

Career opportunities in sustainability-related fields

by
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Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: Crtkn2014

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ABSTRACT

The impact of the economic turndown in 2008, brought sustainability issues to the forefront of public debate as the realities of climate change, and society's response to it, gain higher visibility. As a result, the green economy is gaining global traction as it is evident in South African policy frameworks and investment. In this new environment, human or social capital is fast becoming the foundation of sustainable businesses. The pursuit of green jobs is seen as a key economic driver in the 21st century, creating a green pathway out of poverty. Shifting the economy from business as usual to a low carbon, resource efficient, resilient and inclusive sustainable economy will involve large scale investment in new technologies, equipment, buildings, and infrastructure, research and development and skills training and could thus be a major stimulus for much-needed employment (UNEP, 2008:3).

The focus of this study is to investigate, career opportunities for graduates of the programme in Sustainable Development, offered by the School of Public Leadership (SPL) at Stellenbosch University. The question is asked if future careers in sustainability-related fields are secured for these graduates. The problem statement was formulated to determine possible challenges that graduates might face from advancing in their careers. I have aimed to address this problem by exploring the prospects for employment in various sustainability-related fields. The research objectives are to: a) attain clarity regarding graduates' understanding and awareness of available careers in sustainability-related fields; b) to investigate attempts, tools and processes through which graduates could develop careers in the sustainability-related fields; and c) To confirm the graduates' employment status, pre-and post-graduation. My study will aim to demonstrate that more research needs to be conducted related to career guidance to prepare a new workforce, with skills and career knowledge to enter career opportunities in green economy.

Keywords: sustainable development / green economy / green collar workers / green jobs

SAMEVATTING

Die impak van die wêreld resessie in 2008 het volhoubare ontwikkelingskwessies skerper na vore gebring. Dit het die noodsaaklikheid van 'n groen ekonomie verder beklemtoon. In hierdie omgewing word menslike kapitaal belangriker vir besighede wat wil oorskakel na die groen ekonomie. Die soektog na groen werk word gesien as 'n hoof ekonomiese aandrywer in the twintigste eeu, wat 'n uitweg uit armoede kan bied. Die skuif van 'n huidige besigheidsmodel na 'n lae koolstof, effektiewe hulpbron gebruik, weerstandige en inklusiewe, volhoubare ekonomie vereis 'n besondere groot investering in nuwe tegnologie, toerusing, geboue, infrastruktuur, navorsing en ontwikkeling, en vaardigheidsopleiding. Hierdie beweging kan moontlik 'n stimuli wees vir broodnodige werkskepping (UNEP, 2008:3).

Hierdie studie ondersoek die onderlinge verband tussen die ontstaan en ontwikkeling van die groen ekonomie in Suid Afrika en werksgeleenthede wat moontlik daaruit mag voortvloei vir gegradueerdes van die program in volhoubare ontwikkeling by die Skool vir Publieke Leierskap by die Universiteit van Stellenbosch. Die vraag wat ek gestel het is of toekomstige beroepe in volhoubare ontwikkelingsgebiede bestendig is vir hierdie gegradueerdes. Die probleemstelling was geformuleer om die volgende navorsings doelstellings te ondersoek: a) gegradueerdes se huidige en toekomstige beroeps verwagtinge, begrip en bewustheid van beskikbare beroepe in volhoubare ontwikkelings verbandte velde b) pogings, gereedskap, en metodes waarmee gegradueerdes hulle beroepe in volhoubare ontwikkelings velde sou kon ontwikkel; en c) om gegradueerdes se werksnemings status vas te stel voor en nadat graduering plaasgevind het.

My studie poog om te demonstreer dat meer navorsing gedoen moet word rakende beroeps opleiding om so'n nuwe werksmag voor te berei met vaardighede en kennis wat hulle in staat stel om werksgeleenthede in die groen ekonomie te kan betree.

Stelutewoorde: volhoubaarheid / groen ekonomie / groenboordjiewerkers / groen werk /

Acknowledgement and dedication

I dedicate this study to the Alumni of the BPhil and MPhil Programme in Sustainable Development at the School of Public Leadership at the University of Stellenbosch for their passion and commitment in our shared journey to create positive change inspired me! My appreciation goes towards their willingness to participate in the research survey.



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List of acronyms and abbreviations

BAU	Business As Usual
BAU2%	Business-as-usual 2% scenario
BPhil	Bachelor of Philosophy
CDM	Clean Development Mechanism
CGE	Computable General Equilibrium
CMD	Clean Development Mechanism
CRSES	Centre for Renewable and Sustainable Energy Studies
DBSA	Development Bank of South Africa
DEA	Department of Environmental Affairs
DEDT	Department Economic Development and Tourism
DME	Department of Minerals and Energy
DTI	Department of Trade and Industry
EDD	Economic Development Department
EPWP	Expanded Public Works Programme
GBCSA	Green Building Council South Africa
GCRO	Green Strategic Programme for Gauteng
GCW	Green Collar Workers
GETS	Green Economy Target Specific scenario
GGND	Global Green New Deal
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
ILO	International Labour Organisation
IRP2	Integrated Resource Plan
KZNDEDT	KwaZulu-Natal Department of Economic Development and Tourism
MCJC	Million Climate Jobs Campaign
MPhil	Master of Philosophy
MTEF	Medium Term Expenditure Framework
NDP	National Development Plan – Vision for 2030
NFSD	National Framework for Sustainable Development

NGP	National Growth Plan
NRCS	Natural Resource Conservation Service
NSSDI	National Strategy for Sustainable Development and Action Plan
PCS	Premier's Council on Skills
PGWC	Provincial Government of the Western Cape
PSDF	Provincial Skills Development Forum
REC	Research Ethics Committee
REIPPP	Renewable Energy Independent Power Producer Programme
SAGEM	South African Green Economy Modelling Report
SD	Sustainable Development
SETA	Sector Education and Training Authority
SPL	School of Public Leadership
STATS	SA Statistics South Africa
TIPS	Trade Industrial Policy Strategies
TWG	Technical Working Group
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
WCG	Western Cape Government
WCGE	Western Cape Green Economy Strategy Framework

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CHAPTER 1: INTRODUCTION

This chapter introduces the body of the thesis. The background to the study is presented, through a summary of the literature review followed by the motivation for the study. The following section elaborates on the refinement of the research process, introducing the argument, the field of study, main objectives and key concepts used. The significance of the study is explained, followed by a description of the approach adopted. The process of the literature review, themes used and the structure are presented along with the methods of data analysis. The research survey's approach, population and selection criteria are described. Finally the limitations of the study are outlined.

1.1 Background

This chapter presents an overview of the findings and implications of the importance of green job creation in South Africa. It provides a chronological background to the Sustainable Development agenda and the adoption of national and provincial policy, employment potential for green jobs in the short, medium and long term and investment in the green economy to support new markets and businesses.

The United Nations Environmental Programme (UNEP, 2008:35) indicates that greening the economy will involve large scale investment in new technologies, equipment, buildings, and infrastructure, and could thus provide major stimulus for much-needed employment. Based on this notion, the pursuit of green jobs is viewed as a key economic driver in the 21st century. In this new environment, human or social capital promises to become the foundation for sustainable businesses (UNEP, 2008). The South African government has been successfully implementing new policy frameworks to support the growth of the green economy. The first step in this process was to sign the Green Economy Accord (Patel, 2011) in November 2011, as an outcome of social dialogue on the new growth path. Shortly after that, a Green Jobs Report (IDC, DBSA and TIPS, 2011) presented an estimate of the direct employment potential of greening the South African economy. The majority of the research findings presented in the report involved green job

projections over a time horizon span of 15 years, grouped as follows: 2 years indicated as the short term (2011 to 2012), 5 years indicated as the medium term (2013 to 2017) and eight years as the long term (2018 to 2025), (IDC, DBSA and TIPS, 2011:17).

My study will demonstrate that more research needs to be conducted not only to inform government policies regarding green job creation, but more importantly to prepare a new workforce, with skills ready to meet the demands of the growing green economy. The focus of this study is to investigate career opportunities for graduates of the programme in Sustainable Development, offered by the School of Public Leadership (SPL) at Stellenbosch University.

1.2 Motivation and refining the research topic

The motivation and refinement of my research topic is outlined in more detail in this section than prescribed by my department's thesis guidelines (Muller, 2009). This is necessary to describe the context motivating my research and how that guided me to arrive at the research approach used.

The research study has personal relevance for me. Through the formulation of the research topic I discovered where best I could place my skills obtained during the BPhil programme in Sustainable Development and to take possible new knowledge into practice, thereby enabling me to contribute to positive social, environmental and economic change in the twenty-first century.

1.2.1 My research journey and professional evolution

The story of my research journey started in 2008, a year after I graduated in the BPhil Programme in Sustainable Development at the School of Public Leadership, University of Stellenbosch. The initial inspiration for the research started when I was searching for career opportunities in sustainability. It was a difficult journey and I had limited resources to inform me of what my new qualification could contribute to my professional career. I approached a number

of recruitment agencies with my CV and they were not able to tell me where I would fit with my degree in sustainable development.

Before continuing further studies at a Master's level, I investigated topics of interest to formulate a research proposal. The first topic that came to mind was to examine trends in South African eco-estates. Greening the building industry had not yet taken off at that stage (February 2009) and I therefore decided to look for a research topic that could *possibly* add to the body of knowledge on sustainable development.

My career began in the construction sector where I worked as a project manager in property development. In November 2009 I qualified as a Green Star Accredited Professional through the Green Building Council of South Africa (GBCSA, 2013). This is a body that governs best practise in green building and they provide accreditation through a star rating system. Work opportunities in the green building space were limited at that time, as there was only 12 Green Star Accredited Commercial buildings and developers saw it as a costly investment.

My understanding was that, based on my academic and professional qualifications, I was qualified to be employed as a green collar worker, but I did not work for a green employer. However, my employer took on projects that had principles of sustainable development at their core, so I would say I did have a green job.

During 2010 I started following the Green Job movement in the United States of America. The President was Barak Obama, and his work with Jones (2008), during his election campaign inspired me because it focused on the creation of a green economy to stimulate new job creation to empower a green collar workforce.

The literature I obtained on green collar workers, green jobs and the green economy was useful in formulating my research proposal and I registered in February 2011 to continue formally with my research on career opportunities for graduates in sustainability-related fields.

1.2.2 Refinement of research topic, approach and methods

This section will provide a research formulation overview that occurred over a two and a half year period pre- and post-registration, demonstrating the theory of ‘becoming’ rather than ‘being’ (this concept will be discussed in chapter 3).

In preparation for my research proposal in October 2010, I reviewed a study conducted by OneWorld Sustainability Investments, commissioned by the International Labour Organisation (ILO) between May 2009 and March 2010, to prepare a South African country study on “Skills for Green Jobs”. The study is embedded in the Green Jobs Initiative, a joint initiative of the UNEP, the ILO, the International Employers Organisation (IOE) and the International Trade Confederation (ITUC), to assess, analyse and promote the creation of decent jobs as a consequence of the needed environmental policies (ILO, 2010:3). I incorporated the information obtained from the report during the submission of my research proposal in March 2011 to guide me through my empirical study to collect qualitative survey data (primary data) and design a questionnaire as my research tool. I had to apply for ethical clearance in April before I could continue with the survey. Ethical clearance was received in May 2011.

In October 2011, my study leader introduced me to a Green Jobs Report conducted in South Africa that was launched at COP17 in 2011, namely: “An estimate of the direct employment potential of a greening South African economy”, produced by the International Labour Organisation (ILO), the Development Bank of South Africa (DBSA) and the Trade Industrial Policy Strategies (TIPS) (2011). This report provided a local definition for a ‘green job’ and supplied statistical data for potential employment opportunities over 5 years, 10 years and 20 years. The report provided more accurate statistics than those projected by the New Growth Path in 2010). After reading the report, I was able to refine my research proposal in February 2012 by focusing on how my research could contribute to my understating of careers in sustainable development.

The literature review grew organically as the wider debate around green jobs unfolded between 2011 and August 2013. The information from my literature review contributed to information

regarding legislative frameworks that support green jobs and green economy reports conducted by academics. Following the development of the literature review up to April 2012, my study was undertaken with a participation group consisting of BPhil and MPhil Graduates in four of the programme's sustainability fields offered by the School of Public Leadership at Stellenbosch University, with permission from the Stellenbosch Research Ethics Committee (REC). Thereafter, the departmental course administrator sent out a voluntary invitation to BPhil and MPhil graduates on my behalf to complete an online questionnaire. Information obtained from the questionnaire was collected and descriptive data were developed and analysed to profile the graduates of the programme. The information was useful to analyse the transdisciplinary academic background and career patterns of the graduates, but it seemed to be insufficient information to substantiate my research argument with. The survey response rate was only 30.83% and for this reason I had to consider a different research approach to gather more qualitative data that would address the knowledge production problem.

Throughout the initial stages of the research process graduates started approaching me to assist them with their career development. I was really passionate to bridge the gap between practice and theory and decided to formalise my expertise by placing myself in practice, entering the "mess of" the green job sector. There were no opportunities where I could join an organisation that focuses on this field, thus I created my own green job opportunity by setting up a social enterprise, called Green Talent. This enterprise was established in 2011 as a Sustainability Career Centre that offered career guidance services to job seekers and recruitment services to employers. During the month of October, I participated in a research colloquium where I presented my research findings and I used this opportunity to ask the attendees (mostly pre-and post-graduates students) to act as a sound board and to provide feedback on how I could add another level of depth to my research. After reflecting on the feedback received, I decided that I wanted more than just a theoretical understanding.

Between October and January 2013, I investigated how my entrepreneurial experience (practical knowledge) could possibly be incorporated into my research (theoretical knowledge) on career opportunities in sustainability. Through adopting a processual perspective on entrepreneurship, I discovered that the notion of "entrepreneurship" as a research method, is an emerging practice-

theory field of research in the social sciences, that could be an appropriate frame of reference to give me a way to follow a paradigm more in line with action research, in the sense that I took 'action' and wanted to see change happen (Bengt, 2009:135).

I had a concern about a possible conflict of interest and I had to expand my search for more literature around the subject matter. The insights gained from research done by Van de Ven & Johnson (2006:802) on "engaged scholarship" as a research approach were very valuable to put my mind at ease. Engaged scholarship is defined as "a collaborative form of inquiry in which academics and practitioners leverage their different perspectives and competencies to co-produce knowledge about a complex problem or phenomenon that exists under conditions of uncertainty found in the world" (Van de Ven & Johnson, 2006:802). They suggest three ways in which to close the gap between theory and practice: a) Consider the knowledge flow; b) Different types of knowledge and c) A new research approach which is collaborative between theory and practice. Van de Ven and Johnson (2006:802) argue that any tensions caused by knowledge creation between the scholar and practitioner should not be seen as a mistake, but to be exploited in the knowledge production process.

At first I felt comfortable to incorporate "entrepreneurship" as a research approach using action based research to collect qualitative data through participant observation. I considered that this research method could allow me to use my "in-side knowledge", gained through my practical experience as an entrepreneur, to provide another angle to address the research problem. The first step towards this approach could be to reflect on my entrepreneurial experience of how I gained information on green jobs and career development. Participant observation could have been possible through my interaction with multiple stakeholders in the green job sector, customers (green job seekers) and clients (green employers). It became clear that from the "entrepreneurship" research approach, my knowledge about career opportunities for graduates, gained through Green Talents service offerings could contribute to my research study.

After researching "entrepreneurship" as a possible research approach, I realised the importance of context and scale in selecting appropriate research methods. The refinement process of developing the core purpose of the study assisted me to maintain my focus on graduate's views

to determine employment opportunities in their field of study. In addition I realised that by including “entrepreneurship” as a research approach, it would be irresponsible to involve my practical experience in the research for it would be a conflict of interest. The ethics committee approved my research proposal based on the principles set out in the initial proposal submitted in March 2011. I decided that the research approach “entrepreneurship” could be successfully applied elsewhere in future studies to ensure that my research model would keep its integrity. I learned from the experimentation, and I gained valuable insights to assist me to complete my research study.

1.3 Research problem and objectives

Problem statement: To what extent are career futures secured for graduates of the BPhil and MPhil Programme in Sustainable Development?

The research problem originated from a sense of uncertainty about postgraduate employment. This uncertainty was triggered while reviewing literature that outlined the demand for and shortage of green jobs relative to the availability of postgraduates in the Sustainable Development Programme at Stellenbosch University.

The specific intention of my study has been to investigate the career prospects of these graduates. The problem statement was formulated to determine whether a lack of career information limited graduates from advancing in their careers. I have aimed to address this problem by exploring the prospects for employment in various sustainability-related fields. The geographical context of South Africa provides a backdrop to development of a green economy in this country and how this is providing employment opportunities.

Based on the research problem stated above, I applied a qualitative research methodology through a survey as my method, and a questionnaire as the research tool, to address the following objectives:

- (a) To attain clarity regarding graduates' understanding and awareness of available careers in sustainability-related fields;
- (b) To investigate attempts, tools and processes through which graduates could develop careers in the sustainability-related fields; and
- (c) To confirm the graduates' employment status, pre-and post-graduation.

1.4 Theoretical framework and research questions

I formulated my research study by applying the analytical framework principles outlined by Bless & Smith-Higson, (1995:13). I discovered that surprisingly little research has been undertaken to date on graduate employment in sustainability-related fields specific to South Africa. Sustainability-related career fields span over a wide array of skills, educational backgrounds, and occupational profiles and should not be confused with careers in only environmental fields. Environmental careers are a specialised field on its own that are developed through an isolated discipline as part of a specific core academic, and they provide professional knowledge and practical skills as important competencies for the working practise of environmental scientist.

The data from the graduate questionnaire would be available to inform my study, but I first needed to deepen my understanding of the term "green collar worker", which is increasingly being used to describe people working in sustainability-related career fields. Various concepts, debates and definitions of the term green collar worker and green jobs exist and raise important questions such as:

- (a) Is there legislation support and financial commitment to development in the green economy?
- (b) How do graduates understand what a career in a sustainability-related field is?
- (c) What attempts, tools and processes did graduates use to develop careers in sustainability-related fields?
- (d) What were graduates' employment status, pre-and post-graduation?

1.5 Glossary

This glossary lists abstract terms and definitions related to careers and employment in sustainable development fields. During my exploration of concepts related to the green economy, green jobs and green collar workers, I encountered diverse interpretations not only on an international level, but also on a country- and provincial wide basis. For the purpose of this study, I had to limit myself to providing a comprehensive overview of the international and local meanings, scope and functions of those concepts. Thus I acknowledge that wider interpretations of the key concepts are beyond the scope of this thesis. I could also not engage fully with the many local debates around the green or low-carbon economy, green jobs and green collar workers. It should therefore be noted that the following definitions are unavoidably incomplete, narrow interpretations, which represent a limited perspective and may not be appropriate to all contexts. As a point of departure, the following words and phrases have these designated meanings in this thesis, unless the context otherwise indicates.

Green Career

A green career refers to a career in a sustainability-related field. Occupations in these fields are categorised as employment activities in one or more of the following broad categories used by IDC-DBSA-TIPS (2011) to describe employment sectors in green industries, namely: “a) Non-renewable: Energy Efficiency; Waste management; Consulting; Environmental Resource Management and Built Environment and; b) Renewable: Wind, Solar, Bio-mass, Bio-fuels, Solar, Geo-thermal, and Wave” (IDC-DBSA-TIPS, 2011). Sustainability-related career fields span over a wide array of skills, educational backgrounds, and occupational profiles.

Green Economy

“A green economy is an economy that values nature and people and creates decent, well-paying jobs” (UNEP, 2008:4). The green economy is different from the pollution-based, fossil fuel dependent economy which creates major problems for the environment and for people’s health, while producing many of the goods and services we rely upon and enjoy. It is an economy that includes all economic activities resulting in improvement of the environment. It is also viewed that a green economy is a shift away from business-as-usual, towards the goal of ‘resilience’

rather than growth for resource efficiency, low carbon and pro-employment, greater social equity and justice, and investment in the protection and enhancement of the environmental asset base, thereby reducing environmental scarcities and risks” (Sutherland et al, 2012).

Green Jobs

There is no narrow definition or single global standard of a green job, these jobs requires a wide range of skills, educational backgrounds, and occupational profiles and they uphold certain standards (UNEP, 2008:3).

Green jobs provide equal hope for the environment and the jobholder that include standards where people`s livelihoods, rights, and sense of dignity are connected with their jobs (UNEP, 2008:39). They are not only related to the credentials of the job, but they are well-paid, decent jobs that are part of a real career path with upward mobility and they provide workers with safe and healthy working conditions, family supporting benefits, and opportunities for continual training and career development (UNEP, 2008:39).

Green jobs contribute directly to preserving or enhancing environmental quality in a sustainable low-carbon economy. My reference to green jobs is in line with the United Nations Environmental Programme`s definition of green jobs, a job that would “protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution” (UNEP, 2008:3).

In the context of this study, green jobs are linked to sustainability-related career fields for alternative futures and job types include non-renewable energy and renewable energy categories.

Green-Collar Worker

A green-collar worker is a worker who is employed in the sustainability sector of the economy and their job is regarded as a green job. UNEP (2008:40) identifies different shades of green-collar workers, with different skills levels and job types, namely: professionals and vocational or trade-level workers in non-renewable and renewable energy sectors in the green-collar worker

may be defined by occupation or by industry. What this means is that green collar workers may exist in any industry according to their occupation or role. By looking at different skills levels and drawing this distinction between environmental and sustainability-related jobs, green collar workers can be identified based on skills levels and areas of responsibility that define their region of focus.

Green Skills

The skills needed to work in a green job (see green job description in this section of the glossary). Green skills are also referred to as “sustainability skills” in the survey questionnaire.

Sustainable Development

Sustainable development was first defined by the World Commission on Environment and Development’s Brundtland Commission report, *Our Common Future* in 1987, as development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, 1987:15). This definition can be further extended to include a description of Sustainable Development from Lovins: “Sustainability is the careful and efficient stewardship of resources by business, communities and citizens. It is the practice of meeting our needs in ways that are respectful of future generations and restorative of natural, cultural and financial assets. Sustainable management is a whole systems approach to achieving superior performance in delivering outcomes to all stakeholders by business, government and civil society. It is achieved by implementing the three principles of ‘Natural Capitalism’ (Natural Capitalism Solutions, 2014). The principles of sustainable development therefore involve seeking to achieve social and economic progress in ways that will not exhaust the earth’s finite natural resources, but consider the carrying capacity of the natural systems with the social and economic challenges faced by humanity.

Programme

The term programme used in chapters one, three, four and five, relates to the postgraduate programme in Sustainable Development offered by the School of Public Leadership at Stellenbosch University. This programme is also referred to as the programme in sustainable development. It is acknowledged that there are four different specialisation fields within the

programme, namely: sustainable development, sustainable development planning and management, agriculture and renewable energy. For the purpose of the study the term “programme in sustainable “development refers to the programme as an umbrella to group all four specialisation fields.

1.6 Significance of the study

Limited information about post-graduate employment opportunities in sustainability-related career fields within the South African context was available when I started my research in the year 2011. This was a great concern for me as a graduate from this programme as I searched for employment opportunities where I could use my new skills and knowledge. My current employment contract at that time offered limited scope to integrate the new skills and knowledge. This lack of available career development knowledge or tools encouraged me to conduct research to determine the methods used by fellow graduates as they developed a career in sustainability-related fields.

The key significance of the research would be that it could possibly contribute to further studies on how a career in sustainability-related fields could be pursued. The possible outcomes could add value to graduates’ knowledge about employment or business opportunities, add to the faculty’s knowledge to help guide students and also help to guide my own career. The findings from this research study would also be able to help in identifying key factors driving green job creation with the South African context (Glen et al, 2009). These factors include: new regulations, new investments, new technologies and new values. This study will aim to investigate these factors.

South Africa’s New Economic Growth Path is one of the new policy frameworks that identifies job creation in the green and knowledge economy (Patel, 2010a). Glen et. al. (2009) argue that the problem many business leaders face is that they are not fully prepared to employ the new talent pool of graduates from sustainability-related programmes as “green-collar workers” due to a lack of knowledge about their skills. Thus, a better understanding of the skills set that graduates

in the sustainable development programme have, needs to be researched to inform employers, especially human resource managers. The UNEP Green Jobs Report (2008) recognises that there is a lack of a skilled workers (green-collar workers), and that a significant investment by governments and private investors across the world, cannot occur unless sufficient research is conducted in this area. South Africa responded to this call by making funds available during 2013 through the Green Accord Fund for research and skills training programmes. It is clear from this call for action that the important role of a green collar work force in developing and implementing low carbon initiatives thus becomes a topic of interest and should be researched.

1.7 Research design and methodology

Constructing the research methodology generally involves establishing a research framework, and formulating a very clear problem statement, a research question and one or more assumptions. This is regarded as the starting point of the study as explained in detail by Brynard and Hanekom (1997 in Muller, 2008). In designing research, one focuses on the end result: what kind of study is planned and what kind of result is aimed for? (Mouton, 2001:56). According to Hart (2006:26 in Muller, 2008), social science research can be broadly categorised according to its objectives and it is either aimed at explaining, exploring or describing, and each agenda has unique implications for the design, presentation and way in which the research should be interpreted. Mouton (2001:56) argues that a research methodology concerns the process of research and what tools and procedures will be used to gather and process information.

A qualitative research approach was used. Primary qualitative data was collected via a graduate survey to be completed by BPhil and MPhil graduates. A questionnaire was used as a research tool to explain graduates' views of careers in sustainability-related fields. The structure of the questionnaire provided the opportunity to collect and analyse data in various forms, but mainly non-numerical (Brynard & Hanekom, 1997:6 in Muller, 2008:4). Annexure 1 outlines the list of questions that were asked in the survey. These questions were informed by my preliminary literature review. My decision to use qualitative research is supported by the UNEP (2008:6) report that argues that more green job surveys and profiling need to be conducted for direct and

indirect jobs to build on the existing data such as the study conducted Bootsma and Vermeulen on the experience of environmental professionals in practice (2011). I was confident that following the guidelines from Mouton (2001:57) to conduct a qualitative methodology would provide me with the kind of evidence needed to address my research objectives.

The survey was designed to provide an opportunity for graduates to share their understanding and awareness of available careers in sustainability-related fields considering their acquired knowledge and skills base; to attain clarity regarding graduates' attempts, tools and processes through which they could develop careers in sustainability-related fields; and to confirm the graduates' employment status, before and after completing the programme. The qualitative research type provided valuable information regarding the interpretation of challenges that they experienced to seek employment.

My research has also been influenced by my personal views, I can relate to the selected sample group because, like them, I completed the BPhil programme and then I applied for a green job. A postmodern qualitative research approach assisted me to deal with complexity and ambiguity (Hertlein, et al, 2004:560-561).

1.8 Conceptual literature analysis

I made use of a conceptual literature review to underpin my research. Thus the conceptual literature was not seen as a formal research approach, but has been an important point of departure for my research journey. My aim has been to build a good understanding of concepts around the green economy, careers in sustainability-related fields, green job opportunities and the nature of green collar workers. The literature review has collected information of the early development of the green economy in South Africa between 2011 and 2013. The purpose of the review has been to clarify whether green economic policy-making, investment in research and employment generating programmes and the creation of new industries could provide much needed employment opportunities for graduates who were interested in working in sustainability-related fields. The information provided by the literature review has created a context for the

main body of research and improved my understanding of green job creation factors. I have used Hart's (2006:13) definition to structure the literature review, namely to arrange it into two parts; a) the selection of available documents and b) the efficient evaluation of this document in relation to the research being proposed. My literature review plan will be discussed in chapter 3.

Analysis of the literature applies a critical lens of the connections between environmental protection, poverty, and unemployment crises in South Africa. The question is posed: does environmental protection harm the economy and destroy jobs, or does it facilitate economic growth and create jobs? This question is addressed by identifying a relationship between the economic, social and ecological crises that South Africa is faced with, and explores a mutually beneficial solution, namely green job creation.

The following core themes will be covered:

- Overview of the emerging green economy in South Africa related to national and provincial policy development;
- The employment potential for green jobs in the short, medium and long term;
- Investment in the green economy to support new markets and businesses.

1.9 Assumptions

My study is based on the following assumptions:

- Sufficient literature sources will be available to inform my study.
- The use of a questionnaire will result in honest and useful feedback for the purpose of analysis.
- The population sample size is large enough to represent graduates' prospects of career opportunities in sustainability fields.
- Conducting research on career opportunities for graduates in sustainability-related fields, could benefit future career guidance.

1.10 Thesis structure

My thesis opens with a review of a selected and limited range of international literature, introducing the origin of the global green economy, with the post-2007 global economic crisis and its social, environmental and financial implications as a starting point. Focus then shifts to follow trajectories of the development of a green economy in South Africa, with emphasis on national and provincial policy development, leading on to projected employment opportunities in the green economy. Against this backdrop I deepen my research focus by drilling down to examine financial investments that will support new markets and businesses, creating green jobs in the green economy.

Chapter three leads into an overview of my research design and methodology. Chapter four presents analyses of data obtained from the voluntary survey of graduates of the Programme in Sustainable Development at the University of Stellenbosch. After determining the graduates' understanding and awareness of career opportunities in sustainability-related fields, career development processes, tools and access to information on employment opportunities, their status of employment before and after completing the programme, results are used to build an argument around career security. The importance of career security in sustainability-related fields for graduates' after completing the programme, is not only important for them to receive income through employment, but it is vital to transfer the skills and knowledge obtained through the programme, into employment areas that will shift "business-as-usual" practices into the green economy.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This literature study traces the trajectory of South Africa's green economy that advanced after the post-2007 global economic crisis that erupted in late 2008. It then leads into a discussion of the connections between the social, environmental and economic crises that South Africa faces and how the impact thereof has created green jobs. The adoption of national and provincial policy development is highlighted as important mechanisms to support green economic development with. A high level summary of key green economy reports is provided and followed by a discussion of green careers, green jobs and green collar workers.

2.2 The global economic crisis

The world finds itself in a slow recovery from the post-2007 global economic crisis. The progressive spread to the real economy resulted in world output growth slowing to 3% in 2008, from 5.2% in 2007 (IDC, 2010:1; One World, 2010:3). Swilling (2013:98) identifies two related but distinct features of this cause, namely: "the persistence of debt-driven recessionary conditions in Europe and North America, and the rise of the so-called 'BRICS-plus' economies in Asia, Africa and Latin America", and indicates that the post-2007 global economic crisis hardly affected African economies with the exception of South Africa.

The focus of this study will be on the South African economy and how it relates with the global affects caused by the post-2007 global economic crisis due to a large number of job losses, and a host of social and environmental crises. New literature has been generated by the post-2007 global economic crisis that "draws on long-wave theory to re-imagine present and future landscapes" (Allianz Global Investors (2010), Bradfield-Moody and Nogrady (2010), Rifkin, (2011) in Swilling , 2013:97) indicates that the newly developed information sources consists of policy-oriented research-based literature generated from a variety of academic, UN, advisory and

consulting agencies. It is of particular interest to review a range of global and South African literature to inform this study. A long-wave theory approach from Swilling (2013) was used for the purpose of this study to not only see the post-2007 global economic crisis as an accident in history, but to provide an empirical conceptual framework to look at historical trajectories and how future trajectories of the green economy in South Africa can occur in more or less predictable ways (see section 2.6).

The United Nations Environmental Programme's Green Jobs Report, *Towards decent work in a sustainable, low-carbon world* (2008), indicated that at the same time that financial recovery was being planned during 2009, attention was also being paid to mechanisms for addressing these global social and environmental crises. The urgent need to reduce carbon emissions was also foregrounded. During 2009, prominent actors in the global economy set out into largely uncharted territory with the goal of achieving a global low-carbon economy. This type of economy is also known by the term "green economy". Fischer-Kowalski & Swilling, (2010:100) refer to this principle as an "inclusive sustainable economy". These terms are often used concurrently in a rather broad or very loose context. In the context of this paper, I will use the term "green economy" as defined by the United Nations Environmental Programme (UNEP, 2008) as an economy that values nature and people and creates decent, well-paying jobs. The focus of this economy turns away from resource consumption in a business-as-usual approach, towards environmental restoration through the re-use of materials and production processes, preferring to invest in the manufacturing and installation of clean energy (UNEP, 2008).

From the above references, it is anticipated that a green economy could supply the types of jobs that are aligned with a positive social and environmental impact. This is important to highlight to ensure that the dual crisis discussed in section 3.3 is addressed. The types of job created by a green economy are known by the term 'green jobs' (Pinderhughes, 2012). According to the United Nations Environmental Programme (2008:35), the pursuit of green jobs will be a key economic driver in the 21st century, as the world sets out into the largely uncharted territory of achieving a low-carbon global economy. Greening the economy will involve large scale investment in new technologies, equipment, buildings, and infrastructure, and could thus be a major stimulus for much-needed employment (UNEP, 2008:35).

If any of the financial losses or impacts of social and environmental crises as a result of the global financial crises are to be addressed effectively, it will require greening of the economy, which involves large-scale investment in new technologies, equipment, buildings, and infrastructure, and could thus be a major stimulus for much-needed employment (UNEP, 2008:35). It is based on this notion that the pursuit of green jobs globally will be a key economic driver in the 21st century and in this new environment, human or social capital will fast become the foundation of sustainable businesses (UNEP, 2008).

The next section will attempt to explain how many of the social and environmental crises precipitated by the post-2007 global economic crisis and the impacts of the industrialised era can stimulate green job creation in South Africa.

2.3 The dual-crises in South Africa: Giving rise to the emerging green economy

The pace of recovery from the economic crisis has varied substantially across regions, and particularly at country level. Impact of job losses during the financial crisis also created new opportunities to develop industries that would support social and environmental concerns, but during 2009, these were still early days for South Africa. Patel (2010a:3) indicated from the Inaugural State of the Nation Address in June 2009 that the impact of the global economic recession during 2009 “limited the pattern of consumption-led growth whilst not underpinned by a strong production base”. This resulted in a 3% fall in the GDP during a period of nine months with a million jobs lost over 18 months. He continues to highlight that this extent of joblessness and inequality in South Africa made the creation of employment the top priority for 2010.

A year after this, in 2011, President Jacob Zuma expressed his concerns in the Inaugural State of the Nation Address that unemployment and poverty persist despite the economic growth experienced in the past 10 years (South African State of the Nation Address, 2011). The official unemployment record of 24% in the fourth quarter of 2010 showed improvement from 25.3% in the third quarter of 2010 which was the lowest rate of unemployment recorded in the South

African history (Statistics SA, 2010). The labour absorption rate (percentage of people at working age with jobs) remained extremely low at 40.8% (Lings, 2011).

While the reality of the high unemployment rate persisted during 2012, the impact of climate change and society's response to it gained higher visibility globally (Montmasson-Clair, 2012). The issues that arose out of the economic turndown in late 2008 moved to the forefront of public debate during 2011 in South Africa, and sustainable development became a popular term (IDC et. al., 2011). Those who set public policies and industrial strategies became increasingly focused on addressing social and environmental issues. As a result, the development of a green economy gained traction.

During 2013, visible signs of improvement in the world economy became evident, although the outlook remains uncertain. South Africa's Minister of Finance, Pravin Gordhan, indicated on 27 February 2013 that the economy has continued to grow, but at a slower rate than projected at the time of the 2012 budget (Gordhan, 2013:4). Statistics of the spending path and the recovery of revenue are estimated to stabilise debt at just higher than 40 % of GDP and the budget deficit will fall from 5.2 % of GDP in 2012/13 to 3.1 % in 2015/16 (Gordhan, 2013:4).

Gordhan (2013:6) highlights the measures set to adapt to a low carbon economy, including mobilisation of South Africa's renewable energy potential. These imperatives are stated in the National Development Plan, and supported by the New Growth Plan. In his speech, Gordhan (2013:9) emphasised that fiscal sustainability should be coupled with national development to ensure that progress made will not be interrupted or reversed. Acknowledgement of the move towards a low carbon economy is made where Government proposes to price carbon by way of a carbon tax at a rate of R120 per ton of carbon dioxide (CO₂) equivalent, effective from 1 January 2015 (Gordhan, 2013:15). These measures are set in place to soften the impact, a tax-free exemption threshold of 60% that will be set, with additional allowances for intensive emissions and trade-exposed industries (Gordhan, 2013:15).

2.3.1 Social crisis

The social crisis is characterised as a widening gap between rich and poor with the result that the majority of the South African population is entrenched in poverty due to unemployment. Prior to the global financial crisis in 2008, deep inequalities in income and wealth allowed limited wealth creation for the working class. The richest 10% of households captured around 40% of the national income in South Africa and around three quarters of new credit creation (Patel, 2010a:4).

2.3.2 Ecological crises

South Africa, like any country in the world, is faced with ecological crises linked to the destruction and depletion of natural resources by human activities. One of the consequences is that rising carbon dioxide (CO₂) levels contributes to climate change (Monbiot, 2006). The country's current economic growth model is resource- and energy-intensive, aggravating pressures on the environment and the threat of climate change (Montmasson-Clair, 2012).

The negative effects of global warming pose a threat to the survival of the human race, yet the human race continues exploiting natural resources, compromising the future functioning of natural systems and in so doing putting more and more people into vulnerable positions of compromised health, wellbeing and livelihoods (Katzschner, 2010). In terms of carbon emissions, South Africa was listed in the Human Development report for 2007/8, as number 12 of the global CO₂ emitters in 2004. According to this report (UNDP, 2007), the country's carbon footprint increased over the growth rate period between 1990 to 2004 of 32% and a population share of 0.7% in 1990 to 9.1% in 2004, from 9.1% CO₂ emissions per capita in 1990 to 9.8% in 2004. The share of the world total CO₂ emissions per capita remained at 1.5% in 1990 and 2004 (UNDP, 2007).

The Green Jobs Report (UNEP, 2008) compiled by the United Nations Environmental Programme (UNEP), indicates that the intersection of environment and employment comes

against the backdrop of a profound crisis in both of these areas. From this report it is clear that there is growing recognition that humanity faces a severe environmental emergency and that modern economies have been built on an unsustainable foundation. This is because activities ranging from agriculture and mining to manufacturing, services, and transportation rely on fossil fuels and generate copious amounts of pollution and waste. They also undermine critical ecosystems, eco-services, and life-support. The key challenges in this context are air and water pollution, hazardous wastes, deforestation, desertification, and overfishing (UNEP, 2008).

2.3.3 A green pathway out of poverty

Jones (2008) identifies the linkages between a social and ecological crisis in America which he refers to as the “dual crises” and he suggests the solution to both would be to create a green pathway out of poverty. What does this imply and can it be true for South Africa? Based on the work of Jones (2008), it is clear that the ecological and social crises impact both negatively and positively on each other.

The *negative impact* of the ecological crisis contributes to the social crisis, for example natural resources are being depleted, while at the same time the cost of energy generation is increasing (Irurah, 2003). This adds to the financial burden affecting the poorest of the poor in South Africa most acutely (Khan, 2008). Swilling and Annecke (2012) indicates that it is an extremely difficult task to eradicate poverty with the need to rebuild our eco-system services and natural resources and that South Africa is facing severe challenges in this regard.

The *positive impact* is that energy security becomes critical for economic development and can stimulate job creation. This is the emphasis found in President Zuma’s annual State of the National addresses (2011, 2012 and 2013). Through the White Paper on Energy Efficiency Strategy (2003), national targets were set in South Africa for an energy efficiency improvement of 12% by 2014. Energy efficiency is connected to renewable energy. If renewable energy is harvested, it can be referred to as clean energy, that is, energy that was not generated by the use of fossil fuels (Ururah, 2007). The harvesting of clean energy or renewable energy generation not

only provides jobs, but it also has a reduced impact on the earth's natural resources compared to fossil fuels do (Ururah, 2007). For example, buildings can be designed or retrofitted to be weatherproofed against extreme climatic weather conditions to maximise energy efficiency, both of which impact positively on poverty alleviation through job creation (Jordaan, 2007). Patel (2010:5a) holds an ideological position and as a political leader in South Africa, and from this perspective he states that the world economy faces far-reaching changes as a result of efforts to reduce global warming. He continues to state that while efforts to control emissions will impose heavy costs, especially on relatively carbon-intensive economies like South Africa's, there will also be opportunities for new industries that arise. For example, accelerating technological change promises to transform the world economy, with new job opportunities in areas such as biotechnology and nanotechnology (Patel, 2010a:3). It is important to note from the above statements that Patel's views (2010a) do not provide scientific evidence that could limited business-as-usual to open up opportunities for alternatives.

It is evident from the discussion above of the linkages between environmental and social factors that South Africa is also affected by the dual crises. If one of the solutions might be to create a green pathway out of poverty, it would necessitate building a green economy or inclusive low carbon and sustainable economy that is strong enough to lift millions of people out of poverty through green job creation. Montmasson-Clair (2012:4) supports this notion and states that a green economy, as a ground-breaking way forward, needs to combine economic development, social welfare and environmental protection.

The next section will open with a discussion of the emergence of South Africa's green economic development pathway, then look at the adoption of policy and research on green job potential thereafter.

2.4 The trajectory of South Africa's green economy

South Africa not only faces social, environmental and financial challenges, but a maze of institutions is involved in working out a response to it (Montmasson-Clair, 2012:6). It is of

utmost importance to first unpack South Africa's institutional structures (national, departmental, provincial and local municipality) that are regulating the green economy in order to identify the key policy players and their mandates before entering the next section on national and provincial policy. The clarification of the green governing bodies outlined by Montmasson-Clair (2012:6) is helpful to understand the green economic growth plans and potential green job projections, industries, funding and projects. The following summary by Montmasson-Clair (2012:6) is useful:

- **Department of Environmental Affairs (DEA):** *The National Strategy for Sustainable Development and Action Plan (NSSD) is the responsibility of the Department of Environmental Affairs (DEA), but the National Planning Commission (NPC), a department of sustainable development in all but name, resides in the Presidency (it however have advisory powers only).*
- **Economic Development Department (EDD):** *The green economy formulation of a New Growth Path (NGP) for the country falls under the EDD, but EDD only has direct control over the two main state-run development finance institutions: a) the Development Bank of Southern Africa (DBSA) and b) the Industrial Development Corporation (IDC).*
- **Department of Trade and Industry (the DTI):** *Support for green industry, but the DTI has to rely on other departments to implement measures aimed at green industries.*
- **National Treasury (NT):** *Environmental fiscal reform (green taxes and subsidies which supports both green industries and the greening of the economy as a whole).*
- **Department of Environmental Affairs:** *The DEA is responsible for the protection and restoration of ecosystems and the setting of environmental standards (e.g. for pollution or emissions).*
- **Department of Energy (DoE)** *is in charge of issues relating to fossil fuels and renewable energy.*
- **Department of Water Affairs:** *Falls under the same Minister as the DEA and is responsible for issues relating to water, and technology policy.*
- **Department of Science and Technology (DST):** *Research and development (R&D), in particular the Global Change Grand Challenge.*
- **Other departments:** *These include mining, agriculture, forestry, fisheries, transport, housing and local government and they all contribute to green economy activities and*

thereby to green jobs at the sectorial level. (including mining, agriculture, forestry, fisheries, transport, housing and local government): Contribute to green economy activities and thereby to green jobs at the sectorial level.

2.4.1 National policy framework

The following aspects of regulatory development around the green economy have been considered in this summary: a) government support, policy and market context; b) key challenges and priorities for the green economy and c) the government's response strategy to climate change and environmental degradation. These considerations will only be briefly discussed to provide background.

Montmasson-Clair, (2012) conducted extensive research on South African policy responses and how the above-mentioned considerations support employment opportunities in the green economy. Montmasson-Clair provides a chronological overview of South African policies related to the green economy and green jobs in the table 1 below. The summary includes policy measures, relevant goals, progress (2006 mid-2012) and the nature and level of civil society involvement in their establishment. This overview provides a contextual timeline to frame the green economy trajectory that will be discussed in more detail in the following paragraph.

Polices and measures	Main goals	Progress (mid-2012)	Civil society involvement
Framework for Environmental Fiscal Reform (NT, 2006).	Provides principles and guidelines for fair and effective environmental taxes.	Taxes and levies have been implemented on plastic bags, incandescent light bulbs, ecosystem restoration costs related to water use, liquid fuel, non-renewable electricity and new vehicle carbon dioxide emissions performance.	A paper on carbon tax was published in 2010 for public consultation.
Innovation Plan (DST, 2008).	Includes "safe, clean, affordable and reliable energy supply" and climate change as	Support for innovation in electric vehicles, fuel cells and carbon capture and storage, but	Limited.

	priorities.	cancellation of the country's largest clean energy R&D programme (the Pebble Bed Modular Reactor) and delay in the implementation of renewable energy demonstration projects (e.g. solar tower).	
Medium- Term Strategic Framework 2009-2014 (NPC, 2009).	Notes the need for sustainable livelihoods and sustainable resource management and relates these to various other policy areas including energy, water, housing, technology and competitiveness.	Numerous policy responses implemented in line with the Medium-Term Strategic Framework, particularly the NSSD, the creation of an enabling environment for renewable energy, several water management projects and the National Climate Change Response	Limited.
National Development Plan (NPC, 2011b).	<p>The NDP is very specific about goals and focuses on energy and carbon:</p> <ul style="list-style-type: none"> • Greenhouse emissions to peak in 2025 and introduce carbon budgeting; • An economy-wide price for carbon and incentives for energy efficiency and managing waste better; • 5 million SWHs by 2030; • Vehicle emissions standards, zero emission building by 2030; • Simplify the regulatory regime for contracting about 20 000 MW for renewable 	<p>Greenhouse gas emissions may already be higher than levels committed for stabilization in 2025. A carbon tax with exemptions is expected in 2013. SWH installations stand at just over 200 000 in 2012 (compared to the targeted 2 million by 2014 and 2015). Tax carbon dioxide emissions of motor vehicles and new building energy efficiency regulations implemented. Procurement has started on the first 3.7GW of electricity supply from renewable energy out of a plan for 17.8 GW by 2030.</p>	The NPC is guided by nominated Commissioners from outside of government (and business for the most part) and consulted publicly on the Development Plan based on an initial publication of a diagnostic document.

	energy by 2030.		
National Strategy for Sustainable Development (DEA, 2011).	A large variety of indicators and goals spanning social, economic and environmental issues, but no budgets, timelines or responsibilities.	Strategy published and annual publication of sustainability indicators (different from the ones in the strategy).	Public consultation on a draft NSSD since 2009.
Industrial Policy Action Plan (the dti, 2010, 2011 and 2012).	Specifically targets growth in green industries, focusing on solar water heaters (SWHs), but also includes other solar and wind energy, biofuels, electric vehicles and organic farming.	Around 200 000 SWHs installed by mid-2012 and a procurement process started for around ZAR 120 billion worth of large scale renewable electricity generation.	Some consultation via NEDLAC.

Table 1: Chronological overview of South African policies related to the green economy and green jobs. *Source: Montmasson-Clair (2012).*

This overview provides a contextual timeline to frame the green economy trajectory that will be discussed in more detail in the following paragraph.

Fischer-Kowalski and Swilling (2010:100) highlighted that the issue of our dependence on the consumption of natural resources, which are constrained, is a limiting factor in South Africa's growth plans. This discussion about constraints on natural resources previously came to the forefront in the National Framework for Sustainable Development (NFSD), adopted in June 2008. South Africa's focus since 1994 has been to redress previous imbalances caused by Apartheid, and therefore had not made greening of the economy a priority (ILO, 2011b) until it started to feature in the New Growth Path (Patel, 2010a). The New Economic Growth Path aims at enhancing growth, employment creation and equity. This policy's principal target is to create five million jobs over the next ten years (Patel, 2010a). One of the main drivers of the New Growth Path is to take advantage of new opportunities in the knowledge and green economies (Patel, 2010a:7).

A significant policy breakthrough came early in 2011, when South Africa adopted a resource-efficient, low carbon and pro-employment approach as one of the key drivers of our economic growth path (Patel, 2011). This commitment was made during South Africa's Statement to the Second Preparatory Meeting of the United Nations Conference on Sustainable Development on 7 March 2011 (Patel, 2011) and put in place the fundamental principle on which to build a green economy. If South Africa follows this approach it will help to alleviate social, environmental and economic problems. The United Nations Environmental Programme (UNEP) indicated in the Green Jobs Report, *Towards Sustainable Work in a Low Carbon World* (UNEP, 2008) that a global transition to a low carbon and sustainable economy can create large numbers of green jobs across many sectors of the economy, and indeed can become an engine of development (UNEP, 2008:3). This notion is also supported by a study completed on Skills for Green Jobs in South Africa (ILO, 2010).

The New Growth Path (Patel, 2011:15) prioritises efforts to support employment creation and the green economy is recognised as one of these. The rest of the job drivers are infrastructure, the agricultural value chain, and manufacturing sectors which are included in IPAP2 and tourism. The NGP (Patel, 2011:15) lists the green economy under job driver 3: "Seizing the potential of new economies". Sectors that are showing significant potential for employment opportunities are natural resource management and construction in the short to medium term and renewable energy construction and manufacture of inputs in the medium to long run. Clean or renewable energy and energy efficiency will be discussed in more detail for the purpose of this study.

The gap between access to affordable energy and the demand for clean energy is very large in South Africa and energy efficiency has the potential to accomplish multiple social and economic objectives (Winkler et. al., 2002:593). Most of South Africa's electricity is generated from coal power. Our electricity prices are amongst the lowest in the world, because coal is relatively cheap to mine and environmental costs have not been part of the accounting (Ward, 2005:16). The country is currently faced with an energy crisis. It is as a result of this that more energy strategies and policies have been formulated, for example, the Western Cape Integrated Energy Strategy (PGWC, 2007), that identifies the supply of quality, reliable, clean energy as a vehicle

for delivering social, economic and environmental benefits to citizens while also addressing climate change challenges facing the region and eradicating energy poverty.

Another policy that bears reference is the National Energy Efficiency Strategy (DME, 2009) that sets out the following goals under Social, Environmental and Economic Sustainability. These goals are outlined below as a direct quotation out of the strategy.

i) Social Sustainability

Goal 1: Improve the health of the nation

“Energy efficiency reduces the atmospheric emission of harmful substances such as oxides of sulphur, oxides of nitrogen, and smoke. Such substances are known to have an adverse effect on health and are frequently a primary cause of common respiratory ailments” (DME, 2009:4).

Goal 2: Job creation

“Studies show that jobs will be created by the spin-off effects of energy efficiency implementation. Improvements in commercial economic performance, and uplifting the energy efficiency sector itself, will inevitably lead to nationwide employment opportunities” (DME, 2009:4).

Goal 3: Alleviate energy poverty

“Energy efficient homes not only improve occupant health and wellbeing, but also enable the adequate provision of energy services to the community at an affordable cost” (DME, 2009:4).

ii) Environmental Sustainability

Goal 4: Reduce environmental pollution

“Energy efficiency will reduce the local environmental impacts of its production and use. These impacts include the atmospheric emission of harmful and odorous gases” (DME, 2009:5).

Goal 5: Reduce CO2 emissions

“Energy efficiency is one of the most cost-effective methods of reducing greenhouse gas emissions, and thereby combating climate change. Addressing climate change opens the door to utilising

novel financing mechanisms, such as the Clean Development Mechanism (CDM), to reduce CO2 emissions” (DME, 2009:5).

iii) Economic Sustainability

Goal 6: Improve industrial competitiveness

“It has been demonstrated that one of the most cost-effective ways of maximising commercial profitability is the adoption of appropriate energy efficiency measures. Nationwide, this will improve South Africa’s export performance and improve the value that her economy derives from indigenous energy resources” (DME, 2009:5).

Goal 7: Enhance Energy Security

“Energy conservation will reduce the necessary volume of imported primary energy sources, crude oil in particular. This will enhance the robustness of South Africa’s energy security and will increase the country’s resilience against external energy supply disruptions and price fluctuations” (DME, 2009:5).

Goal 8: Defer the necessity for additional power generation capacity

“It is estimated that the country’s existing power generation capacity will be insufficient to meet the rising national maximum demand by 2007-2012. Energy efficiency is integral to Eskom’s Demand Side Management programme insofar as it contributes 34% towards the 2015 demand reduction target of 7.3GW” (DME, 2009:5).

From goal number two (job creation) listed above it is clear that South Africa’s conditions of unsustainability, inequality and environmental degradation can be addressed to some extent through investment in the renewable energy sector (DME, 2009:4). Saving electricity rather than supplying more of it may be the most cost-efficient path for development (Winkler et. al., 2002:593). “South Africa has excellent renewable energy resources” (Ward, 2005:24). These include solar radiation (especially in the Kalahari); wind energy (on the West Coast) and hydro-electric power (Lesotho Highlands Water Scheme project and Steenbras Dam). Other options that are currently being experimented with include landfill gas, waste-to-energy and wave energy. During 2010 the New Growth Path (Patel, 2010a) recognised the importance of rigorous prioritisation of programmes and policies needed for inclusive, green growth. One of the NGP’s

next steps was to draft a strategy for the green economy that was presented to Cabinet by July 2011 (Patel, 2010 a:23). The Department of Environmental Affairs made a presentation on the Green Economy Programme and New Growth Path to the Portfolio Committee in February 2011 (DEA: 2011). The Green economy key focus areas and related programmes that were identified and are listed in table 2 below:

Green buildings and the built environment	<ul style="list-style-type: none"> • Greening private* and public buildings
Sustainable transport and infrastructure	<ul style="list-style-type: none"> • Promoting non-motorised transport
Clean energy and energy efficiency	<ul style="list-style-type: none"> • Expand off-grid options in rural and urban • REFIT optimisation for large scale renewable and localisation • Up-scale Solar Water Heater rollout
Resource conservation and management	<ul style="list-style-type: none"> • National payments for ecosystem services • Up-scale "Working for" programmes • Sustainable infrastructure and ecosystems integration • Offset programme* • Wildlife management*
Sustainable waste management practices	<ul style="list-style-type: none"> • Zero waste community programme for 500 000 households • Waste beneficiation
Agriculture, food production and forestry	<ul style="list-style-type: none"> • Integrated sustainable agricultural production system
Water management	<ul style="list-style-type: none"> • Water harvesting • Alternative technology for effluent management • Comprehensive municipal water metering (Demand Side Management) • Reduce water losses in agriculture, municipalities and mining
Sustainable consumption and production*	<ul style="list-style-type: none"> • Industry specific production methods* • Industrial production technology changes*
Cross-cutting	<ul style="list-style-type: none"> • Research, awareness, training, skills development and knowledge management

Table 2: Green economy key focus areas and related programmes. (Source: DEA, 2011)

During the first round expression of interest, the department received 154 project proposals of which waste management, agriculture and agro processing and renewable and energy efficiency has the highest job intensity, significant opportunities for localisation and most environmentally beneficial in the short to medium term (DEA, 2011). Round two of the expression of interest resulted in 200 projects received focusing on green industry potential (manufacturing & localisation) (DEA, 2011). The Department of Environmental Affairs (DEA) identified the following major green economy projects: Working on Waste, People and Parks, Sustainable Land-Based Livelihood and lastly Working for the Coast (The MTEF budget for the year 2011/12- 2013/14 from the Expanded Public Works Programme (EPWP) contribution is listed

below and a projection of the job creation and skills development targets is also listed per focus area (DEA, 2011). See table 3 below.

Focus Areas (Projects)	Budget for 2011/12 – 2013/14 MTEF (R' 000)	Job Creation/ Skills Development Targets
Working on Waste: Includes waste recycling and buy-back centres, rehabilitation and or new landfill sites, Assist municipalities with street cleaning and general waste collection.	R 1, 813, 139	60, 111 Work Opportunities by March 2014
People and Parks: Development and upgrading of infrastructure in and around protected areas; Development of benefit sharing models for communities living around parks & protected areas.		30, 056 Full Time Equivalents by March 2014
Sustainable Land-Based Livelihood: includes creation of recreational parks, sustainable management of open spaces, landscaping & beautification, planting of indigenous trees, establishment of food and medicinal plant gardens, nursery as well as rehabilitation of wetlands		104, 482 Accredited Training Person days by March 2014
Working for the Coast: Cleaning along the coast, rehabilitation of coastal environment including but not limited to dunes, estuaries, etc. Upgrading of facilities and infrastructure along the coast.		

Table 3: Green project focus areas and job creation and skills development programmes.

Source DEA (2011).

Unfunded green economy projects are listed in table 4 below and it is notable that the majority projects that require funding are Sustainability Land-Based Livelihood that would potentially

Projects	Investment Value (R' 000)	Job Creation Potential (Work Opportunities)
Working on Waste: includes waste recycling and buy-back centres, rehabilitation and or new landfill sites, Assist municipalities with street cleaning and general waste collection.	R 60, 400	1,695
People and Parks: Development and upgrading of infrastructure in and around protected areas; Development of benefit sharing models for communities living around parks & protected areas.	R 441, 139	12,378
Sustainable Land-Based Livelihood: includes creation of recreational parks, sustainable management of open spaces, landscaping & beautification, planting of indigenous trees, establishment of food and medicinal plant gardens, nursery as well as rehabilitation of wetlands	R 551, 320,	15,469

Table 4: Unfunded green economy projects. Source DEA (2011).

The projects that moved forward during 2011 were: Energy, Transport, Agriculture and Waste Management. The UNEP report on Green Jobs states that forward thinking government policies remain indispensable: “They are important for providing funding of green projects; overall goal- and standard-setting beyond the time horizons typical in the business world; providing infrastructure that private enterprises cannot or will not create; and creating and maintaining a level playing field for all actors” (UNEP, 2008:4). The UNEP (2008:4) recommended that the following key policies be adapted:

Subsidies

Phase out subsidies for environmentally harmful industries, and shift a portion or all of those funds to renewable energy, efficiency technologies, clean production methods, and public transit.

Carbon Markets

Fix the current shortcomings inherent in carbon trading and Kyoto Protocol related innovations like the Clean Development Mechanism so that they can become reliable and adequate funding sources for green projects and employment.

Tax Reform

Scale up eco-taxes, such as those adopted by a number of European countries, and replicate them as widely as possible. Eco-tax revenues can be used to lighten the tax burden falling on labor while discouraging polluting and carbon-intensive economic activities.

Targets and Mandates

Ensure that regulatory tools are used to the fullest extent in the drive to develop greener technologies, products, and services—and thus green employment. This includes land-use policies, building codes, energy-efficiency standards (for appliances, vehicles, etc.), and targets for renewable energy production.

Energy Alternatives

Adopt innovative policies to overcome barriers to renewable energy development, including feed-in laws that secure access to the electrical grid at guaranteed prices.

Product Take-back.

Adopt “extended producer responsibility” laws (requiring companies to take back products at the end of their useful life) for all types of products.

Eco-Labeling

Adopt eco-labels for all consumer products to ensure that consumers have access to information needed for responsible purchasing decisions (and hence encouraging manufacturer to design and market more eco-friendly products).

R&D Budgets

Reduce support for nuclear power and fossil fuels and provide greater funding for renewable energy and efficiency technologies.

A national partnership for sustainable development emerged during 2011 when the National Strategy for Sustainable Development and Action Plan (NSSD1) was approved by Cabinet on 23 November 2011 and builds on the 2008 NFSD and several initiatives that were launched by the business sector, government, NGOs, civil society, academia and other key role players to address issues of sustainability in South Africa (DEA, 2011). This shift was seen by DEA (2011) as a proactive strategy that regards sustainable development as a long-term commitment, which combines environmental protection, social equity and economic efficiency with the vision and values of the country (DEA, 2011). The implementation period of NSSD1 is over a four year period (2011-2014) and the progression thereof will be followed by NSSD 2 (2015–2020). The NSSD 1 identifies 113 interventions that can be monitored for implementation and will be overseen by DEA. DEA will establish and oversee the NCSD that will “operate in multifold among government spheres to engage civil society, NGOs, the private sector, academia, independent reviewers and other multistakeholders” (DEA, 2011).

Additional commitments to the green economy followed from the National Development Plan that indicated significant policy contributions during 2013 where a carbon tax policy paper were published to support a low carbon economy in South Africa (Gordhan, 2013:16). Gordhan highlights that Government continues to direct spending toward environmental programmes, for example: “ installing solar geysers, procuring renewable energy, low carbon public transport, cleaning up derelict mines, addressing acid mine drainage, supporting national parks and saving red data species like the rhino population” (Gordhan, 2013:16). Government is encouraging the private sector and smaller public entities to be creative and develop low-carbon projects through the Green Fund where R800 million rand was allocated in the start-up phase and an additional

R300 million is projected to be included (Gordhan, 2013:16). The Green Accord (Patel, 2011) confirms that South Africa has a unique opportunity to create jobs on scale and address the concerns about climate change, through a partnership to promote the green economy and processes to green the economy. The New Growth Path sets a goal of five million new jobs by 2020. It projects that, with the right policies and cooperation, large numbers of green jobs can be created (Gordhan, 2013:16). The key messages are about opportunity, innovation, responsibility and partnership. More details regarding the Green Fund will be discussed in section 3.5.3.

2.4.2 Provincial initiatives

Since 2011, green economic policies became a reality at a provincial level. These policies have been adapted over a 3 year period, indicating significant advancement and commitment. The section below will briefly elaborate on the latest policy advances in the three largest provinces in South Africa, namely the Western Cape, Gauteng, and Kwazulu-Natal. The purpose of this overview is to elaborate on the policy support for investment in projects that creates green jobs and prospects to develop green skills.

2.4.2.1 Western Cape Province.

The Western Cape Green Economy Strategy Framework (WCGE) is seen as the Western Cape's roadmap to achieving a low carbon, green and inclusive economy (PGWC, 2013). Helen Zille, the Premier of the province, stated that "through this strategy, the Western Cape Province is positioning itself as the leading green economic hub in Africa" (PGWC, 2013). This notion was foreshadowed by Minister Alan Winde's Provincial Budget Speech, where he identified the green hub as one of the key priority Special Purpose Vehicles (SPVs) for the province (Winde, 2012). It is clear from these references that this province is aiming to set a standard for green economic development that would lead the national commitment to move towards a low carbon economy. The objective of the Western Cape Green Economy's Strategic Framework is to include the double dividend of optimising green economic opportunities and enhancing environmental performance (PGWC, 2013:5). The Western Cape Green Economy Strategy Framework is

premised on 5 key principles that drive areas of focus and choices of action. These are: “a) A strong potential market demand from the local to the global sphere; b) Investment to support green growth primarily driven by private enterprise and entrepreneurial businesses; c) To be public sector-enabled entities that create important markets, providing both political and economic leadership; d) Collaboration through innovation and market expansion; d) Inclusive growth by addressing resource and climate change challenges that threatens economic exclusion” (PGWC, 2013:6).

Alan Winde indicates that “employment in the province’s green economy was expected to increase from 3 000 jobs in 2010 to 12 000 by 2015, 16 000 by 2020 and 20 000 by 2025” (Creamer Media, 2013). Helen Zille stated that the potential impact of the renewable energy sector for the Western Cape is significant (Winde, 2012). This is demonstrated by substantial investments of R7.5 billion in the Renewable Energy Independent Power Producer Programme (REIPPP) (Winde, 2012). Advantages of the Western Cape province include its rich natural assets, especially for renewable energy (wind, solar and wave); the resident expertise, design capabilities and diverse economic activity of the region. Caution needs to be taken to be proactive about the impacts of climate change, due to the province’s vulnerability. These vulnerabilities, which include drought and water shortages, will be most threatening to agricultural activity, especially food security and exports (PGWC, 2013:5).

Private sector is seen as driver with government being a more responsive partner that plays a supportive role. One of the striking areas highlighted by this policy is the province’s openness to learn as well as engage with government and the private sector in order to ensure that this is not a static, but a living strategic framework (PGWC, 2013:5).

Allen Winde (Creamer Media, 2012) indicated that employment opportunities in the Western Cape’s green economy are projected to grow 500% by 2020, with the majority of the new opportunities to be created in the manufacturing of components for the renewable energy sector (Creamer Media, 2012). One of the Sector Development Agencies that was established by the Western Cape provincial government and the City of Cape Town is GreenCape (Green Cape, 2013 & Creamer Media: 2012). The GreenCape Initiative was established to unlock the manufacturing and employment potential in the green economy in the Western Cape. “Through

partnerships with WESGRO, provincial government and academia, the GreenCape Initiative provides a platform to build a competitive business infrastructure in the Western Cape” (Winde, 2012).

This province is taking initiatives to address skills gaps, not only by looking at skills shortages at a technical level of green collar workers only, but also shortages in human resource and training professionals. To respond to these challenges, Helen Zille, Premier of the Western Cape hosted the first Provincial Skills Development Forum (PSDF) in June 2011 to address the skills shortage and future skills demand in the Western Cape (PGWC, 2011). Three spheres of government, higher education, organised labour and business together were brought together through this forum (PGWC, 2011). One of the key areas of focus during the forum discussions was to create awareness of green skills in the renewable energy sector invited representatives from all SETAs, local business owners and international investors to look at the supply of skills training programmes and the demand for employment (Cape Chamber of Commerce and Industry, 2012). A key question asked was whether the province can ensure that the skills of wind technicians and solar panel technicians and all of the other skills are going to be available when these factories come on stream (Cape Chamber of Commerce and Industry, 2012).

2.4.2.2 Gauteng Province

The most recent strategic policy for the Gauteng province was released on 19 October 2011, namely *Green economy transitions: Gauteng Green Strategic Programme* (Gotz, 2011). During 2011, Gauteng province generated 34% of the national GDP and the wider city-region 43%. This is seen by Gotz (2011:2) as a significant part of the ‘problem’ in terms of unsustainable production and consumption.

Key conceptual areas of interest in this strategic programme are summarised below (Gotz, 2011), namely:

- Green jobs and green economies are seen as public sector sponsored jobs in eco-systems services. Green economies not only create direct and indirect employment opportunities,

they also protect existing jobs by addressing the increasing costs and challenges that undermine traditional economic growth, such as increasing food and energy prices.

- It is clear that industrial interventions are needed to target businesses for subsidy support and the IDC and IPAP2 is working around providing these;
- Market demand needs to be created for green goods and services in every sector. Procurement is a key lever here;
- Investment in green assets (infrastructure) that provide ecosystems services, and in doing so reduce the long terms costs on the economy;
- Re-internalising costs to include environmental costs; and
- A fully regenerative economy, not just one that improves unit-efficiency; and

In summary, the following targets were set by the framework:

- **Intergovernmental standards:** To agree on intergovernmental standards of new technologies and selected industrial strategies that would receive targeted support. The International Development Corporation (IDC) and Natural Resource Conservation Service (NRCS).
- **Skills:** Grow a technical skills base for the green economy by undertaking a detailed skills audit to enable the reskilling of recently unemployed workers.
- **Innovation:** Develop regional innovation to support research and development around green products and services.
- **Manufacturing:** Create “cradle to cradle” (closed loop) circuits where the waste outputs of some industries are used as the inputs for others.
- **Energy:** Determine and promote the most economically, socially and environmentally sustainable supply of renewable and alternative energy. This will maximise the use of clean energy technologies and interrogate barriers.

- **Agriculture:** Promote and support training of conservation agriculture with a strong focus on organic- and small scale farmers.

Swilling, et al indicated in the first draft of the Gauteng Green Strategic Programme that “it will be up to Gauteng as the economic heart of South Africa to drive these goals and create sustainable jobs through a sustainable use of resources and a reduction in carbon intensity. To achieve these goals, the economic focus needs to be on creating institutions that are able to foster the evolution of new technologies and processes. These institutions are the key to unlocking green potential, by creating skills and programmes that drive a low carbon agenda” (Swilling, et al, 2010:12).

2.4.2.3 KwaZulu-Natal Province

The KwaZulu-Natal Department of Economic Development and Tourism (KZNDEDT) developed a Strategy for a Green Economy during 2012 (Sutherland et. al., 2012). This strategy’s vision is “to be a province in 2013 where the economy provides opportunities for all its residents to prosper, and where the natural resources are enhanced and used sustainably in supporting basic needs as well as green economic growth” (Ramayia, 2012:1). The province’s global response is to build resilience into the economy through recognising and addressing environmental and social thresholds in how economic growth takes place. Thus the dual crisis is addressed. The strategy states clearly that the development of a green economy is not “about the establishment of a new sector within the existing economy, but about transformation of existing supply chains over non-renewable resources, and the development of new products and services in the environmental sector” (Sutherland et al 2012:1).

The strategy was developed through a collaborative process by harnessing interest through sector and multi-stakeholder workshops around the green economy (Sutherland et al. 2012:1). This interactive process resulted in the establishment of a green economy “community of innovation”, or green economy hub. Sutherland et al (2012:1) describe that the first phase of the policy development process involved a review of literature to define the green economy, followed by an analysis of green economy activities in the province to identify interventions. “This methodology

that was used contributed to the production of knowledge around the green economy, both from an academic and a practical perspective, leading to tangible outcomes”... and it “allowed the province to shift in thinking from ‘business as usual’ Sutherland et al (2012:1).

The economic approach is seen as a transition from an approach that “*considers the environment as an infinite resource from which to grow the economy, to one that recognises that the environmental system and economic sub-system should be embedded within, and shaped by, the environmental assets and services restructuring of business, infrastructure and institutions towards more sustainable (green) production, consumption and distribution processes, creating new economic opportunities and green jobs*” Sutherland et al (2012:4). This shift is also viewed as: “result[ing] in improved human well-being and social equity, risks and ecological scarcities” (UNEP, 2010 in Sutherland et al 2012:1). In this definition, the acknowledgment of the inclusion of both the ‘green’ and the ‘brown’ issues in the green economy is made and “[t]he development of an economy where there is a shift toward the goal of ‘resilience’ rather than growth, greater social equity and justice, and investment in the protection and enhancement of the environmental asset base, thereby reducing environmental scarcities and risks.” (Sutherland et. al., 2012:6) It is clear from the above argument that the green economy requires a shift in business, infrastructure and institutions towards more sustainable (green) production, consumption and distribution processes, creating new economic opportunities and green jobs.

In conclusion the recommendations for KwaZulu-Natal’s Strategy for a Green Economy are to move towards a type of economic growth which strives to achieve resilience by examining and challenging the use of non-renewable or unsustainable resources. This will require significant shifts, where the Green Economy’s commitment will be to create decent jobs and sustainable livelihoods by social justice and equality; “greening the brown”; retrofitting; “unlocking the green”; achieving the goal of ‘resilience’ rather than growth; and investing in the management of the environmental asset base (IIED, 2009:4 in Sutherland et al (2012:8).

What are the implications of this strategy for the creation of green jobs and skills development?

At present, there is a strong focus on research that has been conducted in the province related to the creation of green jobs for local people. This is possible because the province offers

significant opportunities for job creation and economic growth. A website called “KZN Green” was launched (refer to <http://www.kzngreengrowth.co.za/>) to disseminate information to all stakeholders regarding main developments, “early-wins”, opportunities and resources in the green economy sector in KwaZulu-Natal. The public can access research reports, articles, presentations, events notices, funding notices and business linkages.

Various projects within the province have been identified within the strategy, but will not be discussed due to restrictions on the length of the conceptual literature review. The purpose of the above summary was just to outline that KwaZulu-Natal province has a strategy in place and to discuss the fundamental thinking behind the approach.

2.5 Key research reports related to green jobs and skills

This section will discuss key green jobs reports related to potential employment opportunities over the short, medium and long term. It will also discuss funding for policy development, research development, key projects to create green jobs, and investment in skills development training and education.

The following is a brief summary of key South African research reports related to green jobs that informed my study. These reports are all complementary: they build on one another’s findings and contribute to the foundation of a knowledge field in the green economy specifically related to job creation. A high level overview of these key reports will be presented in chronological order from the most recent backwards.

2.5.1 South African case study: Green Economy Policy Framework and Employment

Opportunity

The South African case study on Green Economy Policy Framework and Employment Opportunity was conducted in August 2012, by Trade Industrial Policy Strategies (TIPS). The

study suggests that if South Africa supports green sectors through creating an enabling environment, it is possible to create a shift towards sustainable development that would foster growth and employment (Montmasson-Clair, 2012:4).

The paper is structured as a national case study that “investigates the current state of play in terms of green jobs in South Africa and analyses potential changes that a shift to a green economy could generate on the labour market” (Montmasson-Clair, 2012:4). Montmasson-Clair makes a critical contribution to the green economy body of knowledge by unpacking the role and mandates of South Africa’s institutional structures (national, departmental, provincial and local municipality) to enable the growth of the green economy.

The report is helpful in understanding how the green economy growth plans are not only projecting potential green job creation, but already created several hundred thousand jobs “in mining jobs related to catalytic converters (half the demand for platinum, which employs 180 000 people), as well as services jobs in recycling, biodiversity conservation and eco-tourism” (Montmasson-Clair, 2012:16). This report substantiates the National Growth Plan’s projection of 300 000 - 400 000 new jobs to be created in green industries.

Montmasson-Clair addresses concerns previously highlighted by the international report on *Green Jobs: Towards Sustainable Work in a Low Carbon World* (UNEP, 2008) which warned that the decline in fossil fuel-dependent jobs would be problematic. His recommendations are aligned with proposals made by UNEP (2008) to put preventative measures in place to target and empower workers such as coal miners to transition to greener jobs. Montmasson-Clair (2012:16) contends that sacrificing some of these types of jobs could improve employment quality through green jobs created. This, however, would be dependent on existing and future regulations. This research indicates that work in the construction and manufacturing sectors is not likely to change drastically, but that while service jobs in waste collection or ecosystem restoration may not represent formal and/or full-time jobs, people who would otherwise not have a job would be able to receive the benefit of employment.

Reference is made to higher quality job requirements for professionals with managerial and technical (engineering and artisanal) skills. The report identifies needs for a technical skills base, as well as the demand for engineers and highly qualified staff. The challenge of a skills shortage needs to be addressed urgently to avoid “bottle-necks” that could stall the growth of the green economy. The cause of this skills shortage was found to be a lack of coordination in training and development programmes as well as the absence of ‘green skills’. These findings reflect those made by the International Labour Organisation (ILO) when they conducted a study in 2010, *Skills for green jobs in South Africa* (ILO, 2010). The shortfall could be addressed productively if South Africa develops green economy policies for skills development as the foundation for developing the green economy.

2.5.2 Green Jobs: An estimate of direct employment potential of a greening South African economy

This report, conducted by the Industrial Development Corporation (IDC), Development Bank South Africa (DBSA) and Trade Industrial Policy Strategies (TPS) during 2011, was the first report that focused on estimating the direct employment potential of a greening South African economy.

During 2010, South Africa’s New Growth Path (NGP) identified technological innovation as an opportunity for substantial creation of employment. A target of 300 000 additional direct jobs by 2020 has been set to green the economy, with 80 000 in manufacturing and the rest in construction, operations and maintenance of new environmentally friendly infrastructure (Patel, 2010a:23). The potential for job creation rises to well over 400 000 by 2030. Projections for additional jobs precede from the assumed expansion of existing public employment schemes to protect the environment, as well as in the production of biofuels. The Integrated Resource Plan (IRP2) targets for renewable energy open up major new opportunities for investment and employment in manufacturing new energy technologies as well as in construction. In addition, the New Growth Path set a target for 100 000 new jobs by 2020 in the knowledge intensive

sectors of Information and Communications Technology (ICT), higher education, healthcare, mining-related technologies, pharmaceuticals and biotechnology.

Following these projections, there was a need to conduct more research on potential job creation, specifically related to the transition to a low carbon economy in South Africa. The most recent green job projections were made by IDC-DBSA-TIPS during 2011. Estimates are made in individual green areas/technologies within which each of these broad types of activity for three consecutive timeframes. These projections revealed the potential of an unfolding green economy, namely: 98 000 jobs in the short term over a two year period (2011-2012) , 255 000 in the medium term over a five year period (2013-2017) and 462 000 employment opportunities in the formal economy in the long term leading over eight years (2017-2015) (IDC-DBSA-TIPS, 2011:3-4).

The following categories are used by IDC-DBSA-TIPS (2011:8) to describe employment sectors in green industries, namely: “a) Non-renewable: Energy Efficiency; Waste management; Consulting; Environmental Resource Management and Built Environment and; b) Renewable energy: Wind, Solar, Bio-mass, Bio-fuels, Solar, Geo-thermal, and Wave”.

Jobs in renewable energy

“Jobs in renewable energy can be found in installing, operating, and maintaining renewable energy systems. This type of work tends to be localised in nature and can thus benefit job creation aimed at young people, women and skilled or unskilled labour” (UNEP, 2008:8). Grameen is training local youth and women as certified solar technicians and as repair and maintenance specialists, hoping to create some 100 000 jobs (UNEP, 2008:8). There is also a potential contradiction between renewables as a global source of jobs and renewables as part of national competitive economic strategies. As renewables industries mature, they will increasingly be marked by difficult issues of competitiveness, trade rules, and wage differentials that are already familiar topics in other industries (UNEP, 2008:9). The UNEP Report on Green Jobs (2008:6) states that employment in renewable energy is growing at a rapid pace and this growth seems likely to accelerate in the years ahead. Compared to fossil-fuel power plants, renewable energy generates more jobs per unit of installed capacity, per unit of power generated

and per dollar invested. Recent statistics on employment potential in renewable energy were made available through a study conducted by the IDC-DBSA-TIPS during 2011, “*Green Jobs: An estimate of the direct employment potential of a greening South African Economy*”.

This report categorises energy generation sectors into: “Renewable (non-fuel) electricity, fuel-based renewable energy and liquid fuel. Segments of wind power, solar power, marine power and hydro power fall under renewable (non-fuel) electricity, waste-to-energy falls under fuel-based renewable energy, and bio-fuels fall under liquid fuel” (IDC-DBSA-TIPS, 2011:8). Table 5 below illustrates these segments, listing technologies and products under each and then making green job projections for total net direct and net direct manufacturing employment potential in the long term (15 years) (IDC-DBSA-TIPS, 2011). From the table it is clear that an estimate of 130 023 energy generations jobs are projects over the long term (15 years) (IDC-DBSA-TIPS, 2011:8).

Broad green economy category		Segment	Technology/product	Total net direct employment potential in the long-term	Net direct manufacturing employment potential in the long-term	Total net direct employment potential (ST, MT, LT)	Net direct manufacturing employment potential (ST, MT, LT)
ENERGY GENERATION	Renewable (non-fuel) electricity	Wind power	Onshore wind power	5 156	2 105	VL, L, M	L, M, H
			Offshore wind power				
		Solar power	Concentrated solar power	3 014	608	N, VL, M	N, VL, M
			Photovoltaic power	13 541	8 463	M, H, H	H, VH, VH
		Marine power	Marine power	197	0	N, N, VL	N, N, N
		Hydro power	Large hydro power	272	111	VL, VL, VL	VL, M, VL
	Micro-/small-hydro power		100	0	VL, VL, VL	N, N, N	
	Fuel-based renewable electricity	Waste-to-energy	Landfills	1 178	180	VL, VL, L	VL, VL, L
			Biomass combustion	37 270	154	VL, H, VH	VL, VL, L
			Anaerobic digestion	1 429	591	VL, VL, L	VL, L, M
			Pyrolysis/Gasification	4 348	2 663	VL, L, M	VL, H, H
			Co-generation	10 789	1 050	L, M, H	M, H, H
	Liquid fuel	Bio-fuels	Bio-ethanol	52 729	6 641	M, H, VH	L, H, VH
			Bio-diesel				
ENERGY GENERATION SUB-TOTAL				130 023	22 566		

Table 5: Green Jobs potential in renewable energy generation over the long term. *Source:* IDC-DBSA-TIPS (2011:8).

Jobs in non-renewables:

A total of 462 567 jobs in non-renewables are projected and categorised as follows (see table 6):

- Energy & resource efficiency (67 977) : Green Buildings, transportation and industrial;
- Emissions and pollution mitigation (31 642): pollution control, carbon capture and storage, recycling; and Natural resource management (232 926): Biodiversity conservation and eco-system restoration, soil and land management.

Broad green economy category	Segment	Technology/product	Total net direct employment potential in the long-term	Net direct manufacturing employment potential in the long-term	Total net direct employment potential (ST, MT, LT)	Net direct manufacturing employment potential (ST, MT, LT)
ENERGY & RESOURCE EFFICIENCY	Green buildings	Insulation, lighting, windows	7 340	838	L, M, M	L, M, M
		Solar water heaters	17 621	1 225	L, H, H	L, M, H
		Rain water harvesting	1 275	181	VL, VL, L	VL, VL, L
	Transportation	Bus Rapid Transport	41 641	350	VH, VH, VH	H, M, L
	Industrial	Energy efficient motors	-566	4	VL, VL, VL	VL, VL, VL
		Mechanical insulation	666	89	VL, VL, VL	VL, VL, VL
ENERGY & RESOURCE EFFICIENCY SUB-TOTAL			67 977	2 686		
EMMISSIONS AND POLLUTION MITIGATION	Pollution control	Air pollution control	900	166	N, VL, VL	N, L, L
		Electrical vehicles	11 428	10 642	VL, L, H	N, H, VH
		Clean stoves	2 783	973	VL, VL, L	VL, L, M
		Acid mine water treatment	361	0	VL, VL, VL	N, N, N
	Carbon Capture and Storage		251	0	N, VL, VL	N, N, N
	Recycling		15 918	9 016	M, H, H	H, VH, VH
EMMISSIONS AND POLLUTION MITIGATION SUB-TOTAL			31 641	20 797		
NATURAL RESOURCE MANAGEMENT	Biodiversity conservation & eco-system restoration		121 553	0	H, VH, VH	N, N, N
	Soil & land management		111 373	0	VH, VH, VH	N, N, N
NATURAL RESOURCE MANAGEMENT SUB-TOTAL			232 926	0		
TOTAL			462 567	46 049		

Table 6: Green Jobs potential in non-renewable over the long term. *Source: IDC-DBSA-TIPS (2011:8).*

Low hanging fruit: Jobs in green buildings and the built environment

Low hanging fruit for green job creation in the manufacturing and installing of renewable energy technology is present in the construction industry. The Industrial Development Committee (IDC) (The Good News, 2011) reported that skilled labour could provide immediate job opportunities,

for example, the installation of solar panels. Patel (2011) indicates that 25 000 units of solar water geysers were installed up to 2011 in new low-cost houses through a partnership that included the IDC. The South African construction industry is currently negatively affected by the global financial crisis and a great number of job losses occurred during the past year (Salgado, 2011). Thus, people who need work can be provided with the type of work that is most needed to stimulate the green economy.

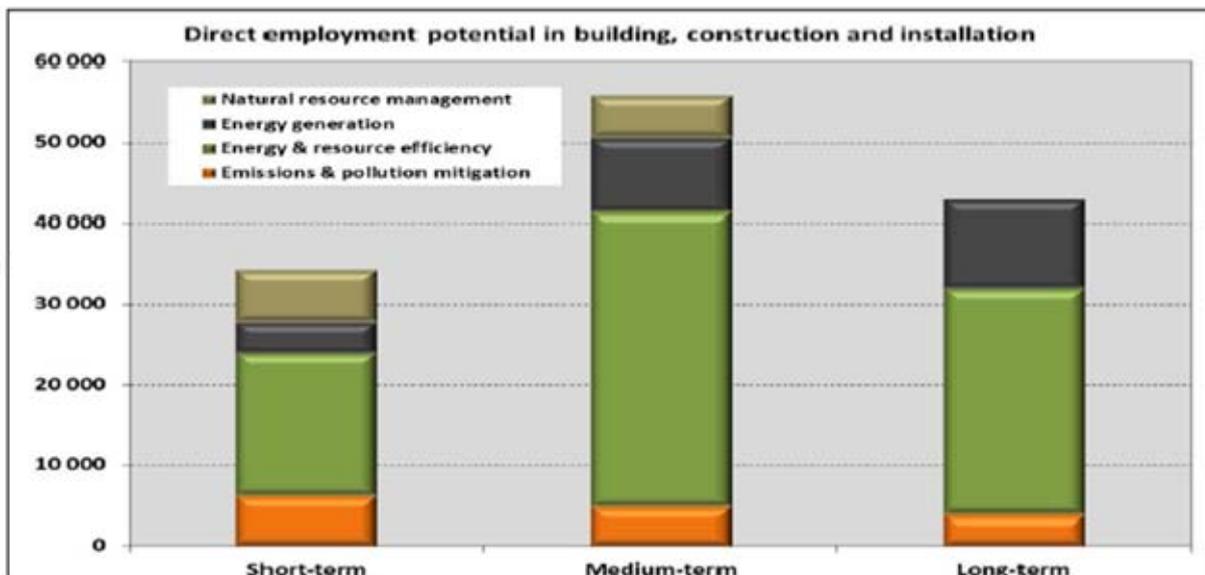
Types of jobs that are created in the green building and the retrofitting process include green designers, architects, auditors, engineers, estimators, project managers, and various jobs in the construction trades, such as pipe fitters, sheet metal workers, and general construction workers, among others (UNEP, 2008:10). These jobs are created during the initial construction or investment periods and are likely to be local jobs, which is especially beneficial for developing regions and areas of high unemployment. The UNEP Report on Green Jobs indicates that an increase in demand for green building components and energy-efficient equipment will stimulate green manufacturing jobs. “Energy-efficient equipment often requires more skilled labor than their inefficient counterparts, thus leading to not only a larger number of jobs, but also higher-skilled, higher-paying employment. Sectors such as manufacturing, construction, education, services, finance, and agriculture, which are more labor intensive than traditional energy services, stand to benefit from the re-spending effects associated with energy efficiency. Workers in coal, oil, gas extraction, and fuel refining could see a reduction of jobs in the traditional energy sector” (UNEP, 2008:10). The potential jobs that would be created through energy-efficiency measures including investment, standards, and mandates are listed in the extracted Table ES-2 from the UNEP Green Jobs Report (2008:10) below.

Jobs related to the design and construction of green star buildings (commercial, residential and retail) can be generated through the implementation of Green Star Rating tools that were introduced by the Green Building Council of South Africa in 2007. No reference to the potential for job creation is made in South African literature. The Green Star Rating system is similar to that of the LEED (Leadership in Energy and Environmental Design) certification system commonly used in America. The Green Building Council offers training and a qualification for accredited professionals.

UNEP (2008:12) indicates that a transition to energy-efficient buildings could create millions or even tens of millions of jobs worldwide and would green existing employment for many of the estimated 111 million people already working in the sector. Furthermore, the effects of greening municipal, commercial, industrial, and residential buildings will radiate outwards to people who work in these energy-efficient buildings.

Figure 2 below describes the direct employment potential in building, construction and installation. It is clear from this illustration that employment in jobs related to energy and resource efficiency would be substantially highest in the short-, medium- and also the long term. Energy generation-related jobs opportunities are the lowest in the short-term, but more than natural resource management and emissions and pollution mitigations categories, second largest in the medium- and long term. Projected employment in emissions and pollution mitigation is projected to be slightly higher than energy and resource efficiency in the short term, but equally low to natural resource management in the medium-term and even lower in the long term. Natural resource management employment potential shows similar statistics as emissions and pollution mitigation in the short- and medium- term and is not evident in the long term.

Figure 2: Direct employment potential in building, construction and installation. *Source: IDC-DBSA-TIPS (2011:14).*



Direct employment in the building, construction and installation industry could be seen as a “quick win” or “early fruit” for green jobs. The shifting nature of employment in the construction industry is becoming more evident as property developers, architects, engineering firms, builders and other specialists are re-positioning themselves to become competitive in the “green economy”. Building practices are changing and the Green Star SA rating system is proving to be a dynamic driver to formalise innovative designs, materials and building processes to support more energy efficient buildings (GBCSA, 2013). This is creating more green jobs and engineers and architects are re- and up skilling by acquiring more qualifications to work as green collar workers.

The largest potential for green job creation according to the Green Jobs Report (IDC-DBSA-TIPS, 2011) is found in the building, construction and installation industries and the following numbers of green jobs are projected to become available in three different categories, namely: Insulation, lighting and windows (table 7), solar water heaters (table 8) and rainwater harvesting (table 9).

Insulation, lighting and windows

Table 4.1: Summary of net direct employment potential associated with insulation, lighting and windows

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	1 559	0	1 559	3 856	0	3 856	6 502	0	6 502
O&M	0	0	0	0	0	0	0	0	0
Manufacturing	302	0	302	588	0	588	838	0	838
Totals	1 861	0	1 861	4 444	0	4 444	7 340	0	7 340

Source: Authors

Table 7: Summary of net direct employment potential associated with insulation, lighting and windows. Source: Table 4.1 in IDC-DBSA-TIPS (2011:88).

Solar water heaters

Table 4.3: Summary of net direct employment potential associated with solar water heaters

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Installation	1 345	0	1 345	8 932	0	8 932	16 278	0	16 278
Distribution	6	0	6	20	0	20	119	0	119
Manufacturing	157	1	158	451	104	555	912	313	1 225
Totals	1 508	1	1 509	9 403	104	9 507	17 309	313	17 622

Source: Authors

Table 8: Summary of net direct employment potential associated with solar water heaters.

Source: Table 4.3 in IDC-DBSA-TIPS (2011:92).

Rainwater harvesting

Table 4.4: Summary of net direct employment potential associated with rainwater harvesting

Activity	Short term			Medium term			Long term		
	Domestic	Export related	Total	Domestic	Export related	Total	Domestic	Export related	Total
Construction	34	0	34	76	0	76	1 041	0	1 041
O&M	1	0	1	4	0	4	53	0	53
Manufacturing	6	0	6	13	0	13	181	0	181
Totals	41	0	41	93	0	93	1 275	0	1 275

Source: Authors

Table 9: Summary of net direct employment potential associated with rainwater harvesting.

Source: Table 4.4 in IDC-DBSA-TIPS (2011:97).

2.5.3 Green Skills: Skills for green jobs in South Africa: unedited background country study

This material was reviewed to: a) unpack the characteristics of green skills; b) identify skills shortages; and c) identify green skills training and education programmes.

OneWorld Sustainability Investments was commissioned by the ILO between May 2009 and March 2010, to prepare a country-wide South African study on Skills for Green Jobs, to be completed by 2010. The study is embedded in the Green Jobs Initiative, a joint initiative of the UNEP, the ILO, the International Employers' Organisation (IOE) and the International Trade

Confederation (ITUC), to assess, analyse and promote the creation of decent jobs as a consequence of required environmental policies (ILO, 2010:3).

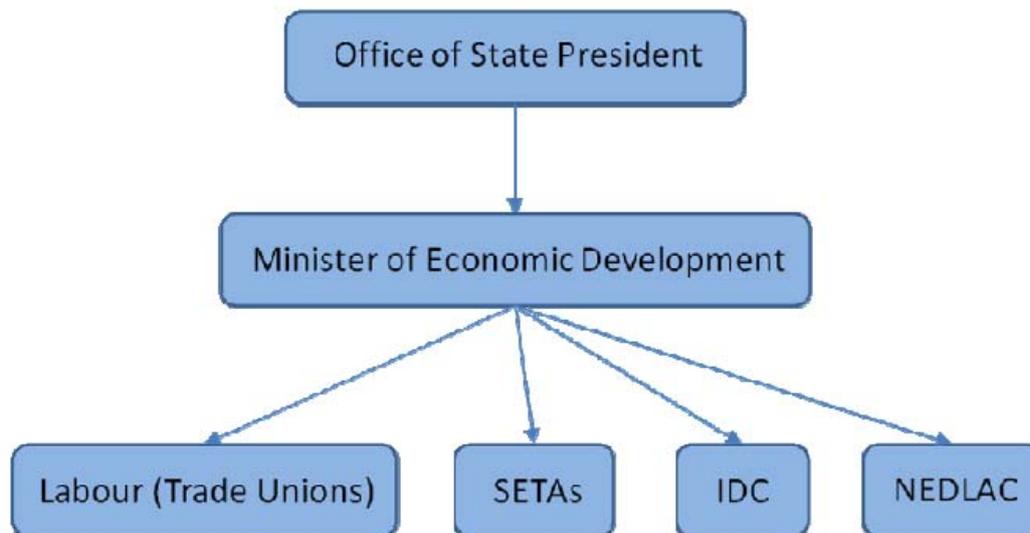
The study looked at current and future skills requirements for South African's greening economy. Sectors which are likely to see changes due to the global push for green economies were identified. The analysis combined existing data on skills shortages, estimates of demand for green occupations, and case studies where specific sectors have experienced elements of "greening". It further identified skills needed for greener economies with respect to structural shifts, and new, emerging and changing occupational profiles (ILO: 2010).

The following key constraints for green skills development were identified: a) inconsistency in South Africa's policy; b) no specific budget allocations for green skills development is not earmarked in relevant programmes; c) a lack of awareness around green skills; d) skills gaps across all sectors and e) a lack of a skills development structure at a national level (ILO: 2010).

Skills gaps impose significant bottlenecks for the further development of a green economy. These gaps exist across all sectors, while it is acknowledged that skills development structures are well developed, led by market demand. This might explain why green skills requirements are being overlooked, or provided outside of this framework, and could be detrimental to national training. Therefore anticipation of green skills requirements must be addressed through a cohesive approach on a national level "to ensure the correct identification of needs and strong implementation of the pre-existing skills framework" (ILO, 2010:ix).

A key recommendation to fast track green skills development (ILO, 2010:xv) is the creation of a National Low Carbon Economy Skills Forum. It is proposed that this forum would oversee training and education in all sectors. The forum structure must be driven from the Office of the State President (Ministry of Economic Development), and should coordinate participation in policy development from all segments of the economy central to driving both skills and low carbon economy policy implementation. Trade unions as well as businesses and institutions that cater for skills development via the SETA's are also key participants (see proposed structure below in Figure 2).

Figure 2: Green skills development in SA: Low Carbon Economy (LCE) Skills Forum. Source: ILO (2010: xv).



The outcome of the study indicates that training measures can only be effective if based on timely identification of skills needs. It argues that the effective training measures are crucial not only to economic recovery but also to a longer-term sustainability agenda. The report proposes a set of recommendations and an institutional framework that aims to promote green skills throughout the country.

2.5.4 South African Green Economy Modelling (SAGEM)

During June 2013 a joint study (SAGEM) on green economy investment was conducted through a modeling approach by UNEP, Department of Environmental Affairs, the Millennium Institute, the Sustainability Institute and the Centre for Renewable and Sustainable Energy Studies at Stellenbosch University. This modelling study assesses the impact of green investments in four sectors of the country's key economic sectors: agriculture, energy, transport and natural resource management (UNEP et al, 2013).

Employment is of specific interest for this literature review, thus I would like to highlight employment that is generated as a result of different activities taking place in the economy.

(UNEP et al, 2013:18). The report indicates that job creation is dependent on the investment option chosen, thus if investment is directed towards the energy sector, then more jobs will be created there. “The total employment in the economy is also estimated in the module as the sum of all the employment, which include employment in the following: power sector, biomass electricity generation, transport, restoration of invasive alien species, mining, agriculture, services and industry” (UNEP et al, 2013:18). It is important to note that if green investments are spread equally across all sectors, then the agricultural sector has the most potential for employment creation.

Planned targets and expenditures are described and through the modeling of possible options and opportunities to achieve these targets. Four scenarios are defined in the report: “ *a) Business-as usual (BAU); b) BAU2%, representing a 2 percent investment of gross domestic product in green economy sectors (natural resource management, agriculture, transport and energy); c) GE2% (Green Economy 2%), representing an allocation of 2 per cent of gross domestic product in green economy sectors (natural resource management, agriculture, transport and energy); and d) GETS (Green Economy Target Specific scenario), which is a target-specific scenario aimed at identifying whether policy-makers can achieve the medium- to long-term targets following green economy interventions in the prioritized sectors*” (UNEP et al, 2013:46). Key findings indicate that compared to current practices, improving the management of natural resources coupled with investments in the environment is essential and can create many more green jobs compared to a business-as usual approach (UNEP et al, 2013:5).

2.5.5 The Green Accord

UNEP (2008:4) states in the Green Jobs report that forward thinking government policies remain indispensable. “They are important for providing funding of green projects; overall goal- and standard-setting beyond the time horizons typical in the business world; providing infrastructure that private enterprises cannot or will not create; and creating and maintaining a level playing field for all actors” (2008:4). UNEP (2008:4) lists the following policies related to funding

support that should be adopted to get initiatives that provide green jobs off the ground, see table 10 below.

Subsidies	Phase out subsidies for environmentally harmful industries, and shift a portion or all of those funds to renewable energy, efficiency technologies, clean production methods, and public transit.
Carbon Markets	Fix the current shortcomings inherent in carbon trading and Kyoto Protocol related innovations like the Clean Development Mechanism so that they can become reliable and obtain adequate funding sources for green projects and employment.
Tax Reform	Scale up eco-taxes, such as those adopted by a number of European countries, and replicate them as widely as possible. Eco-tax revenues can be used to lighten the tax burden falling on labor while discouraging polluting and carbon-intensive economic activities.
R&D Budgets	Reduce support for nuclear power and fossil fuels and provide greater funding for renewable energy and efficiency technologies.
International Aid	Reorient the priorities of national and multilateral development assistance agencies as well as export credit agencies away from fossil fuels and large-scale hydropower projects toward greener alternatives.

Table 10: Policies supporting funding to get green jobs off the ground. Source: UNEP (2008:4).

Three years after UNEP (2008) proposed policy frameworks to support green job creation in South Africa, a Green Economy Accord was launched at the COP17 talks on Nov 2011 (Patel, 2011). President Jacob Zuma referred to the Accord in his opening speech at COP17 as a key example of the steps being taken locally to address the challenge of climate change, drawing on strong local traditions of social dialogue (Botes, 2013). The accord is one of 4 national accords of the New Growth Path which is a national environmental finance initiative administered by the Development Bank of Southern Africa (DBSA) on behalf of the Department of Environmental Affairs (Botes, 2013).

The Green Fund will be the foundation for the South African economy to transition to a low carbon, resource efficient and climate resilient development path, delivering high impact economic, environmental and social benefits. This transition will be made possible through catalytic finance to facilitate investment in green initiatives. The purpose of the research fund is to strengthen the interface between science and policy in the green economy and, in so doing, build a knowledge base for the expansion of the green economy (Botes, 2013). Patel (2011) indicates that this Accord is *“one of the most comprehensive social pacts on green jobs in the world, build[ing] a partnership to create 300 000 new jobs by 2020, in economic activities as diverse as energy generation, manufacturing of products that reduce carbon emissions, farming activities to provide feedstock for biofuels, soil and environmental management and eco-tourism”*.

The fund will respond to market weaknesses currently hampering South Africa’s transition to a green economy by: a) promoting innovative and high impact green programmes and projects reinforcing climate policy objectives through green interventions; b) building an evidence base for the expansion of the green economy, and c) attracting additional resources to support South Africa’s green economy development (Patel, 2011). The funding windows are entitled: “Green Cities and Towns”; “Low Carbon Economy”; “Environmental and Natural”; and “Resource Management”.

The formulation of this accord did not occur in a government silo alone. A unique feature of the development process was to host discussions around this report inclusive of the following representatives that participated, namely: the Ministers of Energy, Economic Development, Environmental Affairs, Finance, Trade & Industry, Labour, Public Enterprises, Transport, Public Works, Higher Education & Training, Rural Development and Agriculture. Business delegates included representatives of South Africa’s largest companies as well as smaller enterprises and from green energy associations. All three labour federations with a joint membership of more than 2,5 million workers were represented. Community representatives were drawn from women, youth, cooperatives and civic formations (Gordhan; 2013).

One of the critical commitments made by this Accord is to reach a target of 80% of new jobs to go to young workers, who face high levels of unemployment, and to support school programmes

on the environment (Gordhan, 2013). Another critical commitment is an investment of up to R 25 billion (over US\$ 3 billion) by the state-owned Industrial Development Corporation (IDC) in green economy activities over the next five years (Gordhan, 2013).

First call for fund proposals:

Round 1: Start-up Phase 1 for low-carbon projects, R800 million

R800 million rand was allocated in the start-up phase. The first call for proposals was for private sector and smaller public entities to develop low carbon projects through the Green Fund. An additional R300 million is projected to be included in the follow-up phase (Gordhan, 2013: 16).

Round 2: Research and policy development, R34 million

Through this fund, the South African government has made R34 million rand available for research and policy development initiatives that advance the green economy. The following interested parties have been invited to submit proposals: universities, government-affiliated institutions, private companies, NGOs and other interested parties (Botes, 2013). Mr Michael Hillary, DBSA's Group Executive for Financing Operations, said "We are hoping that this will contribute to the research community playing a catalytic role in building the knowledge economy required to shift South Africa towards a resource-efficient, low carbon and pro-employment growth path" (Botes, 2013).

2.6 Green careers, green jobs and green collar workers

The focus on job searches and hiring decisions related to "green careers" (referring specifically to sustainability-related careers in the context of this research study) became evident as far back as October 2007, when the online global career and recruitment service MonsterTRAK launched "GreenCareers" (UNEP, 2008:33). Their services allowed for both entry-level and experienced job seekers to identify green jobs and green companies (UNEP, 2008:33). A survey conducted by GreenCareers in 2007 indicated that 80% of young professionals showed interest in securing employment that would impact positively on the environment, and 92% preferred to work for a company considered environmentally friendly (UNEP, 2008:33).

For the purpose of this study it is important to understand the notion of green jobs and green collar workers to sketch a background for careers in sustainability-related fields that will be further discussed in the results of the research methods used.

2.6.1 Defining green jobs: shades of green

The green collar notion is still superficially understood and a significant investment cannot occur unless sufficient research in this area is conducted. UNEP's *Green Jobs: Towards decent work in a low carbon economy* report published in 2008 indicates that green jobs "span a wide array of skills, educational backgrounds, and occupational profiles" (UNEP, 2008:38). These jobs can be described as "work in agricultural, manufacturing, research and development (R&D), administrative, and service activities that contribute substantially to preserving or restoring environmental quality. Specifically, but not exclusively, this includes jobs that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; de-carbonise the economy; and minimise or altogether avoid generation of all forms of waste and pollution" (UNEP, 2008:3). Green jobs are not only related to the environment, but also connected to the economy and wellbeing of people (Jones, 2008). Thus green jobs relate to all aspects of sustainability in the context of the triple bottom line, namely environment, social and economic considerations (Sustainable Development Dictionary, 2013).

The transition towards a low carbon economy will stimulate the growth of green jobs. It is important to note that this transition will not have a uniformly positive impact on employment status, however. For example, some workers whose income is generated through employment in fossil fuel-dependent sectors might be hurt through new restrictions as the economy moves away from "business-as-usual" (BAU). However attractive the growing supply and demand of green jobs might sound, it is also important to understand the implications that UNEP (2008:44) foresee. Table 11 below lists four implications and provides a summary of each.

	Implication	Industry (sector) example
1	Creation of new employment	Manufacturing of pollution-control devices
2	Substitution of employment	Moving from landfilling to recycling
3	Elimination of jobs, without replacement	Discontinuing of packing materials
4	Transformation of jobs by re-skilling	Plumbers, electricians, using greening methods

Table 11: Implications for green job creation. *Source: UNEP (2008:44).*

2.6.2 Green-collar workers

Hattingh (2012) argues that “defining a green-collar worker could be as easy as saying that it is a worker who is employed in the environmental sectors of the economy, but it is not as simple as that. A definition like that would put the person in a box that would limit the real meaning of their work”. This literature review outlines a number of considerations that must be grasped before attempting to define a green collar worker.

A green collar worker may be defined by occupation or by industry. What this means is that green collar workers may exist in any industry according to their occupation or role (e.g. sustainability manager) (Hattingh, 2012). Green-collar workers can be distinguished as those involved in management, strategy, technology, policy, education, action and process. This definition is reasonably straightforward but it hinges on the further definition of what constitutes “green”. The terms “green”, “environmental” and “sustainability” are often used interchangeably to describe companies, people or technologies that do “green things”, but they do not mean the same thing (Hattingh, 2012). Environmental practices tend towards specific physical processes, and sustainable practices tend towards more generalised processes, or policies and attitudes. Jobs and organisations may combine significant elements of both. It can be considered that many green collar jobs fall under more than one of these areas but if they do, the two areas are usually contiguous. Education-related work can be either environmental or sustainable, or a combination. Nor does it fall neatly into administrative or operational (Hattingh, 2012).

By looking at different skills levels and drawing this distinction between environmental and sustainability-related jobs, green-collar workers can be identified based on skills levels and areas of responsibility that define their region of focus. According to Hattingh (2012), green collar workers can be grouped under two different skill types:

Type A: Managers and technicians who work in green organisations or who have green skills and responsibilities within other organisations that may not be considered green.

Type B: Services, clerical, sales and semi-skilled workers who work in green organisations.

The green-collar worker's unique talent goes beyond skill level to include passion and drive. A question raised by Hattingh (2012:93) to all green job seekers is simply: Why do you want to work in a green job field?

2.6.2.1 What do green-collar workers do?

Green-collar workers include a wide range of transdisciplinary professionals across different sectors in the green economy (Hattingh, 2012). This dynamic workforce are the drivers behind the scenes, shifting "business-as-usual" practises into the operating space of a low-carbon, inclusive green economy. The list below provides a sample list of professionals, vocational workers and includes a few samples of business owners (UNEP, 2008):

“Professions: Conservation movement workers, environmental consultants, council environmental services/waste management/recycling managers/officers, environmental or biological systems engineers, green building architects, holistic passive solar building designers, solar energy and wind energy engineers and installers, nuclear engineers, green vehicle engineers, "green business" owners, organic farmers; environmental lawyers; ecology educators and eco-technology workers and sales staff working with these services or products” (UNEP, 2008).

“Vocational: Green collar workers also include vocational or trade-level workers: electricians who install solar panels, plumbers who install solar water heaters, recycling centre/MRF attendants, process managers and collectors, construction workers who build energy-efficient green buildings and wind

power farms, construction workers who weatherize buildings to make them more energy efficient, or other workers involved in clean, renewable, sustainable future energy development” (UNEP, 2008).

2.6.2.2 Supply of qualified green-collar workers

The last five years showed a significant growth in sustainable economic development. Based on Salgado’s (2009) findings, it is certain that the insurance industry already has to contend with a rise in natural disasters and higher concentrations of carbon in the atmosphere will increase the occurrence of extreme weather events in the future. The world will have no choice but to adapt to these changes. Simultaneously, the shift to a low carbon and eventually zero carbon energy base is inevitable (Salgado, 2009). No-one is certain what the implications for global trade, financial systems, multilateral relations and socio-political dispensations are but the question that I would like to address is if the implications can be dealt with by a skilled workforce that understand Sustainability?

Based on the above notion, the questions remains of who will be driving the shift towards a carbon neutral state in a green economy? In building a green economy you need a workforce that is ready to meet the demands of green jobs. Jones (2008:12) argues that a green economy demands workers with a new skill set, these workers are known as green-collar workers, for example a solar technician (ILO, 2010:3). Green jobs span a wide array of skills, educational backgrounds, and occupational profiles, and is especially true with regard to so-called indirect jobs—those in supplier industries and for new industries like wind and solar power, supply chains consist largely of very traditional industries (UNEP, 2008:4).

Research indicates that the skills set needed by graduates in the green sector(s) of the economy are varied and a successful skills set is still developing in the young industry. Thus it is important to define the skills set needed to be employed in a green job (Bezdek, Wendling et al, 2008). Who and what kind of skill set is required to deal with the implications? Who will be the leaders and who will do the ground work? There is a need for increased investment to create green jobs, facilitate the just transition from tradition to low-carbon economy, and further analyses the major

shifts in employments and skills patterns (UNEP, 2008:9). The green collar notion is still superficially understood, and a significant investment cannot occur unless sufficient research in this area is conducted. Thus the role of a green collar work force in developing and implementing low carbon initiatives becomes a topic of interest and should be researched.

The field of applicants is still small for these positions, giving committed graduates the opportunity to showcase their abilities to hiring managers and change in talent management strategies is required today as businesses realise that a focus on sustainability is a strategic and operational priority (Glen, Hilson et al, 2009). The work opportunities for green collar workers are also limited. These constraints need to be addressed if the change towards lowering carbon emissions is a priority for the South African Economy. Who will drive? Who is qualified? What kind of skill set is required?

2.7 Conclusions and implications for thesis research

South Africa's is creating a green pathway out of poverty through green job creation. This is indicated by the adoption of new green economic policies after the global financial crisis erupted in late 2008 and is seen as important mechanisms that are supporting green economic development to address the dual-crises. Policy advancement is due to a national government commitment to shift from "business as usual" to build a low carbon, resource efficient, climate resilient, pro-employment and sustainable economy (green economy) (Patel, 2011; Botes, 2013). A national partnership for sustainable development occurred during 2011 when the National Strategy for Sustainable Development and Action Plan (NSSD1) was approved by Cabinet on 23 November 2011 and builds on the 2008 National Framework for Sustainable Development (NFSD) and several initiatives that were launched by the business sector, government, NGOs, civil society, academia and other key role players to address issues of sustainability in South Africa (DEA, 2011). The National Development Plan (NDP) supported by the New Growth Plan (NGP) is taking measures to adapt to the low carbon economy by coupling fiscal sustainability with national development to ensure that progress made will not be interrupted or reversed (Gordhan, 2013:6).

Green economic policy was reviewed at provincial level, and evidence of policy advancement in the Western Cape Province, Gauteng Province and Kwa-Zulu Natal Province. The findings were that provincial green economic strategies are supporting green job creation. The strategies for each province are listed below:

- The Western Cape Green Economy Strategy Framework (PGWC, 2013) is seen as the Western Cape's roadmap to achieving a low carbon, green and inclusive economy. Through this strategy, the Western Cape Province is positioning itself as the leading green economic hub in Africa.
- The most recent strategic policy for the Gauteng province was released on 19 October 2011, namely "Green economy transitions: Gauteng Green Strategic Programme (Gotz: 2011). Current advancement in this strategy is underway.
- The KwaZulu-Natal Department of Economic Development and Tourism (KZNDEDT) developed a Strategy for a Green Economy during 2012 (Sutherland et al, 2012). This strategy's vision is "to be a province in 2013 where the economy provides opportunities for all its residents to prosper, and where the natural resources are enhanced and used sustainably in supporting basic needs as well as green economic growth" (Ramayia, 2012:1).

South Africa has gone a long way since 2008 to adopt a green economic policy that was informed by research, and continues to do so. Four key green economy reports were reviewed and indicated a positive response to support the growth of the green economy and the section below provides a succinct summary of the highlights without the intend to repeat the detailed summaries in section 2.5.

The South African case study on policy frameworks and employment potential (TIPS, 2012)

Montmasson-Clair (2012:4) confirms in this report that it is possible to create a shift towards sustainable development that would foster growth and employment if South Africa supports

green sectors through creating an enabling environment. Employment projections of 300 000 - 400 000 new jobs could be created in green industries and fossil fuel-dependent jobs will be in decline. Provision for the decline will have to include training programmes to target workers that might be in risk to lose their jobs. Technical and professional skills shortages can create “bottle-necks” for the green economy to grow and this is identified due to a lack of national policy commitment to investment in education. Green jobs in construction and manufacturing sectors are not seen as the immediate highest potential, but service sectors related to waste collection and environmental restoration and eco-tourism.

The employment potential for green jobs in the short, medium and long term (IDC-DBSA TIPS, 2011)

This report provides estimates for direct jobs namely: 98 000 jobs in the short term over a two year period (2011-2012) , 255 000 in the medium term over a five year period (2013-2017) and 462 000 employment opportunities in the formal economy in the long term leading over eight years (2017-2015) (IDC-DBSA-TIPS, 2011:3-4). Employment sectors in green industries categorised under: a) Non-renewable: Energy Efficiency; Waste management; Consulting; Environmental Resource Management and Built Environment and; b) Renewable energy: Wind, Solar, Bio-mass, Bio-fuels, Solar, Geo-thermal and Wave.

Green skills: “Skills for green jobs in South Africa: unedited background country study (ILO, 2010)

The study looked at current and future skills requirements for South African’s greening economy during 2010. The study was reviewed to: a) unpack the characteristics of green skills; b) identify skills shortages, training and education programmes. The following key constraints for green skills development were identified: a) inconsistency in South Africa’s policy; b) no specific budget allocations for green skills development - it is not earmarked in relevant programmes; c) a lack of awareness around green skills; d) skills gaps across all sectors and e) a lack of a skills development structure at a national level. The South African government adopted policy and budget allocations for green job creation since 2010, but more investment needs to be made in skills development to avoid future “bottle-necks” to grow the green economy.

South African Green Economy Modelling (SAGEM) (UNEP et al, 2013)

This modelling study assesses the impact of green investments in four sectors of the country's key economic sectors: agriculture, energy, transport and natural resource management and indicates that job creation is dependent on the investment option chosen. Planned targets and expenditures are described and through the modelling of four scenarios possible options and opportunities to achieve these targets are identified.

Investment in the green economy to support new markets and businesses

The national government is taking steps to move towards a low carbon, resource efficient and climate resilient development path by demonstrating financial commitments made available by the Green Fund to enable the creation of 300 000 new green jobs by 2020. The investment is targeted towards renewable projects, technology, research and development and training that would support the business development (creating markets, products and services) for green job creation (Botes, 2013). Round 1 allocated R800 million toward low carbon projects and round 2 R34 million towards research and policy development.

Green careers, green jobs and green collar workers

The clarification of key definitions related to the green economy, green jobs, green collar workers in the literature review contributed to my understanding of careers in sustainability-related fields. The information obtained was useful to identify suitable questions to ask graduates of the post graduate programme in Sustainable Development and to identify in where (sectors) possible employment opportunities can be found after graduation.

A definition of a green job was unpacked and it was clear that these jobs are not only related to the environment, but also connected to the economy and wellbeing of people (Jones, 2008). Thus green jobs relate to all aspects of sustainability in the context of the triple bottom line, namely environment, social and economic considerations (Sustainability Dictionary, 2013). The discussion on green collar workers outlooks on sustainability-related careers indicated certain

value systems that were important to understand who they are and how they want to contribute to sustainable development.

Key green job challenges

Skills gaps

Current and future skills gaps are causing “bottle-necks” to grow the green economy. The skills gaps exist across all sectors and are led by market demand. National green skills policies need to be developed to ensure the correct identification of needs and strong implementation of the pre-existing skills framework. Managerial and technical (engineering and artisan), and training professionals are much needed for employment and up-skilling and re-skilling is priority in these professions (Vass, et al., 2009; SANBI and The Lewis Foundation, 2010; HSRC, et al., 2008 in Montmasson-Clair, 2012:4).

Institutional alignment

Montmasson-Clair (2012:6) acknowledges that South Africa not only faces social, environmental and financial challenges, but a maze of institutions exists, that can also be seen as a crisis on its own. Decision making processes should be aligned to avoid a mismatch between green economic policy and growth plans for potential green employment opportunities.

Employment implications

UNEP (2008:43) foresee the following four implications, namely: a) creation of new employment, b) substitution of employment, c) elimination of jobs, without replacement; d) transformation of jobs by re-skilling.

CHAPTER 3: RESEARCH DESIGN

This chapter considers the following: a) research steps; b) research strategy, problem statement and objectives; c) research framework and questions; d) assumptions; and de) research approach (methodology). This will be followed by an overview of the type of research design, the tools used, description of my sample population group and method of analysis. I will also discuss my conceptual literature review process. Table 12 below outlines my research deliverables that I planned to conduct in six different phases.

PHASE 1 : CONCEPTUAL	
1	Develop Research Concept
2	Scan Relevant Literature
3	Start with Preliminary Literature Review
4	Develop topic into a research problem statement
5	Preliminary Research Hyposthesis
6	Conclude Research Design: Appropriate design, reasons therefor, defining relevant concepts & choosing a measuring instrument
7	Prepare Research Proposal
PHASE 2 : OPERATIONAL (FIELD WORK)	
8	Submit Research Proposal
9	Set up research tools (Questionnaire & Structured Interviews)
10	Build Data Basis
11	Submission of first chapters (literature analyses & methodology)
12	Conduct survey
PHASE 3: ANALYTICAL	
15	Write up data assembled in first quarter
16	Analyse Data
17	Submission of final thesis title
18	Submit initial research results and obtain feedback from study leaders on the first chapters
19	Incorporate feedback from study leaders and refine first chapter 1-3
20	Submit initial draft of thesis
21	Obtain comments on initial draft from study leaders and refine
PHASE 4: FINALISATION	
22	Submission of final draft of thesis
23	Obtain feedback on final draft from study leader
PHASE 5	
24	Final submission of thesis for examination
PHASE 6	
25	Obtain feedback from examination process
26	Submit Final document that incorporate necessary changes

Table 12: Research deliverables

3.1 Research steps

The research steps followed was guided by Mouton (2001:47 in Muller 2008:10). Firstly I choose the research theme, then conducted a preliminary literature review, focused the topic, formulated my research question, developed the research design. My research design consisted of the following:

- a) Conducting conceptual analyses, where my process was centred on realising internal theoretical validity, and where key concepts were defined and linked to a body of existing theory and research (Mouton, 1996:84, 109 - 110). The information obtained in the literature review was seen as a building block to inform my research.
- b) Operationalising my research by using a survey as my internal measurement and a questionnaire as my tool that will enable me to collect quantitative data-collection and analyses of my data and then the writing up my research (Mouton, 1992:61 in Muller 2008:10).

After developing my research design, I wrote a research proposal and submitted it to my department in March 2011. Research process then followed by developing a time framework with consecutive steps and time allowed for each step, indicating how I will conduct the research.

3.2 Research strategy

Constructing the research methodology generally involves establishing a research framework, and formulating a very clear problem statement, identifying key objectives, a research question and one or more assumptions. This I regarded as the starting point of the study as explained in detail by Brynard & Hanekom (1997 in Muller, 2008). Before I could start to construct the research methodology, I developed a research strategy as a roadmap for the direction that is headed, the position it intends to stake out, and the capabilities it plans to develop based on a strategy definition by Thompson and Strickland (2003 in Ramayia et al. 2012:3). “Strategic thinking is about making the best use of what will always be a limited amount and quality of

resources” (Hanford 1983, in Ramayia et al. 2012:3). This notion is particularly important in my study where resources were limited during the first phase of developing my research proposal in 2011, and in addition where the benefits that I obtained through the available resources, could not be maximised for the scope of my research. My research strategy advanced towards the end of 2011 and I continued to follow literature that became available leading up to September 2013. The process of gathering literature on the topics listed above will be discussed in more detail below.

Developing the conceptual literature review

My conceptual literature review was used to underpin my research and was not seen as a formal research approach, but has been an important point of departure for my research journey. My aim has been to build a good understanding of concepts around the green economy, careers in sustainability-related fields, green job opportunities and the nature of green collar workers. The literature review has collected information of the early development of the green economy in South Africa between 2011 and 2013. The purpose of the review has been to clarify whether green economic policy-making, investment in research and employment generating programmes and the creation of new industries could provide much needed employment opportunities for graduates who were interested in working in sustainability-related fields. The information provided by the literature review has created a context for the main body of research and improved my understanding of green job creation factors. I used Hart’s (2006:13) definition to structure the literature review, namely to arrange it into two parts; a) the selection of available documents and b) the efficient evaluation of this document in relation to the research being proposed. I started to plan a search process and to select a list of terms, then based on the outcomes of the search process, I expanded my literature scope and organisation of key themes.

Search process

In preparation for my research proposal in February 2011, I conducted my preliminary literature review through a combination of online searches and other leads from available international and local literature. I approached the librarians at the JS Gericke Library at Stellenbosch, and they were unable to assist me with literature records on their database that could inform my study on green jobs. Extensive use was made through Google scholar to conduct primarily investigations

into new fields of the research topic, followed up by more extensive and specific searches on international material available on the internet, especially the study conducted by UNEP (2008).

Lists

To ensure that I covered all the subject matter, I compiled a list of research terms that I inserted into the database searches in various combinations. These were Green Economy, Green Jobs, Green Skills, investment and projects. This process gave me confidence that I covered all the available literature at the stage of my literature review during 2011. In preparation for my research proposal submission in March 2011, no green jobs related studies were available in South Africa. This lack of information available on the topic indicated possible limitations for my study. I acknowledged in the limitations of my research process that I identified gaps due to the limited literature on my research topic.

Expanding the literature review

The research process grew organically and my literature review evolved over two and a half years during my research journey to discover new resources that deepened my knowledge on the topic of green jobs and the green economy. A greater degree of confidence developed during 2011 when a number of key reports related to policy, investment and green job projections became available locally (in South African). During the process of accumulating the new literature listed above, I was able to further develop my research strategy to provide a building block that could strengthen my argument. The next step included a selection of literature themes.

Themes

The research strategy was needed to process large amounts of international information and then structuring the relevance themes on a local level. Hart (2006:143) proposes a clarification of terms used to group them. The following themes emerged out of the South African literature review: Green economic development; policies and investments; and green job projections. Once I selected these key themes, I decided to arrange the themes from a broad to more specific in order to provide logical background to the study.

- **The Social and Ecological Crises (Duel Crises in South Africa)**

Various reports and statistics on poverty and unemployment rates were reviewed to provide a detailed understanding around the connection of the social and economic crises in South Africa. Jones (2008) and Montmasson-Clair (2012) indicated that green economy, as a ground-breaking way forward, needs to combine economic development, social welfare and environmental protection and that a green pathway out of poverty should be inclusive to lift millions of people out of poverty through green job creation.

- **Green Economy Legislation and Policy**

I reviewed a number of legislative frameworks and policies relevant to green economy in South Africa. The primary legislation and policy that is aligned with the green economy was abstracted and used to inform the study. The content was arranged to first provide an overview of national policy and then provincial policies. The most important national policy identified was the New Economic Growth Path (Patel, 2010a). The policy's principal target is to create five million jobs over the next ten years and will be analysed to understand how it aims at enhancing growth, employment creation and equity.

I also looked at "The South African State of the Nation Address" 2011, 2012 and 2013 where a firm and on-going commitment from President Jacob Zuma on job creation was made, specifically related to the green economy (green jobs). In addition to this set of governmental policies, I looked at commitments made to funding mechanisms like that of the Green Fund (Green Accord) that poured millions into the green economy, to invest in renewable energy projects, the manufacturing and installation of renewable energy technology, research and development and training. A brief overview of provincial policy developed by Western Cape, Gauteng and Kwa-Zulu Natal were presented.

- **Green Jobs**

International and local studies were reviewed that focussed on green job creation. The first international report released was a study conducted by UNEP (2008) on "Green Jobs: Towards decent work in a sustainable, low-carbon world". This was the first comprehensive report on the emergence of a "green economy" and its impact on the world of work in the

21st Century as it relates to job creation. The report assembled evidence for currently existing green jobs in key economic sectors (renewable energy, buildings and construction, transportation, basic industry, agriculture, and forestry) and presents estimates for future green employment opportunities. It also provided a broad conceptual perspective that employment will be affected in at least four ways as the economy is orientated toward greater sustainability. The four ways refers to job creation, job substitution, job elimination and job transformation (UNEP, 2008:44).

The first local (South African) report produced was a study on “Green Jobs: An estimate of the direct employment potential of a greening South African economy”, released by UNEP (2011). This report was followed in the same year by a financial commitment made by South Africa when the government signed the Green Accord (DEA & DBSA, 2011). The information still seemed limited and I decided to extend my research period to leave room for more information on the research topic. In the year 2012, a South African case study on Green Economy Policy Framework and Employment Opportunity (Montmasson-Clair; 2012) became available that builds on the ILO (2010) report. In September 2013, the *Green Economy Scoping Study: South African Green Economy Modelling Report* was released by UNEP (UNEP, 2013).

- **Green Skills**

A study conducted in 2010 by the International Labour Organisation (ILO) Sustainability Investments on “Skills for green jobs in South Africa” was reviewed. This report identified skills needed for greener economies with respect to structural shifts, and new, emerging and changing occupational profiles. The study is embedded in the Green Jobs Initiative, a joint initiative of UNEP, the ILO, the International Employers Organisation (IOE) and the International Trade Confederation (ITUC), to assess, analyse and promote the creation of decent jobs as a consequence of the needed environmental policies (ILO, 2010:3). The outcomes of the study indicate that training measures can only be effective if based on timely identification of skills needs and argues that the effectiveness of training measures is decisive not only for economic recovery but also for a longer-term sustainability agenda (ILO, 2010).

Through the process outlined above, I developed a better understanding of the principles of South Africa's green economy policies, a review of research conducted around the potential of employment opportunities (green jobs) in the short, medium and long term), and funding for projects. The information gathered was used to define my research problem and objects.

3.3 Research problem and objectives

Problem statement: To what extent are career futures secured for graduates of the BPhil and MPhil Programme in Sustainable Development?

The research problem originated from a sense of uncertainty about postgraduate employment. This uncertainty was triggered while reviewing literature that outlined the demand for and shortage of green jobs relative to the availability of postgraduates in the Sustainable Development Programme at Stellenbosch University. The specific intention of my study has been to investigate the career prospects of these graduates. The problem statement was formulated to determine whether a lack of career information limited graduates from advancing in their careers. I have aimed to address this problem by exploring the prospects for employment in various sustainability-related fields.

The geographical context of South Africa provides a backdrop to development of a green economy in this country and how this is providing employment opportunities. Based on the research problem, I applied a qualitative research methodology through a survey as my method, and a questionnaire as the research tool, to address the following objectives:

- (a) To attain clarity regarding graduates' understandings and awareness of available careers in sustainability-related fields;
- (b) To investigate attempts, tools and processes through which graduates could develop careers in the sustainability-related fields (sustainable development fields); and
- (c) To confirm the graduates' employment status, pre-and post-graduation.

3.4 Research framework and questions

I formulated my research study by applying the analytical framework principles outlined by Bless & Smith-Higson, (1995:13). I discovered that surprisingly little research has been undertaken to date on graduate employment in sustainability-related fields. The data from the graduate questionnaire would be available to inform my study, but I first needed to deepen my understanding of the term “green collar worker”, which is increasingly being used to describe people working in the sustainability-related career fields. Various concepts, debates and definitions of the term green collar worker and green jobs exist and raise important questions such as:

- *To what extent is there legislation support and financial commitment to the development the green economy?*
- *How do graduates understand what a career in sustainability-related fields is?*
- *What attempts, tools and processes did graduates use to develop careers in sustainability-related fields?*
- *What were graduates` employment status, pre-and post-graduation?*

3.5 Research assumptions

My study was based on the following assumptions:

- *Sufficient literature sources will be available to inform my study.*
- *The use of a questionnaire will result in honest and useful feedback for the purpose of analysis.*
- *The population sample size is large enough to represent graduates` prospects of career opportunities in sustainability fields.*
- *Conducting research on career opportunities for graduates in sustainability-related fields, could benefit future career guidance.*

3.6 Research methodology

Constructing the research methodology generally involves establishing a research framework, and formulating a very clear problem statement, a research question and one or more

assumptions. This is regarded as the starting point of the study as explained in detail by Brynard & Hanekom (1997 in Muller, 2008). In designing research, one focuses on the end result: what kind of study is planned and what kind of result is aimed for? (Mouton, 2001:56). According to Hart (2006:26 in Muller, 2008), social science research can be broadly categorised according to its objectives and it is either aimed at explaining, exploring or describing, and each agenda has unique implications for the design, presentation and way in which the research should be interpreted. Mouton (2001:56) argues that a research methodology concerns the process of research and what tools and procedures will be used to gather and process information. I applied the structure of Mouton (2001:56) for my research methodology.

A qualitative research methodology was used, collecting primary qualitative data via a graduate survey to be completed by BPhil and MPhil graduates. My decision to use a qualitative research approach is supported by the UNEP (2008:6) report that argues that more green job surveys and profiling need to be conducted for direct and indirect jobs to build on the existing data. I am confident that following guidelines from Mouton (2001:57) to conduct a qualitative methodology provided me with the kind of evidence needed to address my research objectives.

3.6.1 Research method and research tool

Using a survey as my method and a questionnaire as my research tool, it provided the opportunity to collect and analyse data in various forms, but mainly non-numerical (Brynard and Hanekom, 1997: 6 in Muller, 2008:4). My questionnaire was influenced by my personal views, I can relate to the selected sample group because, like them, I completed the BPhil programme and then I applied for a green job. I asked myself: what are their problems and critical decisions they face? The survey was designed to provide an opportunity for graduates to share their understanding and awareness of available careers in sustainability-related fields considering their acquired knowledge and skills base; to attain clarity regarding graduates' attempts, tools and processes through which they could develop careers in the sustainability-related fields; and to confirm the graduates' employment status, before and after completing the programme.

After the submission of my research proposal in March 2011, I applied for ethical clearance in April 2011 before I could continue with my survey. The purpose of the REC review was to ascertain possible ethical risks associated with my proposed research project of which I needed to be aware of, to assess the nature and extent of these ethical risks, and to suggest measures that can be taken to avoid or minimise these risks. My research proposal was then tabled, considered and evaluated by the REC in terms of the guidelines prescribed by the Stellenbosch University Framework Policy to Promote and Ensure Ethically Responsible Research, adopted by the Senate on 20 March 2009. The draft questionnaire was revised and I received assistance from Ben Zonder through a one-on-one consultation session. Zonder is a writing consultant of the Language Centre at Stellenbosch University. After the amendments of my research proposal and questionnaire, a copy was sent to Prof Jan Botha, the senior director of Institutional Research and Planning on 24 June 2011 and he approved my application to proceed with my research proposal. Ethical clearance from REC was received in June 2011 (see annexure A).

I discussed the timing of my survey with my study leader and we agreed to conduct the survey in May 2012. This would allow: a) the inclusion of a possible larger sample group by including graduates from December 2011 and March 2012; and b) sufficient timing for the course administrator to update the graduate contact database. More details about the sample group will be discussed in the next section. A survey invitation letter was prepared in April 2011. The course administrator, Beatrix Steenkamp, sent out a voluntary invitation to BPhil and MPhil graduates to participate in my survey, on my behalf (see section below for more information about my sample group). I conducted my survey during May and June 2012 using a questionnaire as my research tool. See annexure B for the list of questions that were asked in the survey.

3.6.2 Data gathering process

The survey was conducted through a structured questionnaire. The process to collect data from participants were conducted on-line (on the internet) to "[reduce] the participants' carbon footprint" and to accelerate the research process. The online questionnaire tool that was used is a

software programme called SurveyMonkey (SurveyMonkey, 2013). The reason why I chose this programme to design my questionnaire was because my research budget was limited and I had to find a creative way to save costs. I was also conscious about my environmental footprint. The programme provided me features to analyse data by downloading the data on an excel spreadsheet.

The online questionnaire was not in the public domain. A secured internet link was sent to all graduates via an email from the course administrator, to invite them to voluntarily participate in the survey.

3.6.3 Sampling

The survey was undertaken with a voluntary participation group consisting of BPhil and MPhil Graduates in four of the programme's sustainability fields offered by the School of Public Leadership at Stellenbosch University, with permission from the REC. The sample group included all students that graduated from the programme, between December 2003 and leading up to March 2011. Study participants were invited to complete an online questionnaire. Information obtained from the questionnaire was collected and descriptive data were developed and analysed to profile the graduates of the programme. The information was useful to analyse the transdisciplinary academic background and career patterns of the graduates.

CHAPTER 4: DATA RESULTS AND ANALYSIS

In this chapter I will describe the data gathering process and the sampling success rate will be revealed. This will be followed by a presentation of my survey results pertinent to the main objectives of the research as to guide my reader through my story and back to the academic dimension of the survey findings. These results will be presented through a series of themes which emerged as core to the outcome of the questionnaire. The last section of this chapter will discuss research limitations and challenges

My research objectives are:

- (a) To attain clarity regarding graduates' understandings and awareness of available careers in sustainability-related fields;
- (b) To investigate attempts, tools and processes through which graduates could develop careers in the sustainability-related fields; and
- (c) To confirm the graduates' employment status, pre-and post-graduation.

4.1 Results and success of sample responses

The results of my survey's sample population group who voluntarily participated were received in August 2012. The survey response rate was 30.83%. A total of 43 graduates participated in the survey of which only 32 completed the survey. Table 13 below illustrates the survey results. The success rate was 74.40%.

	Programme	8 Years									
	Start date										
	TOTAL	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Graduated	186		1	2	6	27	20	50	40	40	0
Deceased	1		0	0	0	1	0	0	0	0	0
Completed Survey	32	1	0	0	1	3	0	6	9	9	3
Success Rate	17.20										
Total Invitations											
Send	175										
No email records	11										
Email failures	54										
Success Rate	30.86										
Total Started	43										
Total Finished	32	74.40%									

Table 13: Survey response rate.

4.2 Data analysis

The method of analysis used was to organise the data received through the questionnaire into categories. Themes were identified under each category. Five participants working in different sectors were selected to present diverse career interests and challenges in sustainability-related fields.

The following categories were used to capture data and to synthesize findings. In each category there are different themes:

Quantitative (statistical) data

The quantitative data was used to analyse the sample group profile.

- a) **Demographics:** programme specialisation field; nationality; cultural orientation; gender; and age at graduation.

- b) **Employment status:** prior to graduation; and post-graduation
- c) **Employment field or field of interest:** Agriculture, food production and forestry, Biotechnology Industry, Clean/Renewable Energy (Solar, Wind Industry and Biofuels) and Energy Efficiency, Design and Creative Industry, Green buildings and the built environment ; Policy, Administration, Analysis and Advocacy, Research, awareness, training, skills development and knowledge management, Resource conservation and management: Parks, Recreation and Tourism; Sustainable consumption and production; Sustainable transport and infrastructure; Sustainable waste management practices and Water management.
- d) **Employer type:** private enterprise, government or public enterprise, non-profit organisation, training/academic organisation; and green business.
- e) **Business owner type:** private enterprise, non-profit organisation, training/academic organisation; and green business.

Qualitative data

The majority of data gathered was used to provide a set of qualitative data to evaluate the objectives of the research that would identify common characteristics of the sample group:

- a) **Understandings and awareness of available careers in sustainability-related fields:**
 - i. The understanding of a career in a sustainability-related field;
 - ii. Interpretation of terms used: how graduates would define a green job and sustainability skills;
 - iii. Motivation to work in a sustainability-related field;
 - iv. Motivation why sample group enrolled in the programme;
 - v. Sustainability skills type;
 - vi. Skills improvement in the programme;
 - vii. The type of skills obtained through the B/MPhil programme.

b) Identify attempts, tools and processes through which graduates did or did not develop careers in the sustainability-related fields:

- i. How sustainability skills were communicated;
- ii. If a career in a sustainability-related field were pursued and the job types that the graduates applied for; and
- iii. Challenges to pursue a career in sustainability-related fields.

4.3.1 Quantitative data

a. Demographics

This first part of the data collection process was used to develop a sample group profile consisting of the following categories: programme specialisation field; year of graduation; nationality; cultural orientation; gender; and age at graduation. The results are indicated below:

Programme specialisation field

There are four specialisation streams in the programme. The majority of participants specialised in the sustainable development stream. This was followed by those who selected sustainable development and planning, renewable and sustainable energy and managing sustainable agriculture for development.

Year of graduation

The sample group that participated graduated in the following years: 2011 showed the largest participation; 2010 second largest; 2012 third; 2009 fourth; 2006 and 2007 equally.

Graduate nationality

82.1% of graduate sample group were South African citizens and 17.1% were from countries outside South Africa.

Cultural orientation

The majority sample representatives were white (Caucasian); Black (African); Coloured and Other was equal and there were no Indian participants.

Gender

The gender representation of the sample group indicated a distribution of 56.4% males and 43.6% female graduates.

Graduation age

The following groupings were presented through a tick box option: Age 20 to 25; 31 to 35; 36 to 40; 41 to 50; 51 to 55; 56 plus.

- Age when graduated in the BPhil: Results showed that the majority of participants was between the age of 36- 40 and 41 to 50 with the second highest aged between 20 to 25 and 31- 35; thirdly between 26 and 30 and the minority representation was aged between 51 and 55.
- Age when graduated in the MPhil: Results showed that majority of participants was between the age of 20 to 36 to 40 and 41 to 50; secondly 26 to 30 and 31 to 35. The smallest representative group was aged between 20 to 25.

b. Employment status

Questions were asked to identify graduates' employment status before and after graduation. The following categories were used: Employed, unemployed, a full time student or business owner.

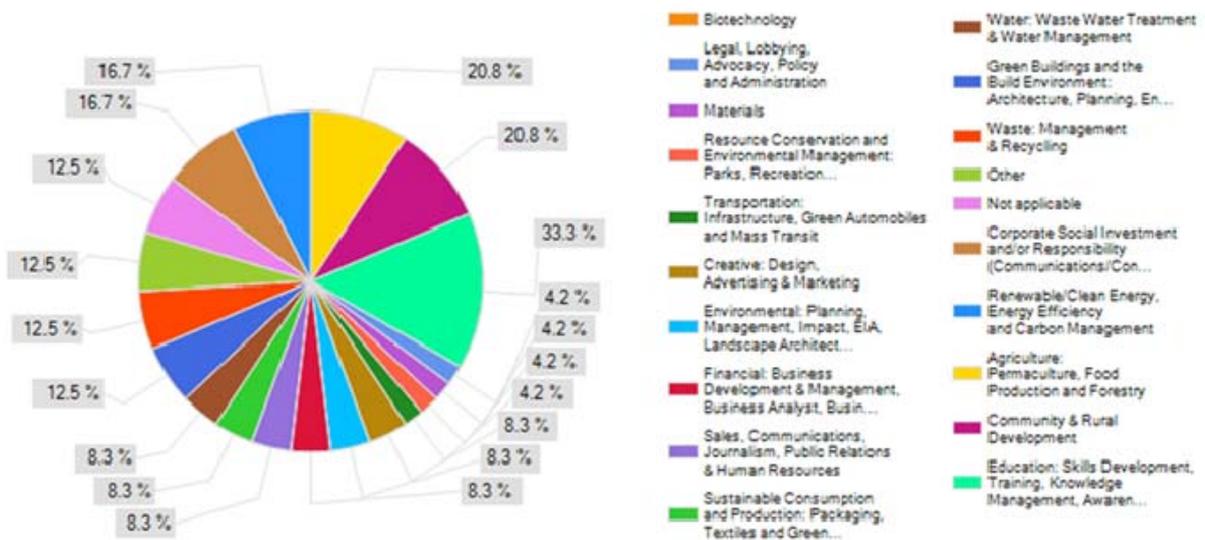
- Employment status before graduation: Employed: 70.3% (26); Unemployed: 2.7% (1); Full time student: 16.2% (6); Business owner: 10.8% (4).
- Employment status after graduation: Employed: 62.2% (23); Unemployed: 8.1 (3); Full time student: 10.8% (4); and Business owner: 18.9% (7).

c. Employment field and field of interest

Graduates were asked to indicate their current employment field/s (this status relates to post-graduation). The employment fields options were: *Agriculture, food production and forestry, Biotechnology Industry; Clean/Renewable Energy (Solar, Wind Industry and Biofuels) and Energy Efficiency; Design and Creative Industry; Green buildings and the built environment; Policy, Administration, Analysis and Advocacy; Research, awareness, training, skills development and knowledge management; Resource conservation and management: Parks, Recreation and Tourism; Sustainable consumption and production; Sustainable transport and infrastructure; Sustainable waste management practices and Water management.*

The results indicated highest employment in the environmental sector (33.3%), with agriculture sector and community and rural development second (20.8%) spread. Renewable energy and corporate sustainability resulted in 16.7% each (see Figure 3 below).

Figure 3: Employment fields post-graduation



d. Employment type

The following employment categories were used to identify the employer type: Private enterprise, government or public enterprise, non-profit organisation, Training/academic organization, and green business.

Results of those employed pre- graduation, employment type:

- First: Private enterprise: majority
- Second: Non-profit organisation: second
- Third: Government or public enterprise: and Training/academic organization
- None: Green business
- None: Not applicable

Results of those employed post-graduation

Results are indicated in the graph below: The majority of the group were employed (62.2%) indicating that graduates were employable after completing the postgraduate programme in Sustainable Development. The second largest representatives were business owners (18.9%) indicating that the post graduate degree in Sustainable Development provided graduates with entrepreneurial skills.

- Private enterprise: 35.5%
- Government or public enterprise: 19.4%
- Non-profit organisation: 19.4%
- Training/academic organization: 12.9%
- Green business: 12.9%
- Not applicable: 6.5%

e. Business owner type

Type of business owners after graduation

- Majority: *Not applicable (The majority of graduates were not business owners).*
- Second: Private enterprise and green businesses were equal.

- Thirdly: Non-governmental organisation.
- Fourthly: Training institution.

4.3.2 Quantitative data

a) Understanding and awareness of available careers in sustainability-related fields

- i. The graduates' understanding of a career in a sustainability-related field was determined. It was important to first determining what was the graduate's understanding of a career in sustainability (see annexure 7 for results).

<i>Correlations</i>
<ul style="list-style-type: none">❖ Uncertainty about a career in sustainability❖ A career that is challenging❖ A career that is related to the triple-bottom line❖ A career where you are working in a field to create positive change (for now and future)❖ A career that is fulfilling and rewarding❖ Re-designing business-as-usual❖ A career related to activities around environment❖ It is a frustrating concept, a difficult one to define. It is not recognised, only those familiar with sustainable development can understand and relate to it.

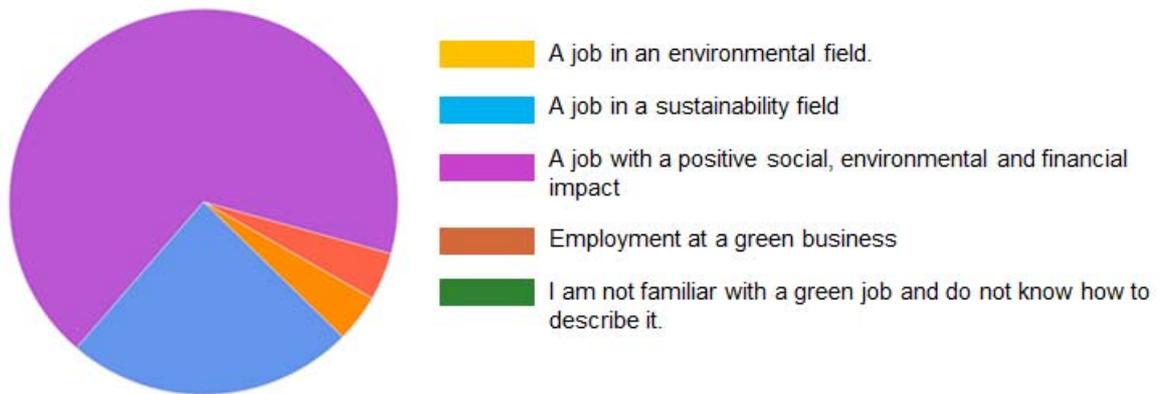
- ii. Interpretation of terms used in the survey, namely how graduates would define a green job and sustainability skills.

Provide a definition of a green job

Participants were asked to choose one of the options below that would best describe a green job: “A green job is...”

- The majority indicated: “A job with a positive social, environmental and financial impact”;
- Secondly : “A job in a sustainability field”;
- Thirdly, the following two categories showed the same results: “A job in the environmental field” & “employment at a green company” (equal).
- None of the participants indicated that they were not familiar with a green job and that they did not know how to describe it (see figure 5 below).

Figure 5: Description of a green job



Provide a description of sustainability skills

It was important to look at the graduates' skills development through the programme and what they perceive their new skills to be. The type of skills obtained through the B/MPhil programme is listed in annexure 4.

Correlations

- ❖ Technical skills
- ❖ Strategic skills
- ❖ Analytical skills
- ❖ Research and report writing skills
- ❖ Complexity thinking skills
- ❖ *References were also made to “internal happiness” and personal values.*

iii. The participants were asked if they have skills in sustainability, the majority said yes and the rest indicated no or non-applicable.

iv. Graduates were asked what type of skills was required to work in a sustainability-related field. The responses listed below were collected.

Correlations

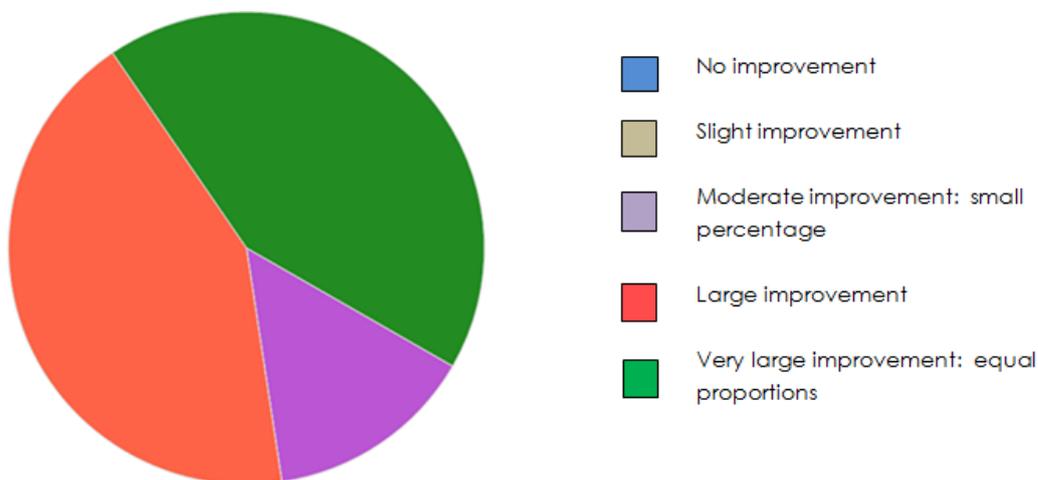
- ❖ *Hard skills*
 - Transdisciplinary skills are needed.
 - Knowledge of how the triple bottom line is connected.
 - Strategic thinking
 - Complexity thinking
 - Business skills
- ❖ *Soft skills*
 - Self-reflection
 - Drive and passion, optimism, values

v. Reasons why the graduates were motivated to enrol in the BPhil and MPhil programme (*Refer to annexure 2 to view all responses received*).

<i>Correlations</i>
<ul style="list-style-type: none"> ❖ Continual learning: graduates felt that they needed to move on with their careers and the programme would be the next step in their career. ❖ To broaden thinking, to think wider (out of the box), deepen understanding of sustainability. ❖ Connection between the environment and sustainability issues. ❖ To use skills to add a positive value in the world, more than just financially motivated, leave a legacy. ❖ To use new qualification (skills and knowledge) to change current employment position (type). ❖ The graduates were passionate about sustainable development, they had a personal interest and fulfilment of educational needs.

The results are indicated in figure 4 below for results. None of the sample group indicates that there was no improvement or a slight improvement of their new skills obtained through the programme.

The Figure 4: Indication of skills and knowledge improvement



b. The attempts, tools and processes through which graduates did or did not develop career in sustainability-related fields.

- i. The graduates were asked to provide a description of sustainability skills that can be communicated to prospective employers during interviews.

The following responses were obtained and categorised under hard skills and soft skills (*Refer to annexure 6 for the complete set of responses received*).

Correlations

❖ Hard skills

- Complexity thinking.
- Strategic.
- Policy analysis.
- Marketing and event management.
- Research skills

❖ Soft skills

- Clear understanding of the benefits of renewable energy
- Awareness of challenges, to identify creative solutions
- Transdisciplinary thinking, ability to work with diverse backgrounds
- Self-reflection
- Connections with sustainability networks
- Clear understanding of what sustainable development is and the connection between the triple bottom line.
- Communication (written and verbal).
- Leadership skills: skills to identify vulnerabilities in organisations and resilience and to respond by identifying opportunities to reduce vulnerabilities and increase resilience.

It was important to identify the contradictions of the responses that could not be categorised under hard skills and soft skills. These contradictions were that sustainability skills are undefinable and some of the graduates did not see the need to explain and motivate sustainable development to the employer. They were of the opinion that the type of employers that are looking to appoint a graduate of the BPhil and MPhil programme would have been familiar with the type of skills needed to work in a sustainability-related field.

- ii. Graduates were asked if they attempted to pursue a career in a sustainability-related field and if yes to indicate the job types.

The majority indicated that they made numerous attempts to research prospective employers and the approached hiring managers for employment opportunities. Those that identified employment opportunities and that had access to prospective employment listed the types of job applications. Annexure 9 provides a detailed list of the sample group's responses. These responses were categorised under eleven different sectors and indicates the number of the responses regarding the type of jobs that the sample group applied for (see table 14 below).

Sectors (themes)	Job types in the different sectors	Number of employment applications		Successful applications
Social	Social – NGO sector. Very little organisations were looking for a sustainability degree as a qualification.	x		
Environmental	Sustainability position under health and safety commissioned through the company's international department to the South African branch. The South African managers did not understand what job was about.	x		x
	Environmental, management, health management	x	x	
Research	Researcher, writing, analyst	x	x	x
Food security	Project manager food security – successful	x		
Education				
Renewable energy	Not understand, shortage of background qualifications in business/finance	x	x	
Recycling		x		

Marketing		x		
Green Building		x		
Sustainability manager		x	x	x
Public relations		x		

Table 14: Type of jobs that sample group applied for.

iii. The sample group’s challenges that they experienced while a career in a sustainability-related field was pursued (refer to annexure 10 for results).

<i>Correlations</i>
<ul style="list-style-type: none"> ❖ Challenges that emerged during applications: <ul style="list-style-type: none"> • The majority of the sample group did not know how to connect to employers and green jobs. • There was a strong indication that employers (hiring managers) and recruitment specialists did not understand their skills set and a tertiary qualification (degree) in sustainable development. The BPhil qualification is unknown to the industry. • Employers (hiring managers) indicated that the degree in sustainable development was not specialised enough, too broad. Sustainability skills could not be “boxed”. This can be referred to the transdisciplinary nature of the degree in sustainable development. • Most of the graduates did not know how to connect to employers and green jobs. • Graduates were not familiar with sustainable development employers • The graduates experienced limited access to employer networks in sustainability – related fields. • There were a lack of available jobs to apply for and a small amount of companies consulting in sustainability. • Sustainable development were categorised under NGO and environmental job types. • One of the participants indicated a lack in finances/business qualifications and work experience prevented the participant to be appointed. • Some of the participants had to apply for junior level and internships to gain experience in the sustainability field.

One important trend that emerged from graduates' feedback is career shifts where the participants worked in community development at a non-profit organisation and shifted to a sustainability position (job title) in the corporate business sector.

4.3 Summary of results

The survey response rate of 30.83% provided sufficient data that could be analysed according to quantitative data and qualitative data. The questionnaire was designed to provide quantitative and qualitative data.

The qualitative nature of the first part of the questionnaire was used to collect statistical data that sketched a profile of the sample group and these questions formed part of a lesser amount compared to the quantitative questions. The sample group's profiles were key to understand the characteristics of the sample group prior to describing the qualitative responses that allowed for open-ended questions. A rich pool of qualitative data were collected and analysed to connect the objectives of the research with the desired results. The following key results were obtained:

Quantitative data

Demographics

The majority of graduates specialized in the sustainable development programme and most of the 2011 graduates participated in the survey. The national orientation consisted of a majority of South African citizens (82.1% of total), but there were also a healthy representation of international students (17.1%) of which a white cultural orientation were represented in the majority, followed by a diverse spread of different other cultures. Participants consisted of an almost equal amount of males and female graduates. Ages varied between 20 and 56 plus of which the majority of BPhil graduates were between the age of 35-40 and the minority between

51 and 55. MPhil graduates that participated indicated that the majority was between the ages of 20 to 36 and the minority was aged between 20 to 25.

Employment status

The majority of graduates were employed pre-graduation and there was a slight decline after graduation. The unemployment figure went down indicating a 5.4% employment increase and it is significant to note that there was an increase of 7.9% in business owners. Employment in environmental fields consisted of 33.3%, followed by a spread of agriculture and community and rural development fields (20.8%). Renewable energy and corporate sustainability fields are new employment areas and presented 16.7%.

Employer and business owner type

The majority of those employed before and after graduation were in the private sector with the minority that remained in green businesses. An equal spread was employed in for-profit, governmental or public and training or academic organisations. There was 18.9% business owner represented that indicated that the programme provided graduates with entrepreneurial skills to create self-employment. The majority of business owners were in the private sector described as green business.

Qualitative data

The majority of data gathered was used to provide a set of qualitative data to evaluate the objectives of the research that would identify common characteristics of the sample group:

The graduates` understanding and awareness of available careers in sustainability-related fields

The results indicated that graduates had a similar understanding of a career in a sustainability-related field where the job role is redesigning ways of operating in business to improve environmental, social and financial aspects of the organisation. This notion was similar of the

description used of a green job that is a job with a positive social, environmental and financial impact. It was also described as a career that is very broad and not yet defined. References were made that it is a career that is challenging and not yet defined, responses were also in contradiction that it can be awarding, groundbreaking and exciting. The description of key sustainability included analytical, strategic, technical, complexity skills and research and report writing skills. The majority of graduates indicated that they have sustainability skills that these are skills that the programme provided in order to work in a sustainability-related field. The skills descriptions included both hard and soft skills. Soft skills were related to self-reflection and that drive, passion and optimism and values were also important. Graduates were motivated to work in a sustainability-related field because they had a personal interest and the course provided continual learning and fulfillment of educational needs. The course also broadened their thinking and they could use the new skills to change their current position at work. There was also a strong indication of inherent needs to add positive value in the world that goes above and around themselves.

The attempts, tools and processes through which graduates developed careers in the sustainability-related fields.

Graduates used a number of tools and processes attempting to develop a career in sustainability-related fields. The majority of graduates pursued a career in sustainability and applied for a number of jobs in a wide selection of fields through which they experienced similar challenges. Many of the responses indicated that it was difficult to communicate their newly obtained skills set. The study attempted to determine the method of how sustainability skills had been or could be communicated to employers through a combination of hard and soft skills. The outcome was hard skills that included complexity thinking, strategic skills, research skills, communication and marketing skills and a clear understanding of the concept of sustainable development. Awareness, self-reflection and leadership skills were included as soft skills. Leadership skills stood out as necessary to identify vulnerabilities in organisations and resilience and to respond by opportunities to reduce vulnerabilities and increase resilience.

There was a strong indication that employers (hiring managers) and recruitment specialists did not understand the concept of sustainable development and were unfamiliar with a tertiary qualification (degree) in sustainable development. Graduates described that they had an integrated knowledge set that was seen by employers as too broad and not specialised enough. There were a limited amount of companies that were looking to employ graduates or specialists in sustainable development, thus a limited supply of green jobs. Additional challenges included lack of work experience in the new knowledge field.

One important trend that emerged from a limited amount of graduates' feedback is the evidence of career shifts where the participants worked in community development at a non-profit organisation and shifted to a sustainability position (job title) in the corporate sector.

Conclusions

It is still early days in the development of the green economy for South Africa and although there are significant employment projections over the short, medium and long term, evidence currently indicates green jobs are led by market demand and employers overlook the need to incorporate green skills requirements in their organisations. Key concluding remarks of data analysed in this chapter is that green jobs, green collar workers and green careers (careers in sustainability-related fields) are still superficially understood by employers. Graduates all have sound and similar understandings of these concepts.

It is clear from the different tools, processes and attempts that graduates followed, that careers in sustainability-related fields vary across multiple sectors and are not just environmentally focussed. Students of the programme in Sustainable Development that graduated between 2003 and 2012 are employed in multi-dimensional sectors of the economy. The majority of the graduation group that participated in the survey that are not working in their field of interest have experienced severe difficulties to communicate their newly acquired knowledge and transdisciplinary skills-set that includes both hard and soft skills. Some of these skills were difficult for the graduates to describe to existing and prospective employers, for they viewed

sustainability skills as a lens to apply to complex issues related to sustainable development. Values and a drive to affect positive environmental, social and economic impact were part of to the graduates' interest to work in a sustainability related career field. Work experience in the field of study was limited and caused a barrier to enter careers sustainability-related fields.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

The South African green economy is still in its infancy, but clear evidence exists that it is building up as reflected in growing private sector interest and the number of policy initiatives underway within government. Policy development is supporting the new foundation of this economy and green economic frameworks are evident in most spheres of government. Sources of funding are available through the Green Accord that supports green business development and in addition provides support for research and development. This growth is creating more employment opportunities (green jobs) and opening career paths for students, professionals and entrepreneurs in the young green economy.

Significant investment in human capital is required to ensure that a skills gap is addressed and to prepare a skilled workforce ready to meet the demands of the green economy in order to expand according to the projected employment potential that are outlined in the Green Jobs report that was conducted by IDC-DBSA-TIPS in 2011. These projections revealed the potential of an unfolding green economy to lead to the creation of approximately 98 000 jobs in the short term over a two year period (2011-2012) , 255 000 in the medium term over a five year period (2013-2017) and 462 000 employment opportunities in the formal economy in the long term leading over eight years (2017-2015) (IDC-DBSA-TIPS, 2011:3-4).

There is a need for increased investment to create green jobs, to facilitate a just transition from traditional to low carbon economy, and to further analyse the major shifts in employments and skills patterns that must take place. The following four employment implications need to be dealt with, namely: a) creation of new employment, b) substitution of employment, c) elimination of jobs, without replacement; d) transformation of jobs by re-skilling (UNEP, 2008:44).

5.2 Research results

The survey results indicated that sustainability-related career paths are opening up for young graduates whose values are connected to sustainable development as well as those professionals in companies wanting to shift their focus to more meaningful and worthwhile work, but there are concerns that graduates are not connecting to green jobs. They are lacking career guidance and networks for job placements. These graduates are also facing employment challenges, because their transdisciplinary skills set is not easily understood by employers (hiring managers). Many graduates also lacked work experience in their new field of knowledge. The field of graduate applicants is still small for sustainability related positions and not allowing graduates the opportunity to showcase their abilities to hiring managers. From the soft skills feedback, graduates indicated that skills can be learned, but passion about sustainability and creating a positive environmental and social impact is just as important.

- Employment status

Employment fields

The literature review identified a wide range of green employment sectors in different industries, see chapter 2, section 2.5.2. These employment sectors were categorised under: a) Non-renewable: Energy Efficiency; Waste management; Consulting; Environmental Resource Management and Built Environment and; b) Renewable energy: Wind, Solar, Bio-mass, Bio-fuels, Solar, Geo-thermal, and Wave (IDC-DBSA-TIPS (2011:8). The survey response indicated that graduates were employed in all of these sectors. These fields coincides with those listed as green job areas that was used in the glossary (see chapter 1, section 1.5).

Connecting to green jobs

From the analysis of the research survey it became clear that graduates of the programme in sustainable development struggled to place themselves in employment positions due to limited career information.

Employment mismatch

The majority of graduates that were employed after completing the programme remained in their employment positions before completing the programme and was not successful to find a job in a related field of interest. They experienced several challenges in this regard, including challenges communicating their new skill set and knowledge. Results indicated that self-employment was considered to enable graduates to use their skills and knowledge.

- Graduate skills set

The literature review indicates in chapter 2 under section 2.6.2.2 that the skills set needed by graduates in the green sector(s) of the economy are varied and a successful skill-set is still developing in the young industry and not yet understood. The results from the survey indicated that the skills needed by graduates to work in a sustainable development field is varied and cannot be “boxed in”. The results of how the programme provided graduates with soft and hard skills to work in a sustainability-related field indicated a positive response.

- Sustainability career outlooks

Graduates’ outlook of a career in sustainability-related fields indicated that their values were connected to the purpose of the work that they want to do. These values were attached to affect positive environmental and social change, and shifting business as usual by demonstrating the business case for sustainable development.

- Career trends

Green job creation was discussed in the literature review (see chapter 2.6, section 2.6.1) and UNEP (2008: 43) highlighted that there will be four implications in anticipation through the shift from business-as-usual towards greater sustainability. These implications were: a) creation of new employment, b) substitution of employment, c) elimination of jobs, without replacement; d) transformation of jobs by re-skilling. Two of the implications have specific relevance to this study.

Creating new jobs

The first of these implications is the creation of new employment opportunities that can have a positive effect. My observation from the extensive review on the South African green economy trajectory (see chapter 2, section 2.4) indicated that green policies exist and they can support the creation of new jobs. The literature review indicated in chapter 2, section 2.5.2, that new employment projections revealed the potential of an unfolding green economy, namely: 98 000 jobs in the short term over a two year period (2011-2012), 255 000 in the medium term over a five year period (2013-2017) and 462 000 employment opportunities in the formal economy in the long term leading over eight years (2017-2025) (IDC-DBSA-TIPS, 2011:3-4). Governmental policies that support the growth of the green economy policies working together with the Green Fund's investment in the development of new technologies and the emergence of new industries can grow green enterprises that will provide more green jobs. The information obtained through the literature review on the creation of new green jobs linked to the survey responses that indicated that graduates are applying various tools and processes to apply for new green jobs in sustainability-related fields and some are also creating self-employment through entrepreneurship.

Preserving jobs

Existing jobs can also be preserved if government can assist business practices to up-skill workers through educational programmes. In the transition from business-as-usual to a green economy, it is important to determine if the implications can be dealt with by a skilled workforce that understands Sustainability. The literature review clearly highlights in chapter 2, section 2.5.1, that the challenge of a skills shortage needs to be addressed urgently to avoid "bottle-necks" that could stall the growth of the green economy. The cause of this skills shortage was found to be a lack of coordination in training and development programmes as well as the absence of 'green skills'. Shortfalls could be addressed productively if South Africa develops green economy policies for skills development as the foundation for developing the green economy (ILO, 2010). The literature review also indicates in chapter 2 under section 2.6.2.2 that the skills set needed by graduates in the green sector(s) of the economy are varied and a successful skill-set is still developing in the young industry. The survey response indicated that graduates obtained new skills through the programme that

allowed them to change their job description within their current employment contract. Thus some of the graduates were able to preserve their jobs.

5.3 Limitations and challenges

- This methodology or approach does not claim to be a solution. I would have preferred to include “entrepreneurship” and “engaged scholarship” as part of my research methodology prior to the ethical clearance application. At that stage I only registered my enterprise and there were lots of uncertainty about the possible experience that I could obtain to enable me to contribute my knowledge from practical experience in sustainability-related career development. Towards the end of my research I had a wealth of knowledge that could have contributed to my research field to bridge the gap between theory and practice. This wealth of knowledge was captured over the two and a half years through valid research methods, such as participant observation, structured interviews and action research.
- One of the assumptions made in this research study prior to data collection, was that the population sample size would be sufficient to represent graduates’ prospects of career opportunities in sustainability fields. The results of the data collection process were limited to represent views of the majority of the sample group. I had no direct access to the sample group’s contact details. The ethical clearance limited me to access the graduate database. The course administrator discovered that the graduate database was outdated and that their contact details were no longer correct. Graduates changed email addresses and could not respond to the request to voluntarily participate in the survey.
- I was challenged by my initial timeframe, capacity and budget to expand my study to include information about the needs of green businesses to hire graduates. I would have also preferred to incorporate human resource managers in my survey to better understand their knowledge of sustainability-related career fields.

- The population sample size is large enough to represent graduates' prospects of career opportunities in sustainability fields.
- Access to my study leader was limited. I furthermore moved to Pretoria during the end of the second year of my research and I was of ill health for nine months in 2013 and received medical treatment for three of those months of which one month was in hospitalisation.

5.4 Recommendations

Graduates should pursue careers in sustainability fields to safeguard against the loss of knowledge and skills gained in the programme. Thus it is recommended to apply skills in relevant fields and to take action and invest in career planning through researching different types of green job opportunities, to speak to employers and human resource manager and explain their skills set and knowledge in sustainable development, and network with industry leaders. Consider business opportunities to create more green jobs. It is also advisable to transform existing jobs and positions through amending existing job specifications to include sustainability principles.

I would like to recommend to the School of Public Leadership to provide more guidelines around career planning for graduates during and after the programme in Sustainable Development. More research needs to be conducted to understand how career development in the programme can be provided and how graduates are being absorbed by green job opportunities in sustainability-related fields. It is also important to explain to graduates how the programme provides trans-disciplinary skills that are needed to be employed in a green job and to connect the alignment of these skills with the programme outcomes.

My recommendation to employers is to consider employing sustainability graduates in the workplace for their skills and knowledge could be a valuable contribution to practise by shifting the practice from "business-as-usual" towards a low carbon, inclusive green economy.

ANNEXURE

Annexure 1 : List of survey questions

Annexure 2 : The sample group`s motivation to enrol in the programme.

Annexure 3 : The sample group`s understanding of work experience & qualification required to work in a sustainability-related field.

Annexure 4 : A description of the sample group`s sustainability skills.

Annexure 5 : A description of how the BPhil programme provided skills.

Annexure 6 : A description of how the sample group`s skills could be communicated to future and/or existing employer/s.

Annexure 7 : The sample group`s understanding of a career in sustainability.

Annexure 8 : Why sample group want to work in a sustainability career.

Annexure 9 : Type of jobs that sample group applied for.

Annexure 10: Career challenges experienced by the sample group.

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Annexure 1

List of questions used in the questionnaire (survey monkey).

**Note: The original online format of the survey is not available. The online survey (www.surveymonkey.com) link was closed to the public after July 2012. Below is a list of the questions that were asked in the questionnaire.*

- 1. Name and Surname:**
- 2. Student Number:**
- 3. Kindly indicate in which one of the following B/MPhil Specialisation fields you graduated:**
 - Sustainable Development
 - Sustainable Development Planning
 - Renewable & Sustainable Energy
 - Managing Sustainable Agriculture for Development
- 4. In which year did you graduate?**
- 5. If you continued with the MPhil after graduating in the BPhil, kindly indicate your thesis title:**
- 6. Provide a short summary of your thesis:**
- 7. Gender: Male or Female.**
- 8. Nationality: South African or International.**
- 9. Cultural Orientation:** White, Black, Coloured, Indian, Other.
- 10. Age when graduated in the BPhil Degree:**
- 11. Age when graduated in the MPhil degree:** *Note: Mark only if applicable
- 12. Current Location:** *Note: Indicate your city and province.
- 13. List all your academic qualifications:** *This includes your diplomas, undergraduate and postgraduate degrees.
- 14. List your professional qualifications:** *This includes certificates obtained through short courses and by attending academies or conferences.
- 15. Provide an overview of you career background:** *Note: There is no word count limitation in this section.
- 16. Are you currently employed, unemployed, a full time student or business owner?**
- 17. If you are currently employed, kindly indicate the type of organisation:**
 - Private enterprise
 - Government/public institution

Non-governmental organization (NGO)

Training/academic institution

Green business

Not applicable (Unemployed)

18. If you are employed, list the organisation name:

19. If you are currently a business owner, kindly indicate the type of organisation:

Private enterprise

Government/public institution

Non-profit organisation (NGO)

Training/academic institution

Green business

Not applicable (Unemployed/student)

20. If you are a business owner, kindly list the name of your organisation/enterprise: __

21. Your employment status prior to your graduation in the BPhil and/or MPhil programme:

Employed

Unemployed

Full time student

Business owner

22. If you were employed or prior to graduating in the BPhil or MPhil programme, kindly indicate the type of organisation:

- Private enterprise
- Government/public institution
- Non-governmental organization (NGO)
- Training/academic institution
- Green business
- Not applicable (Unemployed)

23. If you were a business owner or prior to graduating in the BPhil or MPhil programme, kindly indicate the type of organisation:

- Private enterprise
- Non-profit organisation (NGO)
- Training/academic institution
- Green business
- Not applicable (Unemployed)

24. How would you describe a green job?

- A job in the environmental field.
- A job in a sustainability field.
- A job with a positive social, environmental and financial impact.
- Employment at a green business/company.
- I am not familiar with a green job and I do not know how to describe it.

25. If you are employed or a business owner, would you say that you currently have a green job?

***Note: If you are unemployed or a full time student, kindly tick the box "Not applicable".**

- Yes
- No
- Don't no
- **Not applicable (unemployed or full time student)**

26. If you are not working in a sustainability field would be interested to work in one? *Note: If you are unemployed or a full time student, kindly tick the box "Not applicable".

- Yes
- No
- Not applicable

27. If you are employed or a business owner, indicate in which of the following field or fields you currently working in: *Note: If you are unemployed or a full time student kindly tick the box "not applicable".

- Agriculture: Permaculture, Food Production and Forestry
- Biotechnology
- Corporate Social Investment and/or Responsibility (Communications/Consulting),
- Ethical Supply Chain
- Community & Rural Development
- Creative: Design, Advertising & Marketing
- Education: Skills Development, Training, Knowledge Management,
- Research & Development
- Environmental: Planning, Management, Impact, EIA, Landscape Architecture and Health & Safety
- Financial: Business Development & Management Analyst, Modelling and Feasibility
- Green Buildings and Build Environment: Architecture, Planning, Engineering & Construction

- Legal, Lobbying, Advocacy, Policy and Administration
- Materials Renewable/Clean Energy, Energy Efficiency and Carbon Management
- Resource Conservation and Environmental Management: Parks, Recreation & Tourism
- Sales, Communications, Journalism, Public Relations & Human Resources
- Sustainable Consumption and Production: Packaging, Textiles and Green products
- Waste: Management & Recycling
- Water: Waste Water Treatment & Water Management
- Transportation: Infrastructure, Green Automobiles and Mass Transit
- Other
- Not applicable

28. Only if you marked "other" in the question above, kindly describe the field that you are working in:

29. List the total number of years work experience that you have in the field or fields indicated in question 27/28 listed above. *Note: If you are unemployed or a full-time student, tick the box "not applicable".

30. Describe the type of work experience that you have obtained over the time frame that you listed above: *Note: This is only applicable to graduates that are currently employed or business owners. If you are unemployed or a full time student, kindly skip this section and move to the next question.

31. If you are currently unemployed or a full time student or not working in a sustainability field, would like to work in a sustainability field?

- Yes
- No
- Not applicable

32. If you are answered yes in the question above, kindly indicate the field or fields that you would like to work in:

- Agriculture: Permaculture, Food Production and Forestry
- Biotechnology
- Corporate Social Investment and/or Responsibility (Communications/Consulting),
- Ethical Supply Chain
- Community & Rural Development
- Creative: Design, Advertising & Marketing
- Education: Skills Development, Training, Knowledge Management,
- Research & Development

- Environmental: Planning, Management, Impact, EIA, Landscape Architecture and Health Safety.
- Financial: Business Development & Management, Analyst, Modelling and Feasibility
- Green Buildings and the Build Environment: Architecture, Planning,
- Engineering & Construction
- Legal, Lobbying, Advocacy, Policy and Administration
- Materials Renewable/Clean Energy, Energy Efficiency and Carbon Management
- Resource Conservation and Environmental Management: Parks, Recreation & Tourism
- Sales, Communications, Journalism, Public Relations & Human Resources
- Sustainable Consumption and Production: Packaging, Textiles and Green products
- Waste: Management & Recycling
- Water: Waste Water Treatment & Water Management
- Transportation: Infrastructure, Green Automobiles and Mass Transit
- Other
- Not applicable

33. List your core skills (Communication, Strategic, Analytical, Leadership and other): Open-Ended Response

34. Do you have any skills in sustainability?

Yes

No

Not applicable

35. If applicable, kindly describe the type of sustainability skills that you have:

36. What do you think are the work experience, professional and academic requirements needed to work in sustainability?

37. Have you tried to pursue a career in sustainability?

Yes

No

38. If you answered yes in the question above, kindly describe the type of jobs that you have applied for: Open-Ended Response

39. If you answered yes in the question above, kindly explain why you want to pursue a career in sustainability: Open-Ended Response

40. Did you find it challenging to apply for a job in a sustainability field?

Yes

No

41. What kind of challenges did you face?

42. Do you think that the BPhil/MPhil degree in Sustainable Development Planning and Management provided you with a skills set that you can use in a sustainability career?

Yes

No

43. If you answered yes to the question listed above, kindly describe in a short paragraph how the BPhil programme provided you with a skills set that you can use to find a career in sustainability?

44. How would or did you describe the skills set that you developed through the BPhil/MPhil program to a future employer when applying for a job in a sustainability field?

45. To what extent did your competencies improve as a result of your participation in the BPhil or MPhil programme?

- No improvement
- Slight improvement
- Moderate improvement
- Large improvement
- Very large improvement

46. How would you describe a career in sustainability?

47. Why did you decide to enrol for the BPhil/MPhil programme?

48. How did you find out about the BPhil or MPhil programme?

- University of Stellenbosch
- Sustainability Institute
- Work Colleague
- Friend
- Internet

Annexure 2

The sample group`s motivation to enrol in the programme.

**Responses received: Direct quotations (36 responses)*

Why did you decide to enrol in the BPhil/MPhil programme?

<ul style="list-style-type: none"> • Because it made sense at that time in my life. My other option was City and Regional Planning at UCT (was also accepted there).
<ul style="list-style-type: none"> • After 7 months living in a sustainable community in India, it was the next logical step.
<ul style="list-style-type: none"> • To broaden my thinking through my approach in biodiversity management. To learn not to always think you need fences and gates to manage human and nature conflicts, but to find the synergies and connect them to create a harmonious environment.
<ul style="list-style-type: none"> • To clearly understand environmental issues and the relation to sustainability.
<ul style="list-style-type: none"> • I was disillusioned with the superficial world of advertising and wanted to spend my time contributing positively to the world.
<ul style="list-style-type: none"> • I wanted to continue studying and I believed the programme was suited to me desires and interests.
<ul style="list-style-type: none"> • To put myself in a better position to work in the field of community development and poverty eradication. In the hope of working with development NGO's like UNICEF, DIFID, etc.
<ul style="list-style-type: none"> • I needed to close one book and open another one, the BPhil seemed like a great way to start!
<ul style="list-style-type: none"> • For a change in mental stimulation.
<ul style="list-style-type: none"> • I wanted to further my studies and I learned about the term Sustainable Development during 2002 in my undergraduate programme. I have always been familiar with the principles, but wanted to learn the theory.
<ul style="list-style-type: none"> • Wanted to improve my qualifications and was interested in sustainable development.
<ul style="list-style-type: none"> • I have grown up in a family that has been committed to making a difference in our local community, and with this background I have grown in passion to find a career where I can contribute "more" to society than just helping an organisation make more money. Whilst I

<p>originally was set on Social Development at UCT, I heard about this course and was drawn to it for I had a hunger to gain a more holistic understanding of the complexity of society's problems.</p>
<ul style="list-style-type: none"> • It met my needs, the style and content of the way the course is offered.
<ul style="list-style-type: none"> • It offered me the opportunity to move in the direction I wanted to go without needing to start studying from scratch again. The content interested me.
<ul style="list-style-type: none"> • To resolve the Nature vs Humans impasse in my mind.
<ul style="list-style-type: none"> • To gain knowledge on Sustainable Development and Sustainable Agriculture, so that I could further my career into one of these avenues.
<ul style="list-style-type: none"> • To improve my understanding of sustainable development
<ul style="list-style-type: none"> • To develop my career, broaden my skills and knowledge in sustainability as I share the common goal of promoting a healthy planet. I wanted to learn more about the varied fields such as environmental protection and remediation, waste reduction, green building, sustainable agriculture, climate change, and renewable energy and energy efficiency.
<ul style="list-style-type: none"> • Strategic, marketability and personal interest.
<ul style="list-style-type: none"> • I wanted to get an understanding of sustainable development.
<ul style="list-style-type: none"> • I wanted to understand the concept sustainable development.
<ul style="list-style-type: none"> • On a whim. Because I got frustrated that nobody I knew could explain to my satisfaction what 'sustainable development' meant and what it entailed, and yet the word was sprinkled everywhere like confetti.
<ul style="list-style-type: none"> • I'm passionate about the planet and people, and I wanted to learn how to evaluate, analyse and develop new ways of thinking.
<ul style="list-style-type: none"> • I had a good grounding in marketing and branding, and realised these fields needed to be used to get people to consume differently. I knew very little about sustainability and wanted to learn.
<ul style="list-style-type: none"> • I wanted to leave a legacy that I could be more proud of.

<ul style="list-style-type: none">• I visited the Sustainability Institute and immediately felt a fit with the place and their approach.
<ul style="list-style-type: none">• I wanted to take the sustainable cities module.
<ul style="list-style-type: none">• Attracted by sustainability field.
<ul style="list-style-type: none">• Sold my business and wanted to expand into sustainable agriculture, but the energy grabbed my attention. Was offered a bursary. Never looked back.
<ul style="list-style-type: none">• Was looking for a postgraduate programme that departed from technical / policy focussed, silver bullet type approach to sustainable development.
<ul style="list-style-type: none">• I wanted the knowledge.
<ul style="list-style-type: none">• A visit to the institute inspired me to do so. Ongoing interest in sustainable development and its application in the built environment.
<ul style="list-style-type: none">• I have always had a passion for nature and felt that there are better ways of doing things. I did research and found the B.Phil. programme and knew that I had to enrol.
<ul style="list-style-type: none">• I needed to change my life!
<ul style="list-style-type: none">• Related to the job that I am currently doing.
<ul style="list-style-type: none">• First I wanted to do planning stream and then I enjoyed the all programme and like I said above it is a huge opportunity.

Annexure 3

The sample group`s understanding of work experience and qualifications required to work in a sustainability-related field.

**Responses received: Direct quotations (30 responses)*

What do you think are the work experience, professional and academic requirements needed to work in sustainability:

- | |
|---|
| <ul style="list-style-type: none"> • It is such a wide field, everything is needed. |
| <ul style="list-style-type: none"> • Understanding the business you are in or planning to be part of. How this business could play a role in sustainability. Computer skills. Excellent Listening skills (this will help achieving buy-in when people see that you understand their business and where they are headed by simply listening to the background about that business). Communication skills (you need to build models and communicate them well to ensure a wider buy-in). Negotiation Skills at all levels of business and at a community level with diverse backgrounds. Research skills (it is important to be always ahead in discovering new technologies to help reduce cost for running business while increasing returns). Project Management Degree/ Sustainable Development/ Applied Economics/ Planning (especially spatial planning) and probably other academic requirements. |
| <ul style="list-style-type: none"> • Clear and good knowledge of social development, environment skills, government policies and business impact in society. |
| <ul style="list-style-type: none"> • Exposure to different industries and environments, disillusioned with the status quo, strategic thinking and creative problem solving ability, ability to communicate clearly and concisely, ability to self -reflect, willingness to challenge assumptions, deep understanding of the interconnection between human and natural systems. |
| <ul style="list-style-type: none"> • Drive/determination, passion, complexity-thinking, knowledge. |
| <ul style="list-style-type: none"> • Environmental analysis, carbon auditing; Social and community research and evaluation; Conflict resolution; Financial management; Project management and others. |
| <ul style="list-style-type: none"> • Business skills are a key pre requisite. Academic qualifications and professional certificates are not really that helpful unless they have been utilised. |
| <ul style="list-style-type: none"> • Optimism. |
| <ul style="list-style-type: none"> • Understanding of the agenda. |

<ul style="list-style-type: none"> • Understanding of social and environmental issues community development and negotiation training in sustainability issues
<ul style="list-style-type: none"> • There is a broad range of skills needed to work in sustainability. In my experience I have realised that organisations are really looking for someone to specialise in 'sustainability' but rather, the more that sustainability becomes integrated into business thinking, organisations are looking for skills in engineering, supply chain, information systems, law, finance, marketing and communications etc, to work on sustainability related projects. Therefore I think that whilst it is important to show some kind of additional qualification or experience in sustainability specifically, it is crucial to have experience in "traditional" industries as these are the industries that continue to drive our economy and that need people at the heart of the business who understand and contribute towards sustainability integration. Whilst there are some opportunities for people with academic qualifications in sustainability to go into a small strategic consulting firm who advise larger companies, these opportunities are very few and the more sustainability thinking becomes integrated into the organisation, the more organisations will depend on their own employees to provide these services.
<ul style="list-style-type: none"> • Knowing how to balance economic, social and environmental benefit.
<ul style="list-style-type: none"> • I think that any background and qualification is appropriate for working in "sustainability". What is required is recognition of complexity, ecological thinking (interconnectedness), systems thinking, understanding the challenges and ethics of sustainability.
<ul style="list-style-type: none"> • Positive attitude. Desire to make a difference – passionate, perseverance. Push boundaries - effect change. Enquiring.
<ul style="list-style-type: none"> • You need to have basic understanding of any of the following areas: Economics, Environmental management, Development or social studies.
<ul style="list-style-type: none"> • Advanced university degree (Bachelors, Masters or higher level) in a discipline relevant to Natural Resources Management such as: Natural resources management, environment studies, development studies, forestry, geography, etc. Experience: Minimum of 5 years professional experience in environment, sustainable management of natural resources, and / or related field.
<ul style="list-style-type: none"> • Not many. Life experience can be sufficient. Should not sift / exclude people based on their academic profile. Short course on sustainability can be enough to retool / retrain people - it's an approach more than a skill - speaks to values and thinking.
<ul style="list-style-type: none"> • Analytical, communication and leadership.

**Continue to next page.*

<ul style="list-style-type: none"> • A broad vision that can take in to account many different perspectives and join the dots. Creativity. Willingness to break barriers and go against the status quo. Ability to create visions of better/ more positive ways of doing things. Willingness to take risks with new technologies/ ideas. Academic skills that promote analytical abilities of a wide range of options and scenario's, rather than a focus on narrow/specialist field. Good communication skills.
<ul style="list-style-type: none"> • A qualification in Sustainability like a degree like the B.Phil.
<ul style="list-style-type: none"> • I feel you do need a solid grounding in sustainability such as the B.Phil. provides to have a accurate picture of the complexities of sustainability. But there are lots of entry points into the industry via jobs that involve changing the status quo. As a constantly changing field I think there are roles that may grow into a taking on more of a sustainable focus. Or jobs in corporates, government, NGOs, small biz focusing on food, energy, built environment etc. Not sure about professional requirements, only know about GBCSA.
<ul style="list-style-type: none"> • Sensitivity, patience, leadership, integration, awareness and integration of social, environmental and economic factors in all processes and decision-making.
<ul style="list-style-type: none"> • For me as an Engineer, I believe my Engineering skills were the basis for an understanding of sustainability.
<ul style="list-style-type: none"> • Have to have lived.
<ul style="list-style-type: none"> • Passion, open-mindedness, appreciation for complexity, ability to build dialogue and investment into personal, ongoing learning journey.
<ul style="list-style-type: none"> • I feel you need to back up a specific skills e.g. law; communications; engineering with sustainability skills and then re-enter that field but enlightened with this point of view. Just having the sustainability knowledge without a specific skilled area to apply it to is often not enough. Business management and an advanced degree in a branch of sustainable development would be an advantage. The knowledge imparted by a basic degree in sustainable development (BPhil) is often too shallow to be of any real use.
<ul style="list-style-type: none"> • Everything I've done has application. What is missing is the skill of encouraging and facilitating engagement, participation and inclusivity.
<ul style="list-style-type: none"> • A good knowledge of the sustainability challenge that is faced by us. A degree in Sustainability.
<ul style="list-style-type: none"> • I think you need to have a tough skin. Consumers, stakeholders, are all fighting back with sustainability awareness, it's not easy and there's no real money for the advocacy work that I want to do.

- Understanding the concepts of sustainable development and understanding the resource limitations when making development decision.

Annexure 4

A description of the sample group`s sustainability skills.

**Responses received: Direct quotations (33 responses)*

Describe the type of sustainability skills that you have:

- | |
|---|
| 1) The ability to find peace and happiness within/without and be a source of light, inspiration, positive outlook and grounded hope. |
| 2) Carbon Footprinting, Corporate Climate Change policy and Strategy. |
| 3) Research & writing. |
| 4) Linking biodiversity conservation with social development. This create a culture of belonging to the people and thus making them stewards of th e conservation areas, which aid in the sustainable management of that area. Recycling programme. Sustainable building technologies, for efficient energy use. |
| 5) Energy efficiency climate change (adaptation and mitigation) research. |
| 6) Strategic thinking whole-system thinking creativity generalist. |
| 7) Knowledge. |
| 8) CSAP and Carbon Footprinting. |
| 9) Research. |
| 10) Not for profit planning and management. |
| 11) A comprehensive understanding of and holistic thinking around sustainability issues in South Africa and the world at large. This provides me with a basis of knowledge and understanding that is crucial to providing advice, guidance and information to different departments within the organisation who do not quite understand the value and practical implementation of the triple bottom line. This also enables me to play a key role in the education of colleagues and suppliers. |
| 12) Evaluating implementation of projects in a sustainably manner; considering using natural resources efficiently and not polluting the environment in projects. |
| 13) Engineering skills such as design of energy systems, energy efficiency. Ability to deal with ambiguity , Systems thinking, analysis and design. |

14) Sustainable Development. Sustainable Agriculture.
15) Ability to create an understanding of interdependence between social environmental and economic spheres.
16) I am able to review policies and regulations on natural resources, economics and environmental issue on how to promote a systems approach to sustainable resources production and resource use in low income country contexts. I am also able to enhance existing climate initiatives by strengthening capacity for long term investment in, and management of climate-resilient sustainable development.
17) Ability to think in complex terms.
18) Analytical.
19) Knowledge of complexity and systems, sustainable agriculture and gardening methods, designing of sustainable systems (especially in agriculture gardening fields), working with different cultural paradigms, analytical skills.
20) Ecological building design and planning.
21) Problem identification, Analytical and coordination.
22) I have developed a course on CSR.
23) Carbon Footprinting. Training and Development.
24) Integration of both overview and detail issues and different fields and disciplines. Will to make a difference where possible.
25) What I gained from SI.
26) Systems thinker, myth buster, sees the whole picture.
27) Appreciation for complex system, knowledge in areas of food security and sustainable agriculture, sustainable resource management (energy, water, carbon etc.), corporate governance and sustainability.
28) I have completed 5 out of 8 modules of the B. Phil. in Sustainable Development. These have equipped me with a working knowledge of sustainable development; biodiversity, corporate citizenship; complexity thinking and systems theory and conventional energy systems.
29) Any of the above translated into a sustainable application.
30) Communication skills, problem solving, critical analysis.

- | |
|---|
| 31) I have a broad based set of skills from my time in a corporate environment, these skills, coupled to the knowledge on sustainability from the SI have left me in a good position in which to find employment. |
| 32) Understanding the concepts of sustainability, environmental challenges and ethics. |
| 33) Green building. |

Annexure 5

A description of how the BPhil programme provided a skill set that can be used to find a career in sustainability.

**Responses received: Direct quotations (36 responses)*

Kindly describe in a short paragraph how the BPhil programme provided you with a skills set that you can use to find a career in sustainability?
<ul style="list-style-type: none"> • It gave me a wide outlook (trans-disciplinary basis) and philosophical grounding (complexity theory), which enables me to feel comfortable working with very challenging situations and see things from many angles simultaneously.
<ul style="list-style-type: none"> • I did not have an understanding of sustainability and its concepts. B.Phil. gave me knowledge and detailed understanding of the relevant topics.
<ul style="list-style-type: none"> • It gave me a comprehensive overview of the state of the world and ways in which the complex problems could be approached. Although I think it provided me with a skills set I could use in a sustainability career, the job market hasn't caught up yet to think the same thing.
<ul style="list-style-type: none"> • One is exposed to an array of sustainable skills and knowledge that empowers you to better understand issues related to sustainability in government, business and the community at large.
<ul style="list-style-type: none"> • My studies led to a career in sustainability through the Sustainability Institute.
<ul style="list-style-type: none"> • By providing us with material to broaden our mental horizons and knowledge, and demanding assignments and interpretation on issues.
<ul style="list-style-type: none"> • While it may not give one direct skills it certainly gives one a clearer perspective on the issues and the scope of possibilities in the area of sustainable development.
<ul style="list-style-type: none"> • I think that the overviews of the modules were great from an academic perspective. I think that in many cases they lacked a realistic "professional" qualification edge to them. They lacked a kind of "practicality" that could be transferred. From a theoretical perspective the modules were definitely fab, I would just like a more "professional" type qualification. The group work and presentations were brilliant, I worked with so many great people, all with different skills who came together to deliver something special every time.
<ul style="list-style-type: none"> • Broad general grounding across all spheres of planetary existence by humankind.

<ul style="list-style-type: none"> • Research skills, analytical skills and knowledge of the agenda.
<ul style="list-style-type: none"> • Gained a practical understanding of sustainability and the skills needed for development planning.
<ul style="list-style-type: none"> • The programme provided me with a background understanding and comprehensive knowledge that has proven fundamental to starting out in a sustainability career. The programme has trained me up in a way that has enabled me to analyse data, apply strategic thinking, argue for and against different solutions, and communicate clearly, within a sustainability mind-set.
<ul style="list-style-type: none"> • Understanding what Sustainable Development means.
<ul style="list-style-type: none"> • Because the BPhil offer more of a conceptual grounding I think they are very useful skills if you already have a job to apply them to. However, I'm not sure they provide a solid foundation from entering a specialised career.
<ul style="list-style-type: none"> • It moved me from a focus on natural ecology to recognition of the place of humans and their creations in the world. So it developed my philosophical skills if you will (as I have prior postgrad degree in environmental management).
<ul style="list-style-type: none"> • The degree provided a fair amount of flexibility in terms of the courses I wanted to attend. This allowed me to choose those subjects that I felt would be most beneficial to me in a future sustainability career. Many of the assignment topics were broad enough so that I could research areas that interested me.
<ul style="list-style-type: none"> • We're up to date with the current and very recent developments with the sustainability field - the programme is very relevant and current. It's also very context relevant because you can sort of differentiate between the different continents and know what the issues are at context specific levels. It also touches on the respective tools that are currently in use of the job market, so you know what these tools is when you enter the job market.
<ul style="list-style-type: none"> • Complexity thinking exposure to all things related to sustainability. Practical examples and living experiences class / fellow student interactions. Being part of a greater network of ppl with similar vocation / interests.
<ul style="list-style-type: none"> • I am currently in a position of making informed decisions with desire of getting sound environmental, economic and social goals. I fully understand the complexity in sustainability and I can tell if someone is trying a short cut route. I can develop a matrix that can portray sustainability whether weak or strong sustainability.
<ul style="list-style-type: none"> • The programme is very broad and thus enables me to have a variety of career choices such as, perhaps work for a municipality in its sustainability department, urban planning, project management, in development planning, for a mine in its sustainable development department,

<p>lecturer in land policy etc.</p>
<ul style="list-style-type: none"> • Provided very good analytical skills. Provided very good skills in working with people with a wide range of abilities and perspectives. Provided a good, broad in-depth background to the social, political and environmental issue around sustainability. Provided good examples of alternatives to the unsustainable status quo. Provided good problem solving, communication, presentation and research skills.
<ul style="list-style-type: none"> • It provided me with a holistic view and understanding of sustainability.
<ul style="list-style-type: none"> • The programme sensitised me to the different aspects that needs to be addressed when looking at sustainability. Systems thinking and complexity are skills that are needed in sustainability and I learned it in this course.
<ul style="list-style-type: none"> • I feel that I have great knowledge and understanding of sustainability but given my background I can mainly conceive of using my knowledge for education or strategy. I have not explored other skills.
<ul style="list-style-type: none"> • The BPhil programme provides students with a range of skills. Firstly knowledge, knowledge is power. Working across disciplines, especially the group work. Some of the specialised modules gave real life examples of stuff that is happening, so for example, visiting biodynamic farms, or renewable energy finance calculations or what technologies exist already for ecological design of cities. The course also tugged quite incessantly on one's conscience, it gets you to think and to challenge what is currently business- as-usual.
<ul style="list-style-type: none"> • Increased awareness of need for integration of social, environmental and economic aspects of sustainability and provided a platform and facilitated exploration of these relevant to my field of expertise and experience.
<ul style="list-style-type: none"> • The ability to think about complex problems, good networks gained from lecturers and very diverse classmates. Also, the emphasis on transdisciplinary knowledge creation is incredibly useful and unique and I can see it being a value adds to future employers.
<ul style="list-style-type: none"> • As a Metallurgist Engineer, the BPhil programme allowed me to have another understanding of the Mining activities. Furthermore the programme allowed me to be aware of the environmental, economic and social impact of Mining activities.
<ul style="list-style-type: none"> • Background knowledge can be found anywhere, but the networking that came with studying with like-minded students and lecturers is more than money can buy.
<ul style="list-style-type: none"> • Understanding of complexity and interconnectedness, appreciation for alternative approaches to development and ways of learning, networks and contacts in broad range of sustainability related fields.

<ul style="list-style-type: none">• It is imparting knowledge that I previously did not have, especially of key terms and how things are interrelated. It is also sharpening my analytical skills.
<ul style="list-style-type: none">• How long have you got? Through diverse exposure, engagement, process, reflection and challenging norms and assumptions. Inspire creativity, open-mindedness and thinking rather than proceeding as usual.
<ul style="list-style-type: none">• Alternative ways of handling situations and alternative answers are provided in the BPhil degree which is needed to empower people in terms of sustainability.
<ul style="list-style-type: none">• It gives you a broad overview of the issues, and teaches you where to start if you want to specialise in something. The group work enabled complex dynamics and debates to further deepen that understanding and the assignments were hard work. I found that through reading and writing my understanding was cemented and the foundations were laid.
<ul style="list-style-type: none">• Provides me with the skills and understanding mentioned in question 31.
<ul style="list-style-type: none">• The BPhil degree allowed me to foster my critical thinking toward the current system and also enhance my thought in the discovery of more ecological and rational ideas.

Annexure 6

A description of how graduates` skills could be communicated to future and/or existing employer/s.

Responses received: Direct quotations (27 responses)

How would or did you describe the skills set that you developed through the BPhil/MPhil program to a future employer when applying for a job in a sustainability field?
1) That they are skills needed for more coherent and efficient staff and organisations, which face complex social, economic and environmentally rooted problems.
2) As any organisation operates as a system with smaller inherent systems and within larger systems, everything the organisation does has an impact on these systems. In order to operate sustainably, an understanding of this interaction is essential. I have the skills to not only identify vulnerabilities and resilience within the organisation, but also to identify opportunities to reduce vulnerabilities and increase resilience. I can develop strategies for this, communicate it efficiently to others, and lead by setting an example.
3) Being able to work with whatever is provided and find a solution that is tailor made for individuals and businesses alike. Being able to identify opportunities and offer advice.
4) Clear understanding of sustainable development and benefits of renewable energy.
5) Awareness of sustainability challenges and introduction to creative solutions, trans-disciplinary thinking, and ability to work with people from diverse backgrounds and interest groups, skills for self-reflection, connections with a network of people interested in sustainability.
6) Knowledge, as well as complexity-thinking.
7) A broad understanding of the issues involved in the field of sustainability as well as possible developing strategies and solutions to move to a more sustainable way of operating.
8) I developed my own unique writing style and also a mind for research and teasing out facts from corners far and wide across the world wide web. It gave me a different conscience, another way of viewing the world. It expanded my horizons and made me re-evaluate what is important.
9) I understand sustainable development and I have marketing and event management skills and work experience.
10) I would say that it offered me a broad and holistic understanding of sustainable development that has given me a strong foundation for interdisciplinary thought and problem solving.

11) Big picture approach, integrative, multi-disciplinary, soft and technical skills, recognition of the importance of policy.
12) Sustainability knowledge - broad and specific . Sustainable Agriculture & Sustainable Development. Research skills. Presentation skills. Analytical skills. Critical thinking. Teamwork with diverse range of people. Triple bottom line.
13) Used the B.Phil. application as a motivation for a promotion.
14) Experience in Policy Development and Review. Good understanding of the governance and general sustainable development issues and challenges. Extensive experience in policy analysis and sustainable development issues
15) Integrating knowledge set. Attention to detail – thoroughness. Communication - verbal and written.
16) I would tell them that I understand the concept sustainable development and would bring in that aspect in their company or organisation, of course depending on the type of organisation. I would tell them that i have independent research skill and the ability to relate a specific research topic to a broad framework of knowledge as well as the ability to communicate research results.
17) I tried to explain the content of each module to the interviewee, but the information was lost on him.
18) I would say that I am well grounded in current sustainability thinking which would enable me to develop a strategic plan, business model, brand strategy or educational programme for a business.
19) I would link this knowledge to my expertise in the retail segment. The retailers have a lot to do, their direct impacts are high, but their indirect impacts are MASSIVE, how do they account for these and mitigate them?
20) The ability to think about complex problems, good networks gained from lecturers and very diverse classmates. Also, the emphasis on transdisciplinary knowledge creation is incredibly useful and unique and I can see it being a value adds to future employers.
21) In whatever is being done attention need to be paid to the environmental, economic and social impact of our activities?
22) Undefinable.
23) I guess that's partly what I had trouble in communicating - a combination of breadth and depth of knowledge and networks was easy to communicate. Explaining a different way of seeing challenges and opportunities less so, but I guess that comes out in the way in which you approach life which either resonates with a potential employer, or not.
24) Good question. I am working on that. I think what is required is a background knowledge of that employers business, followed by an explanation of how it could be viewed through the filter of sustainability. Each case would have to be dealt with on an individual basis.

25) Depends on the job and what the match with their needs. No point in doing what does not interest you or them.
26) The ability to envisage a different/alternative future for a company or people in general. Analytical questioning of the way things are being done in the business world.
27) I think there was also a journey of personal development, but more specifically there is a convergence of many academic streams of work into sustainability. It is highly complex; one needs to be aware of all these complexities but cannot be an expert in all of them.
28) Sensitivity towards resource limitations. Sensitivity towards development challenges.
29) I would explain that I have a comprehensive and holistic understanding of sustainability issues and how they relate to society as a whole; the ability to analyse information and data; the ability to apply my mind strategically in coming up with more sustainable solutions; the ability to work in a team in coming up with strategic solutions; and the ability to clearly argue and communicate written motivation.

Annexure 7

The sample group`s understanding of a career in sustainability.

**Note: 2 participants indicated "not applicable" in this section (34 responses)*

How would you describe a career in sustainability?

<ul style="list-style-type: none"> I am not sure.
<ul style="list-style-type: none"> As challenging, yet rewarding, if you are lucky enough to get your foot in the door.
<ul style="list-style-type: none"> One which always seeks to improve while considering all aspects around it i.e. financial, social and environmental integration. Always trying to find a win-win outcome or often finding a balanced approach.
<ul style="list-style-type: none"> After graduation I worked in a business environment and the BPhil degree prepared me well for that position. The experience proved that there is more that needs to be done to fast track the implementation of sustainability. it can therefore be best described as challenging, especially in ensuring sustainability is embraced mainly by business.
<ul style="list-style-type: none"> Spending your days doing something to make the world a better place for current and future generations.
<ul style="list-style-type: none"> Fulfilling and rewarding.
<ul style="list-style-type: none"> Redesigning ways of operating in business, environment and society to a more sustainable future for all. As well as developing strategies that help reduce poverty which is also part of long-term economic sustainability.
<ul style="list-style-type: none"> Frustrating. Nobody seems to "get it!"
<ul style="list-style-type: none"> Working in a field that contributes to a positive social and/or environmental impact.
<ul style="list-style-type: none"> Activities of an environmental nature which focus on maximising social and environmental wellbeing of the clients and working environment.
<ul style="list-style-type: none"> A career in sustainability is difficult as it is not yet defined. It is not something that is recognised by those who do not understand sustainability. A career in sustainability is not something that has a succession plan either. It is about finding opportunities to apply ourselves and make a difference by solving problems and changing organisational strategy, and these opportunities

<p>shall change in their form and shape constantly. A career in sustainability is very much like being in the 'unknown' space. The road is not yet mapped out. This is both exciting and crucial, but can be very intimidating and scary”.</p>
<ul style="list-style-type: none"> • Great.
<ul style="list-style-type: none"> • Very broad...any career that contributes towards harmonising humanity's relationship with itself and the non-human world around it.
<ul style="list-style-type: none"> • A career that contributes to humans being able to live in greater harmony with the ecosystems that support all life - it can be really broad.
<ul style="list-style-type: none"> • A career that allows one to make a difference in terms of improving the future sustainability prospects of our planet.
<ul style="list-style-type: none"> • It's a career also known as "green" job and found in such varied fields as environmental protection and remediation, waste reduction, green building, sustainable agriculture, climate change, and renewable energy and energy efficiency. While the specific work tasks may differ, all careers in sustainability would share the common goal of promoting a healthy planet.
<ul style="list-style-type: none"> • Any career that leaves a net positive impact - financially, socially and environmentally. Not in equal degrees, but all must be affected positively.
<ul style="list-style-type: none"> • Future orientated career.
<ul style="list-style-type: none"> • A career that has an aspect of environmental, social and financial sustainability, that works to the benefit of all, natural resources and people.
<ul style="list-style-type: none"> • Exciting, challenging, ground-breaking, frustrating, creative, visionary.
<ul style="list-style-type: none"> • A career where there is opportunity for growth, and where you can make a difference in the world and in other people's lives.
<ul style="list-style-type: none"> • Roles that enable an organisation of any size to make changes towards sustainability, economically environmentally and socially, via systemic interventions regarding business model, resource usage, staff, community, communication etc.
<ul style="list-style-type: none"> • Tough, exciting, challenging, fun.
<ul style="list-style-type: none"> • Work which contributes positively to the improvement of the state of the environment, social equality and is economically viable.

<ul style="list-style-type: none"> • A drive always towards the (ever elusive) short value chain”.
<ul style="list-style-type: none"> • Career in sustainability allow one to be aware of the environmental, economic and social impact of his professional activities.
<ul style="list-style-type: none"> • I don't like the word sustainability as it has become ok to set off one against the other (usually economics vs environment). I like regrowth, positive development, smart thinking. Efficiency. Happiness index etc.
<ul style="list-style-type: none"> • Enjoyable.
<ul style="list-style-type: none"> • It would involve a deepening (on an analytical level) and dissemination (on a strategic and communications level) of the above sustainability skills.
<ul style="list-style-type: none"> • Same as any other but underpinned by a conscious awareness of the development, environment, resource demand/availability and how any decision/action influences these, with a goal to have positive influence or at least neutral.
<ul style="list-style-type: none"> • Making a difference in the world today. Looking at ways in which small changes can add up to make a large contribution to sustainability.
<ul style="list-style-type: none"> • One that is constantly changing and challenging. Company margins are getting ever tighter and the pressure to perform is higher and higher. Often sustainability gets put onto the back burner
<ul style="list-style-type: none"> • A career with the goal to preserve the environment and its resources while at the same time strive to provide a better quality of life for humans.
<ul style="list-style-type: none"> • A career in sustainability can be describe as a the daily practice of a work which try to balance between the triple bottom line in such way that the effect on the most vulnerable part of the all system are minimized or are avoided.

Annexure 8

Why sample group want to work in a sustainability career.

Responses received: Direct quotations (21 responses)

Kindly explain why you want to pursue a career in sustainability.
<ul style="list-style-type: none"> • Well it seemed like a natural continuation from my Masters in Sustainable Development
<ul style="list-style-type: none"> • Because after completing the BPhil and MPhil degrees, it would be irresponsible not to.
<ul style="list-style-type: none"> • To make a difference and promote sustainable practises
<ul style="list-style-type: none"> • I have the knowledge and skills, so I am obliged to use them. Also, I want to make a positive change.
<ul style="list-style-type: none"> • I would like to get involved with community development, as I believe it offers great opportunities to create employment and social upliftment through, community farming enterprises, or direct investment in business for job creation.
<ul style="list-style-type: none"> • I want to make a difference, to leave the world a better place than I inherited. I want to ensure a future for my children that are more sustainable than the way we are living now.
<ul style="list-style-type: none"> • Do use my knowledge and skills obtained through the BPhil degree - to contribute to sustainable development and make a positive social and environmental impact.
<ul style="list-style-type: none"> • I feel strongly that there is a need to change the way that organisations, particularly businesses, are currently running. I understand that there is a pressing urgency for this and that it makes sense. With this understanding I would like to pursue a career that makes a difference in helping to change thinking and behaviour. As much as it is a difficult and long slog, where I have to encourage myself daily to keep at it, I would want nothing else but to go to work every day and know that in some small way I am helping to make a difference. I also feel a huge burden for the amount of poverty that this country and world has and the desire to work in a field where solutions can be found that not only change "business as usual" but that bring about increasing benefit and relief to the poor.
<ul style="list-style-type: none"> • Need more exposure and growth.
<ul style="list-style-type: none"> • It interests and excites me. I want to spend my life working towards something I believe in.
<ul style="list-style-type: none"> • I am passionate about sustainability and as much as I can't solve all the world's challenges around un-sustainability, I think that I can be an agent of change by doing something through

pursuing a career in sustainability.
<ul style="list-style-type: none"> • I like solving problems in a way that brings broad benefits to people and the environment. I think there are very exciting new potentials - we are on the cusp of a new 'sustainability revolution' and it's exciting to be involved in new reformative ideas and vision building
<ul style="list-style-type: none"> • I am passionate about sustainability and would like to use my current skills set to make a difference in the world.
<ul style="list-style-type: none"> • It is my passion....
<ul style="list-style-type: none"> • Sustainability interested me a lot.
<ul style="list-style-type: none"> • I am unable (or possibly not interested) to separate my values and life objectives (continuous learning, fairness, positive development, creating opportunity) from my career objectives.
<ul style="list-style-type: none"> • It is important from a personal satisfaction point of view to do work that I find meaningful, creative, that has scope for growth and that contributes to a greater good in some way. I feel a job in the sustainability sector would give me that.
<ul style="list-style-type: none"> • To make a meaningful contribution
<ul style="list-style-type: none"> • I want to make a difference in the world. I also have a passion for the Earth, and feel that I can help to create awareness about the problems faced by it.
<ul style="list-style-type: none"> • I am interested for the short term in working in the corporate sustainability field, primarily to try and leverage the slow progress that many companies are making there.
<ul style="list-style-type: none"> • I think green job is a huge and simple opportunity today to earn his life first, and also a way to restore the natural world that was disrupted for millennia by the so called modernism and capitalism.

Annexure 9

Type of jobs that sample group applied for.

Responses received: Direct quotations (23 responses)

Kindly describe the type of jobs that you have applied for:

<ul style="list-style-type: none"> Mainly on the social side of Sustainability. Very few jobs look specifically for Sustainability degrees. I applied mainly for NGO jobs (looking at NGO Pulse- Sangonet)
<ul style="list-style-type: none"> Sustainability internship with a mine in JHB (Successful application, but I declined after realising that the position was created by headquarters in the USA, and that the SA team had no idea what it was supposed to entail. They wanted to place me in the Health and Safety Department. I felt as if I would enable them to tick a box, and not really gain the experience I was looking for.)
<ul style="list-style-type: none"> Assistant position with Environmental Business Solutions (Successful application. See employment history for more detail.)
<ul style="list-style-type: none"> Researcher and project coordinator for the Siyakhana Initiative for Ecological Health and Food Security (Successful application. See employment history for more detail.)
<ul style="list-style-type: none"> I can't remember the others, but in the beginning of 2011 I applied for close to 20 positions ranging from junior researcher, through assistant positions to project manager vacancies. Most were turned down because of my undergraduate qualification. I felt as if a degree in science or finances would have given me a better platform to work from.
<ul style="list-style-type: none"> Renewable energy projects, environmental management, business sustainability.
<ul style="list-style-type: none"> Research, writing, internships.
<ul style="list-style-type: none"> As yet I have not been successful. I have probed the market in various areas.
<ul style="list-style-type: none"> ESG Analyst, Research analyst for the JSE SRI Index
<ul style="list-style-type: none"> Recycling - marketing manager. Technical Co-ordination and marketing manager at the Green Building Council
<ul style="list-style-type: none"> I have applied to jobs mainly in the NGO sector as they are more likely to have defined job

vacancies. For example, education and health funding organisations.
<ul style="list-style-type: none"> • Sustainability Manager
<ul style="list-style-type: none"> • Internships, graduate programmes, junior level positions - all with a various developmental organisations and consultancies mostly abroad.
<ul style="list-style-type: none"> • I currently work in a sustainability field.
<ul style="list-style-type: none"> • Sustainable development roles in SD programme coordination, CSI, CSR and sustainability reporting.
<ul style="list-style-type: none"> • UNDP-Sustainable Land Management Project. Other applications were in public relations for different companies and organisations such as Old Mutual, USAID etc.
<ul style="list-style-type: none"> • Not applicable. I haven't applied for jobs as all my jobs are self-created.
<ul style="list-style-type: none"> • Course coordinator.
<ul style="list-style-type: none"> • I have my own company, but have also entered the job market. I have applied for no jobs as yet, but I am using my networks to try and find a job that the company owners don't know exists yet.
<ul style="list-style-type: none"> • I applied for a Job in Environment aspects of Mining.
<ul style="list-style-type: none"> • Recently made a shift from community sustainability work to more private corporate sector sustainability work, so applied broadly in that field before securing position that I currently hold.
<ul style="list-style-type: none"> • Communications; CSI; awareness raising.
<ul style="list-style-type: none"> • I have set up my own business, its hard going but I have just landed a research position working on the JSE SRI, which I am really looking forwards to.

Annexure 10

Career challenges that sample group experienced.

Responses received: Direct quotations (23 responses).

What kind of challenges did you face?

<ul style="list-style-type: none"> • Lack of jobs to apply for in field of interest. Having to rely more on previous social work /social development qualifications and experience.
<ul style="list-style-type: none"> • Small amount of companies consulting in climate change/sustainability.
<ul style="list-style-type: none"> • A lack of available opportunities. An under-appreciation of my qualification. A lack of understanding of what exactly my contribution could be. A lack of financial resources for the kind of projects I could get involved in - applying for positions in the food security field would be easy if you are willing to volunteer your time, services and the petrol money to get you to work.
<ul style="list-style-type: none"> • Better qualified candidates or candidates with better experience.
<ul style="list-style-type: none"> • Lack of communication, opportunities and the insistence on higher qualifications and more experience.
<ul style="list-style-type: none"> • For myself I found that limited direct experience in areas required, like experience in EIA analysis or project management was one challenge the other may be that people are looking for much younger employees to train up for the longer term. Many of the jobs require engineering skills as they are in the energy field. I have done the Renewable Energy module it was a good program but most jobs in that field require a qualified engineer which is understandable.
<ul style="list-style-type: none"> • People don't understand the language; we might all be asking the same thing, or saying the same thing, but specialist disciplines are not able to understand each other language.
<ul style="list-style-type: none"> • Limited work experience in the field.
<ul style="list-style-type: none"> • I have found that there have not been many job vacancies to apply for as recruitment agencies do not recognise sustainability as a sector and either place you in the 'environment' or the 'NGO' sector. I have therefore had to take initiative and offer my services for free in order to convince organisations that they need this kind of skill and that there is a place for me.
<ul style="list-style-type: none"> • People couldn't box my skills set. Nobody seemed to understand my qualifications. I was not specialized enough. I have a very diverse background which I think put potential employers off. Lacked hard skills and quantifiable work experience with an internationally known organisation.

<ul style="list-style-type: none"> • It's a bit of a challenge to get a job easily in a sustainability field in the South African market - they've issues like BBBEE that comes into the mix amongst others. So it possesses a bit of a challenge. On a pan African scale, they aren't that many jobs as yet in this field in comparison to the Americas for example and the African states don't employ that many enviropreneuers as yet whilst the US state in taking them in!
<ul style="list-style-type: none"> • Scarcity of jobs in the field especially in my province.
<ul style="list-style-type: none"> • Maybe the fact that I do not have practical experience in the field, although I know the theory.
<ul style="list-style-type: none"> • Lots of people don't understand the issues. Some people feel threatened by the changes that sustainability entails and can block you out.
<ul style="list-style-type: none"> • The BPhil qualification is unknown to the industry. The employers doesn't know exactly what they want the person to do when addressing sustainability.
<ul style="list-style-type: none"> • People are not yet ready for it.
<ul style="list-style-type: none"> • Imagining where I might find a fit with my skills set and what I consider to be a positive contribution to sustainability.
<ul style="list-style-type: none"> • My background wouldn't allow me to find easily a Job in Sustainability.
<ul style="list-style-type: none"> • Limited types of positions available; difficulty in communicating to potential employees how my diverse training, experience and skills set is of benefit to them (i.e., not fitting into a predetermined 'box').
<ul style="list-style-type: none"> • Two things: No one wants to hire you without experience and; few people understand what sustainability is all about so they cannot see where your skills in this field would fit in.
<ul style="list-style-type: none"> • It's difficult to find the openings and the routes into the large corporate companies. I am busy trying to get a network up and running whereby I can start to leverage my skills and consult to these companies.
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