations initially welcomed the Green Economy Summit (2010) and the Green Economy Accord (2011), they have since become increasingly sceptical of the agendas shaping the green economy. Labour is particularly focused on what it has referred to as a 'just transition' (COSATU 2011 p. 39), arguing that a just transition requires a substantial focus on decent jobs, reskilling in key industries (particularly mining) and careful consideration to ensure that inclusion of nature in economic models through, for example, Payment for Ecosystem Services (PES), do not further support capital accumulation (COSATU 2011).

In summary, approximately 50% of the projects identified for analysis were funded by South African bodies, most notably government or government-supported programmes, such as the Green Fund. Most projects had a variety of stakeholders - often a combination of project coordinators and managers (for example, an NGO or private partner) and local communities. The extended network of stakeholders in South Africa's green economy clearly illustrates the importance of multi-stakeholder initiatives in enabling the transition to a greener economy.

3 ANALYSIS OF CURRENT INITIATIVES FOR AN INCLUSIVE GREEN ECONOMY

Section three provides an in-depth assessment of green economy initiatives by sector. Initiatives selected for analysis had to meet a number of criteria (see Appendix) and had to be active between the periods January 2010 to March 2016. The eight sectors were drawn from the National Strategy for Sustainable Development and Action Plan (DEA, 2011); nine themes were investigated within the context of each sector:

- Sub-sector activities
- Total number of initiatives identified
- Geographical location of projects
- Funding sources and project partners
- Economic indicators
- Environmental indicators
- Social indicators
- Cross-cutting themes
- Circular innovation [2]

Case studies per sector are included in the assessment to demonstrate best practices.

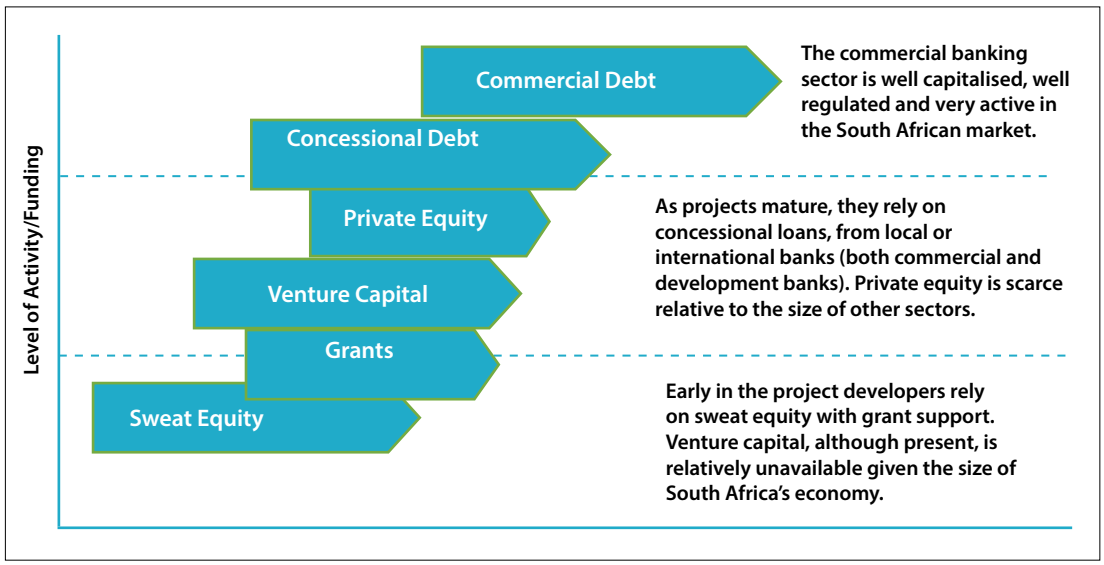
The following section aims to provide a basic understanding of the financing mechanisms that catalyse green initiatives in South Africa and related challenges.

3.1 GREEN FINANCE

The role of finance in the green economy cannot be underestimated. When developing finance models for green economy initiatives, it is vital to share knowledge about the opportunities within a given context (or country). All stakeholders in the value chain need to be included in these conversations to remove power gradients, deepen knowledge and unite all stakeholders toward delivery of a common goal (Nicholls et al., 2016). They also note that the maturity of a project or initiative correlates to the levels of associated risk, and that different institutions will invest in a project at different stages of development (see Figure 4 below).

The South African government accounts for social and environmental benefits in cost-benefit analyses of green initiatives, even if these benefits are difficult to monetise.

FIGURE 4 | LEVEL OF FINANCE VERSUS PROJECT LIFE CYCLE IN SOUTH AFRICA



Source: Nicholls et al. (2016)

Nicholls et al. (2016) argue that, in South Africa, projects typically only have access to grant and concessional finance, which severely curtail the scale and risk tolerance of a project. Creating stakeholder consensus on finance is necessary to streamline policies that aim to drive investment at different stages of the project life cycle. These views are supported by Swilling et al. (2016).

[2] Circular innovation – innovation that supports a circular economy. A circular economy is "where growth is decoupled from the use of scarce resources through disruptive technology and business models based on longevity, renewability, reuse, repair, upgrade, refurbishment, capacity sharing and dematerialization" (Accenture, 2016).

Initiatives to remove financing barriers for green initiatives are highlighted in the NBI report. The report proposes a number of market instruments and notes that a number of green stimulus funds that have been established. These are, however, inadequate to fulfil the investment needs of a near-term transition to a green economy.

Green initiatives face more market challenges than traditional businesses. These can broadly be categorised as behavioural, technological, informational, structural, financial, regulatory, institutional and policy-related. While many of these challenges also exist in other countries, South Africa experiences some unique barriers including high research and development (R&D) costs, difficulties with sourcing suitable funding, and a lack of clear green economy policies in some sectors (see Box 2 below).

BOX 2 | MARKET FAILURES THAT POSE BARRIERS TO FINANCING THE GREEN ECONOMY

Market failures that pose barriers to financing the green economy

- **High transaction costs associated with green economy projects relative to conventional project financing.**
- **High-risk perceptions due to technological uncertainties and lack of familiarity because green economy projects and green industry business models are often untested.**
- **Higher upfront costs compared to conventional ones and longer payback periods.**
- **Inadequate or unsuitable bank regulations and investment policies, which are often geared for larger, conventional projects.**
- **Split incentives in recouping benefits of investment, such in the case of green buildings.**
- **Technological risks arising from technology failure, obsolescence or under-performance relative to expectations.**
- **Information and behavioural barriers, in part due to perceived or actual knowledge gaps and reliability concerns.**
- **Failure to internalise social and environmental externalities of economic activities, thereby creating pricing distortions against green economy solutions.**
- **Policy risks in the absence of clear and long-term policies.**

Source: Swilling et al., 2016

These challenges do not mean that progress on-the-ground is non-existent. As demonstrated in the REIPPPP, when stakeholders and industry experts are engaged at the outset of a process and involved in co-creating solutions, outcomes can be very powerful. A World Bank report has highlighted the following as key success factors of the REIPPPP (Eberhard et al., 2014):

- Political support for the programme across many government departments
- Ability of the Department of Energy (DoE) Independent Power Producer (IPP) unit to act independently of government institutions while adhering to standard governmental rules and procedures
- Extensive knowledge of IPP and experience in working with the right stakeholders
- The skills and experience of the REIPPPP team
- A procurement process built on trust between stakeholders
- Dedicated funding allocation with support from the Development Bank of Southern Africa (DBSA), the Jobs Fund, commercial banks and other donors
- A tight procurement brief created by a cross-functional working group of lawyers and finance firms

There is still, however, room for improvement. The REIPPPP's current institutional set-up relies on external advisors; their knowledge should be transferred into a more permanent management structure that includes the proposed independent system and market operator. It will also be a challenge to maintain the characteristics that have been key to the programme's success, including its ad-hoc and entrepreneurial nature, funding model and the way it sits outside of formal government structures, when it inevitably becomes more formalised.

The Green Fund (Box 3) is another example of what is achievable. The R1.1bn allocated to kick-start the green economy was allocated to 31 investment projects, 8 capacity development initiatives and 16 research activities between 2012 and 2016. However, when compared with the REIPPPP's investment of R193bn, it becomes clear that there is work to be done in scaling green economy initiatives. The role of private finance within the REIPPPP and its potential impacts cannot be overemphasized.

BOX 3 | THE GREEN FUND

Green Fund of South Africa – Supporting Catalytic Investments for Greening the South African Economy

An enabling green economy policy framework capacitated the establishment of the Green Fund in 2012 – a national environmental programme implemented by the Development Bank of Southern Africa on behalf of the Department of Environmental Affairs (DEA). R1.1bn in fiscal allocation from the National Treasury provided the seed funding for the Fund, which aims to respond to the market weaknesses that are currently impeding South Africa's transition to a green economy by:

- **Promoting innovative and high-impact green programmes and projects**
- **Reinforcing climate and sustainable development policy objectives through green interventions**
- **Building an evidence base for the expansion of the green economy**
- **Attracting additional resources to support South Africa's green economy development**

The Green Fund is structured to reflect national green economy policy priorities and the complex cross-linkages between macro-economic and sectoral policy focus areas. The Fund supports initiatives that are at various phases of the innovation value chain, from pilot and demonstration to scale-up. Three thematic windows were developed through extensive research and consultation: Green Cities and Towns, Low-Carbon Economy, and Environmental and Natural Resource Management.

The focus areas and eligibility criteria for each window is different and informed by key national policies. However, all applications to the Green Fund would be appraised in relation to four central principles: relevance, which requires demonstrated alignment to thematic funding windows; innovation, which requires that the initiative be novel (innovation can relate to any of the following aspects: technology, business model, institutional arrangements, or financing approach); additionality, by which financing complements available resources and does not substitute or crowd-out private investment; and the ability to scale up and/or replicate, whereby the project has the potential to be rolled out to other sites and/or to be implemented on a large scale.

Financial support is provided for project development, research and capacity building in the form of grants, loans and equity. By 2016, the Green Fund had approved 55 projects valued at R738 million, creating a projected 12,700 green jobs. The approved projects include 16 research projects in a range of sectors, including waste, agriculture, wildlife, transport and construction, as well as 8 capacity development programmes to support both institutional and individual capacities.

The Green Fund begins to address some critical challenges facing South Africa such as inequality, unemployment and poverty.

Sources: (Green Fund, 2014; DEA, 2015)

Funding platforms such as the Jobs Fund and the Green Fund are playing a significant role in funding green economy transition initiatives, with noteworthy contributions to the domestic finance which has catalysed green economy investments in South Africa.

3.2 GREEN ECONOMY INITIATIVES BY PROVINCE AND SECTOR

Figure 5 provides a snapshot of selected initiatives by geographical distribution and sector. It also indicates the number of permanent jobs created in each sector within each province. The size of the circle for each province shows the total number of green economy initiatives in that province and hence the relative importance of green economy investments in each province. The solid colour circles represent the size of each sector in each province, providing an indication of leading and under-represented sectors. The black circles show the number of projects that created permanent jobs in each sector. It is important to note that this graphic maps all activity accounted for by the GEISA, and that if an initiative operates in more than one province, it will be represented twice in the graphic. Therefore, the total number of initiatives will not add to 357.

This infographic shows that some provinces have an active green economy, such as the Western Cape, Gauteng and KwaZulu-Natal (KZN) and that some sectors (namely, agriculture) have more job-creating initiatives than others. Certain sectors are more active in some provinces, such as agriculture in the Eastern Cape, KZN, Limpopo and Mpumalanga (this reflects the more rural and small-scale subsistence characteristics of these provinces), renewable energy (RE) in the Western Cape, Gauteng and KZN (these have 26, 24 and 20 RE initiatives, respectively), and transport in Gauteng (this reflects the urbanisation of this region and linking of the two main cities, Johannesburg and Pretoria). A large number of transport initiatives that operate across numerous provinces are included in the graphic as national initiatives.

Seven of South Africa's nine provinces have already concluded green economy strategies, including renewable energy strategies. Additional observations from the GEISA on green economy activity in each of the provinces, could support and guide planning and investment processes. If no initiatives were identified in a particular sector, it is likely that initiatives in this sector do exist but were not accounted for by the GEISA, given time and scope constraints.

EASTERN CAPE

- Has initiatives in all eight sectors
- Has the second highest number of agricultural initiatives after KZN (16)
- Resource conservation and management is a significant sector, in terms of number of initiatives identified (7) and number of initiatives which had created jobs (5)
- The Sustainable Consumption and Production (SCP) sector had the fewest number of initiatives (1)

FREE STATE (FS)

- Has the lowest number of initiatives (14), alongside the North-West province
- Agriculture (5), Energy (5) and Waste (2) sector initiatives were most active
- No green economy-related Water and Built environment initiatives were identified

GAUTENG

- One of three provinces with the highest number of initiatives
- Energy (26), Transport (18) and Waste (8) are the leading sectors
- Agriculture (5) is the least represented sector
- No initiatives were identified in Resource conservation and management

KWAZULU NATAL (KZN)

- Had the highest number of initiatives
- Initiatives were spread across all sectors
- Most initiatives were identified in the Agriculture (21), Energy (20) and Waste (8) sectors
- SCP sector initiatives (2) were least represented

LIMPOPO

- Agriculture (14) and Energy (4) had the highest number of initiatives, followed by Waste (2) and SCP (2)
- Very few Transport (1) and Resource conservation and management (1) initiatives were identified
- No initiatives were identified in the Water and the Built environment sectors

MPUMALANGA

- Has a low number of initiatives (21)
- Agriculture (11) and Energy (5) had the highest number of initiatives, followed by Waste (3), SCP (1) and Resource conservation and management (1)
- No initiatives in Built environment and Water were identified

NORTH-WEST

- Has the lowest number of initiatives, alongside FS
- Agriculture (6) and Waste (3) sectors are leading sectors, followed by SCP (2), Energy (2) and Transport (1)
- Three sectors were not represented

NORTHERN CAPE

- Energy (6) and Agriculture (8) are leading sectors, followed by SCP (2)
- Resource conservation and management (1) and Waste (1) are poorly represented
- Built environment, Waste and Water sectors are not represented

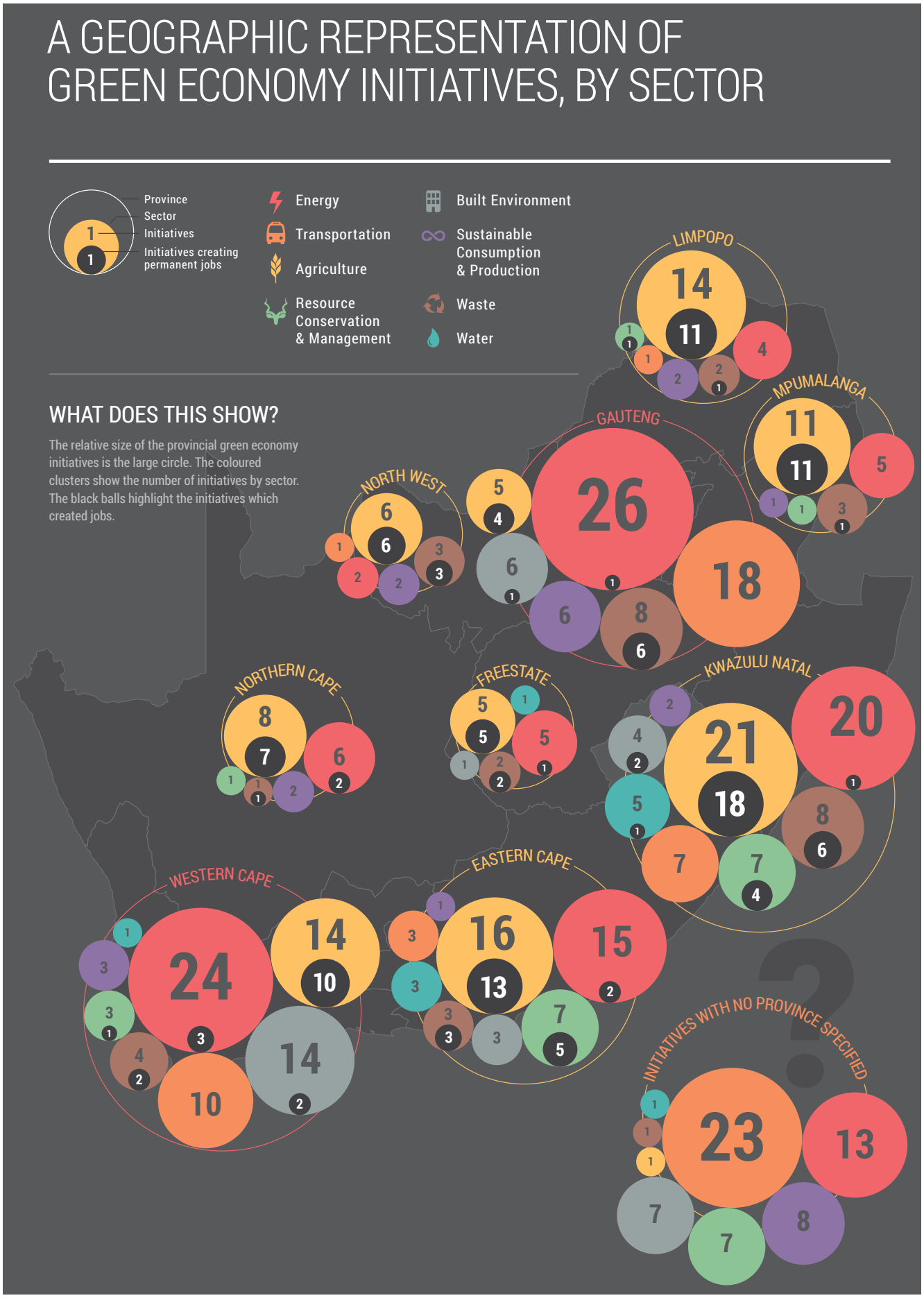
WESTERN CAPE

- Has the second highest number of initiatives
- Initiatives are spread across all sectors
- Energy (24) and Agriculture (14) are the leading sectors
- Has the most Built environment (14) projects
- Few initiatives were identified in SCP (3), Resource conservation and management (3) and Water (1)

16% of the initiatives included in the GEISA did not specify a province, mostly in the transport and energy sectors; these are represented as national programmes.

The following section will discuss each sector in greater depth.

FIGURE 5 | A GEOGRAPHIC REPRESENTATION OF GREEN ECONOMY INITIATIVES, PER SECTOR



3.2.1 CLEAN ENERGY AND ENERGY EFFICIENCY

Sub-sectors were identified as:

- **Solar, wind, energy efficiency (including solar water heating - SWH),**
- **Bio-energy**
- **Hydrogen and fuel cells**
- **Hydro-energy**
- **Education (included for energy-related education initiatives)**

Total number of initiatives identified: 120

Total per sub-sector: solar (45), bio-energy (31), energy efficiency (including solar water heating) (9), wind (8), hydrogen and fuel cells (6), hydro (5) and education (9).

Number of jobs identified

In general, there is poor reporting on jobs for energy projects. Of the 120 identified renewable energy and energy efficiency initiatives, only 10 provided detailed information on the number and type of jobs created. 9 of the 10 initiatives reportedly created a large number of temporary jobs during the construction phase of the projects. Although these numbers do not provide an indication of the types of jobs created, it has been assumed that, since most renewable energy initiatives are still in the construction phase, the jobs created are mainly for semi- to low-skilled labour. No jobs were reported for solar PV projects (more specifically, for private installations).

Geographical location of projects

The GEISA showed that most initiatives are independent projects that operate in a single set location. The Inventory counted 21 independent energy projects in the Western Cape, a large number of which are commercial solar photovoltaic (PV) installations; 16 in Gauteng, including municipal waste-to-energy projects; 13 in KZN, many of which are solar PV projects and 11 in the Eastern Cape. Many of the energy projects in Gauteng and KZN are part of municipal initiatives; Western Cape is the only province with a significant share of commercial energy projects, some of which are in the agricultural sector. Less than 5 energy projects were located in the Limpopo, Northern Cape and Mpumalanga provinces. However, since REIPPPP projects were not counted individually by the GEISA, it is possible that large numbers of renewable energy projects exist in the Northern and Eastern Cape provinces as well.

The GEISA referred to the REIPPPP initiative mainly to draw insight for the broader assessment. The REIPPPP had approved a total of 95 renewable energy projects by the closing of Bid window 4 but specific details relating to finance, target dates and measurable objectives were lacking. By comparison, the Private Sector Energy Efficiency (PSEE) initiative's detailed reporting was exemplary.

Funding sources and project partners

Large-scale renewable energy projects tend to have multiple partners and a crowding in of investments. In general, there is a lack of detailed reporting about funders. Other notes regarding renewable energy projects include:

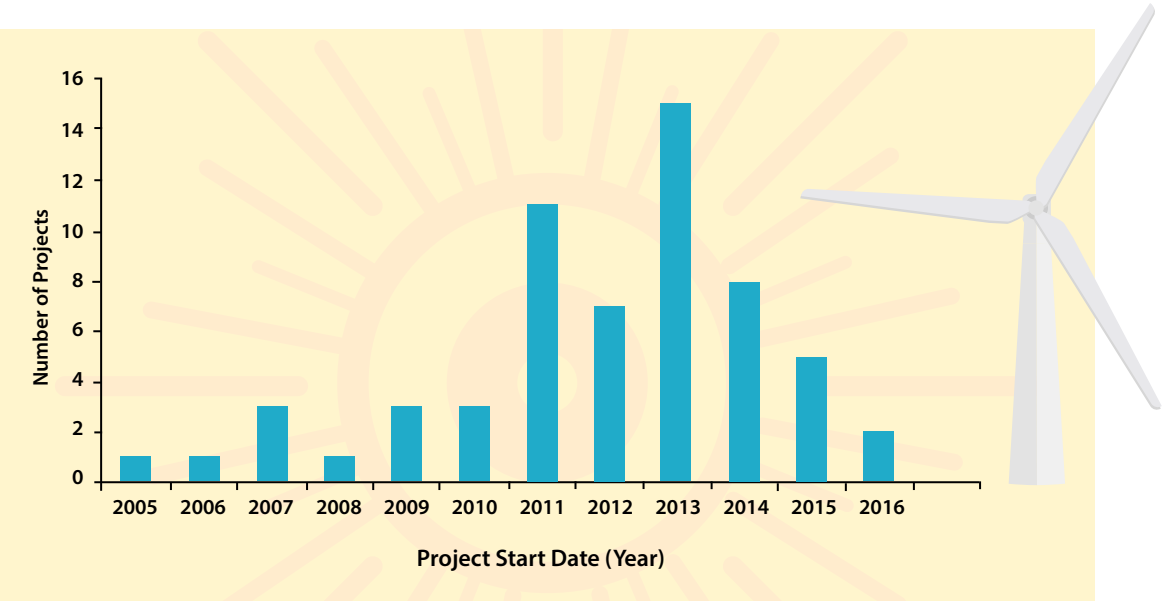
- 53 out of 120 projects have a South African funder; Finland, Austria, UK and Germany are common international investors
- Large energy projects such as REIPPPP and Clean Development Mechanism (CDM) projects are predominantly funded by international agencies and banks

- The Industrial Development Corporation (IDC) and the Department of Trade and Industry (the dti) are active funding partners
- The Technology Innovation Agency (TIA) is active in funding pilot and research projects
- A clear distinction between funders and project partners is often not made in reports
- eThekwini Metropolitan Municipality had the highest number of energy projects supported by a single funder, after the Energy and Environment Partnership (EEP) Southern and East Africa (S&EA)
- Public – private – partnerships (PPPs) for energy projects were predominantly observed in municipality-led projects

Poor reporting has led to an information gap about the total value of funding for renewable projects. Funding is generally above R5 million for small-scale (<1MW) projects, above R20 million for medium-scale (>1MW) and above R100 million for large-scale projects.

Only half of the energy projects included in the GEISA reported project contracting and implementation dates. Figure 6 provides an illustration of the renewable energy project peak in 2013 and subsequent decline.

FIGURE 6 | NUMBER OF RENEWABLE ENERGY PROJECTS BY START DATE



Economic indicators

The clean energy initiatives discussed in this section are mainly renewable energy projects that focus on electricity generation; energy efficiency initiatives are discussed in the section on SCP. Most renewable energy projects have potential for expansion because of the nature of the technology. However, there is poor recording of projects post-funding; online news articles largely provided information about the size of the plant, the client and the companies responsible for energy performance certificates. The lack of reporting on the scale of funding and source of funds and the lack of measureable indicators leave major information gaps.

Environmental indicators

Carbon emissions are currently the main indicator of improved environmental performance (especially for CDM projects); no indicators measure the cross-sectoral environmental impacts of energy projects including water efficiency and sustainable land use.

Social indicators

Very few projects reported associated social benefits. However, REIPPPP and CDM projects did, as this was part of their funding criteria.

Cross-cutting themes

Green jobs, awareness and training are the three most prominent themes. The government's Integrated Resource Plan, and associated policy documents, focuses on job creation and improving skills in renewable energy technologies. Since renewable energy technology is fairly new to South Africa, each project provides opportunities for jobs, training and awareness. Government sets clear targets for the socio-economic development outcomes for REIPPPP projects.

Circular innovation

Bio2Watt in Bronkhorstspruit is a good example of partnerships for bioenergy; its collaborators include farmers, business and the local municipality (see Section 3.2.7. for more information on Bio2Watt). The Bio2Watt project is considered to be an example of circular innovation in waste to energy since waste from the farming process is used to generate electricity instead of being discarded at a landfill site.

CASE STUDY | 50 MW KHI SOLAR ONE PROJECT, UPINGTON, NORTHERN CAPE

Source: Abengoa Solar, 2014

Khi Solar One is a 50 MW concentrated solar power (CSP) plant being built by Abengoa and Industrial Development Corporation (IDC) near the town of Upington in the Northern Cape Province. The tower is 205 metres tall, uses more than 4,000 latest-generation heliostats (ASUP 140), and covers 300 hectares. Khi Solar One uses super-heated steam, dry cooling technology, and has a two-hour steam storage system.

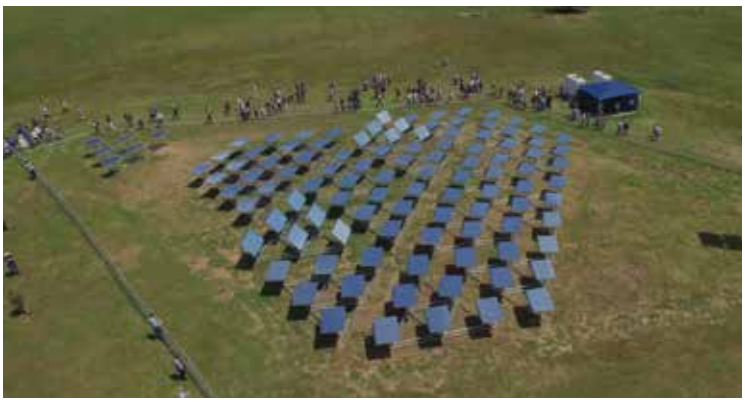
Dry-cooling CSP systems use up to 90% less water than wet-cooling technology, which is critical in semi-arid South Africa – especially in the Northern Cape. It is reported that all but one of the CSP plants implemented under the REIPPPP use dry-cooling systems.

The Khi Solar One initiative is a great example of the effectiveness of partnerships between private business, government and local communities – 51% of ownership is by Abengoa Solar (51%), IDC (29%) and the Khi Community Trust (20%). Benefits include:

- Approximately 183,000 tons of CO2 emissions offset per year
- 600 jobs created during the construction phase
- 35 permanent jobs

CASE STUDY | TIA HELIO100 TECHNOLOGY DEVELOPMENT PROJECT, MARIENDAHL, WESTERN CAPE

The Solar Thermal Energy Research Group (STERG) at Stellenbosch University has been developing a unique South African CSP technology that is able to provide dispatchable, clean energy at utility scale, with the added benefit of high localisation potential. It is the first South African-designed heliostat system intended for small utility-scale CSP towers. In early 2014, the team won a grant from the Technology Innovation Agency (TIA) to showcase the technology in a 100kW pilot facility.



Source: Helio100, 2014

The project illustrates the positive outcomes resulting from partnerships between research institutions and government that aim to commercialise and support local industry. It was selected as one of the winners of the World Wide Fund for Nature (WWF) Climate Solver Projects 2016.

Conclusions

GEISA findings suggest that the following areas require further investigation:

- Research and development of hydrogen fuel cells and solar energy technologies
- Decentralised and off-grid renewable energy solutions which address energy poverty in areas that do not have access to electricity
- Municipal finance as a key source of innovative financing of renewable energy projects
- Waste-to-energy technologies, as part of sustainable waste management solutions, particularly for municipalities
- Reporting systems and data quality for renewable energy projects, from both the REIP-PP as well as private and public sector initiatives

3.2.2 TRANSPORT AND INFRASTRUCTURE

Sub-sectors were identified as:

- **Alternative fuels**
- **Car share programmes**
- **Freight**
- **Fuel efficiency and emissions**
- **Non-motorised transport**
- **Transport planning and**
- **Roads and taxis**

Total number of initiatives identified: 64

Total per sub-sector: planning (23), non-motorised transport (12), fuel efficiency and emissions (10), alternative fuels (8), roads (3), taxis (3), car share (3) and freight (2).

Number of jobs identified

Reporting of jobs was extremely poor for this sector. 10 of the 62 projects reported on jobs created; all reported the creation of 50 or more jobs and all created jobs were temporary. It is assumed that these jobs are created during the construction phase of the projects.

Geographical location of projects

GEISA shows that Gauteng province has the highest number of green transport initiatives (13); the Western Cape has 6 and the remaining provinces have an average of 3 projects each. 36% of these projects were in transport planning, 19% were in the non-motorised category and 16% were in the fuel efficiency and emissions reduction. Initiatives that fall into the planning, non-motorised transport and fuel efficiency and emissions categories were found to be equally supported by national and local governments. Few initiatives fell into the car share and freight categories, as these are mainly private arrangements or commercial businesses respectively.

Funding sources and project partners

The majority of funding came from South Africa. It was further noted that funding was spread across multiple funders. The Department of Transport (DoT) had the highest number of projects by a single funder with a total of eight projects. As seen in the energy sector, there was evidence of public-private partnerships (PPPs); municipalities were central to such partnerships. Funding ranged from R100, 000 to R17 billion; Bus Rapid Transit (BRT) projects received the highest amounts of funding.

Economic indicators

The majority of the projects identified were partly state-owned or -funded. Transport and infrastructure projects are highly dependent on the availability of medium to long-term public financing.

Environmental indicators

Little data with measurable environmental indicators is available for green transport and infrastructure projects. While greening this sector through initiatives such as non-motorised transport, car-sharing and public transport is integral to achieving the country's Nationally Determined Contributions (as set under the Paris Agreement), data collection of these impacts is still in the early stages.

Social indicators

There were no measurable indicators of social impacts for the recorded transport initiatives. However, transport planning is part of national and local strategic plans to tackle issues such as access to services and integrated urban planning.

CASE STUDY | IYEZA EXPRESS BICYCLE COURIER SERVICE, KHAYELITSHA, CAPE TOWN, WESTERN CAPE

Source: Iyeza Health, 2015

Iyeza Express – a medicine delivery service – was founded in 2013 with just one customer, Sizwe Nzima's grandmother. It now delivers much-needed medication to over 1000 people in Khayelitsha, Cape Town while creating employment for five local youth with basic skills. It was founded by 21-year old Sizwe Nzima from Khayelitsha. The project is currently part of the New Economy Accelerator Programme.

It is a good example of local SMEs finding local solutions to address local challenges, addressing issues including access to health care, transport, youth, job creation and innovation. The project has received a variety of accolades, for example being listed as one of the Forbes Africa 30 under 30 most promising young entrepreneurs (2013) and received the Centre for Public Service Innovation (CPSI) Public Sector Innovation Award for improvement of public service in South Africa (2014).

Cross-cutting themes

The three key cross-cutting issues related to transport are, in order of rank: governance and partnerships, research and Small Medium Enterprise (SME) development. Governance and partnerships facilitated 58% of the total recorded projects, since transport planning forms part of national and local government initiatives often with long-term, large-scale projects.

Conclusions

There is a considerable amount of disconnected activity which, in some way, addresses mobility issues. This activity could be aggregated and expanded to form a 'green mobility' sector that provides safe and appealing alternatives to private car ownership.

A few notes on the transport sector:

- In general, there was a trend of poor recording of transport-related projects from a green economy perspective, and many promising initiatives were not recognised as providing viable, greener alternatives
- A significant portion of innovation in the transport sector lies in the private sector; the GEISA largely focused on publicly-funded initiatives
- Non-motorised transportation in cities has become a focus for a few municipalities; there is real potential here for collaborative initiatives with the private sector and non-profit organisations
- Legislative changes could facilitate the proliferation of smaller, more efficient vehicles and non-motorised transport options for commuter transport and freight
- The quality of data available on green transport initiatives is poor, and there is a lack of follow-up reporting which makes it difficult to assess the impact of these initiatives

3.2.3 AGRICULTURE, FOOD PRODUCTION, FISHERIES AND FORESTRY

Sub-sectors were identified as:

- **Farming**
- **Fisheries**
- **Forestry**

Total number of initiatives identified: 54

Total per sub-sector: farming (40), fisheries (5) and forestry (9).

Number of jobs identified

The exact number of jobs created by the 54 reviewed projects was undetermined. However, it can be said that approximately 26 projects in this sector (46% of surveyed initiatives for this sector) created at least 50 jobs per project. The Agriculture, food production, fisheries and forestry sector reported the highest potential for job creation.

Geographical location of projects

Most projects in this sector were in KZN (21) and Eastern Cape (16), which, have the highest poverty headcount in the country and some of the poorest rural populations (StatsSA, 2014). The Western Cape and Limpopo each have 14 projects in this sector [3] . Between 5 and 11 projects were identified in the Free State, North West Province, Gauteng, Northern Cape and Mpumalanga. It is recognised that there are likely to be more projects being undertaken in the Free State than indicated by the GEISA. A positive correlation was observed between the number of initiatives in the sector and the rural poor located within the provinces of KZN and the Eastern Cape.

Approximately 50% of the projects had a local focus; eight were initiated at a provincial and nine at a national level.

Funding sources and project partners

The Jobs Fund, Department of Agriculture, Forestry and Fisheries (DAFF) and the Green Fund were the most prominent funders within this sector. The majority of initiatives are funded by South African entities, including private companies. The SEED Initiative was a good avenue for identifying projects, highlighting local initiatives that engaged a wide variety of community partners. The initiative was founded at the 2002 World Summit on Sustainable Development in Johannesburg by UNEP, UNDP and IUCN, and supports the promotion of social and environmental entrepreneurship for sustainable development and poverty reduction. The Wildlands Conservation Trust is also a proactive partner, often acting as fundraiser and project coordinator.

Approximately 50% of the projects provided values of funding. Projects with the largest funding pots were allocated to:

- Agri-Parks: A relatively new national project (DAFF) (R2 billion)
- Micro Agricultural Financial Institutions of South Africa (MAFISA) (R1 billion); Very little information was available on the specific activities funded under this umbrella initiative
- Operation Phakisa and Camdeboo Aquaculture projects (R250 and R400 million respectively)

[3] Note: Some projects are being implemented in more than 1 province.

CASE STUDY | TSHWANE FOOD AND ENERGY CENTRE, TSHWANE, GAUTENG

Source: Dimmer, 2016

The Tshwane Food and Energy Centre is a greenfield development, sited on 200 of 2,600 hectares zoned for agriculture. It aims to provide an integrated solution to food security and production, energy supply, economic stimulation and job creation, whilst embracing sustainable green practices. In addition, the project will improve the livelihoods of twenty-five displaced farming families from nearby townships; they will be provided with a plot of land on which to live and farm. Each plot of land encompasses a house, rainwater harvesting tank, solar water heater, bio-septic tank, greenhouse, chickens and chicken huts, thereby enabling residents to be self-sustaining and live off-grid.

Tshwane has provided 90% (R40m) of the core funding – this fulfils the Council's remit to meet COP21, C40 and ICLEI objectives and targets, which will hopefully help to attract additional funding. R5m worth of investment has been provided by the EBF Group, who are the main contractors. EBF and the City of Tshwane will co-manage the project until it is self-sustainable.

The Centre also offers training programmes to ensure the farmers are equipped to understand farming economics and can efficiently produce quality products. In addition, neighbouring farms with different products are invited to sell their products at Tshwane Food and Energy Centre market stalls and benefit from the training.

This initiative helps Tshwane position itself as the leading green capital of South Africa. It is an example of well-integrated partnerships operating across the agriculture and energy sectors in a large city.

Economic indicators

Job creation is a critical outcome of agricultural initiatives and 26 initiatives (46%) of the agricultural initiatives surveyed in the GEISA created 50 or more jobs. A verification of actual jobs being created would need to be undertaken per project.

A number of the agri-businesses and small-scale farming initiatives have the potential for scalability, although there was little evidence of expansion of initiatives at the time of the survey.

Of all the sectors analysed, the setting up of SMEs within the agriculture sector was a significant theme, with over 40% of projects citing the initiation of SMEs as an objective of their projects.

Environmental indicators

A limited amount of information was made available to draw conclusions on the environmental benefits of initiatives implemented within the sector. However, some farming and mainly forestry projects (25%) alluded to improving biodiversity e.g., by planting of trees. Not all forestry projects result in benefits, unless indigenous trees are planted. A number of the forestry projects did allude to this, such as the Dukuduku Forest project, funded by GEF to conserve and restore the Dukuduku forest. It includes the Manukelana indigenous nursery, which focuses on rare and endangered plants species in the area. It could be argued that as these are projects that inherently improve biodiversity, they would have positive environmental impacts. Projects that focused specifically on improvements in farming practices or introduction of organic practices could be considered more beneficial than others. However, due to poor data availability, it is not possible to adequately reflect on this.

Social indicators

The most prominent social improvement benefit reported in this sector was the skills development and training for project beneficiaries and stakeholders; over 70% of projects reported this as an objective. A quarter of all agricultural projects mentioned the alleviation of poverty (especially in rural settings) and improvement of health and nutrition as outcomes of the initiatives.

Cross-cutting themes

Over 80% of provided funding was to invest in initial infrastructure or to cover set-up costs for entrepreneurship activities (57%). Over half of the projects had a training or business development element. This was often tied into funding being an enabler to access markets e.g. for food. Project partners included academic institutions and agricultural colleges, projects therefore had an element of research. Seven of the projects reported a focus on women farmers or small-scale producers of food.

Circular innovation

Circular innovation was not a common theme for the majority of the initiatives identified. However, the agricultural sector often plays a role in circular innovation through the beneficiation of agricultural waste. A good example of this is the Bio2Watt initiative, which is a cross-sectoral (agriculture and renewable energy) initiative that uses offal from local abattoirs, manure from local livestock farms and organic waste from local juice makers, to produce power (see Section 3.2.7. for further information on this initiative).

Conclusions

A number of projects overlapped with other sectors. These tended to be those that also improved the biodiversity of a region or farmland, or where agricultural waste is used to generate energy. Some projects, such as the Tshwane Food and Energy Centre, illustrate how green jobs in the agricultural sector have transitioned from the more traditional approach of supporting local farmers' initiatives to supporting more holistic, multi-partnered projects that, if replicated throughout the country, could contribute significantly towards a green economy transition, improving livelihoods and increasing jobs.

3.2.4 RESOURCE CONSERVATION AND MANAGEMENT

Sub-sectors were identified as:

- **Payment for ecosystem services (PES)**
- **Working for… programmes**
- **Ecological infrastructure**
- **Offset programmes**
- **Wildlife management**

These sub-categories were based on the green economy programmatic areas listed on the DEA green economy website (DEA 2016). They worked relatively well, and if 'offset' was interpreted as 'carbon offset', most information could be captured. Infrastructure resilience was interpreted as 'ecological infrastructure' as it made little sense in this category to define it as 'engineering infrastructure'.

Total number of initiatives identified: 31

Total per sub-sector: Ecological infrastructure resilience and ecosystems (19), Wildlife management (5), Offset programmes (4), Working for... programmes (3), and National payment for ecosystem services (0).

Number of jobs identified

Job data is extremely difficult to work with due to the lack of standardisation of reporting on job creation. Terminology including full-time, part-time, full-time equivalents, personal days, temporary, permanent, annual, over life of project and created to date had varied meanings across job creation reports. This will require careful thought and standardisation as the GEISA is developed further.

Large numbers of work opportunities were created in this sector. The Expanded Public Works Programme (EPWP) 'Working for…' programmes create literally thousands of work opportunities annually. However, there appears to be little follow-through into permanent jobs since the economic models are not yet in place e.g. varieties of payment for ecosystem services.

Geographical location of projects

The majority of the projects in this sector (other than the very large EPWP 'Working for …' programmes) tended to be locally focused. There was a high concentration of local projects in the Eastern Cape (4) and KZN (4). This sector lends itself to locally-focused projects as biomes/ecosystems are significantly different and thus require different kinds of projects. The large EPWP projects tended to be implemented through national (e.g. SANParks) or local implementation partners (multiple).

Funding sources and project partners

Funding was spread across international and local funders. International funding came primarily from the GEF and was often counter-funded (in very high amounts) by EPWP. Internationally funded projects tended to focus on infrastructure resilience (here understood as ecological infrastructure) and, due to the high counterpart funding from EPWP, tended to focus on short-term work opportunities rather than long-term job creation.

Local (municipality) level funded projects in semi-urban conservation or ecological infrastructure projects were also often supplemented by EPWP. National level projects were predominantly funded by very large national or international projects e.g. EPWP (through SANParks) or the Green Fund.

CASE STUDY | EXPANDED PUBLIC WORKS PROGRAMME (EPWP)

The Expanded Public Works Programme (EPWP), launched in 2004, incorporates a number of very large resource management and conservation programmes, including:

- Working for Water
- Working for Wetlands
- Working on Fire
- Working for Land
- Working for Forests
- Other programmes

These programmes use government expenditure to create work opportunities for the unemployed. In addition to the billions of Rand that are spent annually by the national government on EPWP initiatives, additional counterpart funding is raised through the Land-user Incentive Programme and funding agreements with large international donor projects in the natural resource management (NRM)/ environmental sectors. This investment creates tens of thousands of short-term work opportunities throughout South Africa with a clear commitment to social inclusivity.

In addition to the work opportunities and wages (below minimum wage), there is a skills development component. These initiatives have undoubtedly had a huge and positive effect on NRM in South Africa. However, numerous studies have identified a number of areas that require attention, including the lack of job creation beyond EPWP work opportunities. This is partly a function of the lack of real commercial opportunities in the NRM sector due to non-existent or inadequate finance mechanisms such as payment for ecosystem services. EPWP provides both formal and informal training. However, in the medium to long term consideration should be given to expanding existing skill sets in order to sustain the necessary and required skills in the sector. Thus, even in well-established and internationally acclaimed green economy initiatives such as the EPWP, there is still room for improvement.

It must be acknowledged that South Africa has a long history of linking tourism and nature conservation through a system of national parks, provincial parks and private nature reserves. These initiatives are now considered business as usual and were therefore not accounted for in this initial round of research as projects with data on funding, job creation, duration, etc. Several of the larger (and well-documented) conservation projects in this sector support community ventures, such as Somkhanda and Makuleke, were captured in the Inventory. 12% of surveyed initiatives focused on carbon offsets; however, it is unclear how many of these initiatives are actually attracting ongoing carbon funding.

The large EPWP projects have all been under implementation for many years. Spikes in funding for the sector are the result of calls for proposals from large funders such as GEF and the resultant project roll out. For example, the Critical Ecosystem Partnership Fund (CEPF) project, managed through Wildlands Conservation Trust, resulted in an increase of projects in Eastern Cape and KZN due to a focus on eastern South Africa.

Economic indicators

It is extremely difficult to obtain meaningful data on job creation given the varied definitions of basic terminology. Initial indications are that very few permanent jobs are created beyond the projects. The lack of projects that could be classified under 'payment for ecosystem services' is an indication that the financial instruments for this kind of conservation work are not yet in place. This is aligned with the recent research on Natural Resource Management (NRM) and the green economy conducted by the South African National Biodiversity Institute (SANBI, 2014) and the CSIR (Audouin et al. 2015).

Environmental indicators

All reviewed projects had biodiversity benefits and deliver significant co-benefits, such as strengthening community participation in local resource governance and protecting indigenous forest. Many projects referred to the number of hectares (ha) placed under conservation (long-term benefit) or restored (no real information about follow-up), which was a useful metric to capture.

Social indicators

The majority of projects had an awareness-raising component. However, follow-through to more meaningful education and green skills training was weak; only 11 of the 31 projects specifically mentioning NRM-related capacity development. It is also difficult to separate general skills development e.g. HIV/AIDS awareness or general health and safety training from training focused on NRM or conservation and green skills. Although not often explicitly stated, most projects seemed to be aware of the importance of promoting social inclusion and actively supported women and youth in the selection of participants.

Cross-cutting themes

Although not specifically identified as green economy projects, one should not underestimate the value of well-established and ongoing conservation work. These initiatives create real jobs over the long term. SANParks' use of EPWP and Environmental Protection and Infrastructure Programme (EPIP) funding to enhance conservation areas and tourism infrastructure is a value-adding approach to ongoing conservation work.

Circular innovation

While not specifically focused on circular innovation, what is innovative in this sector is the sheer size of the EPWP programme and its focus on creating work opportunities. This has had both positive and negative social and economic impacts; though the impacts on NRM have been largely positive.

Conclusions

The focus on jobs may be misleading in this sector; a focus on livelihoods may be more useful given the importance of ecosystem services to marginalised communities. This is not addressed well in project outlines, perhaps due to the EPWP's focus on job creation.

The need to protect and restore natural ecosystems is substantial and ongoing, and green economy initiatives in this sector should be further scaled up. There is also an urgent need to factor environmental services into financial instruments in order to create a more sustainable economy; in other words, without some kind of payment for the protection of ecosystems, the potential to build a viable green economy in this sector is limited.

3.2.5 BUILDINGS AND THE BUILT ENVIRONMENT

The following sub-sectors were identified as a way to provide more nuanced insights into the sector:

- **Buildings**
- **Integrated planning**
- **Materials**
- **Settlements and cities**

Total number of initiatives identified: 29

Total per sub-sector: Buildings (11), Materials (8), Settlements & Cities (7) and Integrated Planning (3).

Number of jobs identified

Job data was quite limited for this sector, with only nine of the projects providing details on number of jobs being created. The number of jobs per project may be summarised as follows:

- 4 Projects: >50 permanent jobs, >50 temporary jobs
- 2 Projects: between11-50 permanent jobs, between 11-50 temporary jobs
- 2 Projects: between 11-50 temporary jobs only
- 1 Projects: <10 permanent jobs, < 10 temporary jobs

Due to the nature of construction work, jobs tended to be temporary; permanent jobs can be created in the operation and maintenance of green buildings.

Geographical location of projects

There is a strong bias toward activities in the Western Cape, which is home to 13 projects. This could be related to the Province's 110% Green initiative (which includes the Better Living Challenge and Sustainable Settlement Innovation Summit). Other areas of activity are in Gauteng (6 projects), KZN (3 projects) and Eastern Cape (2 projects). No projects were identified in the other provinces. 19 projects were specific to a local government jurisdiction; 9 projects were nationally relevant; 1 project was province-specific.

Funding sources and project partners

The majority of the projects included in the Inventory received funding from South African sources. Two projects received foreign funding, from Germany and Switzerland, respectively, both of which are active in the sustainable building sector. This may explain their interest in collaborating with South Africa on projects.

Funding sources were diverse. The Green Fund financed the largest number of projects (4), the Department of Human Settlements funded three, and five projects were self-funded or funded by multiple small contributions (such initiatives may be considered as potential projects for larger-scale funding in future).

Funding ranged from R780, 000 to R120 million. The largest funded green initiative was the Corridors of Freedom project in Johannesburg, which aims to transform segregated urban settlement patterns through transit-oriented development. There is also a R125,000 (USD $9 million) project funded by the World Bank, the Swiss State Secretariat for Economic Affairs (SECO) and National Treasury known as the Cities Support Programme, an integrated urban planning initiative.

CASE STUDY | OCEAN VIEW STONEHOUSE PROJECT, CAPE TOWN, WESTERN CAPE

Source: eNCA, 2013

The Ocean View Stonehouse Project in Cape Town exemplifies how slight shifts in the housing model can achieve environmental, social and economic benefits. The initial plan was to clear the hillside site of rocks and import cement blocks to construct the houses. By using the abundant on-site stone for housing construction, the project was able to reduce material and import costs and reallocate this capital to stonemasonry training opportunities for local workers. It also significantly reduced CO2 emissions resulting from the project.

Ocean View Stonehouse Project has created aesthetically pleasing, solidly built homes and left a legacy of skilled workers that can be employed for other construction projects.

A number of new projects were launched in 2011-2012 and four projects will end in 2018. Limited information on funding details was available for projects under implementation in this sector.

Economic indicators

Three projects demonstrated signs of financial self-sustainability, two of which were commercial enterprises that were self-funded since inception. Upon analysis, 15 projects indicated potential for up-scaling for further impact.

Environmental indicators

Only two projects provided an indication of CO2 emissions reductions: Cato Manor Energy Efficiency in Low Cost Housing Retrofit reported a reduction of 110.7 tonnes per annum and the CO2 Energy Efficient Clay Brick Project reported an emissions reduction of 24,000 tonnes in 2015. This indicates that there is significant room for improvement in environmental impact reporting on built environment projects. It must be noted, however, that the Green Building Council of South Africa's (GBCSA) certified projects have excellent data reporting, which could provide a reporting model for other projects.

Social indicators

13 projects exhibit evidence of poverty alleviation, skills development and capacity building. Considering the potential of the building industry to provide low-skilled jobs for the unemployed, this sector has significant potential to further contribute to poverty alleviation and skills development. Four projects explicitly mentioned youth involvement (iShack, Ocean View Stonehouse Project, Inclusive Violence and Crime Prevention (VCP) programme, Klein Begin Sustainable Settlement), but positive impacts on youth are expected to be much higher. The Wescape Development project footprint was extended to realise health benefits, as it improved access to public health services.

Cross-cutting themes

The most prominent cross-cutting theme was research (9 projects), followed by training and awareness (8 projects each), green jobs (6 projects), governance and partnerships (5 projects), knowledge management, social entrepreneurship, SME development and youth (4 projects each), and finance and investment (2 projects). Further research is necessary, as is an increased focus on green job creation and a shift to greener building practices so that existing jobs in the sector become green. An explicit focus on trade and gender were not found to be themes of any projects surveyed in the sector.

Circular innovation

The building industry has the potential to play a significant role in promoting a circular economy by reusing waste materials in new building construction. Projects that embrace this principle include the Ocean View Stonehouse Project, the Klein Begin Sustainable Settlement Project, the Compressed Brick Manufacturing Project, EcoBrick Exchange and E-Khaya. The Two Rivers Urban Park project and the Greyton 110% Green Forum embrace circular innovation more broadly, looking at systems that facilitate resource re-use where appropriate, taking into consideration that re-used building material may not be of the same quality as virgin material.

Conclusions

South Africa is a leader in green innovation in the built environment in Africa and has one of the fastest growing green building sectors in the world. The country was in fact identified as global leader in green buildings in the World Green Building Trends 2016 (Dodg Data & Analytics, 2016), with a sectoral growth rate of 41% compared to a global average of 37%.

Green approaches are entering the commercial property sector with the help of the GBCSA and others. Green innovation in the residential sector has the potential to deliver significant environmental, social and economic benefits, particularly in the provision of social housing, which continues to be built using highly unsustainable designs and practices, despite environmental guidelines for low-income housing and a number of demonstrated alternatives.

3.2.6 SUSTAINABLE CONSUMPTION AND PRODUCTION (SCP) (INCLUDING MINING AND MANUFACTURING)

The SCP sector was difficult to split into sub-sectors because of the way the sector is structured, and thus initiatives identified in GEISA were not grouped into sub-sectors. SCP can be applied across all sectors. One could categorise early-stage SCP projects by sector (for example, energy efficiency, industrial symbiosis and water efficiency). Industrial symbiosis is an approach to resource efficiency where unused or residual resources of one company are used by another, resulting in mutual economic, social and environmental benefits.

Total number of initiatives identified: 25

Projects were mainly related to implementing energy-efficiency measures. This could be due to a number of factors, such as the energy crisis (wherein more investment has been made in demand-management strategies), technology development and energy efficiency tax incentives.

Much of the activity in this sub-sector has been led by the private sector. The Private Sector Energy Efficiency Programme (PSEE) has successfully demonstrated the business case for mainstreaming energy efficiency, highlighting the savings potential of implementing energy efficiency measures. However, many proposed measures were not implemented, primarily due to lack of available funding. The Inventory does not capture all PSEE initiatives. Switch Africa Green recently implemented three SCP projects, all in the agriculture sector, while the National Cleaner Production Centre of South Africa (NCPC-SA) is a key catalyst in the SCP sector and has case studies of projects that have been implemented.

The scale of the action, however, does not yet match the scale of the challenge.

CASE STUDY | RECYCLING PALLETS PAYS, CAPE TOWN, WESTERN CAPE

Source: Western Cape Industrial Symbiosis Programme (no.date)

Industrial symbiosis programmes (ISPs) unlocks business opportunities through utilising unused or underutilised resources, such as materials, energy, water, assets, logistics and expertise. A key part of the ISPs is connecting companies that can help each other realise these opportunities. A Western Cape Industrial Symbiosis (WISP) forum in August 2014 connected the EnviroServe company with Combo Timber Structures. Combo Timber Structures began collecting broken pallets from EnviroServe clients and remanufacturing them into new usable pallets. This resulted in a fundamental shift in their business model; it eliminated the need to purchase virgin wood to make pallets. Thanks to further industrial symbiosis, offcuts that cannot be used for pallets are used for to make kennels and fire starters.

Although the project is small-scale, it illustrates how a different approach can reduce landfill waste, create new revenue streams, save money, and benefit society and the environment. In the emerging green economy, projects citing multi-capital benefits such as these are rare gems.

1. Economic benefits
    - R29,000 in cost savings by diverting wood from landfill
    - R174,000 in additional revenue via the sale of remanufactured pallets.
    - R100,000 invested by Combo Timber Structures for new equipment to deal with increased wood volumes
2. Environmental benefits
    - 79 tonnes of wood diverted from landfills
    - 200 tonnes of CO2e savings
3. Social benefits
    - Three permanent jobs created to manage increased volumes of wood

This WISP project shows the potential to achieve major social, environmental and economic benefits with one activity.

Number of jobs identified

Job data was very scarce for this sector. Only two of the projects provided details on permanent jobs created; one created less than 10 jobs and the other created over 50. Only three projects provided details about the number of temporary jobs created; two projects created over 50 and one project created less than 10 jobs.

Much of the work in this sector, especially pertaining to energy efficiency, is carried out by consultancy firms. Energy audits themselves create jobs in the form of energy efficiency monitoring, reporting and verification professionals.

Geographical location of projects

There is a fairly even spread of SCP projects across the country. Eight of the 14 projects that are classified as nationally-led projects provided no information about the provinces in which they were implemented.

Eight projects are classified as local projects. These spanned across various categories. Some represented innovative ways of doing things, in many instances in response to drivers such as rising energy prices and load shedding.

Five projects were classified as provincial-level projects; four were implemented in Gauteng. Three of the five projects were funded by the IDC and GIZ.

Funding sources and project partners

The most common source of funding for SCP initiatives in South Africa was the IDC, which funded six projects. Specific details on relevant project budgets were not indicated. The NCPC-SA played a role in four projects, but it was unclear from publicly available information whether or not they funded individual projects. The largest project involved R800 million, the smallest R2 million. With significant amounts of missing data, it is difficult to gain an understanding of funding sources in this sector as a whole.

Donor funding has played a key role in the identified SCP initiatives. For example, there were three EU-funded initiatives, Switch Africa Green, which is funded by the EU, and the PSEE, which was funded by the UK's Department for International Development.

Private companies play a significant role as funding partners in this sector. The EU, UNEP and other UN organisations as well as NCPC and the Energy Efficiency Leadership Network (EELN) feature as major project partners.

There is an even spread of projects start dates. The start dates of eleven of the 25 projects were not publicly available. Six of the captured projects were completed by the time the Inventory research began, and three projects are due for completion by 2018. Sixteen projects failed to provide the intended completion date.

Economic indicators

Most SCP projects required a substantial initial investment, with a projected pay-back period. Required investments are wide-ranging up to R800m. These pay-back periods ranged from six months to three years. One project, with a required investment of R800m, has a projected pay-back period of two years. As such, none of the projects alluded to the potential to become stand-alone self-sustaining entities. Nine of the 25 projects have the potential to be scaled up in the medium to long term.

Environmental indicators

Approximately 50% (14 in total) of the projects demonstrated energy savings. Six projects were relatively large scale, with annual energy savings of over 51,000MWh per project. Three projects reported energy generation, all in the 730-51,000MWh per year range. Due to the nature of many of these projects, the energy savings or energy generation were key parts of the project viability studies, which, in turn, supports the collection and disclosure of energy data. However, there could be improvements in the range of data captured and the consistency of its presentation.

Social indicators

Social indicators were poorly reported, though there are implied health benefits to implementing energy efficiency measures, such as the improvement of local air quality. Skills development, particularly through the work of the NCPC-SA, is a key social benefit emerging from the sector. There is room for improvement on that front, especially as many projects could support skills development, notably through reorientation of education and training systems. This could help to equip technicians along the skills value chain to implement cleaner production systems.

Cross-cutting themes

The most prominent cross-cutting theme was finance and investment, as SCP projects required a degree of upfront investment linked to a pay-back period. Of all reviewed SCP projects, 12 provided qualitative evidence of green job creation, although the quantitative data did not support this assertion. Nine of the initiatives were aimed at raising awareness or sharing knowledge about their impacts.

Circular innovation

Industrial symbiosis projects provided evidence of circular innovation. Three provinces – Gauteng, KZN and Western Cape – have successfully implemented provincial industrial symbiosis programmes, and there is also a national industrial symbiosis programme. There is scope for further innovation in this area.

Conclusions

The NCPC-SA, PSEE and Switch Africa Green (SAG) and IDC are playing a key role in making the case for and financing of energy efficiency initiatives in South Africa. The impact of NCPC and the PSEE on growing the energy efficiency sector could be maximised if funding was increased to extend their capacity development efforts and by linking these programmes to private finance, which is a critical barrier to the implementation of energy efficiency projects. SAG, a global programme implemented jointly by UNEP and UNDP in six countries across four years, is still in the early stages of implementation but is already sharing critical lessons about energy efficiency in the agricultural sector. The IDC-supported energy efficiency initiatives in South Africa should be drawn on to strengthen the case for more private sector involvement in energy efficiency financing.

Collaboration is strong in this sector. This should be leveraged further to improve awareness within industry and catalyse further symbiosis. However, very little information is available online, and what is available is dispersed and difficult to compare. There does not appear to be a central coordinator of green projects in this sector in South Africa, so data extraction is time consuming. In some cases, an overarching project coordinator provides data for an entire large-scale project (such as PSEE or some of the NCPC programmes).

3.2.7 SUSTAINABLE WASTE MANAGEMENT PRACTICES

Sub-sectors were identified as:

- **Food waste**
- **Recycling**
- **Collection**
- **Waste-to-energy (WtE)**

Total number of initiatives identified: 35
Total per sub-sector: recycling (30), food waste (2), waste-to-energy (2) and collection (1).

It is important to note that some waste projects are covered in sections on other sectors (Bio2Watt is covered in the section on the energy sector, food waste to animal feed projects are covered in the section on the agriculture sector, and pallet repurposing is covered in the section on SCP).

Number of jobs identified:
It is difficult to comment on the total number of jobs created as this information was often not supplied, even in the initiatives selected for analysis. However, some projects indicated that over a hundred jobs had been created. This is significant given the potential of sustainable waste management practices to create jobs (Godfrey et al., 2016).

Geographical location of projects
Most waste management projects are located in Gauteng (8) and KZN (8); but also in Western Cape (4), Eastern Cape (3), North West Province (3), Northern Cape (2), Limpopo (2), Mpumalanga (2) and Free State (2). The majority of these are local-level initiatives (17); while national government supports five initiatives. There is no evidence of provincially funded projects.

Funding sources and project partners
The main funders and project partners in this category were the Green Fund and PETCO. Many of the initiatives in this sector had been recognised and acknowledged by SEED's award scheme. The waste sector had some of the largest investments of all eight sectors surveyed in the GEISA, including the Working on Waste/Youth Jobs in Waste and Wastepreneurs, financed by the Green Fund, and the Durban Landfill Gas-to-Electricity Project, which is supported by the World Bank.

Economic indicators
21 (60%) of the waste management projects stated that they had created 50 or more jobs, though it was not possible to ascertain whether job numbers were predicted or had been realised, given the desk-top methodology employed for the Inventory.

It is impossible to comment on whether projects continued to operate beyond the initial funding period. However, many of the recycling initiatives could potentially be replicated across the country, and some may indeed have already expanded to other communities or regions.

Environmental indicators
Most reported environmental benefits were the number of tonnes of waste that were repurposed, collected or diverted from landfill. Additional benefits include reduced methane emissions from organic matter in landfills and reduced use of virgin materials resulting from increased use of recycled materials. Future reports could investigate these types of project benefits.

CASE STUDY | USE-IT WASTE BENEFICIATION, ETHEKWINI, KWAZULU-NATAL

The USE-IT initiative in eThekwini shows that materials that are perceived as waste can actually be a high-value commodity that can be used to create new products. The USE-IT initiative aims to identify opportunities for waste beneficiation to increase waste diversion from landfill while supporting green growth and job creation.

Examples of some of the initiatives supported by USE-IT include:

1. Compressed earth blocks and Rambricks – technology to use landfill-destined building rubble as a component of a building block mix for single storey developments
2. E-Waste Recycling and Refurbishment Centre
3. Hammarsdale Waste Beneficiation Centre
4. Organics and Composting – working with the Duzi Umgeni Conservation Trust (DUCT) to establish small pilot composting operations using harvested local riverweed

From 2010 to 2014, eThekwini provided R4.5m for USE-IT to set up a waste beneficiation cluster from which eleven projects have been created or supported. As a whole, the project has:

1. Diverted 18,254m^3 of waste from landfill, including 2,064 tons of plastic, 1,562 tons of paper, 934 tons of glass, cans and metal and 1,680m^3 of green waste
2. R3.6m equivalent savings to landfill
3. Created 84 direct jobs and 68 indirect jobs from 2013-2014 and a total of 2,122 jobs since inception in 2009

For every Rand of funding eThekwini provided to USE-IT, the city has saved R1.83 in landfill diversion, making this is a cost-negative project with job-creation, environmental, economic and social benefits.

Social indicators

The social benefit most commonly reported by a number of waste management initiatives is job creation and poverty alleviation.

Cross-cutting themes

Most funding was allocated to infrastructure development or new business set-up costs. Four projects focused on (closed loop) circular innovation. A number of initiatives were connected to academic institutions and had a research component. The majority of projects had a community awareness raising and training element. At least 26 of the initiatives actively involved women.

Circular innovation

Circular innovation is particularly relevant to the waste management sector, and several projects illustrate how waste can be a valuable by-product of a process that can be reused to create a product to realise additional value.

CASE STUDY | BIO2WATT BIOGAS PLANT, BRONKHORSTSPRUIT, GAUTENG

Source: Bio2Watt, 2016

Bio2Watt (Pty) Ltd is a leading industrial scale biogas waste-to-energy company in South Africa. They have a 'purely green energy' approach that uses landfill-bound waste for energy generation processes, thereby helping to decrease water and air pollution.

The Bronkhorstspruit Biogas Plant (BBP) is the first commercially viable biogas project in South Africa. It is located in Bronkhorstspruit (in the Tshwane Metropolitan area) on the premises of one of South Africa's largest feedlots, Beefcor. This location provides proximity to key fuel supplies, grid access and sufficient water, which is supplied by Beefcor's stormwater collection dams.

Early stage support was provided by the Department of Energy, who are using this project as a benchmark for future deals of similar nature. Support has also been provided by an extensive set of stakeholders, including BMW, who are using the Bio2Watt system to supply energy to the Rosslyn plant.

The plant began feeding power into the national grid in October 2015, and created long-term direct and indirect employment.

The success of BBP is likely to lead to many more plants. With over 14 million cattle in South Africa, a significant number of which are kept on large farms, the potential for project replication is substantial. Interest shown in BBP indicates that this is a new emerging industry in South Africa.

Conclusions

Almost 75% of identified waste projects support sustainable waste management, from collection and recycling to waste beneficiation. This highlights the importance of an end-of-life focus in a product's value chain, with examples of how to create value for waste or reduce waste through lean management initiatives in supply chains (these are possibly captured within the SCP sector). 90% of waste in South Africa still goes to landfill (DEA, 2012), meaning that there is ample opportunity to implement sustainable waste management practices across the waste hierarchy and waste streams.

The food waste management sector also merits attention. South Africa will launch the UN's Think.Eat.Save campaign nationally over the coming year (it was launched globally by UNEP, FAO and other partners in 2013). This will raise significant awareness on the issue, and could result in increased funding for initiatives to reduce food waste.

3.2.8 WATER MANAGEMENT

Please note that large catchment management projects were included in the section on Resource Conservation and Management (RCM) (e.g. EPWP, Working for Water, Working for Wetlands).

Sub-sectors were identified as:

- **Water harvesting**
- **Alternative technology effluent management**
- **Comprehensive municipal water metering**
- **Reducing water losses in agriculture, municipalities and mining**

These sub-sectors are based on the green economy programme areas listed by the DEA (DEA 2016). These categories proved to be not particularly useful, as many larger water sector projects relate to catchment management. It is recommended that in future the water sector be sub-divided into three sectors – catchment management, water capture and loss reduction, and effluent management – to capture the full spectrum of water sector initiatives.

Total number of initiatives identified: 10

Total per sub-sector: catchment management (5), effluent management (3), and urban initiatives focused on water capture and loss reduction (2).

Number of jobs identified

The number of jobs being created in the sector is still limited. Opportunities are emerging, particularly in initiatives related to greater public and private sector investment in catchment management and leak detection. The War on Leaks initiative, which is still relatively new seems to have a significant impact, particularly with regard to training.

Geographical location of projects

These projects were often national level, as water issues could be dealt with in similar ways across the country. Significant innovation was evident in the urban initiatives in KZN and the Western Cape.

Funding sources and project partners

Outside of the large national water initiatives included in the RCM sector, funding for these initiatives were often municipal-level and allocated to innovation in wastewater treatment. The 2015/2016 drought has led to a focus on leak detection, and both national and local government are initiating projects in this area. Water pollution from sewage is also an emerging focus area. Most projects are at research phase or implementation.

Economic indicators

There is potential to scale-up many of the initiatives, which are still largely publicly-funded. The case for greater (and complementary) private sector investment in critical ecosystem services such as water has been articulated recently by both the South African National Biodiversity Institute (SANBI, 2014) and the Council for Scientific and Industrial Research (Audouin et al., 2015).

Environmental indicators

Key impacts of the water management projects are protection of water resources (catchment management), water saving and reduced nutrient load into water sources. These impacts were not quantified in the projects surveyed in the Inventory.

CASE STUDY | ENVIRO CHAMPS, MPOPHOMENI, KWAZULU-NATAL

Source: Mpophomeni Conservation Group, 2015

In the context of high unemployment, poor service delivery and a history of activism around social issues, local communities are increasingly mobilising on environmental issues. The Enviro Champs in Mpophomeni in the catchment of Midmar Dam, KZN, is one example of community mobilisation. With initial support from local NGOs and the UMgungundlovu District Municipality, community members have used citizen science tools to monitor and report on sewage manholes in their community that are discharging raw sewage.

20 community members, predominantly women and youth, currently monitor over 60 manholes. Four years ago, over 50% of the manholes were surcharging hundreds of litres of sewage into streams that flow into the Midmar Dam. Years of monitoring the manholes and local water quality and uploading this information to the Internet produced real results: as of January 2016, there were no discharging manholes. The Enviro Champs are currently funded by the EPWP to monitor sewage spills, water leaks, solid waste and a number of other environmental issues in their community. They also work with the national Department of Water and Sanitation, the UMgungundlovu District Municipality, municipal plumbers, the Mpophomeni municipality and Ward Councillors to ensure that a safe and healthy environment is maintained in Mpophomeni. Accredited education and training initiatives supported by local NGOs have enabled the Enviro Champs to run environmental education programmes and street theatre in Mpophomeni.

This model is now supported in other areas across the country including Stellenbosch, Ceres, and Pongola. The Enviro Champs are active in supporting these emergent community initiatives. A key challenge is finding a sustainable funding mechanism for these community initiatives, such as payment for leak and spillage detection. This will require innovation in terms of reporting and low transaction costs for payment. Access to the internet and the use of cellphone technology makes the initiative quite feasible.

Social indicators

A growing number of very small initiatives modelled on the Enviro Champs/FLOW/Water Husslers are improving the quality of life in under-serviced urban areas. The potential to build this into an economic activity depends on lowered transaction costs and supporting community involvement with benefits. There seems to be huge involvement from both youth and women in such projects, often due to the voluntary and close-to-home nature of this work.

Cross-cutting themes

There is a close link between the water and resource management sectors due to the emphasis on catchment management as a response to water quality and quantity issues. A focus on the link between waste and water is also emerging, due to the poor functionality of South Africa's wastewater treatment plants. Finally, the link between energy and water (particularly wastewater) is evident, due to efforts to improve current technology and infrastructure to use methane gas produced at wastewater treatment plants. There is also potential for greater linkages between stormwater management and water saving initiatives.

Circular innovation

A number of initiatives in the wastewater sector have substantial potential for nutrient recovery. Johannesburg Water produces compost from wastewater sludge and waste wood from the tree-felling industry. Many of the identified initiatives were in the research phase and were not included in the data captured. This is an area with substantial potential for expansion.

Much of the work related to the links between wastewater and the circular economy are still at the research phase or are small pilot studies. Unfortunately, some of the more innovative work such as 'Genius of Space' (http://biomimicrysa.co.za/genius-of-space) is very poorly reported on beyond a description of the project. Therefore, it is difficult to assess its impact.

Conclusions

The majority of initiatives in the water sector overlap with RCM, SCP, agriculture and energy, since the availability of water is a critical input in these sectors. It is recommended that mechanisms for water pricing and investment models for catchment management (which are already underway) are prioritised, given the ongoing water crisis in the region. New and successful approaches to water conservation, local-level water management and sanitation that are currently available in South Africa should be up-scaled.

3.3 CROSS-CUTTING THEMES

The following themes were used to examine and understand some of the overarching impacts of identified initiatives in South Africa's green economy transition:

- **Governance and partnerships**
- **Trade**
- **Finance and investment**
- **Research**
- **Awareness**
- **Training**
- **Skills development**
- **Knowledge management**

Figure 7 provides a detailed overview of the distribution of these themes across each sector. Each puzzle piece represents the percentage of initiatives that incorporate the given theme. It shows that certain sectors have a thread of themes common to them, or that certain themes are pertinent to certain sectors. For example, finance and investment is, perhaps obviously, the most common theme, as funding is generally directed to set-up and/or trial innovations or businesses to implement an initiative. The seed investment acts as a catalyst for bringing an idea or large-scale project to commercial realisation.

Awareness was identified in all sectors, but particularly in the transport sector, which is likely due to the emphasis of these initiatives in encouraging behavioural changes including the use of alternatives to private cars.

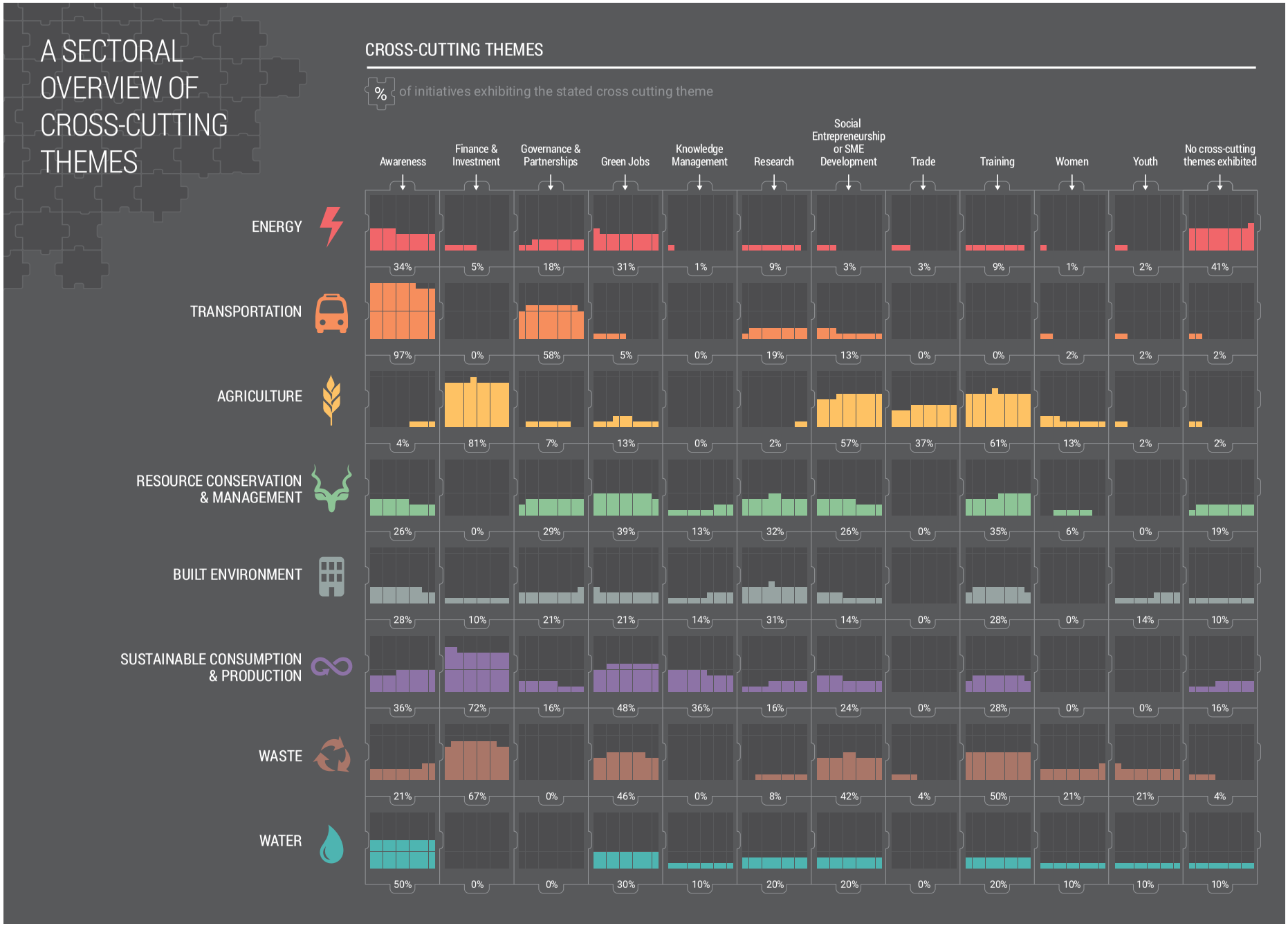
Trade was identified as a key theme in the agricultural sector, notably for initiatives that focus on export-oriented agro-processing, where getting products to market is a primary goal.

Skills development through training mechanisms was identified as a key cross-cutting theme in all sectors. Improved business skills can help ensure sustainability of initiatives post-funding, and improved technical skills can help to ensure that users or employers have a good understanding about maintenance and operations. While training was not a focus of the GEISA, it would be useful to better understand who is offering training, how to enhance training, how green skills could be integrated into other initiatives to improve South Africa's skills set, and to complement current research. This is an important area that requires further assessment, as there is a strong sense that the skills development component of green economy work is often neglected. Having an increased green skills pool will enable South Africa to proactively implement and up-scale green economy initiatives.

The gaps, made visible by Figure 7, are also of interest, particularly the dearth of initiatives which focus on women and youth. Given the scale of the energy sector, there are several gaps regarding its impact on cross-cutting themes, and further research is needed to capture data across all of the green economy criteria. Additional research is needed to determine whether these are real gaps or whether the information is not publicly available.

As part of the data gathering process, each initiative was also assessed against a number of criteria across broad green economy indicators. These included environmental and social benefits emerging from the investments, jobs created; finance generated, project scalability and longevity, and circular innovation.

FIGURE 7 | A SECTORAL OVERVIEW OF THE CROSS-CUTTING THEMES



What was abundantly clear from this exercise was the general lack of information about the number of jobs created and about the general social and environmental benefits of green economy initiatives. This does not imply that the information does not exist; rather it suggests that initiatives do not necessarily report their broader impacts in the public domain. This points to the need to design research monitoring, evaluation and learning (RMEL) processes that enable initiatives to identify and report on the multiple returns of green investments, particularly the social and environmental benefits, in order to provide evidence that will support the case for additional investments into greening economic sectors.

Section 3.4 below includes insights from the interviews and from literature recommended by the interviewees, and complements the findings of the sectoral analysis. The Appendix provides more detail on the research approach, including the interview questions and list of people interviewed.

3.4 STAKEHOLDER INSIGHTS

3.4.1. DEFINITIONS AND CRITERIA

The issue of definitions and criteria came up repeatedly in interviews and was a recurring point of engagement between partners. As mentioned, this review worked with a definition of 'green economy' that closely aligns with UNEP's idea of a 'low carbon, resource efficient and socially inclusive' economy. In 2010, the South African Green Economy Summit defined the green economy as a 'low carbon, resource efficient and pro-employment' economy – the emphasis on employment and jobs reflects a focus on the high and persistent unemployment levels in South Africa. This definition is concise, easily communicated and understood, and conveys the central importance of socio-economic factors to the green economy transition in South Africa. As such, it was a useful way of introducing the focus of the GEISA to interviewees and for setting the criteria for the data searches, which had a strong emphasis on direct job creation. It is recommended that the concept of pro-employment is broadened to include indirect contributions to employment and job creation, such as skills development and research.

Despite the usefulness of the above definition for the green economy scoping exercise, it neglects many important issues. Many interviewees stated that these neglected issues has resulted in tension in green economy discussions in South Africa and internationally. Interview participants described the definition as, on the one hand, 'fluffy', 'catch-all', 'a wish list' and on the other as 'eco-centric' and 'divisive'. In some instances, these responses seemed more focused on the term 'green economy' than the short definition given, but the underlying tensions were evident and shaped participants' responses.

A number of the interview participants that were familiar with green economy discussions noted that the work, Green Economy Discourse in South Africa, by Carl Death (2014) provided useful insights for navigating the issues surrounding green economy definitions in South Africa. Death identifies four main discourses of the green economy:

- **Green revolution** – radical transformation of economic (and hence social and political) relationships to bring them in line with natural ecological limits
- **Green transformation** – a re-alignment of current socio-economic and political systems while leaving the basic elements and assumptions of economic growth intact

- **Green growth** – sees green markets as an economic opportunity thus dismissing the notion of limits and focusing on new markets, new services, and new forms of consumption
- **Green resilience** – aims at protecting the status quo and places an emphasis on building infrastructure and communities that are resilient to climate change (flood defences, disaster relief plans) rather than addressing underlying environmental issues

"It is possible to identify each of these discourses to some degree within South African invocations of the green economy, but it is impossible to clearly identify a homogenous 'South African' position given the different agendas, actors, and emphases involved" (Death, 2014). The implication of lack of clarity in terms of definition is that South Africa is a recognised leader in the green economy while having one of the worst ranking environmental performance records. (Yale Environmental Performance Index, as cited in Death, 2014). As Death notes, the risk is that despite the frequent use of the green economy rhetoric, "the overall commitment is rather shallow and incoherent, and it poses little potential to drive sustained economic growth let alone genuinely transform the South African development model."

In addition to the discourses mentioned above, other commentators have noted the importance of recognising a 'green jobs' discourse in South Africa (Swilling et al., 2016).

Perhaps due to the lack of conceptual clarity, there is a growing sense that the focus on 'green economy' will detract from a focus on pressing social and economic issues, and could be divisive and alienating in South Africa. This position is strongly articulated in the report, The Power of Collective Action in Green Economy Planning: It's the economy, stupid (Nicholls et al., 2016), which makes the point that terms like the green economy (environmentalists), inclusive economy (human rights specialists) and circular economy (engineers) are all "…trying to communicate the same simple idea – the economy that we have is not necessarily the one that we want. In reality there is only one economy and we cannot have a meaningful conversation about the economy if we divide it into narrow chunks." The limit of this approach is that it seems to separate the economy from the society in which it operates and the planet in which we live.

This all goes to show that there is a real lack of clarity in the collective discussion on the green economy at present, and calls the usefulness of a catch-all phrase into question. A more holistic and integrated framework and language for conveying the country's ambition needs to be developed. This is not to imply that consensus needs to be reached. In fact, interviewees noted that by waiting for consensus to be reached, many opportunities for action and positive engagement among stakeholders and across sectors would be missed. More importantly, it appears that what is needed is a framework for acknowledging multiple perspectives and understanding what informs these perspectives. It will then be possible to develop ways of working on joint initiatives based on common principles or aspirations, grounded in shared risk or opportunity and reflective of stakeholders' skills and experience.

One suggestion that seemed to provide a useful starting point was to make the links between the green economy and the Sustainable Development Goals (SDGs) more explicit, and to highlight how different green economy initiatives contribute to the SDGs.

In the ongoing development of the GEISA, interview participants suggested that it would be useful to broaden the definition and thus open up the criteria.

3.4.2. LIGHTHOUSE PROJECTS AND SUGGESTED AREAS OF FOCUS

In the interviews, participants were asked what they considered 'stand out' or lighthouse initiatives in the green economy landscape of South Africa. The REIPPPP was mentioned by a number of interviewees (see Section 1.3 for a more detailed description of this initiative). However, many smaller initiatives were also considered to be outstanding for their innovation and relevance. Some of these initiatives tended to reflect emerging priorities such as the water crisis or the aspiration and need to find ways of working across sectors. This cross-sectoral work was referred to by a number of interview participants as "nexus projects". These insights are explored in more depth in this section.

The REIPPPP was noted by many interviews as a very significant case study that needs to be better understood as a model for green economy expansion in South Africa. Since this project has already been mentioned in this report, no further detail will be provided here. Interview participants also identified a number of aspects of the REIPPPP that needed to be better understood and adapted for other sectors, including policy reform, regulatory change, financial mechanisms and crisis response, in order to scale up the work in other green economy priority sectors.

An innovative initiative that was not captured in the Inventory and that was mentioned as by interviewees was the Bulungula Lodge initiative in the tourism sector. This kind of initiative has strong social and environmental attributes and seems to succeed because of the link to highly skilled and influential individuals in local communities, and the ability to develop locally while based on nationally-connected initiatives. Other small-scale initiatives such as tea production by community groups and deriving value from local resources such as baobab trees were mentioned in a similar spirit.

Off-grid renewable energy, including the uptake of Photovoltaic cells (PV) by residential and commercial sectors, was mentioned by a number of interviewees with the V&A Waterfront cited as a prominent example. Reduced production costs was mentioned as a key driver for the expansion of this area.

The industrial symbiosis initiatives currently under implementation in the provinces of Gauteng, KZN and the Western Cape were considered to merit greater attention, given their potential within the green economy space. Also mentioned was the introduction of green manufacturing to large businesses, such as Coca Cola and South African Breweries, who sought to offset their environmental impacts (particularly water consumption). Participants felt that studies that build the business case for such initiatives would provide an incentive for more businesses to follow suit.

Finally, the Biodiversity and Wine Initiative in the South African wine industry was mentioned, along with the importance of developing a label to signify the positive biodiversity impacts of this initiative to potential consumers.

Interviewees also noted that many exciting green initiatives operate across more than one sector. One example is the nexus between water and energy. As water availability diminishes due to drought and use, concentration of pollutants increases. This is exacerbated by the fact that the vast majority of the wastewater treatment works in South Africa are still categorised as medium- to high-risk – and 25% are considered critical risk, which means the plant is approaching its critical state of operation and therefore requires intervention (DWS, 2014). In parallel, wastewater treatment works have to invest between 22% and 60% of their operating costs to purchase energy (Scheepers & van der Merwe-Botha, 2012; interview data). One interviewee mentioned an innovative solution: use the sewage from wastewater treatment plants in biogas electricity systems. This will require collaboration across the water and energy sectors; and can provide insights about the types of support that nexus initiatives need.

The Bio2Watt experience (referenced as a case study in Section 3.2.7) shows that regulations related to cross-sector collaborations require some attention. For instance, energy regulations contributed to a five-year delay in construction and operations because energy from biogas production was not able to feed into the national grid. Many interview participants mentioned the importance of these cross-sectoral initiatives as sites for innovation, learning and change (particularly as related to policy, regulations, financial models, skills shortages, technological bottlenecks and more). It may make more sense to scale up outstanding projects instead of simultaneously developing a range of initiatives. That way, projects can build on existing good practice and avoid similar issues or delays across multiple sites.

3.4.3. SYSTEM CHANGE FOR A GREEN ECONOMY TRANSITION

Information obtained through interviews showed that a number of areas require systemic change in order to support the agenda of a green economy transition. Some of these changes were noticeably absent, despite a number of pilot studies; others were evident as innovations in particular initiatives. This review clusters these insights into four areas: finance, integration, information, and socio-economic considerations.

3.4.3.1. FINANCE

The REIPPPP highlighted the importance of creating new financial models for energy pricing and guarantees in the form of feed-in tariffs and long-term government commitment to the growth of the renewable energy market. Although there are still gaps in this framework, it has played an important role in giving investors the confidence to assess risk and rewards based on a longer-term perspective. This has opened up new partnerships and financing agreements to support renewable energy. The lack of similar mechanisms in other sectors, such as the recycling sector for instance, has exposed many businesses to substantial risk and has stifled sector development.

Another area requiring systemic change is ecosystem valuation in the context of economic development. For too long, companies have been able to exploit ecosystem services without paying a price that reflects the true costs of these resources. For example, most companies use water resources without being required to make substantial investments in catchment maintenance to ensure ongoing water availability. At present, government invests heavily in in maintaining and rehabilitating ecosystem services through initiatives such as the 'Working for…' programmes; these programmes need to find a way to convert short-term work opportunities into long-term jobs. This systematic shift will require a substantial focus on financial mechanisms, such as payment for ecosystem services, and other incentives to stimulate greater public and private sector investment in ecological infrastructure.

Some of the interviewees mentioned the need for new financing models, such as support for green start-ups that provide mentor guidance, protection against market volatility, preferential interest rates, etc., and that social and environmental costs and benefits, need to be reflected in valuation. This will require longer timescales for payback periods and more sophisticated full-cost accounting practices.

Finally, it is important to note that the insurance industry is a partner in a number of green economy initiatives and is doing a substantial amount of work related to risk and risk mitigation from a financial perspective. This industry would thus be an important partner in creating systemic change in the financial sector.

3.4.3.2. CROSS-SECTORAL LINKAGES

Sectoral integration is relevant to many existing and emerging green initiatives. In interviews, sectoral experts and experts working in cross-cutting thematic areas such as research (trans-disciplinary and cross-sectoral research), education (trans-disciplinary learning) and policy making (cross-sectoral policy and integrated planning frameworks) continually mentioned cross-sectoral collaboration. Many interviewees mentioned the importance of integrating systems thinking into siloed disciplines, and working to identify key levers or influence points within systems. Existing and potential ("dream") strategic projects to support sectoral integration were discussed by interviewees. Examples such as the Tshwane Food and Energy initiative and emerging industrial symbiosis initiatives provide potential areas for learning about and up-scaling sectoral integration.

Policy was identified as a key area to support sectoral integration and a systems approach. As noted, a total of 32 national or provincial level frameworks, strategies, policies or Acts support or enshrine sustainability and/or the green economy in South Africa. These policies, while creating an enabling framework for the green economy transition, have also created obstacles and complexity that can hinder the green economy transition (e.g. the Bio2Watt experience, mentioned in section 3.7.2, where energy sector regulations caused a five-year delay in project realisation). Addressing the issue of policy coherence will require multi-stakeholder engagement on policy. It is recommended that such policy engagement be supported in future initiatives.

3.4.3.3. CERTIFICATION AND INFORMATION

Many interviewees wanted to know how to distinguish between real green initiatives and greenwashing. This was a major barrier for companies that wanted to support a reduction in GHG emissions, resource efficiency and pro-employment product development, but were unable to recoup their investment through competitive advantage, differentiation and price premiums on environmentally and socially responsible products. At the same time, supply chain managers need to spend substantial time and resources to identify green products or production inputs to integrate into their supply chains; this points to a lack of easily accessible information and application of recognised standards.

Quality assurance standards, such as those issued by the International Organisation for Standardisation (e.g. ISO 14001) and the South African Bureau of Standards, set international and national benchmarks for environmental management systems; the Forestry Stewardship Council (FSC) provides industry standards, and initiatives such as the Good Guide (www.goodguide.com) provide product-level environmental and social information to guide decision making.

Transparency laws, which could potentially make disclosure of the social and environmental performance of a building compulsory at the time of sale available, was identified as another tool to support transitions to greener economies. One interviewee gave the example of Australia, where sellers need to tell buyers how much water and energy their property requires to operate and advertise this information when selling the property.

3.4.3.4. SOCIO-ECONOMIC CONSIDERATIONS

For the purposes of this analysis, the main difference between UNEP and South Africa's definition of the Green Economy is the emphasis on 'social inclusivity' and 'pro-employment' in the latter. On this front, it is important to note that a focus on formal employment within the formal economy could undermine some very significant initiatives in the green economy and further marginalise poor communities. For example, the EPWP programmes aim to enhance the livelihoods and quality of life of the resource poor in South Africa – a focus on formal jobs undermines both the legitimacy and social benefits of these green initiatives. If the economy is understood as the distribution of resources, then the distribution of environmental goods outside of the formal economy also requires attention, and the contribution that functioning ecosystems make to rural livelihoods needs to be factored into the broader discussion on green economy in South Africa.

More focus also needs to be placed on creating entrepreneurship opportunities (even if they are informal) that contribute to a green economy. At the same time, campaigns can help to change consumer habits and preferences so that they support sustainable consumption and behaviour patterns.

While the procurement policy of the South African government has a strong redistributive goal, skills for greening public procurement requires national-level attention. This will have to be carefully balanced against the transformative focus on public procurement policies.

Insights from the data, interviews and stakeholder feedback suggest that, in addition to an inventory of initiatives that illustrates the extent of green economy activity across the country, a more detailed study is required to track the on-going integration of green economy principles into the economy. Further research could complement the insights from the GEISA, which has begun to illustrate how green investments can help make significant inroads into greening the South African economy.

4 SUMMARY OF FINDINGS AND RECOMMENDATIONS

The Green Economy Inventory of South Africa (GEISA) presents an overview of the initiatives across sectors that are driving South Africa's transition to a resource efficient and low-carbon economy, drawing insights about opportunities and how to prioritise future green investments. It cannot fully capture the richness and diversity of actions taken towards South Africa's transition to a green economy, but it does establish a knowledge base for improved collaboration, coordination, policy development and implementation.

The overview resonates with the conclusions made in the South Africa Green Economy Modelling (SAGEM) report (UNEP 2013), which clearly states that green economy investment interventions have positive impacts on the main indicators representing the transition of South Africa to a green economy.

4.1. KEY FINDINGS

South Africa's transition to a greener economy is articulated in the National Development Plan inclusive of a series of frameworks, strategies, policies and Acts that are oriented toward sustainability or greening the economy. A total of 32 green economy-related policies and strategies were identified through the GEISA review process, indicating the need for policy alignment and coherence to achieve the respective intended policy outcomes.

The Inventory has shown widespread and growing activity in its initial survey of the green economy landscape; it identified approximately 1,000 green initiatives across all provinces and in all sectors. This is a clear signal that South Africa is actively transitioning toward a low-carbon and climate resilient green economy with a range of economic, social and environmental benefits.

The initiatives selected for deeper examination showed that energy, transport and agriculture are playing a leading role in South Africa's green economy, echoing the prioritisation of these sectors in the SAGEM (UNEP, 2013). The built environment, resource conservation and management and waste sectors, respectively, showed growth potential. Investment in water is spotlighted as an area of critical importance given the current drought and future scenarios of food and water security in semi-arid South Africa.

The larger part of the surveyed green economy initiatives are funded domestically, with 27% of initiatives funded from international sources. Of the domestically-funded initiatives, 80% were funded from public finance sources. This highlights the role of targeted public finance as a catalyst for investment in greening economic sectors. While acknowledging the systemic and transformative change in key sectors to be achieved through public finance investment, it is of paramount important to scale-up the blending of public with private finance in order to realise sectoral transformations at the scale needed to advance South Africa's green economy.

The geographical disparity highlighted in the Inventory demonstrates that, while endowments of the different provinces impact on the extent of green economy activity, in most provinces, all sectors are represented. A total of 60% of the initiatives are located in the highly-urbanised provinces of Gauteng, Western Cape and KwaZulu Natal (KZN), where sub-national action, at provincial and local government, is flourishing. These provinces also played a lead in the development of provincial green economy strategies, which have now been developed for seven of the nine provinces in South Africa. Green economy activities, which were identified in all the nine provinces, are likely to increase as more provinces begin to implement their provincial green economy strategies.

Initiatives are being implemented by a large number of development partners from public, private and civil society. 41% of surveyed initiatives demonstrated the importance of the role of partnerships in green economy initiatives. The scale of initiatives and variety of agendas result in a wide and diverse range of project partners that operate horizontally and vertically throughout the country.

Discussions with key stakeholders show that there is need to engage further on the definition of the green economy and the underlying conceptual frameworks to inform the roles of different stakeholders. While social dialogue is critical to defining the path to an inclusive and sustainable green economy, the lack of conceptual clarity on what constitutes a green economy has not impeded green activity in South Africa. On the contrary, initiatives that meet various social, environmental and economic outcomes are being implemented under the rubric of the country's policy vision for low-carbon development and circular economy.

South Africa's development challenges, characterised by persistent poverty and inequality, high levels of unemployment, and energy and water insecurity, can be addressed through a just transition to a "low-carbon, resource-efficient and pro-employment development path". This vision of greening the South African economy, embraced by social partners, requires commitment, resources and, in most instances, a paradigm shift from business-as-usual to innovative solutions that deliver multiple outcomes. The GEISA shows that South Africa's transition to a green economy is well underway, and that the country is working towards its target of planning, piloting and investing in the creation of a framework to achieve an environmentally sustainable, climate resilient and low-carbon economy.

4.2. SECTOR-SPECIFIC FINDINGS

The following sectoral recommendations, grouped according to the eight thematic areas outlined in the National Strategy for Sustainable Development and Action Plan (DEA, 2011), are based on the high-level insights drawn from the GEISA. These insights can help build a more solid understanding of key trends, characteristics, information and policy gaps and opportunities in each sector. For each sector, suggestions for further action are made.

Energy | Given South Africa's heavy reliance on coal, this sector will require an ongoing shift towards renewable energy to meet the commitments to reduce national greenhouse gas (GHG) emissions. The REIPPPP has had a significant impact on greening the energy sector in South Africa; it is suggested that a careful analysis of success factors is conducted and insights are communicated to other sectors, where appropriate. Expansion of solar power initiatives has the potential to boost the green economy efforts of Northern Cape, which, amongst the provinces, registered the least number of green economy initiatives. The renewable projects identified in this review tended to have a high technology, centralised energy-generation focus (hydrogen-fuel cells, solar and wind energy). Greater support is needed for decentralised renewable energy generation in residential and commercial sectors, prioritising areas that do not have access to electricity. SAGEM notes that energy sector investments are focused on supply (particularly, on diversifying the energy supply). Improved energy efficiency in other sectors including transport, industry, residential, agriculture and commerce, can significantly decrease energy demand. This is discussed in Sustainable Consumption and Production.

Transport and Infrastructure | Bus Rapid Transit initiatives are receiving substantial amounts of funding and are linked to large-scale transport planning at national and municipal levels. A number of projects that address non-motorised transport were identified; it is recommended that support in this sector focus on greater integration of non-motorised transport into spatial planning, to ensure that walking and cycling are safe and appealing alternatives to more costly and environmentally harmful modes of transport. Mindset and behaviour change is an important part of the shifts towards greener modes of transport, and, more broadly, environmentally-sustainable lifestyle choices. This sector also has a high level of small and medium-sized enterprise development (e.g. car sharing and ride-hailing services). These should be reviewed and further supported by creating an enabling environment for SMMEs that provide eco-mobility solutions. Green investment in the transport sector should also be aimed at improving energy efficiency, which could lead to reduced energy consumption.

Agriculture, food production, fisheries and forestry | This sector has a huge potential to create direct jobs, when compared to other sectors included in the Inventory. Many of the initiatives in this sector are located in KZN and Eastern Cape. Given the high levels of poverty in the two provinces and the rural nature of the populations, it is recommended that continued

support for labour-intensive sustainable agriculture is a key area for green investments. Investments in this sector could be directed to, for example, the use of organic fertilizer, which will reduce CO2 emissions. Water stress continues to be a serious issue for crop yield, and population growth and rapid urbanisation impact agricultural land availability (SAGEM, 2013). Innovative integrated systems that link the food, energy, waste and water components of agriculture and best practices should be shared widely for better implementation of sustainable agriculture.

Resource conservation and management | Sustainable management of natural resources is critically important for a biodiversity-rich but water-stressed country like South Africa. The country has a legacy and well-established network of protected areas; the rationale for new investments for protecting, restoring and maintaining critical ecosystems beyond protected areas is beginning to proliferate. The Expanded Public Works Programme's (EPWP) "Working for…" programmes have significantly improved land and water quality and quantity through ecological infrastructure maintenance and rehabilitation programmes, notably through initiatives in the Environment and Culture sector. The EPWP, one of the most globally recognized public employment creation programmes, is largely funded by South Africa's national government but has also leveraged substantial international environmental funding. Employment in this sector exists in water ecosystem service restoration (through the removal of alien plant species) and in biomass energy (this needs to be further explored and strategically linked to emerging global environment and climate funding mechanisms, particularly those related to climate change adaptation). Policy and financial structures are required to operationalize and up-scale private investments in ecosystem services. GEISA showed that there are substantial innovations for carbon capture through ecosystem restoration projects, but there are complex barriers to implementation including the stringent monitoring, reporting and verification requirements required to access (primarily international) funding. Concretely, a focus is needed on both improving water supply and gains that can be achieved through systematic investment in this sector.

Buildings and the built environment | South Africa was recently identified as global leader in green buildings; growth in the country's green building sector is 41%, compared to a global average of 37%. A variety of municipal and provincial level initiatives were identified in this sector, illustrating the leading role that South Africa is playing in greening the built environment. The Green Building Council of South Africa (GBCSA) and industry partners have spearheaded green building initiatives. Though the initial focus was on commercial buildings, increasing investment is now being directed towards green residential property development and public buildings. In the delivery of social housing, there is also an opportunity to implement green building design principles, building on the environmental guidelines for low-income housing. Innovation in the residential property market could also be stimulated by legislative measures which make the measurement and disclosure of a building's water and energy efficiencies compulsory prior to sale. Enforcement will be key to ensuring that legislation is effective (as observed with the SANS 10400-XA energy efficiency in buildings legislation). It is recommended that different levels of government harness the country's private sector, NGO, and academic expertise in the built environment to share and expand on the novel ideas and initiatives that exist in the sector.

Sustainable consumption and production (SCP) | Activities in this area have, thus far, largely focused on energy efficiency. This is most likely driven by increases in energy costs and voluntary carbon disclosure programmes in the private sector. SCP initiatives were shown to be mostly domestically funded. SCP initiatives may be significantly under-represented in this Inventory, as private sector resource efficiency initiatives are not always reported. The efforts of the Private Sector Energy Efficiency Programme (PSEE) and the National Cleaner

Production Centre - South Africa (NCPC-SA) provide insights into the spread and uptake of energy efficiency, and both these institutions play a key role in SCP activities. Limited financial support to implement energy efficiency measures exists in both in the private and public sector, and it has been noted that access to finance is key to change in this area. Emerging concepts such as the circular economy, which is being implemented through industrial symbiosis programmes, have substantial potential for further development. Given the ongoing drought and its impact on the quality and quantity of water resources, it is likely that resource efficiencies in the water sector will become a key focus area for SCP activities.

Sustainable waste management practices | The waste sector has immense potential to create work opportunities across the value chain, and several of the initiatives which were identified in the Inventory focus on employment creation in addition to the reduction of GHG emissions. There is a significant focus on employment creation through recycling, which is significant given that fact that approximately 90% of waste in South Africa is landfilled. Given the often hazardous working conditions and high level of informality, priority efforts should be made to ensure the quality of the jobs. Opportunities for decent work in sustainable waste management need to be maximised by strengthening activities along the entire value chain, from recovery at source to waste beneficiation. Waste-to-energy is an increasingly important component; municipalities in South Africa have started incorporating innovative strategies and initiatives to decrease the amount of waste that ends up in the landfills. Initiatives in the waste management sector will require ongoing support and protection from market variability. Initiatives that have demonstrated the substantial social, environmental and economic value in redirecting waste streams for productive use should be more prominently showcased.

Water management | This sector has a large overlap with the resource conservation management, SCP, agriculture and energy. Mechanisms for investing in catchment, management and ecological infrastructure initiatives in the sector that deliver valuable social services such as climate regulation, soil formation and disaster risk reduction should be investigated. Water is largely under-priced in South Africa; the water pricing structure in the country is currently under review. This sector has high potential for taking existing research (including sanitation innovations) to scale. South Africa's categorisation as a semi-arid country, as well as the ongoing drought, also provides an opportunity to develop innovative models and solutions to improve efficient water use, including local-level initiatives where communities play a role in monitoring, reporting and repairing wastewater spillages and potable water leaks.

Although the energy, agriculture and transport sectors play a leading role, notably through investments in the solar and bio-energy, farming and non-motorised transport planning sub-sectors respectively, the GEISA identified key green growth areas within each of the eight surveyed sectors. The knowledge base developed on each sector and sub-sector can be considerably expanded. The Inventory is an initial step towards mapping and tracking of South Africa's green economy initiatives; the resulting knowledge base should be continually maintained and expanded.

4.3. KEY POLICY MESSAGES

South Africa's commitment to greening the economy is expressed in both the policy vision of the country and is demonstrated by the level of green activity observed in the GEISA. In light of the country's recent ratification of the Paris Agreement and adoption of the 2030 Agenda on Sustainable Development, South Africa has embraced the view that economies and societies can advance while reducing their adverse impact on ecological systems. In implementing its commitment to these agreements, the country will have to broaden and upscale investments to green its economy.

The GEISA provides the basis for the following policy recommendations for sectoral transformation and other systemic changes that could support the expansion of green economy activities:

1. GEISA reveals that South Africa has over 32 green economy related policies and strategies.

   Recommendation: Better streamlining and coordination would attract additional investment in green economy sectors and initiatives and effectively transition South Africa to a green economy.

2. The potential to green South Africa's economy exists in all provinces and all sectors surveyed. Key sectors are driving the transition to a green economy but there are concrete opportunities to invest in greening of all economic sectors.

   Recommendation: Green economy investments at sub-national level should be aligned with priorities identified in provincial green economy strategies.

3. A green economy creates jobs. According to GEISA, agriculture, food production, fisheries and forestry have the highest potential to create direct jobs.

   Recommendation: Increase investment in agriculture, food production, fisheries and forestry and allocate additional investment towards resource conservation and management and sustainable waste management, as these sectors can also deliver jobs, as well as substantial social and environmental benefits.

4. A green economy contributes to the reduction of GHG emissions.

   Recommendation: Maximize synergies for lowering emissions through combined interventions in the energy sector to improve energy efficiency, integrate renewable energy power supply mix, and through other low-carbon scenarios in relevant sectors, notably the transport and the built environment.

5. Technological innovation towards low-carbon and resource-efficient technologies has had significant uptake in South Africa.

   Recommendation: While the availability of clean technology is a key driver for green economy transitions globally, South Africa should invest in localising the production and manufacturing of clean technologies.

6. Public finance is playing a leading role in catalysing investment targeted at supporting key transitions in, for instance, renewable energy, green industries and sustainable transport.

   Recommendation: Access to private capital, as well as to international environmental and climate finance will have to be considerably up-scaled to enable investment in the economy-wide transition.

7. Partnerships and collaborative design and implementation have been essential to the actions taken by a wide range of national and global public, private and civil society stakeholders to support South Africa's green economy transition.

Recommendation: The shared value in the implementation of South Africa's green economy policy vision and strategies should be deepened to further harness partnerships in taking green investments to scale.

4.4. STRATEGIC AREAS OF INTERVENTION

Drawing on the policy recommendations, action is also required in the following cross-cutting areas of strategic intervention:

Promote Knowledge Management and Sharing | GEISA revealed that a wealth of information on green economy policies, reports and initiatives does exist but not in a centralised, accessible repository. A consolidated information database could be very useful to support informed decision-making, policy coherence, project planning, cross-sectoral initiatives, advocacy and more. A mechanism for cataloguing South Africa's green policies, frameworks and initiatives (including stakeholder-led planning and implementation processes), sharing knowledge, good practices and tools, introducing learning opportunities and highlighting key practitioners' and stakeholder activities is recommended. Such an effort would contribute to further building the case for South Africa's green economy transition. It would also strengthen cooperation and coordination among green economy policy, planning and implementation processes and the multitude of stakeholders.

Design Research, Monitoring, Evaluation and Learning (RMEL) systems | Tracking the progress of South Africa's transition to a greener economy was a key objective of the GEISA. Although the Inventory was able to capture a significant amount of green economic activities in the country, the lack of available high-quality data on progress was a major challenge – in particular data on tangible social and environmental benefits delivered by green economy initiatives such as job creation, enterprises development, and improved biodiversity or reduced CO2 emissions. The 2030 Sustainable Development Goals' targets and indicators can potentially provide a framework for an RMEL system that helps to monitor and evaluate the performance of South Africa's green initiatives, and to improve planning and decision-making for sustainable development. Multi-stakeholder participation is key to green economy initiatives and transitions, so RMELs have to be designed in collaboration with government and social partners, and applied uniformly.

Foster social dialogue and multi-stakeholder collaboration | Action is required to provide a space for and facilitate a productive social dialogue and collaboration between actual and potential stakeholders. The GEISA showed that multi-stakeholder partnerships and active collaborations are essential to green initiatives and transitions, and are required along the entire value chain of green initiatives, from policy formulation to research and development, funding, capacity development, coordination, implementation, and monitoring and reporting. Government has played a key role in creating an enabling policy environment for green economy transitions in South Africa, but further discussion about the profound transformation of (still) dominant modes of production and consumption requires greater engagement with social partners through social dialogue mechanisms such as consultations, negotiations, and/or knowledge-sharing forums. Ongoing engagement with stakeholders will help to define challenges from multiple perspectives and co-create innovative solutions needed in sustainability transitions.

Stimulate cross-sectoral or nexus initiatives | The importance of working across sectors was emphasised by many of the stakeholders and was key to several initiatives. Stimulating cross-sectoral or nexus projects required support for innovative projects that enable and enhance collaboration between sectors; multi-stakeholder forums and innovation hubs where representatives of different sectors can convene to develop cross-sectoral initiatives; multi- and trans-disciplinary research, and integration across sectoral policy frameworks. Lessons need to be drawn from existing nexus initiatives (such as the ongoing waste-to-energy case studies included in the GEISA) to identify the challenges specific to nexus projects and programmes, including regulatory complexity.

Strengthen and expand finance partnerships | The GEISA shows that public finance (including municipal-level support) has been a major catalyst in kick-starting green economy investments and generating private sector interest in green investment. It also shows that public investments can be made to align with the national green economy agenda and priorities and that more private investment in green initiatives is required. Global climate and environmental funds (such as the Green Climate Fund) should be harnessed to complement and enhance domestic financial investment. South Africa's emerging renewable energy market (one of the fastest growing markets globally) offers key lessons on green financing that can inform and support transitions in other sectors.

Implement a Just Transition | Social inclusivity and equity has to be central to the design to implementation of green economy interventions. The country's National Development Plan (NDP) is unequivocally committed to a green economy transition that is just, ethical, sustainable and socially-inclusive; South Africa's policy framework aims to deliver an equitable transition wherein the poor and vulnerable are protected, and access to opportunities is available to all. The NDP lays out a set of principles to guide the country's transition to an environmentally sustainable low-carbon economy – from policy to process and action – to address the triple challenges of poverty, inequality and unemployment. It prompts questions that should be central to the design and implementation of green economy initiatives and transitions, including: Are the jobs created green and decent? Is gender inclusivity addressed? Which sectors could deliver the greatest social and environmental benefits?

Build skills and capacities | Skills development and training are relevant to initiatives identified in GEISA and are reported on in the sectoral analysis. The early identification, updating and upgrading (in terms of both re-skilling and up-skilling) the skills that are needed for green transitions are critical to harnessing the full employment-creation benefits of green transformations. Skills development – including business management and technical skills – should be an integral component in project and programme design and delivery. Anticipation and in-depth analysis of skills development and training requirements of green economy transition are needed both for new skills development and upgrading existing skills sets. Having a larger pool of green-skilled workers will enable South Africa to become more proactive in implementing and identifying green economy initiatives.

Support job creation | Job creation is key to a successful green transition in South Africa. The country's green economy vision is 'pro-employment' and the concept of green jobs has recently gained traction and featured prominently in sectoral and macro-economic policy objectives. GEISA indicates that the agriculture sector provided the highest number of jobs, followed by the resource conservation and management and waste sectors. One of the most challenging aspects in collecting the data for the GEISA was the lack of general employment data and, particularly, the lack of data related to green jobs. While South Africa has adopted the ILO's definition of green jobs, its labour market surveys do not consistently apply a single approach towards enumerating green jobs, but use multiple methodologies and terminolo-

gies to report on job creation. Therefore standardisation of green jobs measurement and reporting is recommended. Besides, it is recommended that the definition of pro-employment should be broadened to include the informal sector's contribution to greening the South African economy.

4.5. CONCLUSIONS

South Africa is making good progress in its transition to a low-carbon and green economy. It is lauded globally for its policy commitment to transition towards a greener economy and has made significant advances in developing an enabling national policy framework. Domestic and international funding has backed investments in a range of sectors, and projects and programmes across South Africa have been initiated to green the economy.

The political momentum that characterised the period 2010-2014 has escalated in 2015-2016 with the country's ratification of the Paris Agreement and adoption of the SDGs as part of the 2030 Agenda for Sustainable Development. Indeed, this implies that existing green economy activities and investment must be expanded and up-scaled considerably.

The GEISA presents a high-level inventory of green economy initiatives across sectors, institutions and services. The overview conclusively illustrates that the country has taken notable steps in transitioning towards a greener economy. The insights of the GEISA could be instrumental in providing guidance of the ways that national targets set under the SDGs and NDCs could be met effectively.

The transition should be inclusive, fair and just and must align with the country's efforts to address poverty, unemployment and inequality and to the integrated approaches which are embodied in the SDGs and the Paris Agreement.

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APPENDIX: RESEARCH METHODOLOGY

Overview of Research Approach: Rapid Evidence Assessment (REA)

Given the timescales and scope of this project (three months), the research was conducted using a Rapid Evidence Assessment (REA) method – a recognised systematic method for reviewing and assessing a broad and large range of information that maintains the rigour of a full systematic review. It is particularly appropriate for research that needs to meet the requirements of policymakers in a short space of time. The REA, and analysis of information (in conjunction with interviews), was undertaken using a research organisational framework – illustrated below.

The Rapid Evidence Assessment was undertaken over two phases over a 1.5 month process (during a three-month project) and involved initial identification of initiatives through a sifting process (Phase 1) and extraction of data (Phase 2).

Following a project kick-off meeting with the PAGE task team, the project research team met to clarify the requirements of the research, finalise criteria to assess initiatives, and allocate sectors for review and to identify initiatives. The purpose of the exercise was to trawl through sources and identify initiatives that comply with the criteria identified by the team, and guided by the PAGE task team and the original call to tender.

The following **selection criteria** were developed:

1. Contains a project or programme title
2. Names a funder (who provided the money/loan?) e.g. The Green Fund
3. Mentions other project partners
4. Provides a budget (how much money was allocated)
5. Falls within one of the sectors listed
6. Has a start date from 2010 onwards (and end date)
7. Mentions a geographical region
8. Mentions jobs created
9. Mentions environmental savings or e.g. energy created
10. Mentions social interventions e.g. improved skills capacity

An ideal initiative met all of or the majority of these criteria. This phase did not include extraction of information on the initiative; this was undertaken in Phase two.

The following process of identification and collation was followed:

1. Identify initiatives (projects and programmes – not policies) that relate to the researcher's allocated sector.
2. Trawl through sources:
    - Starting with the list provided by the National PAGE Coordinator
    - Using the researcher's knowledge of a sector, a search was undertaken through other appropriate sources. See Annexure 1 for other suggested sources
3. Identify initiatives that meet the criteria identified.

4. Once an initiative that met the criteria was identified, the following was recorded in an accompanying Excel spreadsheet:
    - Record the name of the initiative, the sector and a link to the source
    - Make a note in the comments column if you think the initiative is an example of good practice, or requires further information
    - Where possible, save copies of documents containing information for future reference
    - Initiatives or projects identified under a larger initiative (e.g. the Green Fund) were listed individually or a reference was made to the larger initiative containing numerous individual projects. During Phase 2, for information on the individual projects to be extracted (where appropriate)
    - Assumptions:
        - Reasons for non-selection of initiatives were provided and will be used to justify the non-selection of an initiative

The purpose of this exercise was to be rapid, moving through data sources quickly to identify a broad spread of projects, both geographical and sectoral, and identify both recognised and smaller projects that might not otherwise be known. Strong communication channels were formed between the researchers during this process, aiding each other with the clarification and selection of initiatives.

The list below provides a high-level overview of the number of initiatives identified per sector. The number of initiatives listed meets the research criteria.

Number of identified initiatives per sector

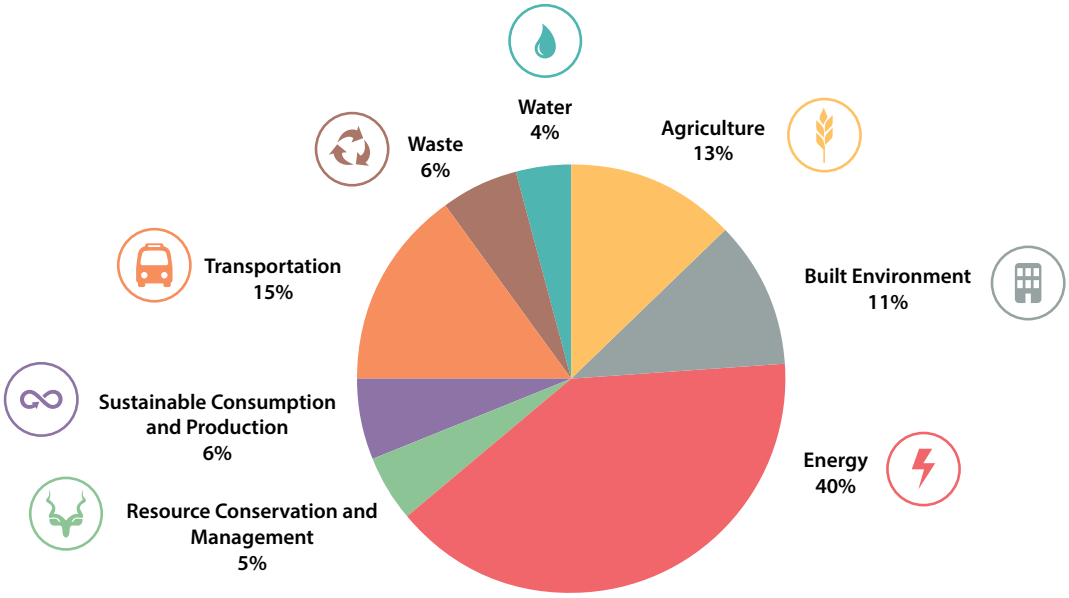
Sector	No. of initiatives identified (to date)*
Agriculture, food production, fisheries and forestry	70
Buildings and the built environment	70
Clean energy and energy efficiency	207
Resource conservation and management	29
Sustainable consumption and production	32
Transport infrastructure	96
Sustainable waste management practices	42
Water management	42

* This number was an initial assessment of initiatives identified in Phase 1. Throughout interviews and the extraction process in Phase 2 of the research, the initiatives identified in Phase 1 were refined and additional initiatives identified.

From approximately 1,000 initiatives scanned in this first phase of sifting, a total of 667 were found to meet the initial criteria for further assessment and analysis. This number was reduced in Phase 2 when each initiative was reviewed in more depth for data extraction (see below); those that did not fully meet the study purpose or lacked key data were excluded.

Phase 1: Initial Identification of Initiatives: A Sifting Process

TOTAL NUMBER OF INITIATIVES FOUND



Data sources used to identify initiatives included national media sources, donor and international agencies, key stakeholder organisations, and government departments.

Phase 2: Data extraction and analysis

The phase of work involved the extraction of data per initiative and sector, and input of this data into an Excel spreadsheet. The list below provides an overview of the types of data and information captured and presented in the final inventory per initiative:

1. **Initiative/project title**
2. **Funder/agency**, including country location of funder
3. **Project partners/actors**: To illustrate evidence of engagement and collaboration
4. **Budget**: How much (currency and amount to be split so total can be calculated)
5. **Date**: Project started and ended (if this is the case)
6. **Project status** e.g. in progress, completed
7. **Geographical location**: National, provincial, local (need to be able to name province(s)
8. **Sector** (as per the list)
9. **Cross-cutting themes**
10. **Economic**:
    - Jobs created (how many?)
    - Temporary vs permanent
    - Direct revenue generated (R)(if possible)
    - Evidence of the project financially self-sustaining
    - Post initial investment (longevity)
    - Evidence of SME development
    - Evidence of local procurement
    - Evidence or potential for scalability

11. **Environmental**
    - Clean energy generated
    - Improved biodiversity
    - Water, waste, energy, natural resources, CO2 saved
    - CO2 net positive
12. **Social**
    - Evidence of poverty alleviation
    - Gender equality
    - Youth involvement/investment
    - Health improvement
    - Education – skills and capacity development
13. **Innovation**
    - Illustrates a new way of doing something in a local context (this could be a product, system or business model)
    - Shifting from a linear to a circular business model
    - Challenges business as usual
14. **Good practice**: Evidence of good practice.

Following the data extraction, pivot table analyses were carried out on all data. Results were used to provide an assessment of the initiatives identified per sector.

Inventory Development

The research team decided to use Excel as the primary tool to capture the project information. Excel allows flexible analysis of the data captured via pivot tables, which summarise the information in databases so the research team could draw meaningful conclusions from the data captured.

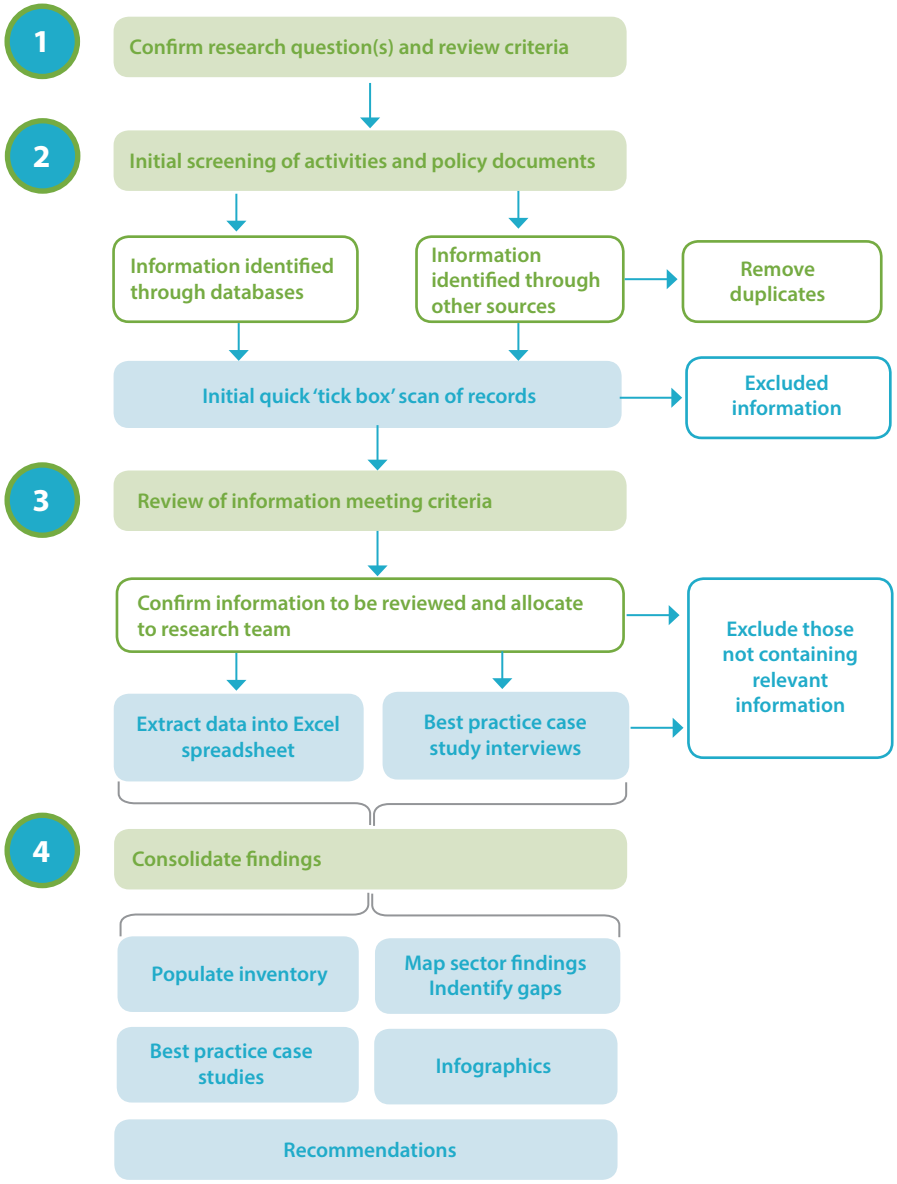
Phase 1: Sifting process
For the initial screening phase of the project, a simple spreadsheet was set up. The data captured consisted of the project name, a reference to a document or a hyperlink to a website, and indication of whether the project contained enough data to carry it through to phase 2.

Phase 2: Data extraction
Data points were identified which would form part of the research methodology. A database was set up in Excel for individual researchers to capture these data-points in a spreadsheet. To ensure consistency of the information captured, validation was included in the columns, which, in turn, minimised manual manipulation of information and erroneous data capture.

This database captured all of the basic information that would be expected of an initiative as well as more detail on economic, environmental, societal and innovation indicators. The information contained in the database was then used in pivot tables to help the researchers write the sector summaries as well as create the infographics.

It was apparent during this data capture process that the information captured or reported in the public domain by many projects was insufficient to meet the stringent qualifications of the research methodology we proposed. Thus, projects were captured with missing data points; the infographics highlight where some of these key missing data points were.

GEISA RESEARCH PROCESS AND ORGANISATIONAL FRAMEWORK



Interview approach

The data was supplemented by a series of interviews with experts in the respective sectors and cross-cutting themes.

The purpose of the interviews was threefold. The first and most important purpose was to verify the data emerging from the data searches that were predominantly performed on-line. The interviews also provided an opportunity to identify projects that may not have come up through the various search functions that were used and to affirm when particular projects with missing data had been selected.

The second key purpose of the interviews was to gain further insights on the data. In many instances the interview participants were able to offer insights or fill data gaps that were not filled through Internet searches. More importantly, the interview participants were able to identify links between projects or stakeholders working with Green Economy initiatives.

Finally, the interviews provided an opportunity to notify people about the PAGE initiative and to invite them to become involved the work of various PAGE partners in South Africa to support the green economy.

Process

The initial list of potential interviewees was drawn up based on the collective experience of the research team. A strength of this team is that it was made up of people with many years of experience as practitioners in the sectors and/or cross-cutting themes. Based on their experience and the data emerging from the internet searches, a list of potential interviewees was compiled. This list was then given to the PAGE task team, who were invited to rate the potential interviewees in order of priority or suggest alternatives if they felt that there were other people who could add more value. The two lists and prioritisation were then consolidated into a single list. Selected participants were sent invitations to take part in the interview with background information on the project. Researchers were allocated particular interview candidates based on the researcher's knowledge of the sector, professional connections that could facilitate the interview and interest in making contact with the interviewee.

The initial invitations were then followed up over a period of two weeks; interviews were scheduled and conducted predominantly through Skype. Where possible, face-to-face interviews were also conducted. Where neither Skype nor face-to-face interviews were possible, written responses were requested. If none of these options were possible or if no response was received from the potential interviewee, other people from the consolidated list were identified and invited.

Each interview was structured around six questions with substantial leeway for spontaneously following up on areas of interest, particularly the cross cutting themes. These interviews were recorded and roughly transcribed. These rough transcriptions were then used as the basis of synthesising key insights including on areas that may require further attention or additional projects that needed to be included in the data spreadsheets. It must be noted that due to time constraints it would not have been possible to return all of the write-ups to the interviewees, and it was thus decided not to quote interviews directly or verbatim but rather to synthesise the insights.

The following sectors and themes were covered in the interviews:

Sectors

- Agriculture
- Built environment
- Energy
- Natural resource management
- Sustainable consumption and production
- Waste
- Transport
- Water

Themes

- Governance and partnerships
- Trade
- Finance
- Research
- Awareness
- Skills development
- Knowledge management
- Policy and strategy
- Job creation
- Youth
- Entrepreneurship
- Technology and innovation

Interview questions

1) We are working with a broad definition of the green economy as one that is low in greenhouse gas emissions, resource efficient, and socially inclusive. Are you working with a similar or different definition? Based on your definition, do you think that current green economy initiatives are addressing the pressing priorities within our economy, environment and society?

2) What do you think are some of the best examples of green economy initiatives in XX sector (where XX stands for the specific sector that the interviewee was an expert in) and why do you think that they are so significant? (name of project, who is implementing it, previous or current project, do they have any further information on the project)

3) Are there any green economy projects in other sectors (we could give some examples e.g. waste, water, energy…) that you think are particularly significant?

4) What systemic changes do you think are key to opening up the green economy locally? [we could seed some examples e.g. financing structures/ capacity development/ policy frameworks/ information portals]

5) In your view what are some of the main barriers to a flourishing green economy in South Africa?

6) What would your dream green economy initiative look like or include? [What would its key objectives be? What major impacts would it have? How would it be financed? Who would implement it? etc.]

These questions were also used to structure the survey that was sent to those participants who were unable to give telephone or Skype interviews.

List of Interviewees

Name	Sector	Organisation
Aldu Cornelissen	Knowledge management	Stellenbosch University: Centre for Knowledge Dynamics and Decision Making
Brian Wilkinson	Built environment	Green Building Council of South Africa
Calvin T. Makhubela	Gender/ Women	Tosaca Media Group (Green Youth Indaba)
Eureta Rosenberg	Education	Green Skills
Henry Roman	Water	Department of Science and Technology, and member of ⎡ YWA-SA
Jonathan Diederiks	Research	National Research Foundation (NRF)
Linda Godfrey	Waste	CSIR: Pollution and Waste
Prof. Guy Midgley	Resource conservation	CSIR
Rest Kanju	Entrepreneurship	SEED
Sharlin Hemraj	Finance and investment	National Treasury
Stephan Krygsman	Transport	Stellenbosch University: Transport Economics
Stephen Nicholls	Partnerships	Climate Change and Water at National Business Initiative (NBI)
Theo Pistorius	Youth	IntegriSense
Wikus van Niekerk	Energy	Centre for Renewable and Sustainable Energy Studies, Stellenbosch University

Challenges and Limitations

There were some key challenges encountered in the process of gathering the data for the GEISA, these include:

- **Counting Jobs**

All the sectors revealed a diversity of terms related to employment that made it impossible to develop a reliable job creation metric. Some of the terms used included: work opportunities (especially in the EPWP although this was occasionally used interchangeably with the term jobs), temporary jobs, permanent jobs, full-time work equivalents, and a number of others. It was also not possible to distinguish between jobs created in the construction phase, jobs that would be available during the initial operation of an initiative, or jobs that may become available as the initiative went to scale. This issue becomes even more complex with capacity development initiatives where job creation figures are based on potential jobs that would need to be unlocked by an enhancement of skills and qualifications. 'Potential jobs' is thus aspirational, but is then double-counted in the jobs recorded by actual initiatives in the different sectors. Research on job numbers often reflect a similar challenge.

- **Recognising Green Jobs**

Adding to the complexity in gauging employment numbers is a lack of clarity on what is meant by a green job. This is partly due to a lack of green occupations recognised in South Africa and partly due to confusion as to whether an accountant working, for example, in a green economy initiative such as Bio2Watt, is a green job or just an ordinary job in a green sector. While South Africa has used the ILO definition of a green jobs to frame national discourse, this definition and categorisation is not implemented in reporting systems. In general, it was established that social and environmental risks and benefits of projects were often not being reported in sufficient depth, and in line with agreed criteria.

Given the importance of creating employment in South Africa and the inclusion of 'pro-employment' in one of the most commonly used definitions of the green economy in the country, one would expect a clear focus on green jobs and job creation in green economy initiatives. One of the most challenging aspects of identifying green initiatives for inclusion in the Inventory was the lack of reporting on green jobs data. While it is recognised that this data exists, it is not easy to access. As such, it is recommended that future work investigates and gathers this more granular information.

- **Recognising the Green Economy**

There is a strong argument that the whole economy should be low-carbon, resource efficient and socially inclusive. In many instances this thinking has become embedded in the South African economy and is, in some sectors, business as usual rather than a green economy initiative. This means that some 'green economy' initiatives are not reported as green economy initiatives and are hidden within sectors. The conservation sector in South Africa, for instance, has a long history of establishing national and provincial parks and private game reserves. Some of these areas were established specifically to protect ecosystem services (such as water catchments), while others preserved ecosystems as the basis for a tourism business. The ongoing development of these parks and nature reserves represents substantial investments in the green economy and yet are not identified as particular initiatives with start and end dates, project names, publically accessible budgets, etc. Similarly, in areas such as the implementation of energy and water efficiency in the private sector, a large amount of activity is already taking place that is not necessarily reported on or even named as a project. This kind of activity was not captured in the GEISA since too many of the criteria were not fulfilled. Some suggestions to support the gathering of this kind of information include competitions and awards (e.g. Better Living Challenge, Green Awards, and SEED Awards) and a requirement that the institutions wishing to apply for green finance in South Africa enter the details of current initiatives into an online database.

NOTES

PHOTOGRAPH CREDITS

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PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

The Green Economy Inventory for South Africa, produced by the Partnership for Action on Green Economy (PAGE) and the Department of Environmental Affairs, takes stock of green economy initiatives that are being implemented by a wide range of development partners in South Africa. The inventory provides a snapshot of efforts towards greening the economy and seeks to establish a knowledge base for improved collaboration, coordination and policy development and implementation.

Firstly, the inventory provides an overview of green economy activity in key sectors prioritised by the South African government: Clean Energy, Transport, Agriculture, Resource Conservation, Sustainable Consumption and Production, Built Environment, Waste and Water. Secondly, it provides sector-specific recommendations, highlighting gaps and opportunities for future investments. Finally, cross-cutting and strategic policy messages and interventions to support the expansion of green economy activity in South Africa, are presented.

The assessment underwent extensive consultation, and seeks to inform and strengthen South Africa's transition to a green economy.

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