environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

PAGE PARTNERSHIP FOR ACTION ON GREEN ECONOMY

Green Economy Learning Assessment South Africa

Critical Competencies for Driving a Green Transition

Report

November 2016

UNEP ILO UNDP UNIDO unitar
United Nations Institute for Training and Research

Table of Contents

Acknowledgements 3

List of Acronyms and Abbreviations 4

Executive Summary 5

About the Assessment 5

Critical Competencies for Green Economy Policy Action 5

Learning Opportunities..... 6

Recommendations 7

1 Objectives, Scope and Components 8

1.1 Context and Rationale 8

1.2 The Nature of an Assessment 9

1.3 Main Components of the Assessment..... 10

2 Assessment Methodology.....11

2.1 Process Overview..... 11

2.2 Priority Sectors and Focus Areas 14

2.3 Competency Framework 16

3 Findings: Green Economy Learning Needs 19

3.1 Case Study Overview 19

3.2 Findings on Learning Needs Across Data Sources 22

4 Findings: Provider Capacity 33

4.1 Desk Top and Interview Data Sources 33

4.2 General Comment on the Provider Findings 33

4.3 Specific Provider Findings 35

5 Discussion of Findings 37

5.1 What Drives the Green Economy - Policies or Projects?..... 37

5.2 Green Economy Learning Needs..... 37

5.3 Green Economy Learning Opportunities 38

6 Recommended Actions.....40

7 Comment on the Assessment Scope and Process 43

Appendix 1: Tools for Localised Learning Needs Assessments.....45

Acknowledgements

This Green Economy Learning Assessment was commissioned by the Partnership on Action for Green Economy (PAGE) in collaboration with the South African Government. The assessment was undertaken by the GreenSkills Programme, a national partnership among universities and environmental partners involved in green skills research and development, under the auspices of the National Environmental Skills Planning Forum.

A task team, comprised of government partners and PAGE agencies, supported the development of the Terms of Reference (ToR) for the study, and was responsible for overseeing its implementation and completion of the report. The task team consisted of Amrei Horstbrink from the United Nations Institute for Training and Research (UNITAR); Devina Naidoo, Dr Jenitha Badul and Leanne Richards from the Department of Environmental Affairs (DEA); Dr Henry Roman from the Department of Science and Technology (DST); Zakhele Mdlalose from the Department of Trade and Industry (dti); and Dr Najma Mohamed from the International Labour Organisation (ILO). The Assessment and report also benefited from contributions from the ILO Green Jobs Programme and the PAGE National Steering Committee, including representatives from DEA, the dti, DST and the Economic Development Department.

The Green Skills researchers who conducted the assessment and drafted the report are Prof. Eureta Rosenberg of Rhodes University and Garry Rosenberg of Garry Rosenberg Consulting with conceptual and management inputs from Prof. Heila Lotz-Sisitka from Rhodes University and Presha Ramsarup from Wits University. GreenSkills is funded through DEA's National Green Fund. Like PAGE, the Green Skills programme aims to strengthen the capacity of the national skills system to respond to the challenge and opportunity of greening the South African economy.

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

List of Acronyms and Abbreviations

CSIR	Council for Scientific and Industrial Research
DBSA	Development Bank of Southern Africa
DHET	Department of Higher Education and Training
DEA	Department of Environmental Affairs
dti	Department of Trade and Industry
DST	Department of Science and Technology
EED	Economic Development Department
ELRC	Environmental Learning Research Centre
GIZ	German Society for International Cooperation
HCD	Human Capital Development
ICLEI	Local Governments for Sustainability
IDC	Industrial Development Corporation
ILO	International Labour Organisation
IWRM	Integrated Water Resource Management
M&E	Monitoring and Evaluation
NCPC	National Cleaner Production Centre
NGO	Non-Governmental Organization
PAGE	Partnership for Action on Green Economy
REIPPPP	Renewable Energy Independent Power Producers Procurement Programme
SALGA	South African Local Governments Association
SETA	Sector Education and Training Authority
TIPS	Trade and Industrial Policy Strategy
UNIDO	United Nations Industrial Organization
UN	United Nations
UNEP	United Nations Environment Programme
UNIDO	United Nations Development Programme and the
UNITAR	United Nations Institute for Training and Research

Executive Summary

About the Assessment

South Africa has made significant progress in developing green economy strategies, with the hallmark adoption of the Green Economy Accord in 2011. Green economy initiatives exist and government resources have backed investments in various sectors, provinces and cities. In addition, South African education and training providers are currently offering some courses relevant for a green economy. However, earlier research conducted for compiling a National Environmental Sector Skills Plan (DEA and Rhodes University, 2010) and other human capital development strategies indicated that environmental skills planning and provisioning in South Africa is largely reactive, ad hoc and inadequate. Given the scale of the challenge of transitioning to a green and inclusive economy, a more systematic engagement of the education and training sector is warranted. The Partnership on Action for Green Economy (PAGE) in collaboration with the South African Government hence put out a call for a Green Economy Learning Assessment in 2016.

The assessment was conducted during June to August 2016 by researchers of the GreenSkills Programme. Compared to previous studies, it focussed on the learning needs of 'champions' in government, business, civil society and academia, who drive the transition towards a green economy in diverse policy contexts at national, provincial or local levels. It included all nine green economy focus areas identified in South Africa's National Sustainable Development Strategy and Action Plan (2011).

The data for the assessment was collected through a desk review of relevant policy documents and studies; two online surveys yielding 40 responses from national experts; 12 individual interviews; three case studies; as well as a review of existing courses relevant to a green economy. The assessment methodology and case study choices were verified with stakeholders in June 2016, and with the assessment task team. The four main outputs of the assessment are:

- A **competency framework** which allows for a structured analysis of green economy learning needs.
- A **database of 170 learning opportunities/courses** offered by universities, research institutes, not-for-profit organisations, development partners and others.
- A list of **priority actions** to advance learning and skills development for greening the South African economy.
- A **self-assessment tool** that can be applied by teams designing or implementing green economy policies, to identify potential competency gaps and identify suitable learning opportunities.

Critical Competencies for Green Economy Policy Action

By triangulating and clustering findings from the various data sources, seven competency clusters and associated learning needs regarded as critical for advancing green economy policy action were identified. These clusters are:

- Making the case for a green economy initiative or intervention.
- Integrated sustainable development planning, policy development and governance.
- Strategic adaptive management and expansive or transformative learning.

- Working effectively across different units within and across organisations and sectors.
- Working with multiple knowledge fields (practically, politically and conceptually).
- Human capacity and organisational development.
- Principle-based leadership.

Each of these requires technical, relational and so-called 'transformational' competencies, which in turn involve particular skills, knowledge and values.

In terms of learning needs, the assessment came to the following conclusions:

- A large number of diverse competencies are needed for driving the green economy transition. These competencies occur or are needed not necessarily in individuals, but in teams of people (distributed competencies) who have different roles and who need to work effectively with each other; for this leadership is required.
- A number of technical learning needs (such as modeling) were identified, but relational and transformational competencies (such as stakeholder engagement and the ability to integrate across development goals) occurred even more frequently in the data.
- Competencies 'overlap' or appear on a continuum of varying degrees of technical, relational, and transformational competencies; for example, modeling also has a transformative dimension (visioning, ethical valuing).
- While technical competencies often pertained to a particular context, the relational and transformational competencies seemed more generic, e.g. stakeholder engagement was needed across all green economy sectors or focus areas and in relation to all levers.

Learning Opportunities

A wide spectrum of learning opportunities relevant to a green economy already exists in South Africa. Most topics/competencies identified in the assessment are taught somewhere by someone. The value of having access to a database of available learning opportunities is evident in that some respondents indicated they did not know of any training in for example adaptive management (while this seems to be offered by at least two universities).

Without a curriculum analysis or extensive personal reviews, it would be difficult to know whether a particular learning opportunity will meet a particular learning need. The nuances that respondents have given to the learning needs they identified, should be noted. For example, while a number of institutions run courses and workshops in monitoring and evaluation, respondents described the learning priority as 'not standard monitoring and evaluation' skills but 'reflexive' or 'innovative' monitoring and evaluation that respond to complexity and support adaptive management, and which can adequately reflect the ecological *and* social impacts of green economy interventions.

Most of the champions interviewed, valued and recommended combinations of structured learning opportunities (courses) with less structured opportunities (such as professional networks). The majority of respondents who were active in driving green economy initiatives, indicated that they learned most 'on the job', in projects with other people, including people with diverse (disciplinary) backgrounds, and that they sought out much of what they need to know, themselves, to either 'top up' or 'beef up' their

skills. They also noted that access to networks and some resources can however be difficult to gain unless one is already relatively senior and experienced.

It was also evident that courses are vital but on their own are not adequate to guide changing practices in the workplace; that shared workplaces are likely to be the most significant learning spaces for the green economy. A model recommended was training that involved members of teams or departments that are meant to function together (but often fail to do so optimally) attending courses (or parts of courses) together, even if they were at different management levels.

Recommendations

A stakeholder workshop in August 2016 identified the following specific actions that PAGE and various South African partners can undertake in the short, medium and longer term, to build the capacity of a growing number of green economy champions:

- Include learning opportunities and tools in the proposed Green Economy Knowledge Platform to be developed under the PAGE programme in South Africa.
- Expand offers of introductory green economy courses i.e. offer more such courses, at a variety of levels, to address the competencies identified in this assessment.
- Develop courses in integrated energy, waste and water management that address the competencies identified in this assessment.
- Develop courses in reflexive evaluation and adaptive management.
- Offer aligned training of trainers opportunities so that the recommended courses (and others) can be offered on a sustainable basis in South Africa.
- Mainstream the findings of this assessment in sectoral skills planning.

Finally, it was noted that the green economy is a fast moving field internationally and in South Africa and there is a rapidly growing body of information. This learning assessment should be used to provide key stakeholders with a deeper understanding of the field and support strategic decisions within it.

1 Objectives, Scope and Components

1.1 Context and Rationale

South Africa joined the Partnership for Action on Green Economy (PAGE) in March 2015. PAGE brings together the expertise of five United Nations (UN) agencies: United Nations Environment Programme (UNEP), International Labour Organization (ILO), United Nations Industrial Organization (UNIDO), United Nations Development Programme (UNDP) and the United Nations Institute for Training and Research (UNITAR). The aim is to support countries and regions to put sustainability at the heart of economic policies and practices.

In partnership with the South African Government, the coordinating ministry Department of Environmental Affairs (DEA), Economic Development Department (EDD), Department of Trade and Industry (the dti) and Department of Science and Technology (DST), PAGE's activities include capacity development support for the design and delivery of introductory green economy learning through national learning institutions. The Green Economy Learning Assessment for South Africa is a response to PAGE's intention to contribute to better policy coordination and collaboration, and to help improve institutional and individual capacities through enhanced green economy learning.

Objectives and Scope of the Assessment

The overall aim of this work stream within PAGE is to advance the integration of green economy considerations into nationally executed learning action and programmes. The specific objectives of this assessment were to:

1. Identify learning priorities for advancing a green economy in South Africa;
2. Review existing institutional capacities to provide related education and training activities, and
3. Identify opportunities for strengthening and upscaling the delivery of green economy learning through national institutions.

While providing some space to cover broader learning needs, the assessment was focussed on core issues closely related to the green economy agenda such as:

- Green economy rationale, benefits and key concepts including externalities; ecosystem services; resource efficiency; green jobs, etc.;
- Green economy strategies and development planning e.g. green growth strategies, integrating green economy consideration in sectoral planning processes;
- Green economy modeling and policy assessments e.g. macro-economic modeling, industry assessments;
- Tools to advance a green economy, including environmental standards, tax incentives, procurement;
- Green economy indicators and measuring progress e.g. different types of indicators, linkages with the international Sustainable Development Goals;
- International green economy policies and cooperation e.g. global policy milestones, major international programmes and initiatives, relevant funding sources, etc.

The aim of the assessment was to look at critical competencies required to understand and apply these concepts in a policy context i.e. it focussed on competencies that were explicitly linked to 'advancing' a green economy. The intended ultimate beneficiaries are professionals involved in policy development and implementation, drawn from government, business, academia and civil society, as well as those who might be in these roles in the future (e.g. university students).

The assessment did not set out to cover the range of understanding and skills required by the broader working population for participating in a green economy. Initiatives to identify and develop technical skills for green jobs already exist (for example supported by the ILO and GIZ) and were not repeated here.

Even with these delineations, the scope of the green economy and associated learning needs is very broad and in some instances contested. An important first step in the assessment was to adapt the thematic scope to the South African context and select sectors in which to conduct the assessment.

As the GreenSkills programme is focussed on strengthening the national system's capacity to continue gathering skills related intelligence, using the opportunity to reflect on appropriate methodology was also important. Assessments need to be repeated from time to time and lessons learnt regarding methodology are therefore valuable. These are included in Chapter 7.

1.2 The Nature of an Assessment

As different readers may have differing expectations of this report, it is worth reflecting on what an assessment needs to do, what it is and what it is not. In this regard it is useful to contrast it with a scientific review (Table 1). An assessment is a critical evaluation of information, for purposes of guiding decisions on a complex, public issue. The topic is defined by the stakeholders, who are typically decision makers. Assessments are conducted by a credible group of experts with a broad range of disciplinary experience, in a balanced and transparent way. Assessments *reduce* complexity but *add value* by summarisation, synthesis and sorting what is known and widely accepted, from what is not known (or not agreed). Assessments relate to the situation at a particular time and in a given geographical domain. They are often repeated after some period.

Table 1 is based on the explication of scientific assessments in the report on the Millennium Ecosystem Assessment (2005). (www.millenniumassessment.org)

Table 1: Comparison between a Review and an Assessment

	Review	**Assessment**
Audience	*Scientists*	*Decision-makers*
Done by	*One or a few*	*Large and varied group*
Topic	*Simple and narrow*	*Broad and complex*
Identifies gaps in	*Research: curiosity driven*	*Knowledge for implementation: problem-driven*
(Un)certainty statements	*Hidden*	*Required, but clearly flagged*
Coverage	*Exhaustive, historical*	*Sufficient to deal with main range of uncertainty*
Synthesis	*Not required*	*Essential to reduce complexity*

1.3 Main Components of the Assessment

1.3.1 Component 1: Assessment of Green Economy Learning Needs

This component involved assessing learning priorities for green economy policy development and implementation in key sectors. The priority sectors were identified through reviews of existing policies and related documents such as the Green Economy Summit Report, the Green Economy Accord and studies such as the South African Green Economy Modelling report, and consultation of stakeholders. It was found that in many instances, green economy action actually occurs *across and between sectors* as opposed to being specifically sector based, and the term green economy *focus areas* was introduced, along with sectors.

1.3.2 Component 2: Assessment of Provider Learning Capacities

This component consisted of an 'audit' of existing capacity in the country to provide learning on green economy issues, in particular the competency needs identified in the assessment. It focussed on institutions that are already engaged in or might play a role in green economy learning. The scope was formal post-school education in universities as well as continuous /non-formal learning offered by universities, not-for-profit organisations, development partners and other agencies.

1.3.3 Component 3: Recommendations

This component proposes actions to upscale green economy learning in South Africa in the short and medium term including recommendations for strengthening the capacity of national education and training institutions. The results of the assessment were presented and discussed at a workshop in August 2016 inclusive of governmental and non-governmental stakeholders and educational institutions. The outcomes of the workshop informed the basis of the final report. More information on the process is included in section 2.

2 Assessment Methodology

2.1 Process Overview

The assessment combined several research methods. The main steps were:

1. **Literature review and methodology design, including:**
   - Review of literature on sustainability and transformative competencies
   - Review of green economy sectorial policies and related studies
   - Adaptation of competency framework and policy cycle
   - Refinements on methodology brief
2. **Online survey (1) on green economy levers and priority areas:**
   - Verification of key levers to stimulate green economy transition
   - Verification of key focus areas for green economy transition
3. **Verification roundtable with stakeholders on 2 June 2016:**
   - Consultation on competency framework, methodology and research process
   - Recommendations of case studies, key informants and institutions
4. **Online survey (2) on learning needs and opportunities.**
5. **12 interviews with key informants.**
6. **Analysis of three case studies:**
   - The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP)
   - Local Government Sustainable Transport Initiatives
   - The Working for Water Programme
7. **Education provider audit in relation to identified competencies.**
8. **Three task team consultations.**
9. **Stakeholder workshop on 30 August 2016:**
   - Presentation of process and synthesized findings
   - Development of recommendations

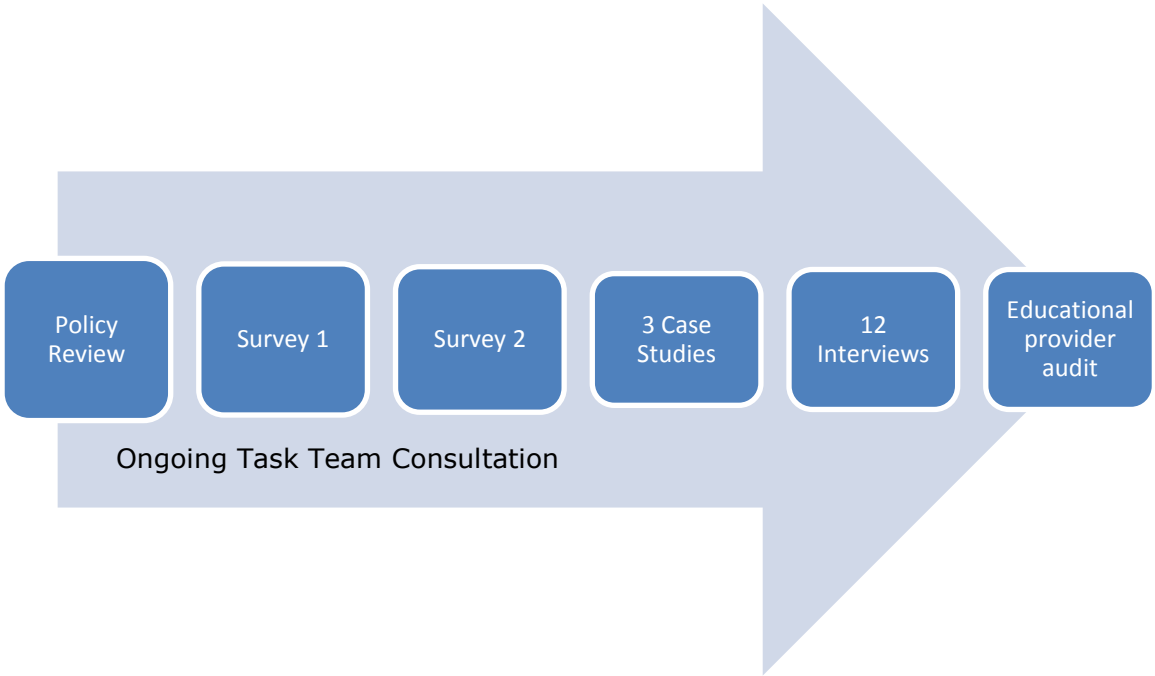

Figure 1: Overview of the Steps and Methods used in the Assessment Process

Tables 2-4 present the detail of the methodology and related outcomes for each of the three assessment components.

Table 2: Process for Component 1 - Learning Needs

Purpose	Process & Data Sources	Outcomes
1. Review learning needs expressed in existing national policies and programmes and refine list of core topics/skills to be covered in the assessment	Green economy related policy documents were identified through desk research and consultation with experts	There are already many green economy related policies in existence. They seldom make explicit reference to skills needs, but point to areas regarded as important for the green economy, which were used to identify key informants
2. Gather insights from key informants involved in green economy policy making and implementation in South Africa	Develop a list of key informants through desk research and consultation with experts	The list of 96 included national steering committee members, representatives from different government departments, education and training institutions, business associations, labour and civil society organisations.
Give the assessment more focus to allow more depth in the outcomes	Survey 1 was emailed to the list of 96 to determine what these experts regarded as the most important levers and sectors / focus areas for the green economy	Green economy focus areas were identified along with priority green economy levers. Policy implementation and review was identified as even more important than policy development; as was education for sustainable development. These outcomes influenced the expansion of the list and the choice of case studies.
Give structure and depth to the learning needs identified and increase depth	Developed a competency framework based on the work of Wiek et al (2011) and Scharmer (2009)	Competency framework developed and verified with stakeholders
Gather learning needs identified by key informants	Survey 2 was emailed to the list of 106, as well as to an ILO Green Economy Community of Practice	20 responses received and analysed (excluding the ILO Green Economy Community of Practice responses)
Gather learning needs identified by key informants	Interviews were conducted face to face or telephonically, with senior level individuals with exceptional experience in Green Economy and Policy (2); Education for sustainable development (2); Water (4); Conservation & Natural Resource Management (2); Cities and Mobility/Transport (2); Waste (1), Cleaner Production & Energy (1).	12 interviews conducted and summarised

Gather learning needs identified by key informants	Case studies were selected in consultation with stakeholders and the task team	3 case studies conducted and analysed: Renewable Energy Independent Power Producers Procurement Programme; Transport: Eco-Mobility and Smart Driver Training in City of Joburg and City of Cape Town; Water and Natural Resource Management: *Working for Water*
3. Refine, analyse and summarise findings regarding green economy learning needs and gaps	Analysis through thematic clustering in three iterations	The findings of survey 2, interviews and case studies were summarised in a draft report, with supporting evidence in Appendices

Table 3: Process for Component 2 - Learning Opportunities

Purpose	**Process & Data Sources**	**Outcomes**
1. Identify existing learning programmes and support initiatives	A list of institutions was drawn up based on desk top research with follow up phone calls where possible; interviews; surveys; two stakeholder consultation workshops. The desk top research was done midway through the Assessment and completed once learning priorities were finalised	A spreadsheet listing 170 courses and other learning opportunities with an assessment of relevance in relation to learning needs identified, and summarised
2. Identify national institutions engaged or potentially interested in providing green economy learning services		Became apparent that many universities were involved in green economy related learning programmes; in addition to a number of other institutions, both local and international.
3. Develop profiles for relevant or interested learning institutions	Through desk research details were added to learning opportunities where available. Follow up phone calls were in some cases necessary to expand on the web-based information.	Given the nature of available information and the time constraints of the Assessment it was concluded that developing a comprehensive inventory would not be possible; but insights regarding learning providers were to be probed in interviews with green economy champions and universities.
4. Develop insights into how best to meet priority learning needs	This question was posed in the 12 interviews conducted with both universities and green economy champions reflecting on their own learning journeys	Preferred learning opportunities identified (a mix of formal and informal processes)
5. Analyse challenges for upscaling green economy learning through national institutions	Discussion with representative learning institutions were held in two stakeholder workshops and interviews with university representatives	The challenges of severely under-resourced universities under pressure to take on more students for less funding, were paramount. In response to rising fees and the slow and inadequate release of government funding to support poor students, student uprisings also affected universities at this time. Lecturers found it difficult to participate in this assessment,

		and to make time for curriculum innovation. Nonetheless there are many 'green economy' and 'sustainability' champions in academia and they have already put in place significant programmes in this regard.

Table 4: Process for Component 3 - Scoping and Deciding on Priorities

Purpose	Process & Data Sources	Outcomes
Verifying focus and scope of the assessment	Consultation with PAGE, verification roundtable with 25 stakeholders in June 2016 in Pretoria; follow up Task Team meeting	Scope and methodology decided including the use of case studies and assessing needs across sectors not only in discrete sectors
Review of draft report by Task Team members	Draft report circulated 23-24 August 2016	Feedback incorporated in report prepared to discuss with stakeholders
Discussion of findings and recommendations with stakeholders	Stakeholder workshop in August with 19 stakeholders including a response to the Assessment and group discussions; Task Team meeting	Endorsement, refinement and expansion of recommendations
Finalisation of draft report	Based on feedback during the final workshop	Assessment report

2.2 Priority Sectors and Focus Areas

The assessment started with a desk top review (reading) of the green economy related policies in (among others) the agricultural sector (national and provincial levels); the *Green Economy Summit Report* (DED, DEA, DST, dti, SALGA and the South African Cities Network, 2010); the IDC/DBSA/TIPS *Green Jobs* report (2011); the *Skills for Green Jobs in South Africa* country study (ILO, 2010); and the *National Development Plan* (NDP, 2012) which guided among others the *Green Economy Modeling Report for South Africa* (DEA and UNEP, 2013). It was observed that experts regard the priority areas as outlined in the Green Economy Summit report (summarised in Figure 2) as still being the main priority areas for advancing the green economy. This was confirmed at the verification roundtable with stakeholders, and by the Minister of Environment Affairs in late May 2016, in a speech where she also highlighted education and training as a key driver of green transitions.

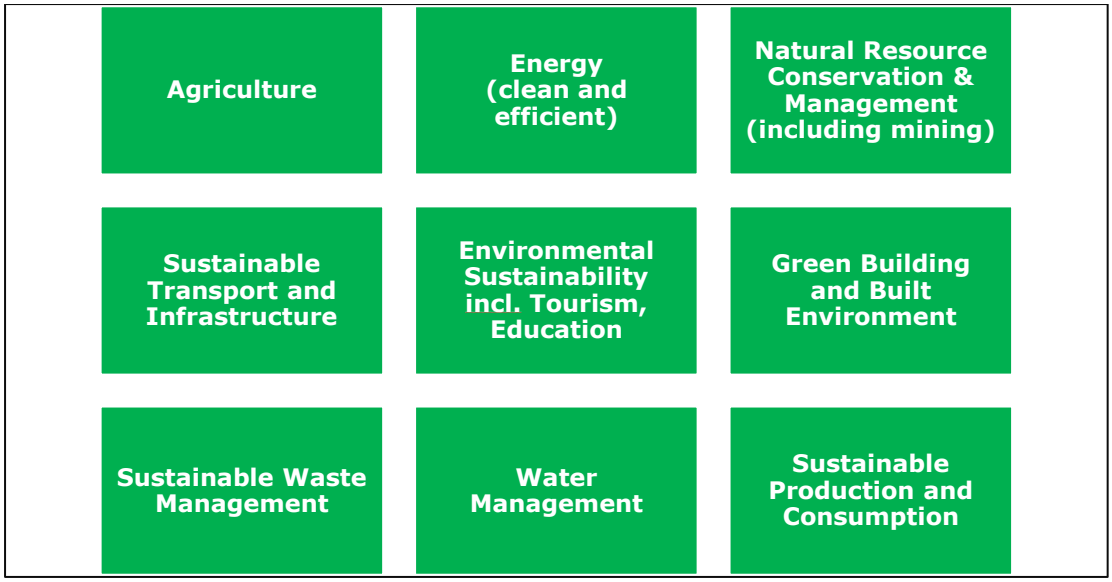

Figure 2: Nine Priority Focus Areas for the Green Economy in South Africa
(Green Economy Summit, 2010)

An online survey was sent to 96 experts in order to further refine the focus of the assessment.[1] The 20 experts who responded indicated which areas they saw as priorities for a green economy in South Africa. These results informed the choice of case studies and the choice of participants for survey 2 and the interviews. The most frequently chosen focus areas are listed in Table 5.

Focus Area/Sector	Survey 1 Responses (20 in total)
Energy	100% (20 mentions)
Transport	70% (14 mentions)
Waste	60% (12 mentions)
Water	55% (11 mentions)
Agriculture	55% (11 mentions)
Built Environment	55% (11 mentions)
Industry	50% (10 mentions)

Table 5: Priority Focus Areas / Sectors for the Green Economy in South Africa

Other focus areas or sectors mentioned were Finance (35%, 7 mentions); Mining (20%, 4 mentions); Tourism (20%, 4 mentions), Fisheries and Forestry (5% or 1 mention each) and in the "Other" category, respondents indicated *Public domain e.g. municipalities; and Mobility (Smart Cities)* as important for the green economy transition. The respondents to survey 1 also regarded a spectrum of policy levers that would advance a green economy (see Figure 3).

[1] The categories used for a recent survey of the state of the green economy in the Mediterranean (www.medgreeneconomy.org/) were included, as well as the nine priority areas from South Africa's Green Economy Summit Report.

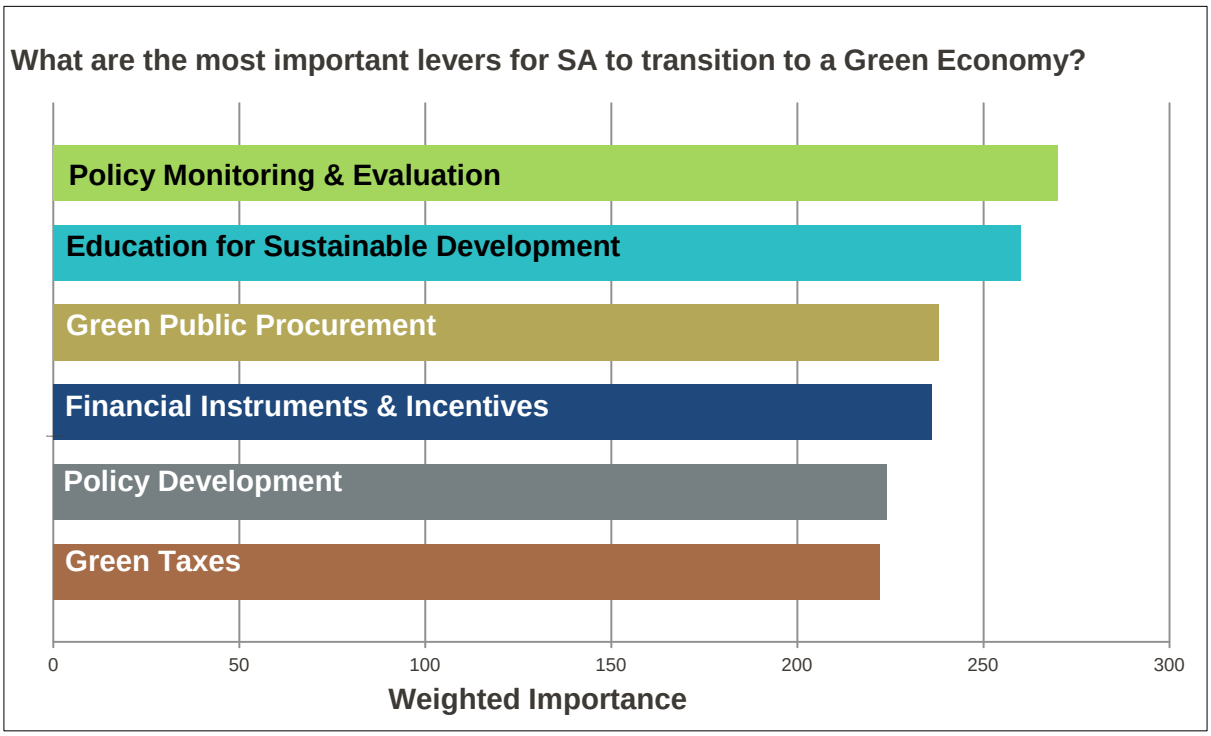

Figure 3: Priority Levers for a Green Economy

Figure 3 indicates that there was more emphasis on the *review* of the (implementation) of existing policy, than on policy *development*. This made sense given the large number of existing policies evident in the desk top review. PAGE emphasised the policy context as a site for driving the green economy, and the survey findings suggest that policy *implementation and review* are equally if not more important than policy *development* as a context for identifying learning needs. This was borne out in discussions at the stakeholder verification workshop.

Survey 1 also identified *education* as a key driver for the green economy. This was significant given the observation in the 2010 ILO country report, *Skills for Green Jobs in South Africa*, that a shortage of environmental educators and trainers could be a key barrier to advancing the green economy in the country.

The levers prioritised in Survey 1 further informed the choice of case studies, which featured all these levers with the exception of green taxes. These insights also informed the compilation of a database of stakeholders for further surveys and interviews.

2.3 Competency Framework

To develop a suitable conceptual framework for determining learning needs, the assessment team drew on the work of Wiek et al (2011)[2] and Scharmer (2009)[3].

[2] Wiek, Withycombe and Redman, *Sustainability Science*, 2011: Key competencies in sustainability: A reference framework for academic program development.
[3] *Ten Propositions on Transforming the Current Leadership Development Paradigm*, paper prepared for the World Bank Round Table on Leadership for Development Impact, October 2009, World Bank Institute, Scharmer@MIT.EDU

The notion of *competence* is preferred to *skills* because educational providers are an important target group for the assessment. For educators and education planners, a competence is a broader concept than a skill; competencies encompass knowledge, values and skills, skills being what one is able to do in relation to one's knowledge and values. In the context of the high level drivers of the green economy, this broader concept is more applicable than a narrowly interpreted 'skill'[4].

Textbox 1: Competencies versus Skills

Colloquially, when stakeholders discuss learning needs, they use the terms technical (sometimes scientific) skills, and *soft* skills. Stakeholders regard the so-called soft skills as critical, but the term used and the lack of distinction do not reflect this importance and do not help education providers design curricula.

Leadership development specialist Otto Scharmer (2009) produced a useful framework in which 'soft skills' that relate to people engagement and people management, are termed *relational competencies*. Scharmer further gives voice to the importance of leaders' ability to envision, drive and manage change in complex institutional contexts, referring to these as *transformative competencies*. Scharmer's work is particularly useful because he notes that while technical competencies are important, we tend to underestimate the importance of relational and transformational competencies.

Based on their review of competencies valued in relation to the sustainability sciences, Wiek et al. (2011) give further differentiation of relational and transformational competencies with references to, for example, communicative competence, anticipatory competence (e.g. evident in modelling), and normative competence (values dimension). Textbox 2 outlines the competency framework for this Assessment, which combines elements of the work of Scharmer (2009) and Wiek et al. (2011).

[4] Note that outside of formal education, in for example labour markets, 'skill' is understood more broadly, as a whole person with a full range of attributes relevant to the work they may do.

Technical Competencies
For example: quantitative modeling, qualitative modeling, cost accounting

Relational Competencies
Communicative competency
Collaborative competency
Stakeholder engagement (including political) competency
Social learning competency

Transformational Competencies
Systemic thinking competency
Strategic competency
Anticipatory competency
Normative competency

Textbox 2: Competency Framework Used for the Assessment

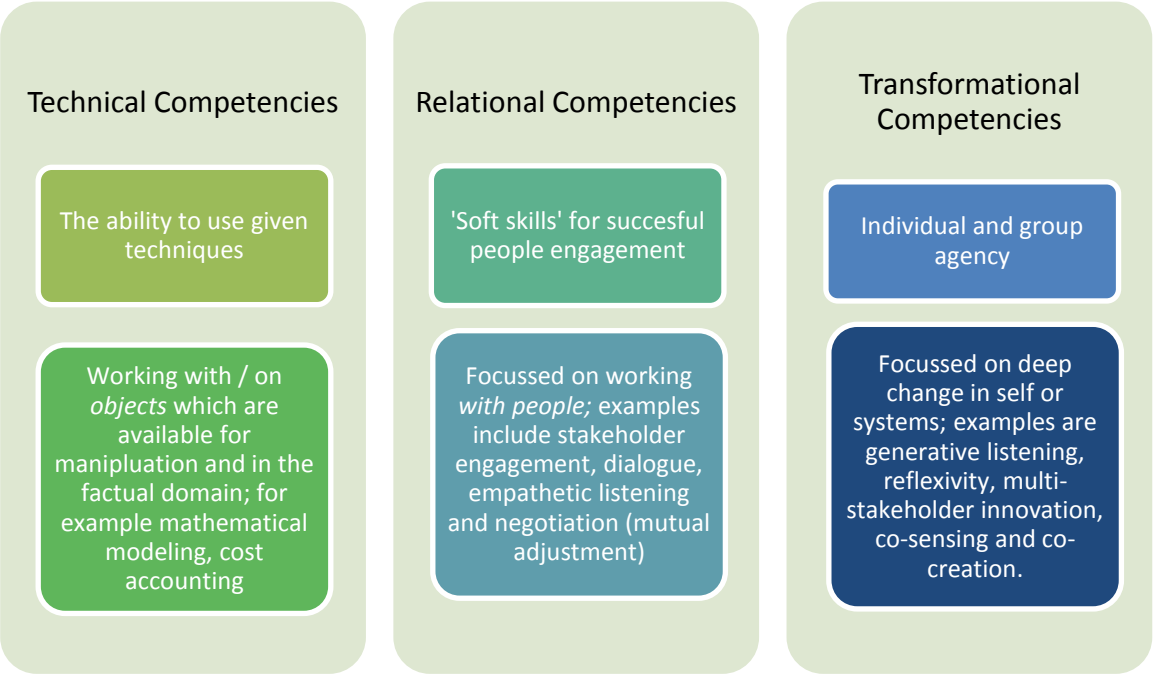

Figure 4: Definitions of the Competencies Used in the Assessment

In conclusion, the methodology for the South African green economy learning assessment was developed through a use of international literature from the fields of sustainability education and leadership development, on the one hand, and intensive stakeholder consultation on the other hand.

3 Findings: Green Economy Learning Needs

3.1 Case Study Overview

The aim of the case studies was to analyse cases of green economy policy action, their success factors or enablers, as well as gaps and risks, in order to identify the competencies that seem to be associated with taking such action, either because the parties in the case exhibited such competencies, or because an absence of certain competencies seems to have inhibited aspects of the action. The findings are summarised here with a focus on the learning needs identified.

3.1.1 The Renewable Energy Independent Power Producers Procurement Programme (REIPPPP)

The REIPPPP is regarded as one of South Africa's most successful green economy initiatives to date. While the country's progress in introducing renewable energy was at first slow, from 2011 onwards progress accelerated and by 2014 $14 billion had been committed to generate clean energy through the REIPPPP. At that stage the project involved more than 100 stakeholders, and it was regarded as the most successful public private partnership in Africa in the last 20 years and one of the top 10 public private renewable energy projects globally. While a number of external factors (like the international markets for renewable energy technology) were relevant to the achievements, the competencies of particular individuals and teams were also significant (as noted in a report by Eberhard et al., 2014[5], on which this case study drew). The project management team displayed the following competencies:

- Coalition building - they brought together stakeholders from government and business sector, and were able to establish credibility with and win the trust of both groups; this was achieved for example through professionally run bid conferences and fair bidding practices
- Championing – they relentlessly *made the case* to government and other stakeholders that this was an important initiative, and eventually won the necessary support; this reflects an ability to provide and act on visionary leadership
- Problem solving and reflexivity – they learnt from earlier bid rounds and made important improvements to following rounds. This also included anticipatory skills, e.g. they were able to anticipate counter-productive moves by bidders
- Project design and implementation in cross-disciplinary teams e.g. energy, finance
- Sourcing and effectively using others' expertise – the project management unit made effective use of local and international consultants and other expertise.

A range of **technical skills** were necessary for the project such as contracting, procurement design and implementation, project development skills, project financing and budgeting, setting up functioning units; also lending and investment, accounting, forecasting and risk assessment.

[5] Eberhard, A., Kolker, J., Leigland, J. 2014. *South Africa's Renewable Energy IPP Program: Success Factors and Lessons*. PPIAF, World Bank Group, Washington.

A critical success factor of the REIPPPP was that the project management unit was set up outside of the government departments where it did not follow National Treasury's extensive supply chain management procedures[6]. This allowed them to move with the necessary speed. The exceptional **agile management** displayed by the management team involved the ability to design and work with an agile management system: being adaptive and responsive, making decisions and progressing with some speed, **while upholding the key principles** of procurement: fairness, transparency and value for money. All this contributed to investor trust and buy-in.

Risks identified included the difficulties the REIPPPP would encounter once it moved into a government department and became subjected to standard procurement processes; also the relatively poor proposals and design features for local social economic benefit associated with the power projects – evidence of a lack of skills in sustainable development – in this case integrating across the technical energy, financial, and social development fields. Concerns were also expressed by Eberhard et al. (2014) in their review of the REIPPPP, regarding the risk of poorly designed indicators to evaluate the success and social impact of the projects (e.g. local content, jobs, benefits within a 50 km radius). Poorly chosen indicators and poor interpretation of indicators by the evaluation teams to be appointed could unintentionally lead to project mismanagement and failure to show benefits – a serious risk, given the extent of this high profile green economy investment.

3.1.2 Local Government Sustainable Transport Initiatives

This case study investigated two initiatives with green economy potential, an Eco-Mobility Initiative by the City of Joburg and a Smart Driver Training project in the City of Cape Town. Increasingly regional or city level sites are playing key roles in the green economy transition.

The Smart Driver project could, it is estimated, save the City of Cape Town R20 million per year. The initiative originated in the transport department, but it only picked up momentum when it was relocated in to environmental management. The individual who then took the lead with the project was interviewed for this case study. The competencies displayed by this 'green economy champion' were as follows: She displayed tenacity and patience, as it was six years since the initiative was started, before she successfully 'make the case' to councillors to allocate budget to the project. She was able to build coalitions, motivate and manage internal teams, raise enthusiasm and funding. She noted that it is important to keep the vision of the importance of the initiative, while also managing details and 'paperwork'.

The ability to move between higher level strategic vision and implementation level detail was another common theme across the assessment. It was also related to the observation in the REIPPPP case, that successful green economy action involved not only to individual competence but also to the organisational set-up: in the environmental department, staff were more likely to have a vision of environmental and social impact than in other departments were logistical tasks were the mainstay of managers' work. This green economy champion also emphasised the need for better monitoring and evaluation tools to better 'make the case' that sustainability projects are worthwhile in a

[6] The observation that a particular organisational set-up was necessary to enable individuals or teams to work effectively, was common to other contexts across the Assessment as well.

local government context. To give effect to the project, she also needed excellent trainers able to custom design and deliver training programmes for a particular context – in this case drivers who have already been in their positions for many years, who are not particularly well educated, and do not necessarily speak English as a home language.

The eco-mobility initiative of City of Joburg involved closing off the business and tourism hub of Sandton to motorised transport for a month. This awareness raising exercise had other lasting impacts. Like many green economy initiatives it involved multiple parties including ICLEI (Local Governments for Sustainability). What competencies enabled ICLEI's manager and teams to effectively engage with the municipality and provide technical and other support? It included the ability to work across organisations (as in the case of the REIPPPP) and across disciplines, and it was noted that the graduate level skills needed for the transdisciplinary work required (engineers, economists, planners and other social scientists) were in short supply – few graduates choose to work in local government or on 'for good' projects. As in the other cases, the competencies required seemed to reside in teams, with strong visionary and motivating leadership.

3.1.3 The Working for Water Programme

Working for Water is an ecological restoration programme with a jobs focus established in 1995; it has been sustained over 20 years during which it also and spawned a number of other programmes with a natural resource focus (such as wetland restoration). The collective 3-year budget is R7.8 billion, more than any other natural resource management project in South Africa. The focus on the case study was on the high level skills that enable and drive such initiatives.

A first relevant observation was that the programme originated through collaboration between individuals in civil society (NGOs), academia and government, suggesting strongly that green economy competency development should involve all social partners. The development of the 1998 National Water Act, a ground breaking policy integrating social and ecological considerations – and hence the skills to design such an integrated policy – are also to be credited for the context in which Working for Water developed. Policy review in the form of amendments to the Conservation of Agricultural Resources Act (Act 43 of 1983) also gave the programme greater traction and sustainability.

As a programme with more than 300 projects across South Africa, that has cleared more than a million hectares of invasive plants, created employment for approximately 20,000 people per annum, and received R3.3 billion over its lifespan, the initiative is in many ways a success with one of the key competencies identified, being the ability of its leaders and senior managers to 'make the case' that it should be supported.

As in the other cases, it is not just individual competence that is important but organisational set-up; for example, bigger initiatives within the programme experience a number of challenges associated with centralised decision-making and limited accountability for specific goals at lower levels; smaller , programmes with a greater degree of decentralised decision making and shared accountability were reported to work better. Hence, **organisational and project design competencies** seem important. **Strategic planning** has been a challenge: planners struggle to integrate across overlapping goals (**integrated sustainable development** competencies required). The programme has been criticized for straying too far from its environmental goals. Other criticisms include that scientific assessments do not benefit the social context as they do

not take the latter adequately into account; it was argued that restoration research and planning should address social needs from the outset. **Stakeholder engagement and collaborative planning** stand out as key learning needs.

Project management was a consistent challenge in implementation; this includes **reflexivity and strategic adaptive management**, so that managers at various levels in the programme can be flexible and adaptive when faced with operational challenges, and make strategic decisions based on changing or unexpected conditions on the ground. Rigid protocols and recruitment procedures were a significant challenge, and again point to **organisational development and human resource development capacity** needs. While such competencies are not directly associated with driving the green economy, they are clearly important in creating the necessary enabling environments.

3.2 Findings on Learning Needs across Data Sources

3.2.1 Analysis

Section 3.2 presents the findings regarding learning needs (competencies identified) across *all* the data sources: the above case studies, the additional interviews, and Survey 2. The data from all these sources were reviewed and competencies identified. Competencies were listed and it was noted which occurred more frequently. The competencies were then clustered in three consecutive rounds. In the first round, it was noted that some competencies were rather a category of 'action' or 'practice' that would be a good label for a cluster of competencies that work together to, for example, 'make the case' for the green economy or 'do integrated sustainability planning'. Each of these 'competency cluster' categories were named using the terms used by respondents. Associated competencies were then clustered together under these headings. Some competencies (like systems thinking) appear repeatedly under different headings.

In the following rounds the process was aimed at combining competencies where possible, so as to reduce the detail and provide a more user friendly assessment for decision makers.

Figure 5 indicates how competency clusters and competencies are related to each other. Each competency may consist of associated knowledge, skills and values, and perhaps particular attitudes and dispositions.

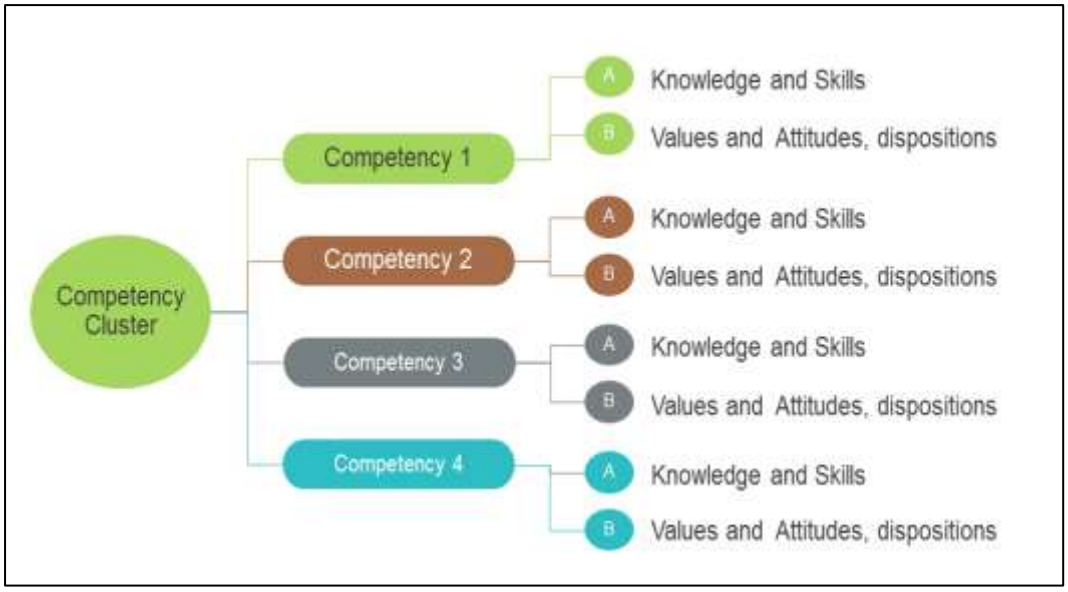

Figure 5: Relationship between Competency Clusters, Competencies, and Skills

3.2.2 General Observations about the Learning Needs Identified

The following general observations were made by either the researchers or respondents:

- A large number of diverse competencies are needed for driving the green economy transition

- These competencies occur or are needed not necessarily in individuals, but in teams of people (distributed competencies) who have different roles and who need to work effectively with each other; for this leadership is required

- A number of technical learning needs (such as modeling) were identified, but relational and transformational competencies (such as stakeholder engagement and the ability to integrate across development goals) were listed even more frequently

- Competencies 'overlap' or appear on a continuum of more or less technical, more or less relational, and more or less transformational competencies; for example, modeling also has a transformative dimension (visioning, ethical valuing)

- While technical competencies often pertained to a particular context, the relational and transformational competencies seemed more generic, e.g. stakeholder engagement was needed across all green economy sectors or focus areas and in relation to all levers.

To reduce the amount of data and make useful recommendations a clustering process was conducted as outlined in section 4.2.1. During clustering it became evident that some learning needs identified by respondents were more than single competencies; they consisted of a number of competencies and could be used as useful headings for competency 'clusters'. For example, it was frequently mentioned that green economy champions need to be able to 'make the case' for a particular sustainability initiative or

for the green economy in general. When 'making the case' was discussed or analysed, it was seen to require a range of competencies from engaging stakeholders and building coalitions, to resource economics and social impact evaluations.

The competency 'clusters' were all generic in that they seem to apply to all of the sectors and focus areas and all the levers addressed in the Assessment. The analysis indicated that they are not a hierarchy (even though some were mentioned more than others) and that they are *all* relevant, as a web or system of capabilities. They are:

1. Making the case for a green economy initiative or intervention.
2. Integrated sustainable development planning, policy development and governance.
3. Strategic adaptive management and expansive or transformative learning.
4. Working effectively across different units within and across organisations and sectors.
5. Working with multiple knowledge fields (practically, politically and conceptually).
6. Human capacity and organisational development.
7. Principle-based leadership.

3.2.3 Learning Needs of the Key Competency Clusters

1. Making the case for a green economy initiative was a phrase frequent used by green economy champions. This was what they had to do to obtain political and financial support and implementation partners. It requires the competencies in figure 6:

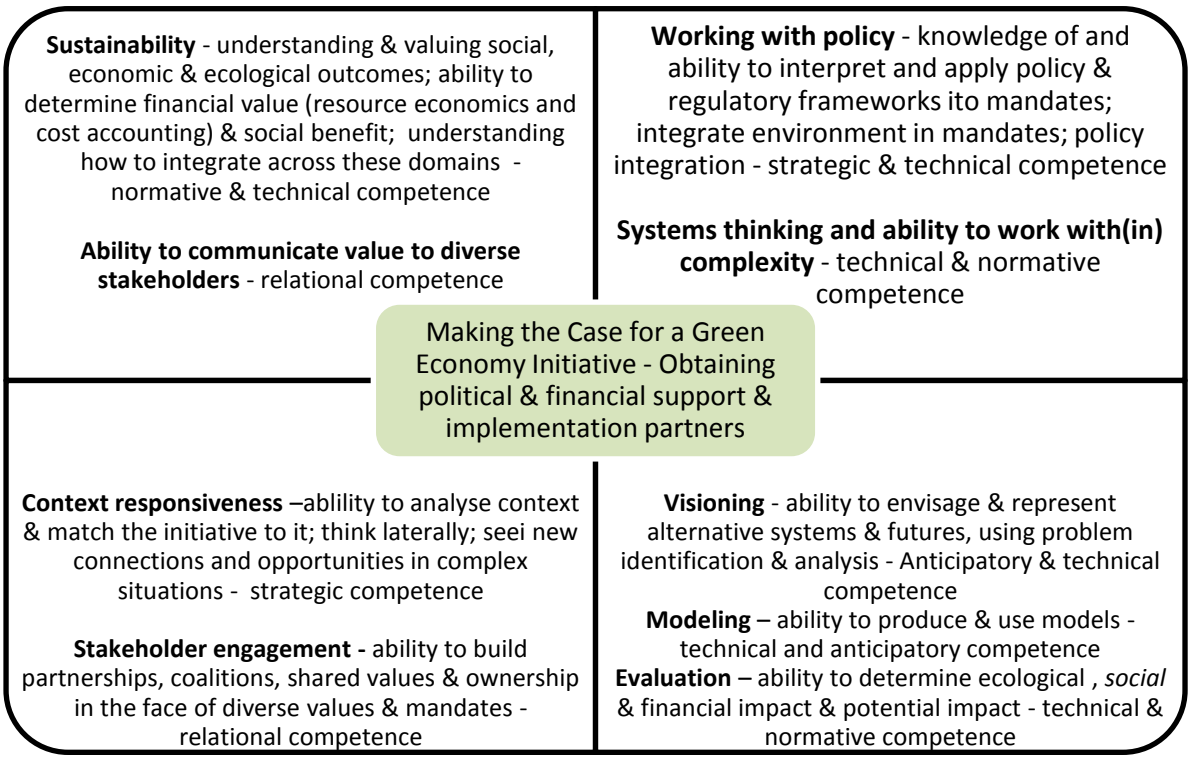

Figure 6: Competencies needed to make the case for green economy initiatives

Technical competencies associated with 'making the case' for green economy initiatives further included:

- the ability to **work with qualitative and quantitative data**
- **resource economics** i.e. the ability to determine the economic value of natural resources such as biodiversity and water or landscapes;
- the ability to **develop a business case** for a green economy initiative (ability to determine how it would make business sense); and
- ability to **set up intelligent data gathering and data management systems** – to be able to show impact over time.

2. Integrated sustainable development and integrated policy planning and development.

This is a cluster of competencies that are required in order to plan for sustainable development through policy frameworks; champions highlighted the difficulty of developing and implementing policies and plans towards *integrated* economic, broader social and ecological outcomes. The associated competencies reside in individuals and across teams or units, several of which overlap with those identified in (1).

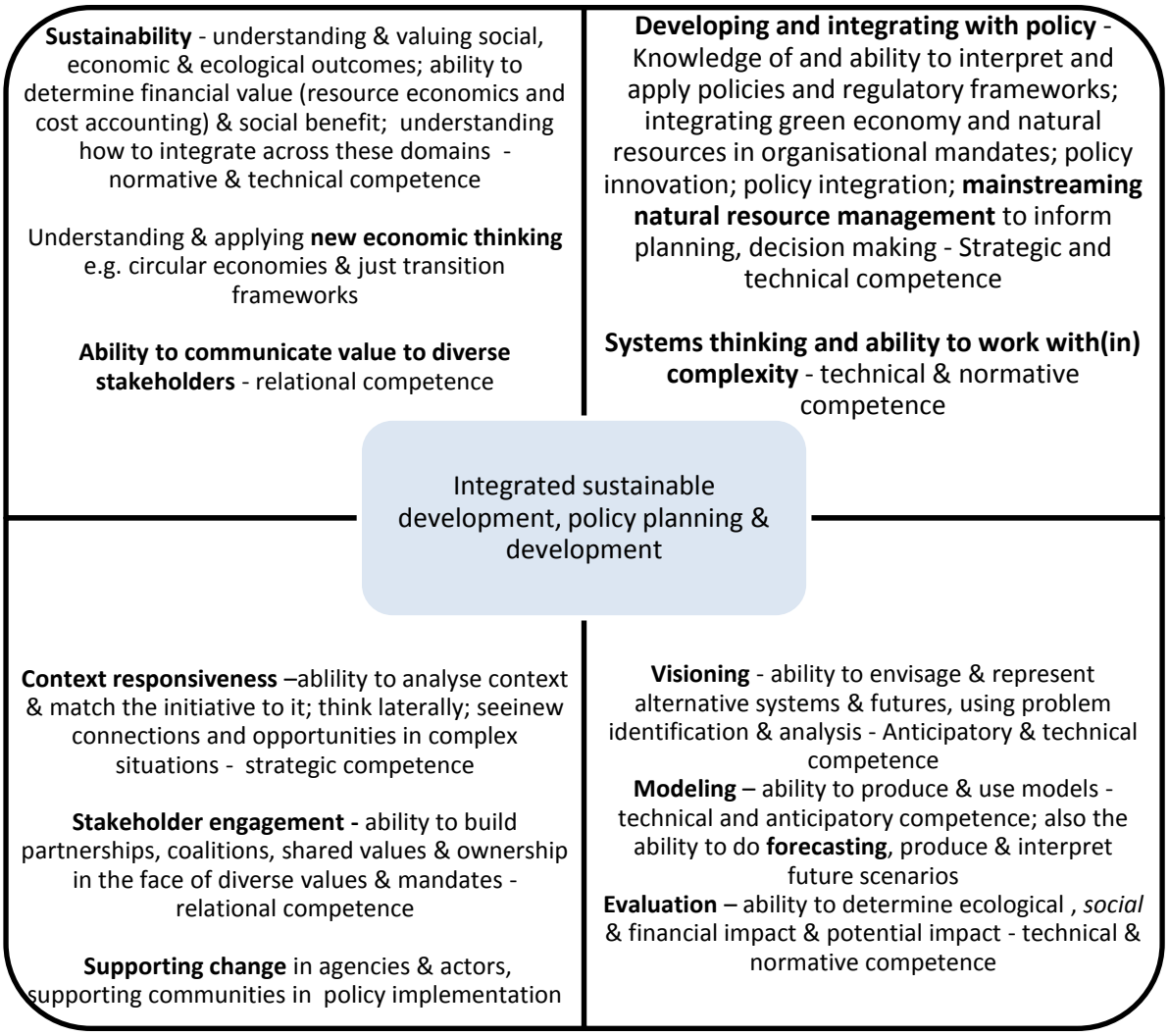

Figure 7: Competencies needed for integrated sustainable development and associated policy planning and development

Technical competencies associated with 'sustainable development and associated policy development' further included:

- **resource economics** i.e. the ability to determine the economic value of natural resources such as biodiversity and water or landscapes;
- ability to **set up intelligent data gathering and data management**
- General **research** and analysis capacity, working with both qualitative and quantitative data
- project / programme **management and leadership** competence.

3. Strategic adaptive management, expansive and transformative learning. These are different terms used more frequently respectively in the natural sciences (Strategic Adaptive Management) and in the social sciences (expansive and transformative learning), but it seemed prudent to group them together given that they required similar competencies. Respondents pointed out that these competencies were required not only at top management but also at middle management levels. Strategic Adaptive Management refers to managers' ability to learn from actions taken and adapt further actions on the basis of this learning (a form of reflexivity); it is particularly relevant in complex systems where it is not easy to predict outcomes and therefore not appropriate to manage according to predetermined formulas. Expansive and transformative learning involves 'learning what is not yet know' with others, often in relation to working on a shared, challenging focus. It moves forward the boundaries of what communities know and understand about, in this case, economy and the environment.

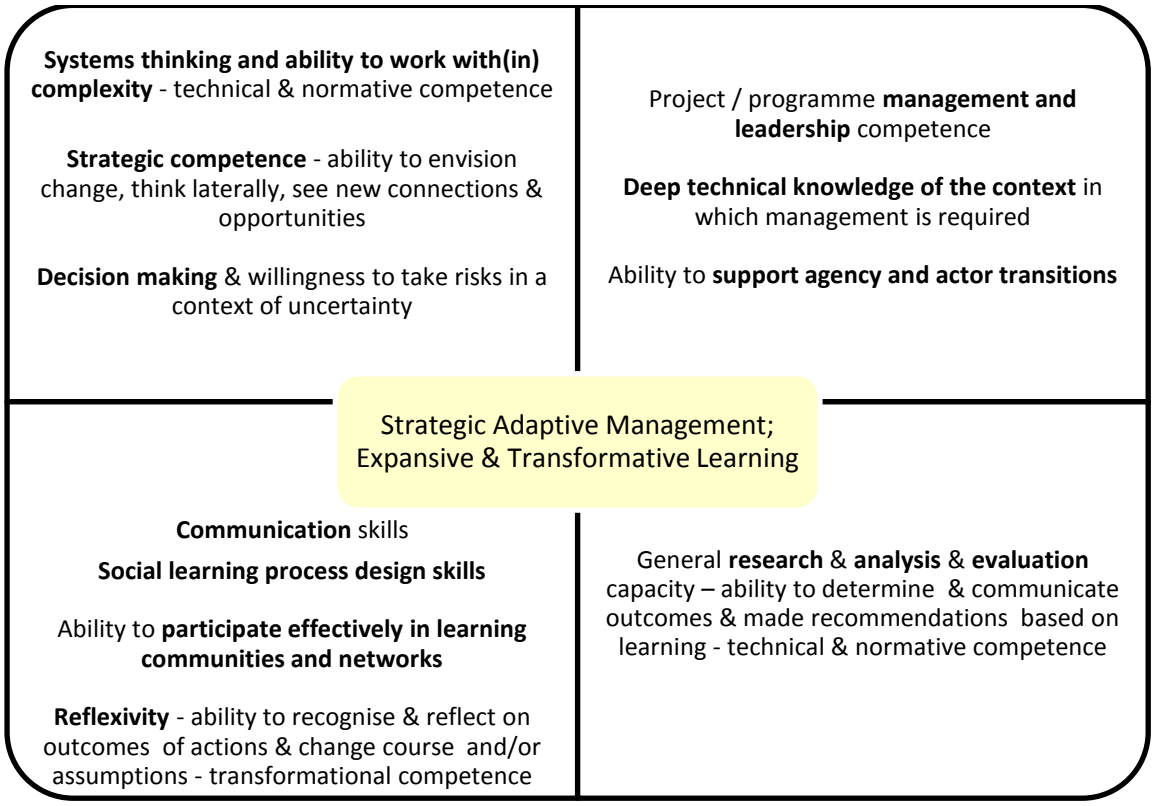

Figure 8: Competencies needed for strategic adaptive management, and expansive and transformative learning

4. Working effectively across different units within an organisation and across different types of organisations and sectors was identified as needed by all green economy champions. Examples are working with colleagues in a team; working with other departments in an organisation; with(in) other organisations and sectors (environment, development, industry; government and business. It requires the following competencies:

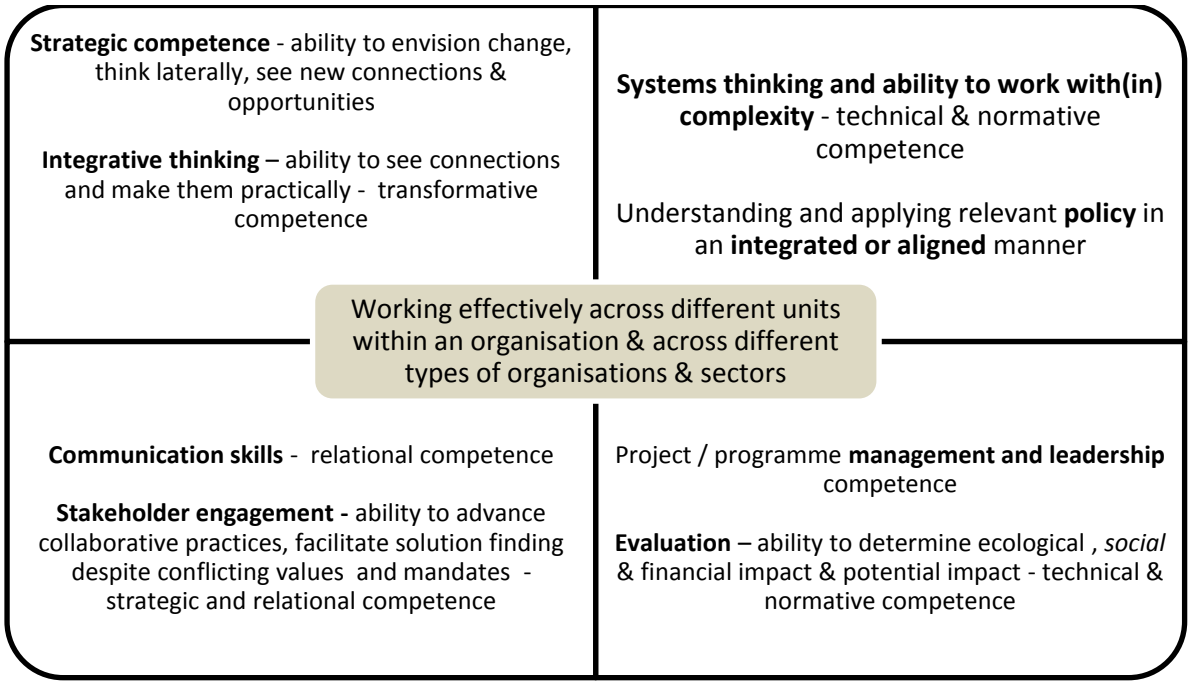

Figure 9: Competencies needed for working effectively across different units in an organisation and across different types of organisations

5. Working with multiple knowledge fields was identified as a requirement; examples include working with urban planning, development studies, economics, political sciences, ecological sciences, marketing and communications, on one initiative. The associated competencies are outlined in figure 10.

6. Human capacity and organisational development emerged as an important organisational or system capability, to support the development and appointment of the 'new' skills necessitated by the need for a green economy transition, and to create the enabling organisational or institutional arrangements within which these skills could be effectively deployed. This set of competencies was associated not only with long term skills development but also with what some respondents called 'overdue' programmes in the post-school system. Figure 11 outlines the competencies involved (see Figure 11).

7. Principle-based leadership

This key cluster focussed strongly on values that were evident in individuals but even more so in organisational cultures or approaches with associated norms, standards, structures and systems. These allow for and encourage innovative, solutions-oriented and agile leadership that exercises creativity and problem-solving, while at the same time, applying high ethical standards related to transparency, honesty, fairness,

ecological sustainability, social justice, serving humanity, working for the greater good, rather than self-interest. The associated competencies are outlined in Figure 12.

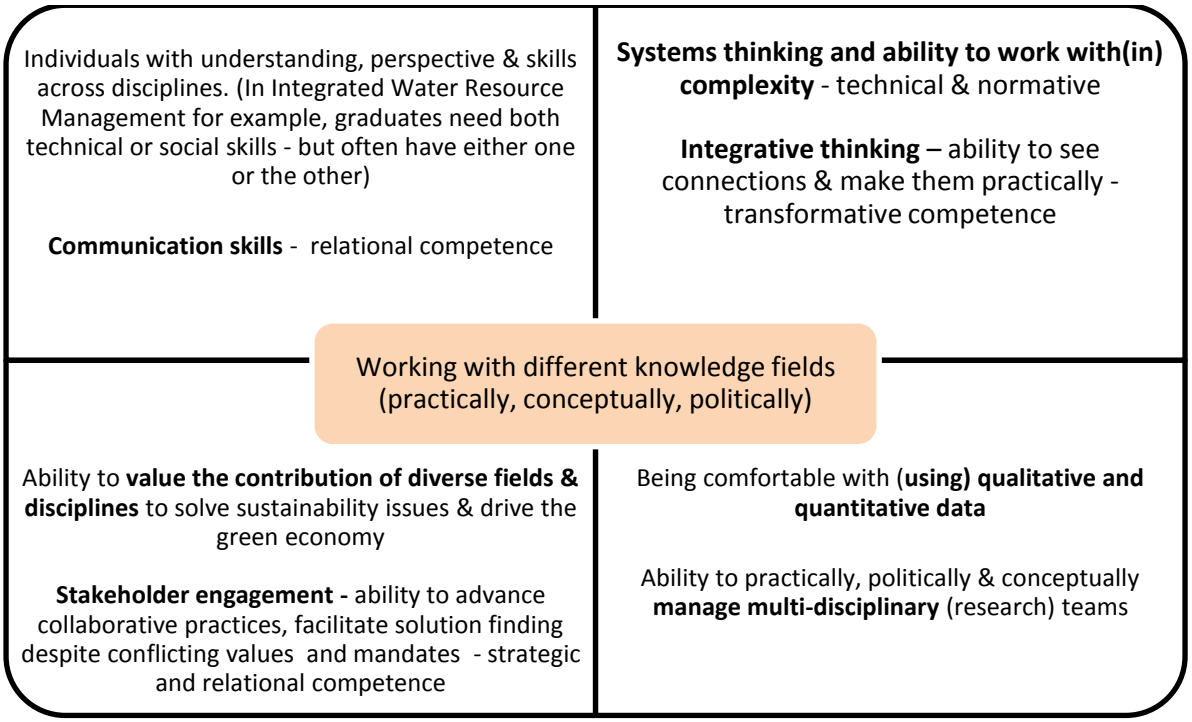

Figure 10: Competencies needed for working with different knowledge fields

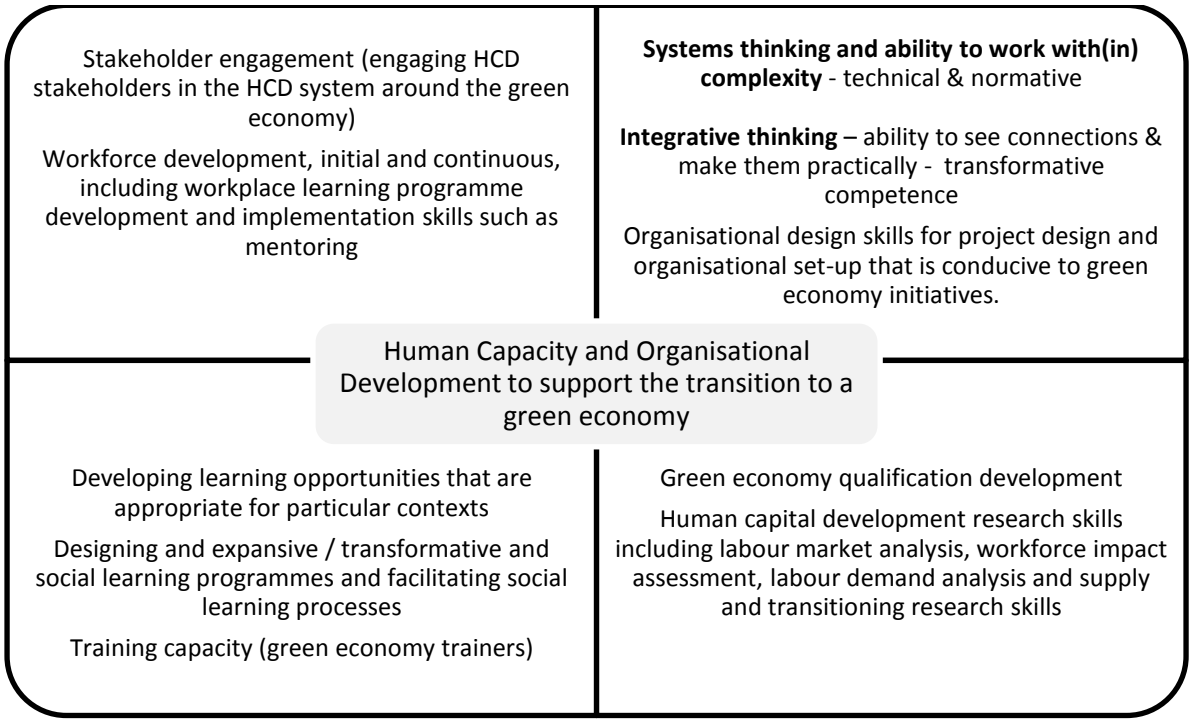

Figure 11: Competencies for human capacity and organisational development to support the transition to a green economy

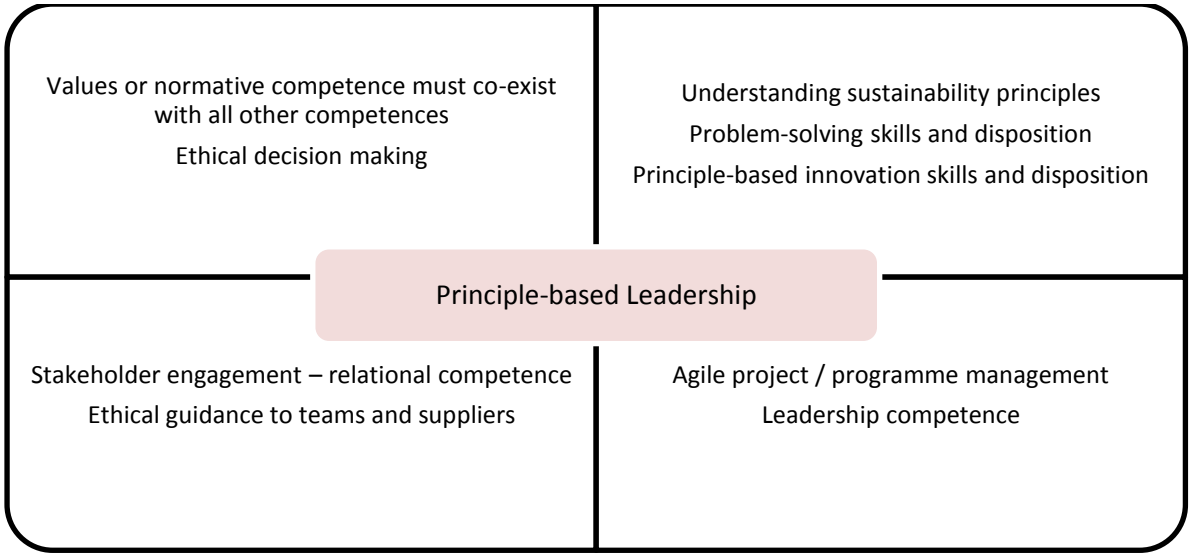

Figure 12: Competencies associated with Principle-based Leadership

3.2.4 Explanation of Competencies

Section 3.2.4 breaks down the most frequently mentioned competencies outlined above into some of their dimensions, by way of explanation. This explanation will be useful to green economy teams attempting to ascertain whether they have in place competencies that may be required for particular green economy initiatives, as a means of conducting local level skills needs assessments, and to the developers of educational programmes who need more detail on what competencies course participants would want to develop.

Project Management competence includes the ability to:

- Lead and manage programmes/projects based on principles, not allowing 'mission drift' or malicious compliance – strategic competence
- Manage transitions and change – taking the steps involved from vision into implementation
- Undertake financial management (technical competence)
- Undertake stakeholder engagement
- Developing and managing teams (see below)
- Manage iterative cycles of experimentation, learning and action (see also Fig 8)
- Design integrated projects, with budgets and finance - technical competence
- Design and implement integrated monitoring and evaluation systems – technical and relational competence
- Design and implement intelligent and practical data capturing and management systems – technical competence
- Mobilise resources (including ability to fundraise)
- Manage contracts (construction contracts was listed specifically)
- Manage suppliers.

Stakeholder engagement competence includes the ability to:

- Build coalitions
- Mobilise committed partners
- Engage local communities towards project acceptance
- Facilitate, Mediate, Negotiate
- Manage conflict
- Manage diversity (in human resources)
- Understand international relations and play a diplomatic role
- Broker Public-Private Partnership transactions, identify barriers to cooperation
- Support agency and actor transitions.

Team Development and Management competency includes the ability to:

- Develop teams across government departments and the policy spheres
- Coordinate and align transversal skills to integrate different competencies and move forward with a common purpose
- Manage and work in multi-disciplinary teams, where the necessary expertise is distributed across the team
- Plan projects in an integrative manner
- Communicate across different levels of expertise
- Undertake stakeholder engagement, build partnerships, negotiate
- Undertake strategic supplier management (see below)
- Support agency and actor transitions.

Strategic supplier management competence includes:

- Human resource management and HR development skills, ability to recruit appropriately staff and / or appropriately skilling staff in line with strategic intent
- The ability to contract appropriately, manage and maximise the benefit of working with external experts (e.g. consultants), identifying suitable partners
- Ability to coordinate.

Communicative competence includes skills such as:

- Public speaking and communicating with diverse audiences
- Report writing (various kinds, not only technical but to 'make a case')
- Knowledge brokering to bridge the science/policy interface
- Supporting agency and actor transitions through communications.

Reflexive monitoring and evaluation to support green economy transitions was a competence proposed not only for M&E specialists, but also for project managers and directors. It would involve standard competencies such as the ability to design and implement M&E systems, but respondents differentiated it from conventional M&E in that it needs to:

- Support 'the case' for green economy initiatives
- Include social, economic and ecological outcomes and impacts in its scope by determining and communicating social, economic and ecological value
- Be complexity aware and be able to track processes in complex systems

- Support, expansive and transformative learning, strategic adaptive management and support agency and actor transitions
- Be aligned and integrated with green economy initiatives (as opposed to be conducted just at the end of an initiative).

Dispositions: The findings suggest that green economy champions have a way of approaching initiatives that some described as "personality", but could perhaps also be seen as a disposition or outlook (that could be amenable to learning). Figure 13 lists features of this disposition. Note the importance of openness to learning outside one's current field of expertise.

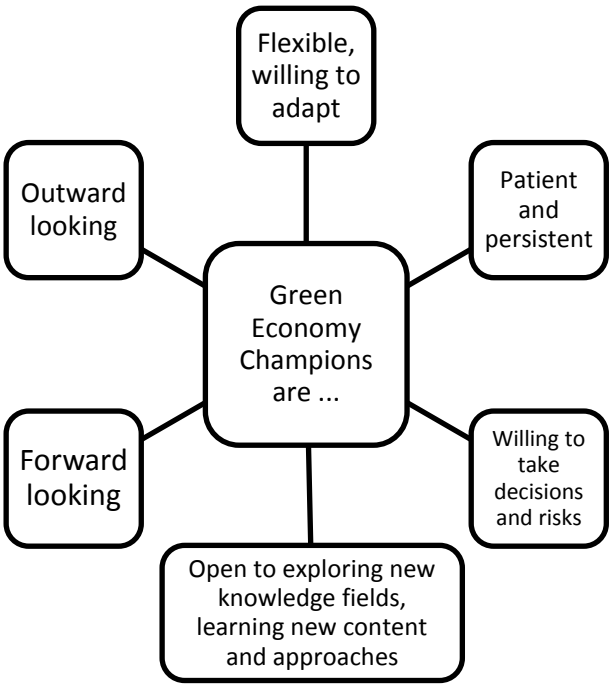

Figure 13: Features of a green economy champion's disposition

The final elaboration (Table 6) outlines a variety of technical competencies required in green economy teams, and the associated occupations or roles.

Occupation / Role Played in the Team	**Some Associated Technical Competencies**
Policy developers, planners (various); also company directors, CEOs	Policy analysis, policy development
Economists, resource economists	Cost benefit analysis, resource economics quantitative and qualitative analysis, ecosystem accounting, resource assessment and evaluation (solar, wind, hydrology); financial modeling, green investment evaluation
Financing	Including micro-financing skills (banks not well set to lend to smaller businesses)
Engineers	Project design and management; energy efficiency, energy optimisation and energy management skills, project design and optimisation (related to renewable

	energy applications), also associated trainers
Educationists, educators and trainers	Including micro-financing skills (banks unwilling/unable to lend to smaller businesses)
Entrepreneurs	Identifying and analysing market, product design, entering markets, capitalising on innovation, championing green business
Agricultural practitioners	Natural resource management
Ecologists	Integrated water resource management, technical skills water quality and flow measurement
Legal	Contracting including construction contracting
Evaluators	Designing and implementing integrated, reflexive and complexity aware monitoring, evaluation and learning systems

Table 6: A list of technical competencies required and associated roles and occupations

In conclusion, the assessment identified a variety of competencies that enable teams and individuals within teams to drive the transition towards a green economy. Clusters of competencies were needed, along with certain dispositions including openness to learn outside one's current field of expertise. Competencies consist of a range of skills, knowledge and values applied in an integrated manner. Competencies identified were technical, relation and transformational in nature; in most cases these overlapped.

4 Findings: Provider Capacity

4.1 Desk Top and Interview Data Sources

An audit of available courses and other learning opportunities was undertaken at two points in the assessment: midway through, and towards the end, once the priority learning needs were identified. The audit was approached in two ways: by online research on the offerings of all educational providers that were mentioned by respondents and interviewees as being particularly, or even just possibly, relevant; and by online searches for any additional providers (not mentioned) who may be offering courses or programmes relevant to the learning needs that were identified in the surveys and interviews. In this way approximately 200 entries were logged outlining providers, offerings (with some detail) and the competencies they address, as well as intended users. It includes nearly 30 online courses. The list was reduced to the 170 most relevant entries and is proposed to be accessible as an interactive database under Green Economy Learning, one of the key themes of the on-line Green Economy Knowledge Platform which will be developed in the PAGE programme in South Africa in 2017.

The desk top review was significantly strengthened by the interview data. Interviewees elaborated on their own learning journeys, key institutions and their reflections on what works in their own or others' training programmes, and what the challenges are.

The desk top provider research was very dependent on the information that is available online, and only in a few instances were follow up phone calls made to providers (due to time constraints). The comparison indicated that some institutions, in particular universities, are not able to keep their websites updated, and what they have on offer is therefore not always well reflected on their websites. This would present a problem for relatively unconnected individuals looking for courses. Providers indicated that this was due to a lack of human resources, less to technically upload new content, than to produce the content.

It is recommended that the spreadsheet developed for the assessment is used to set up an online 'living' database that course coordinators and/or satisfied students could be encouraged to regularly update as a service to the community. However, if providers lack the human resources/time to generate new content to load on websites, this would have to be a supported activity.

4.2 General Comment on the Provider Findings

There is a spectrum of learning opportunities valued by stakeholders, from highly structured to highly unstructured and open-ended (see Table 7). Table 7 is not exhaustive. The information suggests that every topic identified in the assessment is taught somewhere by someone. The value of having access to a database of available learning opportunities is evident in that some respondents indicated they did not know of any training in (e.g.) adaptive management (while this seems to be offered by at least two universities, Stellenbosch Institute for Advanced Studies in South Africa, and a Wits Masters programme) or in entrepreneurship (yet there are opportunities, some of which are mentioned in Table 7).

Table 7: Types of Learning Opportunities Identified in the Assessment

More structured	Longer courses (a year or more)	Resulting in formal qualifications, offered by universities and universities of technology in SA and internationally. All SA universities are in some way "trying to make a difference" in the words of one interviewee, and all seem to have some courses relevant to the needs identified in the Assessment. Courses are offered in a range of departments; schools including business schools; centres including environmental management and environmental learning centres; and other units focussing on Environmental ethics; Governance; Renewable energy; Sustainability for Mining and Industry, and more.
	Shorter courses for physical attendance, from 2 days to 6 weeks Also Summer Schools and Winter Schools	Either accredited or not; customised or not. This is the most popular form of training in many organisational contexts, and like the longer courses they span a range of topics. Providers include universities, NGOs, not-for-profit entities like TIPS and Africege (which all offer bespoke courses), Common Purpose, Biomimicry SA, Wildlife and Environment Society (WESSA), consulting firms and training businesses. A series of relevant courses, some with significant developing world content, are offered by international agencies including the ILO, PAGE, UNITAR, UNESCO. The CSIR's NCPC develops energy, water and waste related courses. Entrepreneurial training is offered in variations of the short course called 'coachlabs' (CSIR Innovation Hub) and 'bootcamps' (DEA). Government also offers short courses; this includes the National School of Governance with a range of relevant programmes and online courses e.g. in strategic thinking, scenario planning, and project management.
	Online courses including MOOCs (Massive Open Online Courses)	These too span a range of highly relevant topics and are usually open to anyone, with varying degrees of interactive components. Most of the providers are international universities but also public entities like UNESCO, UNEP and the Ellen Macarthur Foundation (on circular economy)
	Research opportunities	Several research Chairs at SA universities focus on relevant topics like Business and Climate Change, Green Economy, Global Change and Sustainability, Green Skills and Social Learning. There are also smaller research units such as the Environmental Policy Research Unit, and some (but not many) individuals mentioned the PhD as an important learning opportunity.
Less Structured	Fellowships	A bursary programme with mentoring, coaching and peer support such as GreenMatter.
	Formal and informal networks & exchanges, conferences and research networks	Inter-governmental working groups, industry associations, professional bodies and informal networks including research networks and green economy networks of which there are quite a few. South Africans working in this space are generally but not always internationally connected.
	Resource based learning	Respondents mentioned the availability of materials (such as economic policies) on departmental websites; some departments or NGOs produced 'toolkits' as way of supporting changed practices in the workplace.

Without a curriculum analysis or personal reviews, it would be difficult to know whether or not a particular learning opportunity will meet a particular learning need, despite what is listed in a prospectus or on a website. The nuances that respondents have given to the learning needs they identified, should be noted. For example, while there are Integrated Water Resource Management degree courses available, two interviewees felt that they do not develop the right mix of (inter-disciplinary) skills to the required depth, and it may be necessary to complement them with short courses focussing on missing aspects (whether technical or relational competencies). Similarly, while a number of universities,

as well as development agencies, private providers, the National School of Governance and the South African Monitoring and Evaluation Association run courses and workshops in monitoring and evaluation, respondents described the learning priority as 'not standard monitoring and evaluation' skills but 'reflexive' or 'innovative' monitoring and evaluation that responds to complexity and supports adaptive management, and which can adequately reflect the ecological and social impacts of green economy interventions.

4.3 Specific Provider Findings

The majority of the champions interviewed, valued and recommended *combinations* of structured learning opportunities (courses) with less structured opportunities (such as networks, which were often started or joined on courses). The majority of respondents who were active in driving green economy initiatives, indicated that they learned most 'on the job', in projects with other people, including people with diverse (disciplinary) backgrounds, and that they sought out much of what they need to know, themselves, to either 'top up' or 'beef up' their skills. They also noted that it can be difficult to gain access to some networks and resources, unless one was already senior and experienced.

It was also evident that courses were vital but on their own are not adequate to guide changing practices in the workplace; that workplaces are likely to be the most significant learning spaces for the green economy; that these learning spaces are likely to span more than one unit within a workplace and/or more than one workplace at a time; and that many South African employers (and industry or skills bodies) are not well prepared to support the kind of learning required. A model recommended by two interviewees was training that involved members of teams or departments that are meant to function together in the workplace (but often fail to do so optimally) attending courses (or parts of courses) together, even if or particularly if they were at different management levels.

Respondents have also noted the following:

- Hybrid models, that combine formal courses with less structured and 'on the job' opportunities like networks and supported change projects, or 'apprentice' models where exposure to theory is combined with mentoring, seem most appropriate.
- Training of trainers is a priority
- Some people, usually in senior positions, are self-directed in their learning, identify for themselves what skills they need, and develop these using resources and opportunities that they find and navigate themselves
- Others may need more mediated learning opportunities such as those structured and scaffolding by course instructors; while yet others benefit from media messages and experiential activities.

As a way forward with a repository of green economy related learning opportunities PAGE could consider developing the current Excel list into a database and inviting providers to upload or update material on the learning opportunities they offer, with a short description that outlines how their programmes respond to the learning needs identified in this assessment. This would make such an inventory or database a valuable 'live' resource for team leaders and HR departments wanting to source suitable learning opportunities.

In this regard it may be useful to keep the 'more structured' and 'less structured' framework in mind (see Figure 14).

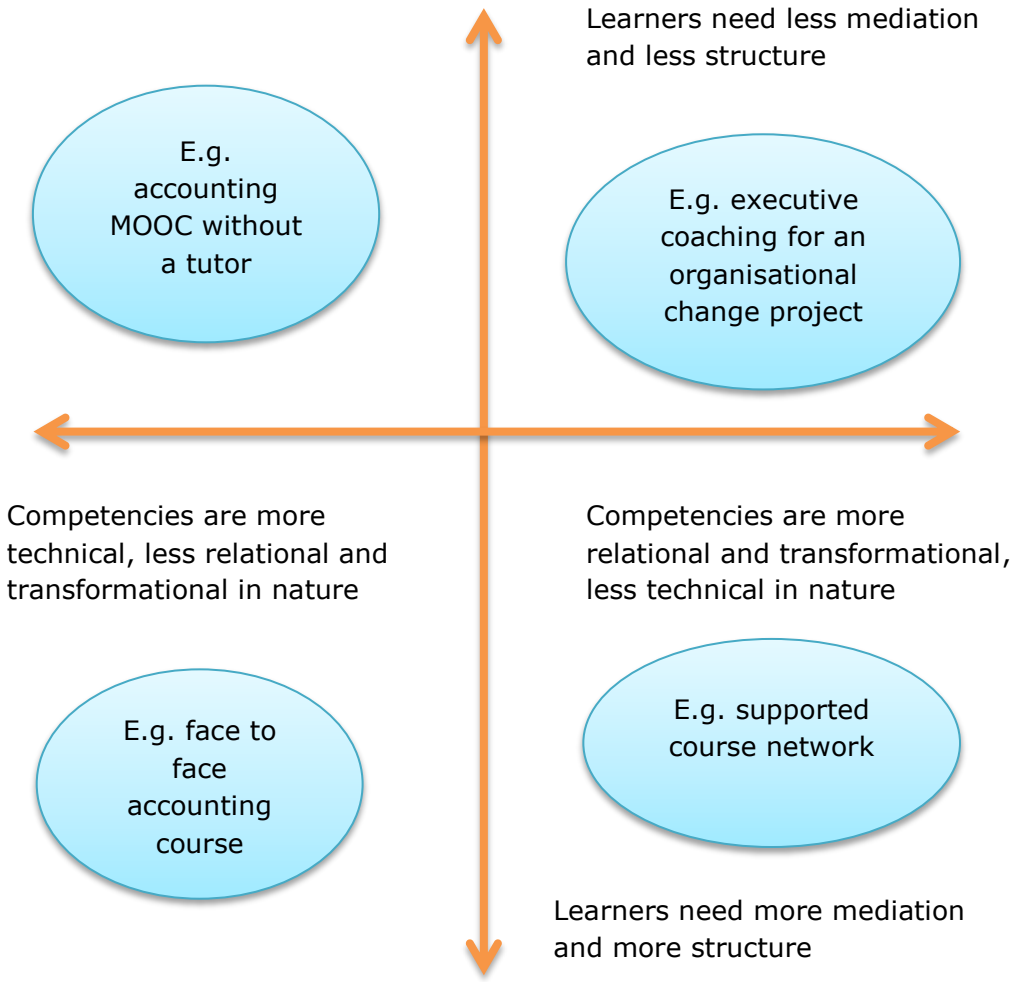

Figure 14: Continuums of Competency Types & Learner Approaches Can Be Used to Plot Learning Opportunity Types

In conclusion, a wide spectrum of learning opportunities relevant to a green economy already exists in South Africa. Topics associated with most of the competencies identified in the assessment are taught somewhere by someone; an exception is the need for complexity sensitive, reflexive evaluation that can assess and support the case for green economy transitions. Green economy champions value a variety of learning opportunities. Courses, whether face to face or online, are not enough, and need to be complemented with opportunities to learn from taking action with others.

5 Discussion of Findings

5.1 What Drives the Green Economy - Policies or Projects?

Based on the case studies reviewed, policy was not necessarily the starting point for green economy actions. In some examples within the cases, projects were started and policy followed. Policy was however critical in creating enabling conditions for projects to thrive and be sustained, and inappropriate policies could create very inhibiting conditions. In the REIPPPP programme for example, ways had to be found around the public procurement policy in order to get the programme off the ground. International events, particularly when held in South Africa (such as the soccer world cup, the climate change Conference of the Parties or Africa Transport Week) provided significant contexts in which green economy actions have been championed, and could give rise to policy developments, provided that the necessary capacity exists in the country, to recognise or create the opportunity and respond appropriately. Government– led policy development is important but is interwoven with the actions of academics and civil society champions, proactive industries and politicians. Hence, green economy learning opportunities would ideally span across all these groups and would be in some instances at least be best approached with mixed groups, given the weight given by respondents in this assessment to stakeholder engagement, partnerships, coalitions and the ability to communicate and work effectively across traditional boundaries.

5.2 Green Economy Learning Needs

In analysing case studies of green economy actions, and conducting interviews with green economy champions, it became clear that the competencies necessary for green economy actions occurred in a distributed format among the members of teams, and that few if any individuals had all the knowledge and skills required to undertake the complex and often drawn out work required to advance the green economy in a particular context. The green economy actions reported on were driven by groups whose members worked well together, whether as management units or as in-house teams, as in-house teams working with other internal teams or with external partners and/or consultants, resource persons and advisors.

A further observation was that the competencies identified were multi-faceted and occurred on a continuum from more technical and less relational or transformational competencies, to less technical and more relational and transformational competencies. Many competencies, such as strategic adaptive management, had facets of each type of competence outlined by Scharmer (2009).

The Scharmer competency framework was nonetheless useful as a prompt, for commentators to look beyond a narrow range or obvious competencies; to recognise the extent to which non-technical skills are necessary; to find a more exact language for describing 'soft skills'; and to note how even technical skills (such as monitoring and evaluation or project management) have relational and transformational dimensions.

This assessment has summarised competency needs identified in three case studies, a survey yielding nearly one hundred answers, and 12 interviews with diverse green economy champions. Across these findings there was a significant degree of congruence. This was particularly the case with generic skills, which were in some cases technical

(like financial management or contracting) and in other cases, relational (such as stakeholder engagement) and transformational (such as strategic planning). Relational and transformational competencies were learning needs regardless of the context or sector.

Given this congruence it was relatively easy to summarise the findings on green economy learning needs. As such the assessment can be used as a decision making tool for teams to identify their own competency needs in a particular context. A team should decide what competencies they need; then conduct a self-assessment to determine what their strengths and their gaps are *in relation to* these competencies *across the team* and not necessarily hoping to find all the necessary competencies for the required action, in one person. (See Appendix 1 for a tool that can be further developed.)

The green economy assessment for South Africa provides a framework that the small functional teams that drive the green economy, either through policies or projects, can use to define what competencies they need in their particular context. They could use the competency framework outlined here, and the examples of competency needs which, with the exception of certain situation specific technical competencies, are likely to be quite comprehensive, given the degree of congruence found in responses.

5.3 Green Economy Learning Opportunities

Green economy learning opportunities were more difficult to provide in a succinct manner. Much information can be found given enough time to track it down, but it is scattered and many providers lack the time to keep their online information updated. It was also difficult to decide how to frame the information gathered – according to provider, according to the (often multiple) learning needs they address, or according to format. It is also challenging to make a generic recommendation on which of these learning opportunities would be useful to expand, or where the most critical gaps are. *What is most critical, would depend on the particular green economy action context in which the need occurs, and this assessment was too broad to make the call.*

This conclusion does not imply that the Assessment was not useful. It begins to provide green economy champions with a framework to help them identify the kind of learning opportunities that may best match their needs. The spectrum of learning opportunities, ranging from more to less formal, more to less structured, and more self-directed to more mediated by learning facilitators, provide a helpful framing for considering the options, particularly when one takes into account that most of the champions we interviewed, valued *combinations* of structured learning opportunities (courses) with less structured opportunities (such as networks, which were often started on courses, e.g. the ILO Green Jobs for South Africa Community of Practice).

Once the competency needs in the team have been identified, as suggested in 6.2, the next decisions would be on how best to meet these skills needs. Again the assessment can offer guidelines in this regard (which could be developed into more or less elaborate decision making tools; see Appendix 1 for a possible start). Decisions will depend on the types of competencies needed (on the technical to transformational continuum), the degree to which learning can be self-directed or needs to be mediated, structured or unstructured (see Figure 4), and the kinds of formats that are feasible in the particular situation. In most situations a hybrid model or combination of learning opportunities would be recommended, and it was found that learning opportunities shared by multiple

members of the same teams or departments can be particularly valuable in strengthening their collective effectiveness.

The database of green economy learning opportunities initiated for this assessment can be used as the start of a 'living repository' where providers can enter their own learning opportunities and provide their own assessment as to how their programmes, courses or workshops, for example, address the learning needs identified in this Assessment, or future assessments.

6 Recommended Actions

The recommended actions in Table 8 are informed by stakeholder feedback on the findings and draft recommendations at a stakeholder workshop in August 2016. The assessment team presented a set of recommendations based on the study findings and invited comments from stakeholders. Stakeholder adopted the list but also refined and expanded on it. The expanded list in Table 8 is the result of this process.

This stakeholder consultation also concluded that the assessment can be flexibly used by multiple audiences including:

- PAGE programme
- Training providers
- The Department of Higher Education and Training (DHET) as well as Sector Education and Training Authorities (SETAs)
- Other government departments
- Civil society including business.

Stakeholders further recommended that the report include both the shorter term and micro actions that the PAGE programme could feasibly support, *as well as* macro level actions required to build the bigger system for sustainability, and *meso* level actions that could bridge from the shorter term actions to the longer term system building and sustainability. The latter two action groups are for the consideration of South African government and civil society agencies, and the PAGE programme could be involved in supporting these agencies to fundraise for these actions (if necessary).

Table 8: Recommended Actions

Shorter Term/Micro Level Actions	**Medium Term/Meso Level Actions**	**Longer Term/Macro Level Actions**
1. Prioritise the development of the PAGE Knowledge Platform and include the Assessment report, provider database and tools for local Green Economy Learning Assessments on the Platform; advertise the Platform widely	Encourage stakeholders to use and contribute to the PAGE Green Economy Knowledge Platform on an ongoing basis; work towards ownership of the Platform by relevant roleplayers; provide human resources to help universities develop content to upload	Encourage more departments (beyond DEA, dti and DST) to become involved and take ownership of green economy learning initiatives; anchor this initiative in departmental strategies so that it can be resourced on a sustainable basis
2. Develop and offer short courses in integrated energy, water and waste management that include technical, relational and transformational competencies, to a range of staff in teams at different levels in a range of industries; include technical, relational and transformative competencies	Develop a series of connected short courses at various levels	'Joined-up' learning pathways to gain access to working in the green economy
	Evaluate the outcomes in the workplace of this training	Inform ongoing training development
	Engage the skills people in industry associations to create awareness of the need for green economy learning and related training	Establish a professional body to drive and guide qualifications, accreditation and learning pathway development for green economy skills
3. Develop and offer a range of Training of Trainers courses/ learning opportunities for Green	Establish learning network(s) associated with the courses, for Green Economy related course developers and trainers, to	Training of trainer learning networks to work in national forums to engage DHET, SETAs and Quality Councils

Economy related course developers and trainers across different fields (like energy, water, Green Economy introduction general, and Green Economy education/ curriculum development and delivery in general); include technical, relational and transformative competencies	support curriculum innovation and transitioning Ensure that broad concepts like sustainability are taught well in schools by engaging with the DBE and teacher development initiatives like Fundisa for Change	and consider the development of professional bodies for course accreditation, learning pathway and qualification development (see also above)
4. Review and expand the offering of Introductory green economy courses currently offered through UNITAR, TIPS, Sustainability Institute and others, and explore the possibility of green economy related training through the National School of Government; include technical, relational and transformative competencies; encourage managerial and ministerial level participants but also involve stakeholders outside of government	In the medium term, evaluate the outcomes and institutionalise introductory green economy courses (e.g. in the National School of Governance) that still meet perhaps changing learning needs Continue to explore options like working with Parliamentarians, National Planning Commission, provincial governments; use the course (face to face and online) or other opportunities to start professional / learning networks among key individuals	In the longer term, also build these into university programmes where governmental and non-governmental partners would interact
5. Develop and pilot a short course or courses in Reflexive Monitoring, Evaluation and Strategic Adaptive Management in Complex Systems for senior and middle managers and M&E designers; include technical, relational and transformative competencies	Use the pilot findings to engage existing M&E training providers regarding the integration of 'complexity aware and reflexive monitoring, evaluation, social learning and strategic adaptive management courses in their programmes	Evaluate the success of these initiatives and whether the need still exists
6. Distribute information about suitable opportunities through the PAGE Knowledge Platform	Review GE related learning opportunities in business schools and Entrepreneurial Training in South Africa (perhaps using SEED's criteria) to see if they are realistic and aligned with green economy thinking and include technical, relational and transformative competencies	Evaluate the success of these initiatives and whether the need still exists
7. Work with the GreenSkills programme to engage DHET and the SETAs, using the report as a stimulus	Mainstream the findings of the GELA in sectoral skills planning, using the tools developed in the GELA and related projects like Green Skills	Use the Assessment findings to make inputs into the National Human Resource Development Strategy and National Skills Development Strategy

Further recommendations from stakeholders for having impact through the assessment were:

- Identify whose responsibility the meso and macro level actions would be
- Utilise DEA's capacity to promote the recommendations in the clusters/working groups.
- Use the report to engage DHET and SETAs
- The learning provider audit is a start that could be used for a 'living' online provider profile/repository that interested providers can complete online, and keep updated, in relation to the learning needs identified in the assessment. That is, providers would be expected to read the assessment and include a paragraph on which of the learning needs identified in the assessment are addressed or supported through their learning programmes, and how.

What a particular group of stakeholders regard as priority learning needs is likely to differ from context to context, and a proposed a methodology whereby groups can determine their own learning needs, using this assessment as guide, is outlined in the analysis. For this purpose, two tools that green economy teams can use to determine their local level learning needs and the best mix of learning opportunities were developed as an outcome of this assessment (Appendix 1). In commenting on the assessment stakeholders noted that the tools were as important as, or even more important than the assessment report, as it could be used to determine context-specific learning needs. The assessment report should then be read as part of the process of populating the tools.

7 Comment on the Assessment Scope and Process

An assessment was found to be an appropriate process for providing PAGE partners and stakeholders with policy relevant recommendations, as, being different to a scientific study, an assessment deals with broad and complex topics and provide a summation based on the gathering of existing knowledge and expert inputs. In this case the scope of the assessment was progressively narrowed in order to gain the more in-depth understanding that could guide recommendations.

The scope of the green economy and associated learning needs is very broad and in some instances contested (for example, whether addressing climate change is part of the green economy, or not). An important first step in the assessment was to adapt the thematic scope to the South African context and select key sectors. Even with these stakeholder led delineations and increasing focus, the scope of the study remained broad. Whereas this is appropriate in some ways there is also a need for greater focus. The assessment addressed the need for greater focus by providing a tool that can be used at a local team or departmental level. Sector and programme specific assessments may also be needed.

The mix of data sources inspired confidence in the findings on the green economy learning needs, particularly given that both a variety of technical learning needs, and congruence on generic needs, have become apparent.

Survey 2 was challenging to complete and some respondents indicated that they would prefer an interview, which we then did. Some (very few) survey responses were difficult to interpret. The survey did allow for a bigger number of stakeholders to be consulted in a relatively short space of time.

Interviews were more time consuming, taking on average one and a quarter hours, but gave rich insights into the green economy experts' and champions' understanding and experiences, and increased the depth of understanding of the researchers. It also helped to clarify points that would have been misunderstood otherwise.

In this regard it was noted that an in-depth understanding of the sector seems a prerequisite for conducting such an assessment, at least in some members of the assessment team. Alternatively, some points could be misinterpreted and lead to misdirected recommendations.

The assessment focussed on quality rather than quantity and every effort was made to source credible data sources including experienced and well informed participants for surveys and interviews. Participation in these data generation processes were satisfactory and often very enthusiastic. Inputs during the two stakeholder workshops were also generally well informed and enthusiastic. Nonetheless the extent of participation in these two workshops was disappointing; in both cases only 20% of those invited, accepted the invitation. Responses indicated that at least some of those who did not attend, were enthusiastic about the initiative but unable to attend on the day. It was noted that many of these key stakeholders have a very large number of commitments to attend to in what are, without fail, under-resourced contexts (in terms of the number of skilled people to do the amount of complex work required).

Finally, it was noted that the green economy is a fast moving field internationally and in South Africa and there is a rapidly growing body of information. This learning assessment should be used to provide key stakeholders with a deeper understanding of the field and support strategic decisions within it.

Appendix 1: Tools for Localised Learning Needs Assessments

For each big action to drive the green economy, ask the following questions in the team/unit/department:

What are ...		In relation to the tasks in the first column, and our competencies ...		
		What are the strengths in our team?	What are our competency gaps?	How can we improve our competency mix and levels?
The technical tasks?				
The people related tasks?				
The transformational task(s)? (What change do we want and why?)				
Hint: Use the tasks and competencies discussed in this Assessment to guide you in completing these columns				Hint: Use the table below and the database of for this column

Green Economy Learning Options (GELO) Decision Making Tool

Learning Options	Is good for:	Not good for:	Good in combi-nation with:	Possible providers, places, resource people:	Decision:
Enrol for a long course (degree, certificate)				(Hint: Start with the database, then explore further)	
Attend a short course or workshop					
Online course					
Conference					
Informal Networks					
Professional association					
Mentoring or Coaching					
On the job learning					
Brown bag lunches					
Reading, guided or shared					
Own research					