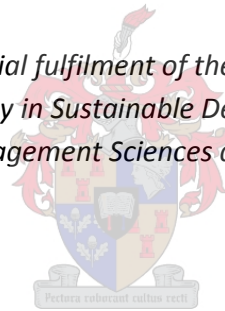


**Utility-Scale Renewable Energy Job Creation:  
An investigation of the South African Renewable  
Energy Independent Power Producer  
Procurement Programme (REIPPPP)**

By  
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*Thesis presented in partial fulfilment of the requirements for the degree  
of Master of Philosophy in Sustainable Development in the Faculty of  
Economic and Management Sciences at Stellenbosch University*



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March 2015

## Declaration

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March 2015

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## Abstract

The South African Government developed the REIPPPP to ensure the implementation of Green Economy and job creation policies, while mitigating the current power crises with the short lead times of RE technologies. Current South African literature is ambiguous when discussing the legitimacy of the REIPPPP and the overall understanding of the programme and its associated outcomes in terms of job creation, are therefore, vague. A need therefore exists to unpack the quantitative job creation submissions of the REIPPPP and to carry out an investigation into the opportunities and challenges associated with meaningful job creation. Through a non-linear iterative exploratory design, hinging on the researcher's position within industry, this empirical research comprises of two components.

Firstly, a literature study informs the development of a meaningful job creation framework which is used to analyse the programme's bid documentation and publicly available data. Secondly, mixed-methods are utilised to collect quantitative data from the DoE and qualitative data from job creation stakeholders.

The result is an enriched understanding of the REIPPPP in terms of meaningful job creation, identifying trends, similarities and unexpected outcomes across methods. The study concludes that the programme does create meaningful jobs yet data is misaligned and currently unavailable to the public. Secondly, since job creation is a feature of South African Government development policy, a more robust emphasis is required in the REIPPPP weighting and auditing process, which includes further research of intended benefits and suggested improvements to align job creation data.

## Opsomming

Die Suid-Afrikaanse regering het die hernubare energie onafhanklike kragprodusent verkrygingsprogram ontwikkel om die voorsiening van die werkskeppingsbeleid en groen-ekonomiebelied te verseker. Huidige Suid-Afrikaanse letterkunde is dubbelsinnig wanneer die wettigheid van die program bespreek word. Die algehele begrip van die program en sy geassosieerde uitkoms is dus vaag. Daar is 'n behoefte om die kwantitatiewe werkskeppingvoorleggings te analiseer en om ondersoek in te stel in die geleentheid en uitdagings wat geassosieer word met betekenisvolle werkskepping. Deur 'n nie-lineêre iteratiewe ondersoekende ontwerp, wat gebaseer is op die navorser se posisie in die industrie, bestaan hierdie empiriese navorsing, uit twee komponente.

Eerstens, lig 'n literatuurstudie die ontwikkeling van 'n betekenisvolle werkskeppingsraamwerk in, en word gebruik om die program se biddokumentasie en publieke data te analiseer. Tweedens, word gemengde metodes gebruik om kwantitatiewe data van die departement van energie te versamel asook kwalitatiewe data van werkskeppingbelanghebbendes.

Die resultaat is 'n meer verrykende verstandhouding van die hernubare energie onafhanklike kragprodusent verkrygingsprogram in terme van betekenisvolle werkskepping asook die identifisering van tendense en onverwagse uitkomst. Die studie kom tot die gevolgtrekking dat die program nie betekenisvolle werk skep nie en is tans onbeskikbaar vir die publiek. Tweedens, aangesien werkskepping 'n kenmerk is van die Suid-Afrikaanse regering se ontwikkelingsbeleid, word 'n meer robuuste klem vereis op die hernubare energie onafhanklike kragprodusent verkrygingsprogram se ouditeringsproses en verdere navorsing van die beoogde voordele word voorgestel.

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## List of Acronyms and Abbreviations

BWR	Bid Window Round
Chpt.	Chapter
CMP	Construction Measurement Period
CO <sub>2</sub>	Carbon Dioxide (Carbon Emissions)
COD	Commercial Operation Date
CSP	Concentrating Solar Power
DEA	Republic of South Africa Department of Environmental Affairs
DME	Republic of South Africa Department of Minerals and Energy
DoE	Republic of South Africa Department of Energy
DoNT	Republic of South Africa Department of National Treasury
DTi	Republic of South Africa Department of Trade and Industry
ED	Economic Development
EPC	Engineering Procurement and Construction
EWEA	European Wind Energy Association
FTE	Full-time equivalent
GDP	Gross Domestic Product
GW	Gigawatt (Capacity)
GWh	Gigawatt Hour (Unit of Energy Generation)
GWEA	Global Wind Energy Association
IA	Implementation Agreement of the REIPPPP
IDC	Industrial Development Corporation
ILO	International Labour Organisation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
MDGs	Millennium Development Goals

MW	Megawatt (Capacity)
MWh	Megawatt Hour (Unit of Energy Generation)
NSSD	National Strategy for Sustainable Development
O&M	Operations and Maintenance
OMP	Operating Measurement Period
PICC	Presidential Infrastructure Coordinating Committee
PMs	Person-Months
PPA	Power Purchase Agreement
PV	Photovoltaic
PYs	Person-Years (one PY is twelve PMs)
RE	Renewable Energy (in terms of power generation)
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for Proposal
SAEP	South African Entity Participation
SAPVIA	South African Photovoltaic Industry Association
SARi	South Africa's Renewable Initiative
SAWEA	South African Wind Energy Association
SAREC	South African Renewable Energy Council
SARETEC	The South African Renewable Energy Technology Centre
SIP	Strategic infrastructure project
UNDP	United Nations Development Programme
UNEP	United National Environmental Programme
WfC	Wind for Communities (SAWEA Working Group)

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## CHAPTER ONE: INTRODUCTION

South Africa, like many other developing countries faces numerous (social-ecological) challenges, especially those linked to high levels of unemployment, poverty and carbon emissions. Unemployment alone is one of the highest rates in the world, ranging between 24.1% and 34% (StatsSA 2014b)<sup>1</sup> and per capita, the country fluctuates between the 12<sup>th</sup> and 14<sup>th</sup> highest carbon emitters in the world (IEA 2013).

Rooted in unsustainable resource use South Africa's economy is highly dependent on the mining industry relying on low-wage skilled labour to sell under-priced resources (Swilling 2010); the result, under-paid and under skilled unequal societies. Swilling continues that development plans are ad hoc and distorted (government departments acting independently to address sustainable development) (*Ibid.*; Swilling 2013) resulting in unanticipated consequences of unequal societies which perpetuate unemployment (Swilling 2010).

One of these potential ad hoc development plans is the New Growth Plan (2011), also known as the development blueprint of South Africa according to Zuma (2012). It aims to address the 'fundamental bottlenecks' and South Africa's socio-economic imbalances, giving special reference to unemployment, the dependence on minerals, energy and emission intensive processes (from both a carbon emission perspective and also addresses the out-dated electricity assets as a result of indecision and poor energy planning (Eberhard et al. 2014)), and backlogs in skills development. Even if ad hoc, the government of South Africa recognises the potential of the Green Economy to create 'decent' and 'meaningful' jobs through the development of the renewable energy sector, as seen by supporting policy and discussed further below (see Section 1.1.5). The Green Economy not only supports the creation of jobs that have broader socio-economic benefits, but also facilitates a move towards more sustainable development trajectories; supporting alternative development options that do not undermine the resilience of important ecosystem processes and functions (Sitas et al. 2014; Sitas et al. 2013) while addressing unequal societies and the growing need for more energy infrastructure.

In 2011 the South African Government therefore launched the utility-scale renewable energy (RE) programme—the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) — which aims to generate much needed electricity to support the development of the country while at the same time creating green and meaningful jobs. The REIPPPP programme thus aims to significantly contribute to satisfying both the job-creation tenant of the Green Economy, and promote the development of clean technologies.

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<sup>1</sup> Two definitions of unemployment are the "official definition", a global definition, including only job seekers and allows South Africa to compare statistics with other countries, and the "expanded definition" which calculates all unemployed ages 15-64 that would otherwise be left out of the percentage due to the unique socio-economic circumstance and lack of access to jobs in the country; specifically rural populations. Source: Stats SA (2014), [http://beta2.statssa.gov.za/?page\\_id=737&id=1](http://beta2.statssa.gov.za/?page_id=737&id=1)

The REIPPPP is nearing the award of the fourth round of preferred bidders and the third round is beginning construction activities, thus, the REIPPPP programme has indeed created numerous employment opportunities under the banner of the Green Economy. However, questions remain as to how many jobs are being created, whether these employment opportunities can be considered 'decent' or 'meaningful', and if the programme contributes to a more equal society.

This study aimed to achieve a basic understanding of job creation in the REIPPPP, by exploring the decent and meaningful job creation of three primary technologies: wind, photovoltaic (PV) and concentrating solar power (CSP), for the first three bid window rounds (BWR) of the REIPPPP tender process from 2011 - 2014.

## 1.1 Background

### 1.1.1 Unemployment and Livelihoods

In the broader pursuit of sustainable development and a green economy, individual livelihoods remain in the forefront of healthy ecosystems and subsiding destructive human processes and behaviours.

*"You can do all the environmental good work you want, but if people don't have reasonably good prospects for jobs, incomes and dignified livelihoods, then they will not be supportive of what it takes to stabilize the climate and conserve nature"* - Michael Renner (Hitchcock 2008:4)

Our livelihoods, self-worth and dignity are strongly rooted in our ability to work. Without the facility to hold a job, our sense of self-satisfaction and general fulfilment is compromised. Thus, holding a job has a great significance in our individual livelihoods. According to Blyton & Jenkins (2007); *"[a job's] anchoring function [gives] structure and purpose to people's daily lives...for most individuals the experience of unemployment is a difficult and debilitating one."* Therefore, a meaningful and/or decent job can be partially defined as one that provides self-satisfaction, fulfilment, self-worth and dignity.

Global unemployment in 2013 reached nearly 202 million people (ILO 2014a) which accounts for about 6% of the population, and is predicted to increase to 215 million by 2018 (*Ibid.*). South Africa's unemployment far exceeds the global average, where nearly 25% of the total population actively looking for work, work less than an hour a week (StatsSA 2014b). If we consider that an unemployed person's livelihood is effected by the fact that they do not hold a job, one can assume that at least 6% of the global population, and 25% of South Africans (ILO 2014a), experience a self-worth and dignity deficit resulting from their inability to work. According to Michael Renner (Hitchcock 2008:4), we can conclude that at least 25% of South Africa's population are potentially lacking dignified livelihoods.

### **Employment, Unemployment and Underemployment**

*Employment and unemployment* are often misunderstood. According to the International Labour Organisation (ILO) *unemployment* statistics include individuals within the *working age* (15-65) actively seeking work. This does not include *discouraged workers*, or those that have given up looking for work as a result of location, failed attempts, or lack of job opportunities due to the economic health of the country (ILO 2012b). *Discouraged workers* statistics in South Africa make up a portion of the expanded definition of *unemployment* yet are often left out of unemployment dialogue and analysis. Figure 1 below shows the unemployment rates, expanded unemployment rates and participation of the labour force per South African Province in 2013.

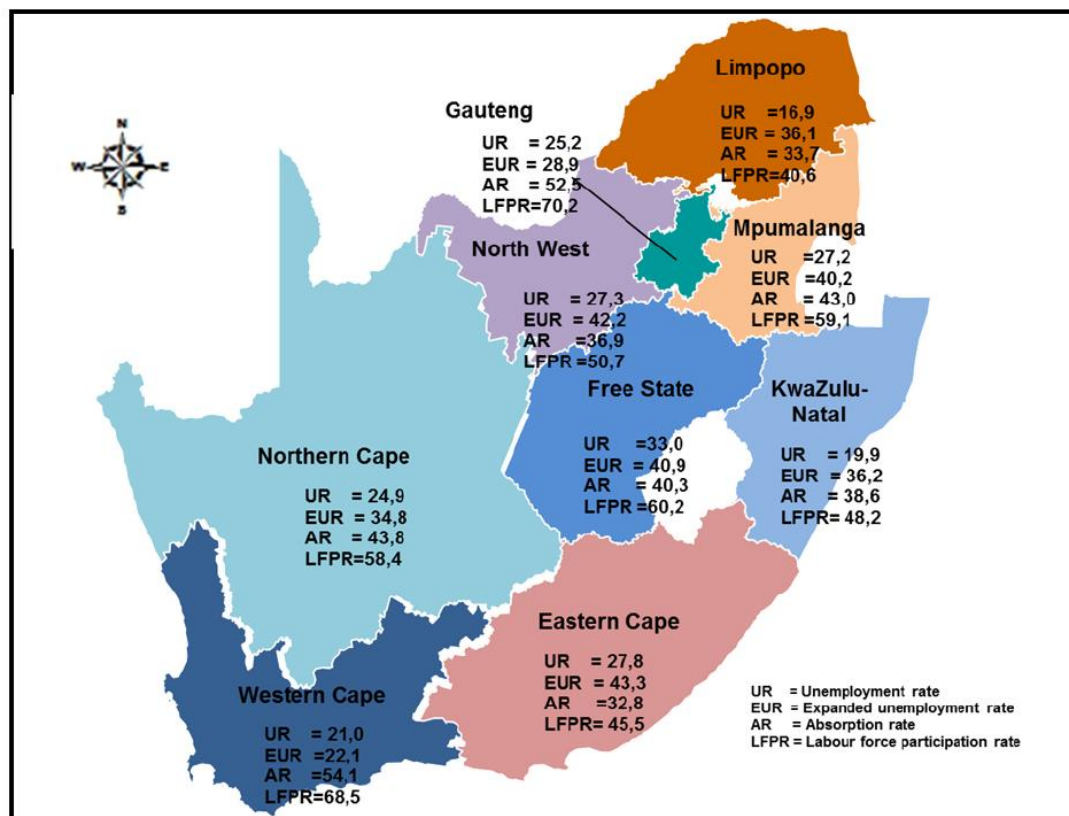


Figure 1 South African 2013 Unemployment rates Source: (StatsSA 2014b)

In contrast an *employed person* includes the *working age* population that participate in any type of work for pay or in kind (food, accommodation, or a returned favour) (ILO 2012b). An employed person can also be anyone that has “worked” at least one hour a week and can include working for a family business without pay (*Ibid*). Therefore, the concepts of employment and unemployment refer to simplistic and quantitative aspects of job creation (age, active or non-active in the employment market, paid not paid), the commonly used statistics do not tell us about anything in between, what defines meaningful job creation. For instance, employed persons are not necessarily jobholders that are well paid, fulfilled or giving purpose. Employed persons are not necessarily individuals that have self-worth, dignity and a quality of life. Being employed does not automatically imply that one is not living in poverty.

*Underemployed* or percentage or *working poverty*, is a definition and statistic often overlooked. Underemployed and the working poverty include a percentage of the employed that do not earn enough money to provide a decent living and that still live on less than \$1.25 per day (the poverty line). Those without sufficient work are resorting to other methods of 'income' often reliant on government grants, illegal trades (the black market, crime and prostitution), begging, and putting school aged children to work instead of attending class. Underemployment can potentially keep individuals locked into the poverty cycle in which the effects can potentially be masked by the statistics of, and efforts to reduce, unemployment.

### **1.1.2 Poverty and Inequality**

With high levels of unemployment and underemployment, poverty is also a global issue. In 2010<sup>2</sup>, the global poverty rate was 22% of the working age population (people living on less than \$1.25 per day). In 2013, 1.2 billion people were living in extreme poverty (less than \$1 per day), and 60% of working individuals in developing countries are living under \$4 a day (UN 2013). Sub-Saharan Africa is responsible for at least 40% of the global poverty figures, and in South Africa, 56.8% live in poverty yet only 24% to 34% are considered unemployed (StatsSA 2012). Employment on its own is not sufficient to determine if livelihoods are being met because populations can still live in poverty, hence, a job is not necessarily decent or meaningful, providing dignity, self-worth and/or a quality of life.

Besides contributing to poverty rates and unemployment rates, an unequal society results in unfair access to economy opportunities, living conditions, education, employment opportunities and the ability for individuals to improve livelihoods. South Africa has one of the highest unequal societies in the world (see Appendix A), a correlation exists between the country's high unemployment and poverty rate. Decent and/or meaningful job creation, therefore, creates equal, fair and just opportunities.

### **1.1.3 South Africa's Energy and Emissions**

To add complexity to the socio-economic situation, South Africa's economy is far from being a leader in transitioning to a green economy (Death 2014). South Africa depends on an inefficient high carbon emission coal-based monopoly (single buyer/supplier) with out-dated infrastructure and maintenance backlog; a result of an indecisive government and post-apartheid development (Eberhard et al. 2014).

In 1998 the South African Government committed to diversifying the energy market in the Energy Policy White Paper to include IPPs and split Eskom's monopoly 30/70 respectively (Eberhard et al. 2014; DME 1998). The projected IPPs would add an additional 18 000MW of installed capacity by 2026 (DoE 2014b). The White paper also prevented Eskom from

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<sup>2</sup> The 1990 the global poverty rate was 48% according to the UNDP Millennium Development Goals (UN 2013)



building further capacity, opening up the market to private investment. However, the reality of implementing new policy and creating an environment attractive to IPP development and investors was more difficult than expected. Without sufficient power supply South Africa is in the midst of an energy and power crisis, impeding economic growth and development.

South Africa often experiences rolling blackouts (locally referred to as load shedding between 1000MW – 3000MW), annual tariff increases, and mandatory reduction targets for high-energy users to maintain out-dated transmission and distribution infrastructure. South Africa’s impending development and economic growth is stunted by the lack of energy and electricity.

The Free Market Foundation executive Director, Leon Louw, stated in an Engineering News article published on-line in June 2013, that as a result of the lack of a stable energy to enable growth, the economy is now R366billion and 13% smaller than it could have been had it not been for a constrained energy environment (Odendaal in Engineering News 2014). The South African National Development Plan (NDP) sets an annual target of 5.4% GDP growth rate to mitigate South Africa’s socio-economic development goals of reducing inequality and poverty by 2030 (NPC 2010), yet according to Statistics South Africa (2014b), the country has not achieved the targeted growth of 5.4%. Figure 2 below shows the average economic development growth per Province from 2001 to 2011 to be 4%. While the Integrated Resource Plan 2010-2030 shows a total GDP growth for 2010, 2011 and 2012 was 2.9%, 3.4% and 2.4% respectively (DoE 2013c:15).

If job creation depends on a healthy economy (Hitchcock 2008; Renner et al. 2008) and it may be said that decent and meaningful work opportunities depend on a decent and meaningful economy, a green economy, and/or a fair or just economy (Swilling, M. & Annecke 2012).

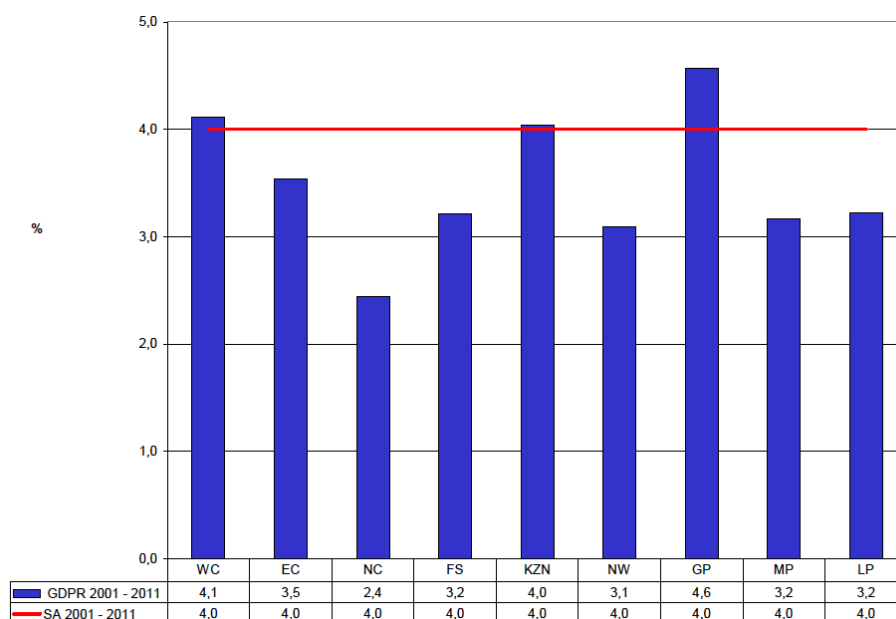


Figure 2 Economic growth per Province from 2001 to 2011 Source: (StatsSA 2011)

To add a final yet not exhaustive layer of complexity, South Africa boasts one of the highest greenhouse gas (GHG) emission factors per capita (13<sup>th</sup> in the world) (IEIA 2013) and is the highest emitter overall in Africa (Letete et al. 2010). South Africa's high emissions<sup>3</sup> are a result of the large coal reserves (95% of Africa's reserves and 9<sup>th</sup> largest reserves in the world) (IEIA 2013). The primary source and supply of energy comes from coal (90% of South Africa's electricity are legacy coal-fired power stations), which is distributed by a single centralised electricity distribution company Eskom.

Mdluli & Vogel (2010) discuss the addiction to coal beyond the coal power station, and how coal is also used at a domestic level in townships not connected to the national grid, co-contributing to national emissions and consumer demand. As a result South Africa is one of the most inefficient and energy-intensive economies in the world, built on "cheap coal" at the expensive of high GHG emissions and other negative spin-off effects of the coal industry.

South Africa's socio-economic and socio-ecological challenges (poverty, un/underemployment, inequality, energy scarcity, high GHG emissions and unstable ecological environments) substantiate government's support of the development of a green economy; decoupling<sup>4</sup> economy growth without the risk of increased resource use and increased emissions.

#### 1.1.4 Green Economy

The current global and South African economy depends on fossil fuels (oil and coal) and unsustainable use of natural resources. Besides the global cost increase and depletion of these natural resources, South Africa faces a third layer of complexity (unstable energy infrastructure) that cannot sustain future economic growth or job creation. With the recent global economic downturn of 2008, a loss of 28 million jobs worldwide (1 million in South Africa) (DTi 2013:12), a rapidly increasing global population, and the depletion of natural resources, the current economic model will not provide employment opportunities that are meaningful and decent; more meaningful employment opportunities will need to come from an evolved economy that is commonly referred to as "the green economy" (Nuttall & Sukhdev 2010; Pollin et al. 2008; EDD 2011; Maia et al. 2011).

Defined by the United National Environment Programme (UNEP) a green economy "*is low carbon, resource efficient and socially inclusive [and] practically speaking ... one who's **growth in income and employment** is driven by public and private investments that **reduce carbon emission and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services***" (UNEP 2011:7) and therefore, results in "*improved human-wellbeing and social equity, while significantly reducing environmental risks and ecological scarcities*" (Sukhdev, Stone, & Nuttall 2010:5).

<sup>3</sup> 85% of South Africa's emissions (471.52 ton CO<sub>2</sub>) are a result of energy production (IEIA 2013)

<sup>4</sup> Swilling (2012) provides a conceptual theoretical underpinning, 'decoupling' economic growth (job creation and power production) and development from carbon emissions and resource use.

With a strong focus on environmental, social and economic benefits, the Green Economy could arguably be the framework and investment needed to create jobs, eradicate poverty and move towards a sustainable framework such as defined in South Africa's *National Strategy for Sustainable Development* (DEA 2011) and the *UNEP Green Jobs: Towards decent work in a sustainable and, low-carbon world* (UNEP 2008).

### **South Africa's Green Economy**

The Green Economy is globally accepted as a framework to attain social, environmental and economic goals, emphasising the potential of RE job creation as the pinnacle of the Green Economy agenda (Nuttall & Sukhdev 2010; Pollin et al. 2008; EDD 2011; Maia et al. 2011). South Africa's interest in the Green Economy is the potential to ease emissions and generate 'meaningful' jobs (Borel-Saladin & Turok 2013), resulting in alleviation poverty and improvement of livelihoods (UN 2013; StatsSA 2013; NPC 2013; EDD 2011; Renner et al. 2008). However, adopting the framework of a green economy does not automatically prepare the country for a just and equal future, it takes hard work and intense engagement according to Nhamo (2013). Death (2014) even suggests that the Green Economy can create unforeseen outcomes of power relations shifts that result in a more unequal and unjust society, therefore, deep-rooted commitments by government and the public must be established.

The Green Economy Accord gives no mention in defining a green economy or a green job, yet two working definitions found in literature feature in the South African context. Firstly, the South African Green Economy Modelling Report (SAGEM) quotes the UNEP (2011), differentiating between a "visionary level", and an "operational" definition," (UNEP 2013:9). A second working definition (specific to South Africa) states the green economy is,

*"one that is decoupled from resource exploitation and environmental impacts, while still ensuring socio-economic growth and quality of life for present and future generations...[and] significant behavioural change has occurred toward lower ecological footprint lifestyles, state-led development and business practices, ensuring at the ultimate level a sustainable social-ecological system"* (ASSAF 2011:165).

Both definitions have some similarities with regards to the environment and human wellbeing, yet are different in that the ASSAF's definition is more academic giving reference to large concepts such as decoupling, state-led development, and sustainable social-ecological systems, what SAGEM refers to as a 'visionary definition.'

The SAGEM 'operational definition' is more specific to measurable outcomes such as the increasing and decreasing of different elements to frame a green economy. For example, current economic growth results in an increase of jobs, emissions at the risk of compromising natural resources, therefore, SAGEM states that a green economy is one where the increase in investments, employment and income do not result in decrease of biodiversity, ecosystem services and it will also reduce carbon emissions and pollutants while increasing energy efficiency and energy production.

South African policy broadly defines the Green Economy, but it does use the same specific language that is found in SAGEM definitions. For instance, the National Development Plan (NDP) presents goals: eliminate income poverty; reduce inequality; increase employment and raise personal income; increase healthcare and well-being; produce sufficient energy to all; access to clean running water; dignified living and identifying that climate change and emissions have an important role to play on the effect of livelihoods and especially those living in poverty.

### 1.1.5 South African RE Policy and Legislative Drivers

The South African Government supports the RE industry hence the development of the REIPP Procurement Programme. By introducing private industry to develop, implement and operate utility-scale RE plants, the DoE aims to reduce and share the costs and risks of new energy generation infrastructure, while creating economic development opportunities (Montmasson-clair et al. 2014; Eberhard et al. 2014). The key policy macro drivers of the RE industry are listed below, where Table 1 chronologically lists the policy and key events leading up to the REIPPPP. A more detailed explanation of the RE policy goals and targets can be found in Annexure B.

The 1998 Energy Policy White Paper and the 2002, World Summit for Sustainable Development (WSSD) marked South Africa's adoption of a RE future. Following the summit, the Department of Minerals and Energy (DME) published the *White Paper on the Promotion of Renewable Energy and Clean Energy Development*, making a commitment to integrate an additional 10 000 GWh (energy units of production) of RE into the mainstream energy economy by 2013 (DME 2003). However, little was done in the coming years to follow.

The adoption of the initial RE policy would hold the Government responsible for meeting the allocated targets, yet the uptake of programmes was initially slow. Substantial support occurred when South Africa's electricity utility Eskom was no longer able to keep up with the demand. The country experienced electricity outages in the Western Cape in 2005 and 2006, a national outage in 2007 and scheduled load shedding from 2008, resulting in a declared national power crisis<sup>5</sup>. Further, coal-fired power plants Kusile (4.8 GW) and Medupi (4.8 GW) developed to alleviate the country's energy shortage experienced massive construction delays. Eskom's current inability to provide a secure energy environment inhibits the development of the South African economy, resulting in the robust provision of alternative energy sources and stronger government support of the RE industry within development policy underpinned by a green economy.

- a) the **National Development Plan (NDP)** aims to eliminate poverty and reduce unemployment from 27% to 14% by 2020, 6% by 2030, and become a less resource intensive economy (NPC 2010);

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<sup>5</sup> Blackouts continued in 2014 (the time of this study) and Eskom enforced a 10% reduction to heavy users stunting economic growth and development (Odendaal 2014).

- b) the **National Strategy for Sustainable Development and Action Plan (NSSD 1)** supports 17 interventions and a top priority - Toward a Green Economy – “A just transition towards a resource-efficient, low-carbon and pro-employment growth path” (DEA 2011:9);
- c) the **New Growth Path (NGP)** targeted 5 million “meaningful jobs” by 2020, and 300 000 direct green economy jobs (RSA 2011b)s
- d) the **Green Economy Accord** (2011) aims to create 50 000 green jobs (EDD 2011);
- e) the **Millennium Development Goals (MDG)** aims to eradicate extreme poverty, increase the employment-to-population ratio (50%-70%) and reduce climate emissions by 34% below a business as usual scenario by 2015 (StatsSA 2013);
- f) and the **Integrated Resource Plan (IRP) of 2010 – 2030** puts an emissions cap of 275 Mt/annum CO<sub>2</sub> coupled with an integrated RE target of 17.8 GW of installed capacity by 2030 with an additional 1 000 annual MW allocation for wind and solar and 200MW for concentrating solar power (CSP) (DoE 2013c). The annual revision draft was completed in December 2013 for comment and will be finalised and published in March 2015.

**Table 1** Chronological key events and policy drivers of RE industry Source: Author

Key Events and South African Policy Drivers		
2002	South Africa hosts the World Summit on Sustainable Development (Earth Summit)	
2003	White Paper on the RE Policy of the Republic of South Africa	10 000GWh of RE to be produced by 2013 (DME 2003)
	Cabinet approved REIPPPP private-sector participation in the electricity industry – 70% Eskom, 30% IPPs (DoE 2014b)	
2006/7	Power outages occur in the Western Cape and South Africa (Montmasson-clair et al. 2014)	
2007	94% of electricity produced from coal, 1% by renewable energy (665MW hydro – excluding pumped storage, biomass-domestic low-income households and sugarcane for industrial use) (Rutovitz 2010:09)	
2008	Rolling blackouts to compensate for electricity shortage by Eskom’s power stations (Eberhard et al. 2014; Montmasson-clair et al. 2014)	
	Cabinet approves the National Framework for Sustainable Development (NFSD) (DEA 2011)	
	South African National Energy Act	DoE to complete 20 year future energy landscape (International Energy Plan) to achieve sustainable socio-economic development

2009	COP15 Copenhagen	Jacob Zuma, commits South Africa to reducing emissions trajectory to 34% below business as usual by 2020, and 42% by 2025 (DTi 2011)
	South Africa RE Summit <sup>6</sup>	Employment creation in RE requires “sustainable jobs (decent jobs)”
	The Department of Minerals and Energy (DME) is separated into two separate entities; DoE and DoM	
2010	South Africa ranks last in clean energy investments of G20 (SAPA 2013)	
	South Africa hosts the first Green Economy Summit, to explore opportunities “ <i>towards a resource efficient, low carbon and pro-employment growth path</i> ”	
	New Growth Path (NGP)	ED Minister supports the Green Economy and RE to create five million new “meaningful” jobs by 2020 (RSA 2011b)
2011	Integrated Resource Plan (IRP) 2010 - 2030	South Africa electricity plan commits to 17.8GW Renewables by 2030 (DoE 2013c)
	DoE REIPPPP RFP (5 BWRs)	August - DoE launched utility scale RE programme to private industry, 3 275MWs allocated (DoE 2013c; DoE 2013d)
	National Climate Change Strategy White Paper	South Africa commits to reducing carbon emissions; 34% below business as usual by 2020; 42% by 2025; create low-carbon jobs (RSA 2011a)
	Durban hosts UN Conference of the Parties (COP17) Climate Change Debates	
	REIPPPP BWR1	October - DoE announces 28 preferred bidders (IPPs) to develop Wind, PV and CSP facilities (1 415.5MW) (Eberhard et al. 2014; DoE 2013d)
	Green Economy Accord (New Growth Path)	The private sector, organised labour, and government to promote the green economy and job creation (EDD 2011)
	South African Cabinet approves the National Strategy for Sustainable Development 2011-2014 (NSSD 1) (DEA 2011)	
	South African Renewables Initiative (SARi)	Climate change response initiative and funding mechanism

<sup>6</sup> The 2009 RE Summit, included 400+ delegates to “undertake a mid-term review on the progress made since approval of the White Paper on Renewable Energy in 2003 and agree on a new set of resolutions, policy direction and action plans to rapidly scale up and streamline the application of renewable energy in South Africa” (DME 2009:54).

2012	REIPPPP BWR2	DoE Allocates another 3 200MWs (Total REIPPPP allocation of 6.925GW) (DoE 2014a)
	National Infrastructure Plan (NIP)	R827 billion to “transform economic landscape” - build infrastructure, create new jobs and deliver basic services. Strategic integrated Project (SIP) 8 supports RE (PICC 2013)
2013	Draft Integrated Energy Plan (IEP)	IEP objectives: increased access to electricity, reduce emissions, enhance localisation, technology transfer and job creation (DoE 2013b)
	South Africa becomes the fastest growing market for RE investments, from \$30m in 2011 to \$5.5b in 2012 (SAPA 2013)	
	REIPPPP BWR3 (May)	17 bidders awarded; total 64 IPPs in three bidding rounds (DoE 2013d)
	2030 National Development Plan (NDP)	Key document in 2013 State of the Nation (President Jacob Zuma) and annual Budget Speech (Pravin Gordon) (NPC 2010)
	South Africa’s Millennium Development Goals (MDGs) 2015 - Updated Report (StatsSA 2013)	
2014	(18 August) REIPPPP BWR4 – Deadline for BWR4 RFP submissions, announcement of preferred bidders (27 November) (DoE 2014)	
	Remaining REIPPPP BWR1 projects come on-line; BWR2 Solar PV projects begin to reach commission; BWR3 achieve financial close (November-December)	
2015	IRP – 2010-2030 Update	Finalised document to be published with new electricity mix (March)

To conclude, South Africa’s RE journey started in 1998 and became a reality with the newly established utility scale RE programme in 2011. The extensive table above and details set out in Appendix B: South African RE and Job Creation Policy, make it apparent that South Africa’s RE and green economy policy drivers and key events support the development of a utility-scale RE programme to generate clean energy and create jobs with associated targets.

Three years into the REIPPP programme, two rounds of projects are nearing commercial operation date (COD), job creation milestones have been achieved and the industry has matured enough to conduct empirical research. The discussions that follow review the job creation studies specific to South Africa, giving some reference to global studies<sup>7</sup>.

<sup>7</sup> Global RE studies and are further discussed in Appendix L: Global RE Job Creation and include the ability of the RE industry to create more jobs than the conventional fossil-fuel based economy

### 1.1.6 South African Empirical Job Creation Studies

The three most commonly cited South African empirical studies (non-peer reviewed) pre-date the existence of a utility-scale RE industry in South Africa, and therefore use employment forecast models and methodologies (Maia et al., 2011; Rutovitz, 2010; Williams et al., 2003). The outcomes are informed by a model that utilises international employment factors (i.e. jobs per MW) with an inefficiency index and/or regional multiplier. These studies were reviewed for a few reasons: they all calculated direct job creation to a 2020 or 2030 timeline; focused on South Africa; are well cited throughout literature; and conducted empirical research.

#### ***Employment Factor (Jobs per MW)***

An employment factor is used to forecast potential jobs, commonly using 'jobs per MW' multiplied by a predicted installed capacity<sup>8</sup>. A standard 'jobs per MW' factor does not currently exist in South African literature, most likely as a result of the absence of a substantial RE industry until the launch of the REIPPPP. The most recent employment factor outcome that is based on REIPPPP job creation outcome data, was published in a study commissioned by the South African Photo Voltaic Industry Association (SAPVIA) (DTi 2013c). The study mentions the initial FTE average of 5.8 jobs per MW for EPC and 0.35 jobs per MW for O&M for the first and second bid window rounds of the REIPPPP in the PV industry. Yet this data is currently out-dated as it does not include BWR3 data from published results of the DoE following BWR3 submission (DoE 2013d).

In summary, all RE job creation estimates had a positive result, supporting the development and investment of wind and PV industries (potentially biased as they are funded by supporters of the RE industry) over a coal or conventional based energy generation future. However, the potential job creation outcomes of all studies vary significantly as well as the jobs per MW factor. Table 2 compares the various studies and associated employment factors in both utility-scale wind and PV (CSP was rarely mentioned and therefore left out of this table). The table presents jobs per MW for the construction (EPC), manufacturing and O&M stages (EPC and manufacture are often combined).

The global average of 15 jobs per MW for wind from the European Wind Energy Association (EWEA) is provided to give a comparison of an international factor based on data from current industry outcomes of the wind industry versus South African forecast figures. Wiesegart et al. (2011) justifies utilising the 15 jobs per MW factor in the forecast study because the methodology had been repeatedly tested and used a combination of 'real' data and the EWEA's actual data. Factors vary significantly because methodologies and definitions are different thus creating inconsistencies. Therefore, when conducting a forecast model to predict the number of job opportunities, one must choose a methodology carefully, specific to the local conditions, and define the parameters of the study and elements of the study in thorough detail.

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<sup>8</sup> See Rutovitz (2009) further discussed in Appendix L: Global RE job creation



**Table 2** Summary of South African RE Job/MW Forecast Studies Source: Author

Wind		PV	
Project Stage	Jobs per MW	Project Stage	Jobs per MW
<b>EPC+ Manufacturing</b>	15 <sup>a</sup>	<b>EPC</b>	21.6 <sup>g</sup>
<b>EPC+ Manufacturing</b>	3 – 11 <sup>b,c</sup>	<b>EPC</b>	7 <sup>h</sup>
<b>EPC</b>	5.0 <sup>e</sup>	<b>EPC</b>	52.3 <sup>f</sup>
<b>EPC</b>	4.5 <sup>f</sup>	<b>EPC</b>	5.8 <sup>b</sup>
<b>O&amp;M</b>	1.0 <sup>e</sup>	<b>EPC</b>	12.1 <sup>e</sup>
<b>O&amp;M</b>	0.72 <sup>f</sup>	<b>EPC</b>	32 – 37 <sup>c</sup>
<b>O&amp;M</b>	0.5 <sup>g</sup>	<b>O&amp;M</b>	2.5 <sup>e</sup>
<b>O&amp;M</b>	0.2-0.4 <sup>a</sup> 0.3 <sup>d</sup>	<b>O&amp;M</b>	0.54 <sup>g</sup>
<b>O&amp;M</b>	0.14 -0.18 <sup>b,c</sup>	<b>O&amp;M</b>	0.73 <sup>f</sup>
<b>Manufacture</b>	3.2 <sup>e</sup>	<b>O&amp;M</b>	0.35-1.0 <sup>b,c</sup>
<b>Manufacture</b>	22.5 <sup>f</sup>	<b>Manufacture</b>	18.8 <sup>e</sup>
<b>Manufacture</b>	6 <sup>d</sup>	<b>Manufacture</b>	14.4 <sup>g</sup>
<b>Manufacture</b>	6.5 <sup>g</sup>	<b>Manufacture</b>	16.8 <sup>f, h</sup>

<sup>a</sup> EWEA (2009)

<sup>b</sup> DTi (2013c)

<sup>c</sup> DTi (2013)

<sup>d</sup> GL-Hassan (2012)

<sup>e</sup> William et al. (2003)

<sup>f</sup> Rutovitz (2010)

<sup>g</sup> Maia et al. (2011)

<sup>h</sup> SEREF (2008)

While the studies are influential in their positive outlook, the methodologies and conclusions are brave, based on a lot of assumptions and some as a result of the non-existence of an industry (the studies and associated job creation predictions are further discussed in chronological order in Appendix C: South African Job Creation Literature). Consequently job creation in the REIPPPP requires further empirical research for imminent decisions.

Up till now, if attempting to define whether jobs are meaningful, job creation factors do not give us an indication about the individual jobs being created or the types of jobs being created. Analysing the value chain, and jobs created in the value chain will give us a better indication of the type of jobs that are created and potentially the quality of the jobs.

### 1.1.7 RE Jobs Creation in the Value Chain

The RE job creation value chain includes direct, indirect and induced jobs. Figure 3 provides a generalised depiction for direct and indirect jobs. The REIPPPP only quantifies jobs that are directly involved in the project activities during the construction measurement and O&M

period. Some direct jobs are not quantified, including development jobs, supportive services (indirect jobs) and induced<sup>9</sup> jobs. Therefore, Figure 3 is not an indication of what is measured in the REIPPPP.

This study is not an attempt to do a detailed value chain analysis, but rather discuss high-level aspects of the value chain that are not considered when using the common method of a job creation ratio, for that reason, deepening the understanding job creation. The most current in-depth South African based value chain analysis is, *REI4P Value Chain Analysis: Creating local opportunities in the renewable energy value chain* (Mitchell 2013). Mitchell reviews PV, CSP, wind and hydro power projects for the project preparation, construction and O&M stages and also discusses the goods and services that can be provided into the three technologies. Other value chain studies that discuss other aspects of the value chain include Steinberg et al. (2012) and Mulcahy (2012), concluding that more Jobs are created in the manufacturing phase than in construction and O&M combined (Steinberg et al. 2012) and one-third of all job creation in the PV value chain are created in the solar module assembly (Mulcahy 2012). Further analysis of the job creation value chain is out of the scope of this study but deserves further investigation.

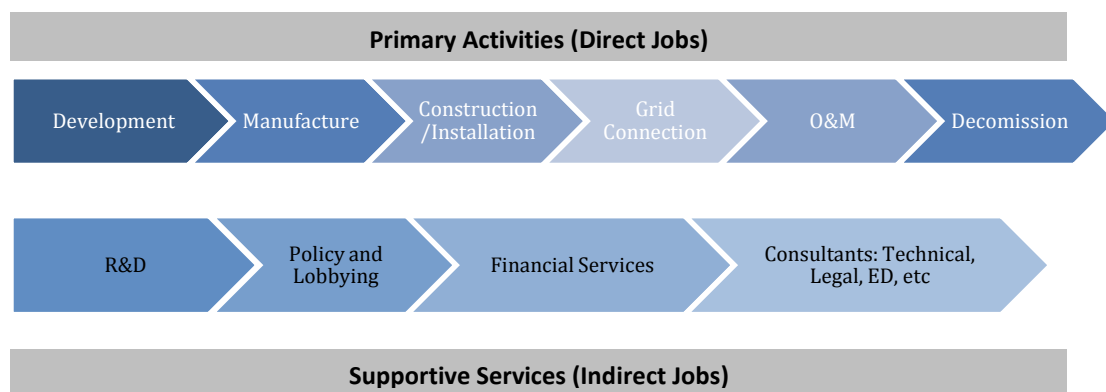


Figure 3 RE Job Creation Value Chain (Macro) Source: Author

## 1.2 Problem Statement

South Africa, as has the world, is embracing the development of utility-scale RE power facilities, which also facilitate the creation of much needed jobs in a post global economic downturn. The South African Government developed the REIPPPP to ensure the implementation of Green Economy policies and supply much needed electricity to the grid with a particular reference and expectation of job creation. However, defining meaningful job creation and associated outputs is seemingly complex and unclear in literature, especially in the context of South Africa.

<sup>9</sup> Induced jobs include accommodation, food, clothing, grocery, petrol and any other services that would induce job creation as a result of direct and indirect job creation individuals spending wages

Current South African literature is ambiguous when discussing the legitimacy of the REIPPPP and the overall understanding of the programme and its associated outcomes in terms of job creation is, therefore, vague. A need therefore exists to unpack the quantitative job creation submissions by IPP's under the framework of the REIPPPP and to carry out an investigation into the opportunities and challenges associated with meaningful job creation.

Based on the REIPPPP requirements of bid submission documents and the associated outcomes, how many jobs has the REIPPPP created and in what ways (how) does the REIPPPP create meaningful jobs?

### 1.3 Rationale of the research

The rationale for this research is a result of the South African government's priority to mitigate development challenges and achieve job creation outputs in a highly competitive programme without publicly available data.

#### ***Primary Government Agenda is Job Creation***

The South African Government has invested in development objectives that address socio-economic development (SED) (unemployment and poverty) and socio-ecological challenges (pollution, GHG, and decreased livelihoods) and meet the broader goals of a Green Economy. The REIPPPP was designed by the DoE to contribute towards development objectives, most importantly, to create jobs. Clause 4.2.1 of Volume 5: Economic Development Requirements of the REIPPPP bidding documents reiterates the importance of the programme stating:

*"The creation of employment is one of the priorities of Government...in light of this fact, Job Creation is one of the important imperatives of the Department in the IPP Procurement Programme" (DoE 2013b:13).*

#### ***Lack of transparency***

The REIPPPP is highly competitive. Information and data from developers, EPCs, O&M contractors, service providers, equipment suppliers, consultants and government is highly confidential, as any information that is available to competing bidders gives them a commercial advantage over other IPPs in being selected as a preferred bidder. For example, REIPPPP documents are only available to those that pay a fee (R15 000), NDAs are signed by anyone who may be exposed to any specific project information, photographs are generally not allowed on site, and the DoE is restricted from sharing any information about IPPs that would identify a single project in terms of the technical and ED commitments made.

If information cannot be easily shared, the RE industry and the REIPPPP stakeholders cannot learn from one another and the industry outcomes are unknown and misunderstood. Thus, conclusions and future decisions about the programme and other development initiatives by Government may be misinformed.

**Aggregated data is unspecific**

Job creation data available to the public is highly aggregated and non-specific. In 2013, the DoE released preferred bidder job creation numbers following the submission and announcement of bid window round three (BWR3). The data was presented for each province for the construction and operations period, and then also presented for each of the primary technologies – onshore wind (OSW), photovoltaic (PV), and concentrating solar power (CSP) per BWR. The quantitative outcomes are unclear, yet assumed it is either person-months (PMs) or person-years (PYs), and that 12 PMs was defined as one job in the operations period (O&M).

### Preferred Bidders Job creation per Province

Description	Jobs during construction period	Jobs during operations period*
Eastern Cape	512	4908
Free State	414	1443
Gauteng	6	240
KwaZulu-Natal	96	240
Limpopo	160	1366
Northern Cape	6502	8736
Western Cape	223	1295
<b>TOTAL</b>	<b>7915</b>	<b>18228</b>

\* One job = 12 person-months

Figure 4 BWR3 Job Creation per Province for all technologies (DoE 2013b:17)

### Solar Photovoltaic

	Bid Window 3	Bid Window 2	Bid Window 1
Local Content Value (R'million)	R 3 698	R 5 727	R 6 261
Local Content %	53.8%	47.5%	28.5%
Job Creation : Construction (Citizens)	2119	2270	2381
Job Creation : Operations (Citizens)	7513	3809	6117

Figure 5 PV Local Content and Job Creation in BWR1, 2 and 3 (DoE 2013b:20)

Wind			
	Bid Window 3	Bid Window 2	Bid Window 1
Local Content Value (R'million)	R6 283	R 4 001	R 2 766
Local Content %	46.9%	36.7%	21.7%
Job Creation : Construction (Citizens)	2612	1787	1810
Job Creation : Operations (Citizens)	8506	2238	2461

Figure 6 Wind Local Content and Job Creation in BWR1, 2 and 3 (DoE 2013b:21)

Concentrated Solar Power			
	Bid Window 3	Bid Window 2	Bid Window 1
Local Content Value (R'million)	R5 627	R 1 638	R 2 391
Local Content %	44.3%	36.5%	21.0%
Job Creation : Construction (Citizens)	3082	1164	1883
Job Creation : Operations (Citizens)	1730	1180	1382

Figure 7 CSP<sup>10</sup> Local Content and Job Creation in BWR1-3 (DoE 2013b:22)

The publically available data in Figures 4-7, is unclear and questions could not be answered such as:

- What is a person-month? Besides 12 person-months, what defines a job?
- What jobs are being created? Are jobs being created decent, meaningful or green jobs?
- Who are getting the jobs, what percent of jobs are allocated to internationals and how are local communities benefiting from job creation?

#### ***Current literature projection studies***

As discussed in Section 1.1.6, a preliminary literature search revealed a few South African specific studies (Agama 2003; Maia et al. 2011; Greenpeace 2009) that projected the number of jobs that the RE industry could potentially create. As a result of the nonexistence of a utility-scale programme during the time of the studies, they did not use actual outcomes and rather employed complex methodologies (i.e. local and regional multipliers to employment factors established in Europe or North America).

With the expectation of the REIPPPP to achieve job creation objectives, this research is crucial in understanding what lies beneath the publically available data, in terms of the broader meaningful job creation goals of national government and the Green Economy.

<sup>10</sup> The table is used directly from the DoE (unaltered) and therefore the term concentrated is used rather than the industry preference, concentrating.

## 1.4 Research Objectives and Key Questions

Publically available job creation data and South African literature are not helpful in understanding job creation in the REIPPPP, hence job creation remains a relatively unknown area. According to Mouton (2007), this study utilises exploratory and descriptive research methods, and aims to find out what can be determined about job creation in the REIPPPP subsequently attempting to achieve the following objectives:

1. Ascertain how job creation is defined and quantified;
2. uncover the programmes targets and bidder commitments;
3. determine if the REIPPPP is a meaningful and/or decent job creation programme;
4. unpack qualitative challenges and successes of meeting the commitments; and
5. analyse the emerging (quantitative and qualitative) job creation trends.

The objectives are formulated through key research questions (Mouton 2007), asking what, how and who based questions, in relation to the problem statement and propositions. This study sets out two sets of questions, one for each core chapter, Chapter Three and Chapter Four, presented in Figure 8.

Table 3 sets out the expected source/method required to achieve the objectives and answer the key specified questions.

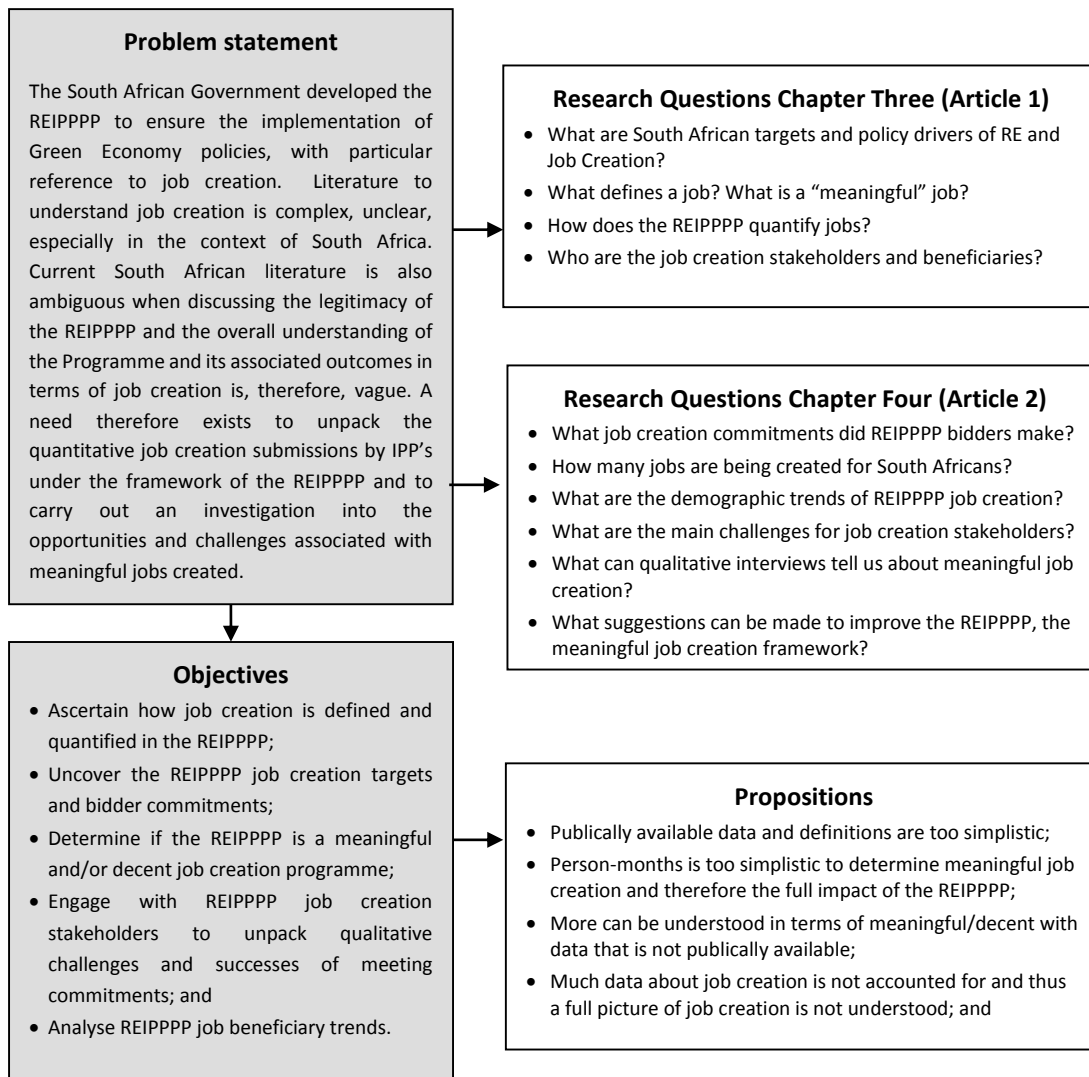


Figure 8 Research Problem Statement, Objectives, Questions and Propositions Source: Author

**Table 3** Research objectives and intended source/method

Objective	Intended Source/Method	Individuals to Contact
<b>Ascertain how job creation is define and measured</b>	Literature, REIPPPP documents (request for proposal (RFP) tender documents)	Bidders and IPP-unit
<b>Uncover programme targets and bidder commitments</b>	RFP bid submission documents, survey, interviews and IPP-unit database	Bidders and IPP-unit
<b>Determine if the REIPPPP tender documents is set up to create meaningful and/or decent job creation</b>	REIPPPP bid documents analysis, personal observation, semi-structured interviews	Bidders and IPP-unit personal
<b>Qualitative challenges and successes</b>	Survey, focus group/workshop and semi-structured interviews	Bidders, construction personal, local communities, job holders/seekers and the DoE-IPP Unit
<b>Determine (and analyse) job creation trends</b>	IPP-unit database	-

**Preliminary Definitions**

Some of the terms used throughout this study are briefly defined as follows:

- **Primary Technologies** includes PV, CSP and onshore wind (OSW)
- Any reference to **the programme** or **the procurement programme** refers to the REIPPPP
- **IPP-unit** refers to the government office in Centurion that houses the IPP governing body, associated consultants and bid management and evaluation activities
- **Job creation beneficiaries** specifically refers individuals obtaining job opportunities directly within the REIPPPP CMP (construction) and OMP (operation) activities and groups of people defined in the REIPPPP information sheet (JB8).
- **Job creation stakeholders** is anyone that is responsible for any job creation elements or is exposed to job creation and employment processes directly related to the IPP.
- **Decent, Meaningful, Quality and Better jobs** are used holistically in this study as the researcher supports elements of all if we were to make a distinction between them, i.e. decent jobs are defined primarily by the International Labour Organisation (ILO) regarding the individual and the environment (i.e. workers' rights and quality of the job), where meaningful, can also have an element of the type of job and if it contributes the betterment of the self and of society (i.e. working at an orphanage or planting trees) depending on the definition of 'betterment', nonetheless this study uses decent and meaningful in a context of improved livelihoods.



## 1.5 Research design (The Process Unfolds)

The research evolved from an evaluative design to an exploratory and descriptive design during the first few months of the process. The original research design was an empirical evaluative analysis (Mouton 2013) intended to determine if REIPPPP bidders had been successful in reaching their job creation commitments. However, a preliminary exploration of the newly established programme revealed that very little information was publically available, including defining and quantifying job creation, as a consequence the parameters of success are too vague. Without a baseline or defined set of parameters, it becomes very difficult to determine the success or failure of the programme as there was nothing to gauge the associate success. In order to understand job creation in the REIPPPP, a new method had to be engaged; aimed to establish a baseline framework of the REIPPPP, the first process is an attempt to gain access to confidential bid documents and even more confidential bid submission data.

Secondly, a series of events further justified why the research became exploratory rather than evaluative.

1. Angelique Kilian, Programme Director and Head of Economic Development of the DoE IPP-unit, made a public announcement that all bid window round one (BWR1) projects had achieved their job creation commitments (November, 2013), therefore 'success' had been achieved; conversely, what had been achieved was still uncertain;
2. The DoE released job creation (person-years) data to the public for the first three rounds and for wind, PV and CSP (DoE 2013d);
3. At the time of data collection, not all the first round of bidders had completed a full implementation cycle (construction), and therefore, the actual data sample was too small to generalise the 'success' or failure of the whole programme; and
4. BWR3 added jobs per MW to the scorecard, requiring bidders to be evaluated and scored on the quantum as well as percentages (DoE 2013e). As discussed further in Chapter Three (see Section 3.4.2), this addition became a 'game changer', as it incentivised bidders to maximise job creation numbers to achieve a higher score outbidding their competition.

In response to the above, the aim of the study changed from concluding on the programme's "success" in terms of the number of jobs created, to employing a deeper engagement and analysis. Subsequently, the results will also change from being a more simplistic yes or no conclusion to a descriptive and more in-depth synthesis of the research findings.

## 1.6 Chapter Outline

The REIPPPP is high up on the broader South African Government's agenda to generate clean power (SAPA 2013; Eberhard et al. 2014; DoE 2013c; Edkins et al. 2010; DTi 2011; DTi 2013b) reduce carbon emissions (DTi 2011; Letete et al. 2010; NPC 2013) and create green and meaningful jobs (Sanchez et al. 2013; EDD 2011; UNEP 2013; DTi 2013b; E&Y & Enolcon

2013; EScience Associates et al. 2013). Though, a clear picture of the REIPPPP's job creation outcomes and what defines a meaningful job remains uncertain; in consequence leading to question how the newly established REIPPPP is creating meaningful jobs.

Chapter Two, Methodology, discusses the methods and design of the following chapters.

Chapter Three, is a combined traditional literature review (Petticrew & Roberts 2006) and literature study (Mouton 2007:86-87), providing a conceptual framework around the concept of a job, job creation and concluding with what is meant by meaningful jobs. The chapter embarks on an empirical review of publically available job creation outcomes and examines REIPPPP bid documents. The outcome is an analysis of job creation definitions utilising the International Labour Organisation (ILO) decent work concept and definitions (ILO 2012b), concluding with a *meaningful job creation framework*. Chapter Three determines that REIPPPP job creation is significant, yet meaningful jobs creation is vague with the publically available information. With inconclusive results to determine how the REIPPPP is creating meaningful jobs, further investigation is required.

Chapter Four, continues the meaningful job creation exploration in an attempt to extract more data from various stakeholders. The chapter looks deeper into the REIPPPP by collecting quantitative data from the DoE's IPP-unit and engages in semi-structured interviews and uses direct observation during site visits, to uncover the qualitative experiences and outcomes of key job decision makers and beneficiaries.

Chapter Five, concludes with a synthesis of the study, embedding the importance of the work in the international and national conceptual framework, contributing to theory and providing suggestions for more research. Below outlines the chapters that will follow:

CHAPTER	TITLE
Chapter Two	Research Design & Methods
Chapter Three	Literature Analysis & Case Study: the REIPPPP
Chapter Four	Mixed-Method Results
Chapter Five	Synthesis, Conclusion & Recommendations

## CHAPTER TWO: RESEARCH DESIGN & METHODOLOGY

### 2.1 An Exploratory and Descriptive Approach

With job creation at the forefront of South African Policy and the newly developed South African utility scale RE programme, this study intended to investigate and explore decent and meaningful job creation within the REIPPPP. According to Van der Merwe (1996:287), exploratory studies are employed if the topic is largely a “*relatively unknown area*”; Chapter Three and Four accessing data that is not publically available or found in literature. Yin (2012) also supports framing the research as exploratory and descriptive, as the topic is new and the research engages in an explanation dialogue of the newly established utility-scale programme. The exploratory design required a nonlinear iterative process, naturally unfolding through continual personal reflection and engagement within industry. Positioned within industry, Figure 9 illustrates: initial questions were posed followed by findings and further reflection, which led to deeper questions and more engagement. The iterative process is further deliberated in the researcher’s position in industry.

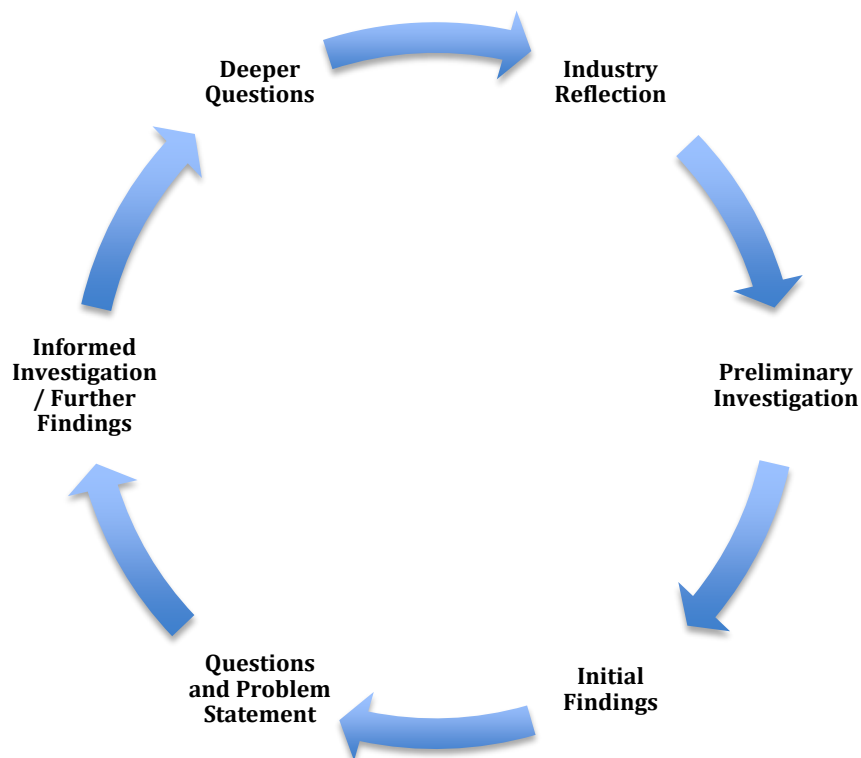


Figure 9 Iterative exploratory process Source: Author

## 2.2 Researcher Integrated in Industry

As a researcher and active industry participant, the research process began to unfold from the beginning of 2012 when I joined AltGen Recruitment (specialising in South African RE skills acquisition); employed to conduct market research on the REIPPPP. Sitting at the forefront of bid submission and implementation, my daily exposure put me in a position to grapple with the REIPPPP ED requirements; specifically interpreting job creation explicit to the South African environment. The engagement ultimately resulted in defining a need for deeper and more informed research that was not rooted in individual interpretation. The research question came naturally, developed over a two-year period and emerging organically from the direct needs and questions presented by industry.

The quantitative and qualitative data used in this research was highly confidential, and depended on access to several institutional bodies and IPP bidders. The lack of transparency posed a continual obstacle during the research yet I was able to access data as an active member of industry and as a result of AltGen's network; unavailable to the public and other researchers. Secondly, personal relationships and a history with individuals became crucial in accessing site visits. The confidentiality required to engage with the industry was evident by the five non-disclosure agreements I was required to sign before anyone would engage in a discussion with me (discussed in more details below). This multi-dimensional position in industry is displayed below (see Figure 10) and discussed in more detail.

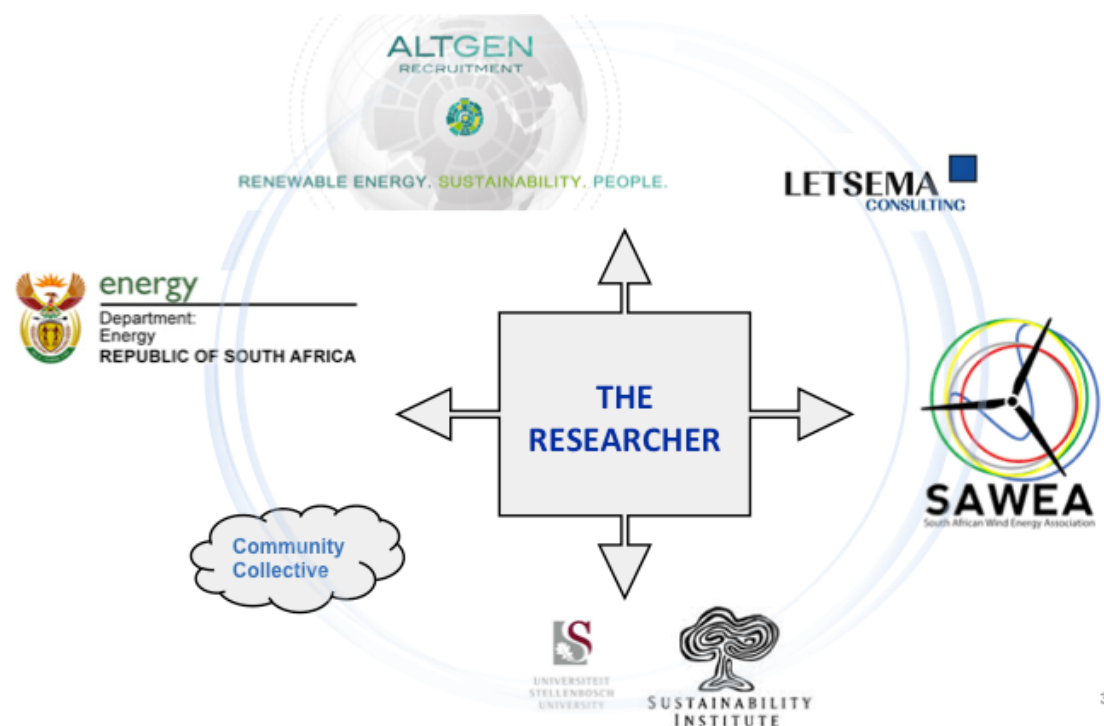


Figure 10 Researcher's position in industry

**Firstly**, I am a RE Senior Consultant and General Manager with AltGen Recruitment, providing recruitment and consulting services to RE project developers, bidders, construction entities and consultancies. We specialise in sourcing South African rare and transferable skills for the emerging RE industry in South Africa and greater Africa<sup>11</sup>. I have the advantage of an extensive network and direct access to the South African RE industry and am exposed daily to the frustrations and challenges which companies and managers face. This position allows me to understand the internal positions of companies involved in the REIPPPP, their industry standing, horizon, position in the market, and what skills they are finding hard to source to develop their company and, therefore, the RE industry.

**Secondly**, I am an economic development (ED) consultant and researcher advising RE developers and construction contractors on REIPPPP ED requirements and skills development. While contracting to Letsema, I conducted local community site-visits specific to each IPP<sup>12</sup> and completing Economic Development Plans for BWR3 bid submission.

**Thirdly**, by corporate company membership, AltGen is a member of both the South African Photo Voltaic Industry Association (SAPVIA) and the South African Wind Energy Association (SAWEA). I was nominated by industry (November 2013), to be an active member of SAWEA's newly established working group, Wind for Communities (WfC), that "*provide[s] the wind industry with the necessary support to enable the best possible social and economic outcomes for communities*" (see Annexure D: Working Group Objectives) and as a result of this research received an award at Windaba 2014 for my engagement with the association and IPP-unit.

The Working Group is supported by four primary objectives, a natural fit with the intended research activities:

1. *Develop and disseminate advice on good practice for working with communities*
  - a. *Collect and document experience of SAWEA members*
  - b. *Investigate good approaches, practices, development strategies and engagements through partnerships with other industries and organisations*
  - c. *Workshop ideas on how to overcome challenges*
  - d. *Design and disseminate appropriate information material*
2. *Monitor progress and assess impact of community partnerships of industry*
  - a. *Survey SAWEA members on their SED, ED, local ownership and local employment strategies, commitments and challenges reaching those commitments*
  - b. *Identify appropriate mechanisms for industry to evaluate socio-economic impact in communities*

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<sup>11</sup> Our experience validates the existence of transferable South African skills and that employing internationals is unnecessary and counterproductive to the economic development goals of the country.

<sup>12</sup> Local communities within a 50km radius were visited to map socio-economic development opportunities, establish relationships, liaise and inform local government and stakeholders, and research the local skill level for future job creation opportunities.

May 2014, the working group facilitated a workshop “*Getting Community Development Right*” that enabled RE economic development stakeholders attendees to discuss and work out some of the obstacles they face in both community development and job creation opportunities. The outcomes are further discussed in Chapter Four: Mixed-Methods Results.

**Fourth**, I am an active member of a collective of select individuals passionate about community development and socio-economic development, all of whom are embedded within the RE industry. The Community Collective is an informal interest group that meets regularly to discuss projects, share experiences and information, reflecting on how the industry is developing and unfolding.

**Fifth**, after signing five non-disclosure agreements (NDAs) and restraints of trade (RoT) contracts, I was given direct access as a researcher to the DoE IPP-unit. Allocated a computer and workspace, I was given access to all bid documents (BWR1-3) and the newly created database to aggregate and conduct a high-level analysis on job creation commitments. Because of the confidentiality of this space, no printing, saving, emailing, or downloading any information was allowed, and all aggregated work had to be approved<sup>13</sup> by all IPP-unit officials: Ompi Aphane (Director Deputy General), Maduna Ngobeni (Director General and Electricity and IPP Manager of the DoE), Karen Breytenbach (Senior Project Advisor), and Lena Mangondo (Head Legal – IPP Office).

The combination of the five spheres described above resulted in: excellent access to quantitative job creation commitments; provided personal experience in developing ED plans for BWR3 submission; a platform for industry leaders to share their experiences; access to bidder commitments and experiences; and one on one interviews with Government, ED Managers, construction companies, community job seekers and stakeholders. Although a lot of the information is to remain confidential (what can be disclosed), the result is broad to understanding job creation outcomes, nevertheless, very specific to understanding job creation in the REIPPPP. The next section discusses the rationale for conducting research on job creation of the REIPPPP.

## 2.3 Aims

This study planned to conduct a quantitative analyses and qualitative narrative around job creation in the REIPPPP to determine if the REIPPPP creates decent and meaningful jobs and

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<sup>13</sup> The approval and release took three months and included further NDAs and two motivational letters describing how the data would be used and published. The common theme that was communicated by the Department, was that the data could not compromise any individual IPP, could not benefit any single technology or IPP, and data that would be published could not compromise the integrity of the REIPPPP in any way. Ultimately, the IPP Unit is protecting the IPPs and often stated that the data is not there's to give, and therefore can only be used to assist in understanding the REIPPPP more thoroughly and potentially improve the programme going forward.

how job creation is quantified. Firstly, by analysing bid documents and publically available job creation data with a green, decent and meaningful job conceptual framework developed by the researcher. Then by collecting and analysing quantitative REIPPPP job creation data found within the IPP-unit; identifying trends amid technologies and provinces specific to job beneficiaries (as defined by the Information Sheet - black persons, women, local communities, skilled and unskilled). Lastly, by collecting data from job creation stakeholders through direct observation and semi unstructured yet open ended interviews.

The lack of peer reviewed literature was a limitation, potentially resulting in not being able to produce new, or validate empirical insights (Mouton 2007). Therefore, an empirical study followed the case study in Chapter Three, to test the insights found in the literature study.

The kind of evidence required to adequately address the research question includes: bid documents (definitions and bidding parameters); job creation data from bidders and the IPP-unit; and personal experiences from stakeholders. Data from the IPP-unit was aggregated per province, technology, and job creation beneficiaries found in the Information Sheet (JB8) and Scorecard (JB9) (see Annexure E), as required by the IPP-unit before information was to be disclosed.

The layout of the research process is displayed below in Figure 11 and Figure 12, while Table 4 lists the research sub-questions and outlines where the information was found to address the questions.

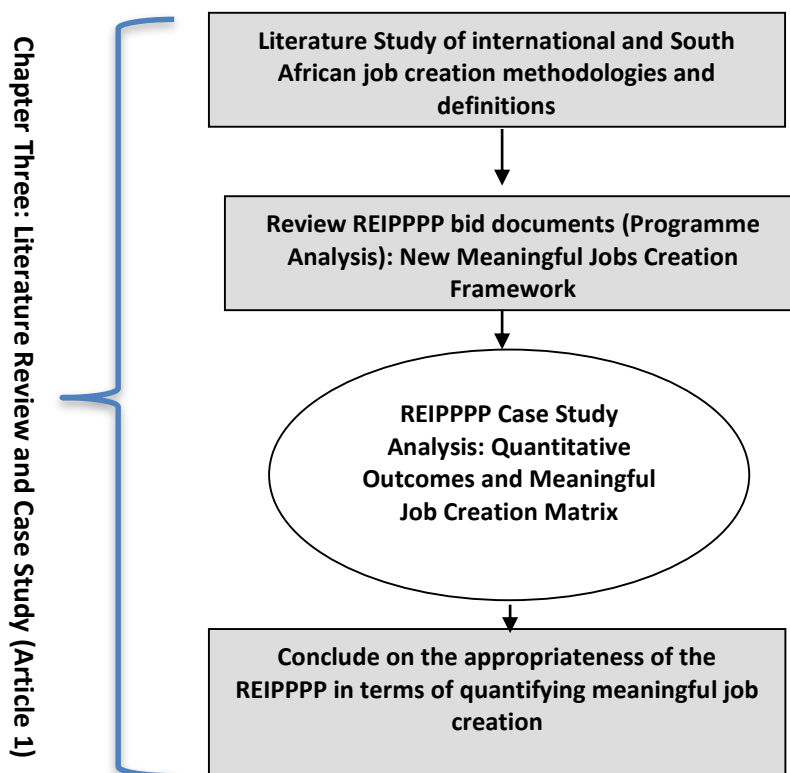


Figure 11 Research Design layout of Literature Review and Case Study Source: Author

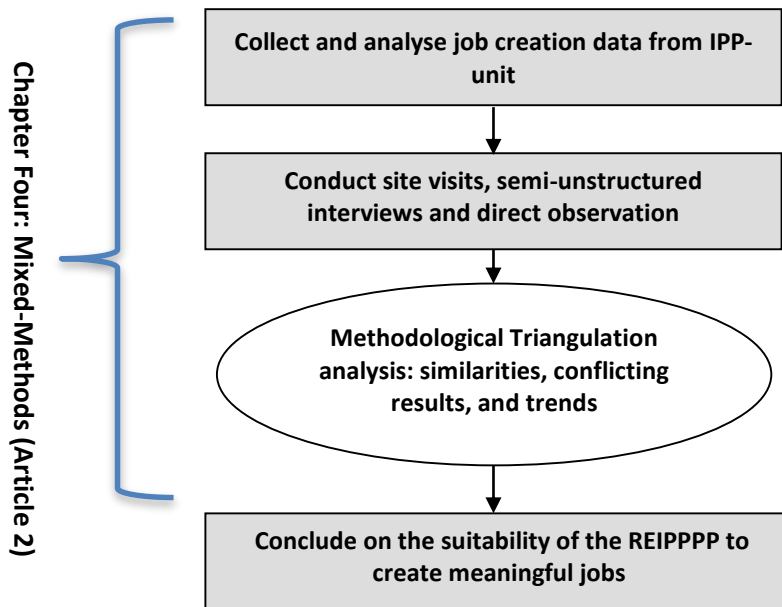


Figure 12 Research Design layout of Mixed-Methods Source: Author

Table 4 Proposed research questions and data source

Research Sub-Question	Data Source
How does the REIPPPP score bidders on their job creation commitments? What is, and is not, being quantified?	Information Sheet (JB8) and Scorecard (JB9) (DoE 2013a) and bid documents: DoE (2013a, 2013c, 2013e)
What is defined as a green and meaningful job?	international and South African policy (academic literature)
What are the commitments made by bidders?	bidders and IPP-unit (database review)
What are some of the practical obstacles of job creation?	job creation stakeholders (interviews)
What are some of the job creation quantitative and qualitative trends in BWRs?	bidders and IPP-unit (database review)
How jobs are defined and quantified?	bid documents: ( <i>Ibid.</i> )
What are the job creation commitments made by bidders?	Information Sheet (JB8) and Scorecard (JB9) (DoE 2013a), IPP-unit
Compare the REIPPPP outcomes to previous job creation projection studies	Literature (Maia et al. 2011; Rutovitz 2010; Williams et al. 2003)
Identify the emerging trends through a quantitative analysis and qualitatively investigate what are the jobs, who are getting the jobs and what skills are missing from South Africa?	interviews, site-visits, participant observation, workshop/survey
Identify the challenges, obstacles and successes	interviews, site-visits, participant observation, workshop/survey



## 2.4 Research Methods

This research used different methods for each stage of the research process, namely: a literature search strategy, preliminary literature review and literature study, mixed-methods (qualitative analysis and quantitative analysis) and case study triangulation.

### 2.4.1 Literature search strategy

A visit to the SU library subject librarian, Hanlie Strydom, was employed to avoid potential literature research errors, namely: *“selectivity in the sources; unfair treatment of authors; misunderstanding the source; selective interpretation to suit one’s own viewpoint; poor organisation and integration of review”* (Mouton 2007:180). Her guidance resulted in the strategy developed below and effectively using library databases within the Economic Development faculty. The databases and Google scholar were the primary sources for relevant literature, and articles that had a negative viewpoint on renewable energy and job creation were also considered in this study.

Primary search terms and key concept words were identified (job/s, labour, employment, decent, meaningful, green, renewable energy, South Africa, economic development) and entered into Word Thesaurus until synonyms repeated. The terms were then applied in a Search Strategy Builder (see Figure 13) to design Boolean strings for more specific searches in the US Library Resources (2014) and Google Scholar. This method was exhaustive when articles started repeating in the searches.

The most effective method was “snow-balling” or “pearl-growing”; using references within key literature then searching *“for assigned index terms, titles or text words, author names, and citations”* as defined in the *Search Strategy Guide* (US Library Services 2014)<sup>14</sup>.

A “Building Blocks” method was attempted, to identify key articles and literature that address the key concepts in the research problem; however, the search results were not producing specific or relevant literature to the question. Literature was more focused on the psychological aspects of job creation within an organisation such as: job happiness, reducing turn-over rates and effectiveness of employees, where this study looks at quantifying and unpacking RE job creation, attempting to assess the negative or positive effect that a utility-scale RE programme could have on the socio-economic/political goals of a country.

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<sup>14</sup> Source: US Library and Information Resources. *Search Strategy Worksheet*. Found at website: [http://lgdata.s3-website-us-east-1.amazonaws.com/docs/2462/565259/Search\\_Strategy\\_Worksheet.pdf](http://lgdata.s3-website-us-east-1.amazonaws.com/docs/2462/565259/Search_Strategy_Worksheet.pdf) [Accessed 29 February 2014]

## Search Strategy Builder

The Search Strategy Builder is a tool designed to teach you how to create a search string using Boolean logic. While it is not a database and is not designed to input a search, you should be able to cut and paste the results into most databases' search boxes.

	Concept 1	and	Concept 2	and	Concept 3
Name your concepts here	renewable ene		job creation		factors
	Search terms		Search terms		Search terms
List alternate terms for each concept.  These can be synonyms, or they can be specific examples of the concept.  Use single words, or "short phrases" in quotes	green energy OR green econom OR clean energy OR <input type="text"/> OR		employment OR employment q OR work oppurtur OR <input type="text"/> OR		methodologie: OR calculation OR scorecard OR <input type="text"/> OR
<p>Click to create a Search Statement!</p> <p>(renewable energy OR green energy OR green economy OR clean energy) and (job creation OR employment OR employment quantification OR work opportunities) and (factors OR methodology OR calculation OR scorecard)</p>					

Figure 13 Search Strategy Builder (Source: University of Arizona Libraries)

### 2.4.2 Literature Review

The preliminary review involved extensive reading and scanning the literature to not necessarily learn about the results and methodologies, but the *“different ways in which this phenomenon has been studied”* Mouton (2007:50). Sources comprised of: South African development and resource plans and targets; the REIPPPP tender documents, specifically, Volume Five: Economic Development Requirements; international and South African RE job projection studies; RE programme outcomes and relevant analysis; international journal articles; media websites such as Engineering News; conference proceedings specific to RE in South Africa; and publically available presentations.

Mouton (2007:86) defines a more detailed literature review as a *“literature study”* that suggests looking not only at literature, but the whole body of scholarship, with an aim *“to learn from other scholars: how they have theorised and conceptualised on issues...the most recent, credible and relevant”*, including: definitions, different theories, models and hypothesis, existing data and empirical findings.

Other types of literature reviews that were not suitable for this study, such as a Systematic, Conceptual, Critical and State of the Art Review, were all deemed inappropriate as they tend to tests hypothesis and can use statistical analysis (Mouton 2007; Petticrew & Roberts 2006; Kelly 2009). The research was rather aiming to find out how jobs are created and quantified within the RE industry in South Africa to understand if job creation aspirations and goals set out by the programme and current policy are being met. Therefore, a traditional review

traditional literature review (Petticrew & Roberts 2006) and literature study is most appropriate.

### **2.4.3 Mixed-Methods**

Chapter Four employed mixed-methods using the REIPPPP as a case study and two embedded units of analysis (Yin 2012): the first a quantitative analysis, looking at the person-months (PMs) found in bid responses and the IPP-unit database; and second, a qualitative engagement interviewing and observing job creation beneficiaries and stakeholders. A more detailed explanation of the data collection and analysis is found in Chapter Four (see Section 4.2).

It must be noted that the above methodology was the end result, after first engaging with the research, from a multi-survey based Delphi study (developing RE job creation factors) to incorporating a more structured quantitative analysis combined with semi-informal qualitative engagements with industry. The change was a result of the competitive, and therefore, highly confidential environment – limited access to data and information.

#### ***Evolved Methodology***

The Delphi ‘expert’ panel was the initial intent of the research, attempting to develop a framework for green, decent and meaningful job creation specific to the South African REIPPPP. An initial industry survey (see Annexure G) was developed to identify experts and test the response level of the industry, designed to understand challenges and successes bidders were facing while extracting quantitative outcomes.

The survey was designed, piloted and distributed in collaboration with the South African Wind Energy Association (SAWEA) working group, Wind for Communities (WfC). Questions had drop down options, multiple choice or were open-ended covering aspects of job creation, socio-economic development, enterprise development, and community ownership. Sent to 350+ wind energy stakeholders with two email reminders over the space of three weeks, only five individuals responded; four of which were incomplete and not from individuals that work directly for an IPP. When confronted, respondents either did not have time or were cautious about sharing information (even though several confidentiality clauses were mentioned) (see Chapter Four: Section 4.3.1 Survey Results).

The conclusion was that an on-line engagement was not the best method to extract information for the study and site visits and semi-informal interviews were more appropriate as they require a higher level of trust. Further, Alan Brent established student access to the IPP-unit, making it possible to conduct research and extract bid submission data for all three bid window rounds.

#### ***Mixed-Methods***

Mixed-methods uses a combination of quantitative and qualitative methods (Creswell & Clark 2007; Creswell 2012; Johnson et al. 2007; Yin 2009) used to triangulate the findings. The outcome is a better understanding of the research problem when one type of research is insufficient (Yin 2009). Job creation is a somewhat traditionally quantitative in nature

(answering such questions as how many), yet this study brings a qualitative component and builds on the inconclusive outcomes of Chapter Three's search for meaningful job creation in the REIPPPP.

This study is exploring a relatively unknown area with very few previous studies and the definitive job creation goals (besides the threshold and target percentages of the scorecard-JB9) of the programme are still uncertain. Therefore, this research will use a combination of methods to further explore meaningful job creation in a pragmatic convergent parallel design (Creswell 2012). Practically speaking, one set of data was not fully analysed before another set of data was collected and at times, quantitative data and qualitative data was collected at the same time, unable to inform one another in future studies.

The challenges to convergent design is the amount of effort that is required and the skill level of the researcher to separate the two methods when required at the time of collection. The strengths of the method are its intuitive and efficient outcome, able to collect numerical and textual data at the same time (*Ibid.*). While it is more rigorous than a single method study it can produce a richer and more open ended understanding of the research problem. Johnson et al. (2007:115) quotes Jick (1979) noting the advantages of triangulation:

*"It allows researchers to be more confident in their results; It stimulates the development of creative ways of collecting data; It can lead to thicker, richer data; It can lead to the synthesis or integration of theories; it can uncover contradictions; and by virtue its comprehensiveness."*

An explanatory sequential design (analysing one set of data to inform the question of the next set of research questions), was originally planned, though, the original quantitative data from the IPP-unit took three months to be released and could therefore not be analysed in time to inform the qualitative site visits<sup>15</sup>. Further, the parallel engagement allowed for a more flexible and exploratory investigation, recording both quantitative and qualitative data simultaneously when the opportunity arose (see Appendix O: Interview and direct observation outcomes (Successes and Challenges)s).

### **Quantitative Data**

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<sup>15</sup> Other methods were attempted to extract quantitative job creation data: directly during site-visits, and interviews, yet this presented a number of challenges. One, not all on-site data collection systems were the same (some recorded numbers by hand or some used a card swipe system); it was impossible to personally count heads while on site (very large areas in wind and solar) and every day was different depending on what sub-contractors were onsite; sub-contractors and EPC companies were not willing to distribute the information; and lastly, to count personal on-site properly, data collection would require a few data collectors positioned on-site for the duration of the construction phase (time and resources in this study did not allow for this). Therefore, instead of only quantitatively analysing DoE job creation data, the research took a more pragmatic approach that resulted in an additional qualitative investigation.

Quantitative methods gather ‘hard’ numerical data (Creswell 2012), that is objective, measurable and can be used to statistically compare technologies, provinces and beneficiaries. This study intended to analyse the following statistics using job creation data extracted from the IPP-unit<sup>16</sup>:

- International jobs compared to jobs created for citizens
- Beneficiary comparisons (quantity of jobs allocated to each demographic set out in the bid documents)
- Jobs created per working age population in each province
- Jobs created per primary technology
- Jobs created per financial (Rand) (input) and per unit of generated energy (GWh) (output)

Job creation data, person-months (PMs), for each IPP project was aggregated into each BWR, province, and primary technology (OSW, PV, and CSP), and separated into each element of the Information Sheet (JB8) – depicting job creation beneficiaries. Additional elements presented in this research that is not in JB8 included Black Female and Unskilled PMs.

Besides PMs, total energy generation (GWh) (of a P90 and P50 scenario) and the total project cost of the IPP investment (to reach commission and the O&M phase) was also collected and aggregated per BWR, province and primary technology.

#### ***Qualitative Analysis:***

Qualitative data relies on the participants, such as survey respondents, job creation stakeholders, and personal relationships. Qualitative data is in the form of text and analysed according to the themes (similarities and conflicting responses).

The survey’s five responses contributed to the qualitative research in Chapter Four, substantiated by IPP site visits, semi-informal interviews, and personal experiences from the researcher imbedded in the industry. IPP site-visits (two preferred bidders in BWR1 and the other preferred bidder successful in BWR2) were located in the Western Cape and in the Northern Cape and involved speaking with a variety of stakeholders including job seekers from the local community, construction personal, and project owners. In addition to the site visits, three semi-informal interviews were conducted at head offices in Cape Town and Johannesburg. Lastly, qualitative information was collected from one-on-one conversations with bidders, ED Managers and other individuals dealing with job creation elements.

#### **2.4.4 Data Collection**

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<sup>16</sup> Very strict non-disclosure agreements (NDA) were signed before given access, so that the information taken out of the IPP-unit would not compromise or benefit a single bidder or IPP in future bid window rounds.

### ***DoE database***

Job creation data from the Information Sheet (Annexure JB8) and Scorecard (Annexure JB9) submitted for bid submission with the Department of Energy (DoE) IPP-unit, is entered into a database. Data of the first three BWRs<sup>17</sup> was collected by the researcher from the data-base, to quantitatively compare job creation outcomes of job beneficiaries of the construction measurement period (CMP) and operation measurement period (OMP). The data points are listed in JB8 including: Total South African (RSA) Based Employees; RSA Based Employees who are Citizens; RSA Based Employees who are Black People; Skilled Employees; Skilled Employees who are Black People; and RSA Based Employees who are Citizens from Local Communities. Other data that was collected included elements not in JB8, included Black Female and Unskilled PMs, total energy generation (GWh) of each IPP in both a P90 and P50 scenario, and the total project cost of the IPP investment (from construction to the operation phase) was also collected and aggregated per BWR, province and primary technology.

Due to the confidentiality of the industry, data collected for each project was then aggregated per primary technology, BWR and Province and compared job creation beneficiary outcomes across provinces and technologies and in an alternative ratio scenario, as defined in Chapter Three. Alternative ratios include jobs per Rand spent (Pollin et al. 2008), jobs per unit of energy produced (Wei et al. 2010), and jobs per local population (del Río & Burguillo 2009; Lambert & Silva 2012) in an attempt to 're-quantify' the socio-economic impacts.

As a result of the confidential space, data collection methods and a predetermined strategy was not possible; as the database, the interface and tools available, was not pre-revealed to the researcher for appropriate planning. Once the intention of the researcher and any conflict of interest was mitigated (NDAs were signed), the researcher was given access to a computer provided by the DoE in a room with 24 hour manned security and cameras. The computer was set up so that the researcher had no external access onto other networks, void of any printing capabilities or data saving methods. Further, the researcher had to independently become familiarised with the database, translate the data, whilst developing a strategy and methodology during the three short days while in the IPP-unit. The flowchart (see Figure 14) and Table 5 display the data collection process and associated activities.

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<sup>17</sup> The only available data at the time of this study was in the first three BWRs. BWR four IPPs were awaiting preferred bidder announcements on the 27 November 2014 (DoE 2014a), thus, data was not available and no interviews were conducted about BWR four. The only aspect used from BWR4 was reviewing the bid documents to evaluate if any changes had occurred for creation submission. The only change identified was the addition of a table found in Appendix F: Skills Level and Additional Items.

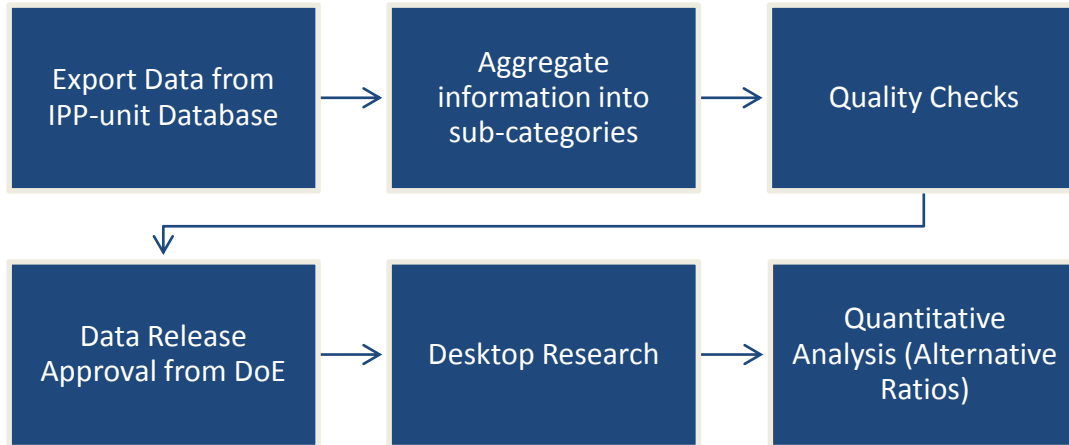


Figure 14 Quantitative data collection methodology flow chat, Source: Author

Table 5 IPP-unit data collection activities and descriptions of Figure 14

#### Export Data from IPP-unit Database

- Familiarize with database
- Identify job creation data points listed in JB8 and Black Females
- Ensure both CMP and OMP points are exported
- Identify additional data points, P90/P50 20 year yield (Mwh), Total Use of Funds, Total MWs
- Export to Excel and repeat process to check quality

#### Aggregate information into sub-categories

- Combine data from individual IPPs into sub-categories (BWR, province and technology)
- Technologies include: OSW, PV, CSP; subcategories of technologies also taken into account for future research
- Aggregate data for each job creation element
- Job creation elements: Total Jobs, Citizen Jobs, Black, Black Female, Skilled, Black Skilled, and Local Communities
- Unkilled was calculated from Total Citizens minus Total Skilled

#### Quality Checks

- Recheck data aggregation with raw data
- Check export and aggregation with research colleagues and IPP-unit database manager
- Conduct tests and quality of data organisation in cells

#### Data Release Approval from DoE

- Approval required reducing the content of the data
- Motivation letters for how the data will be used and additional NDAs delayed process

#### Further Beneficiary Aggregation and Quantitative Analysis (Alternative Ratios)

- Citizen Jobs per International Jobs
- Citizen Jobs per 1 000 Working Age Population
- Citizen Jobs per per Rand invested
- Citizend Jobs per MWh (unit of energy generated)

Once the data was collected, aggregated, and released from the IPP-unit, further aggregation and calculation took place to protect individual IPPs and address the initial research questions: What job creation commitments did REIPPPP bidders make?; How many jobs are being created for South Africans?; Can alternative ratios tell us more about the positive or negative outcomes of the REIPPPP in terms of job creation?

In order to answer these questions, the data points, comparisons, and equations used are listed in Table 6. The data points and equations are explained and clarified. For the alternative ratios, information such as population (provincial, national, regional), unemployment, demographics and other national and regional socio-economic data was found in StatsSA (2014).

**Table 6** Clarification and explanation points for the data points

<b>Total Jobs PMs</b>	BWR1-3, all technologies, all provinces, all nationalities
<b>Total Citizens (PMs)</b>	Total citizen person-months
<b>CMP Total Citizens (PMs)</b>	All citizens in the construction period
<b>OMP Total Citizens (PMs)</b>	All citizens in the operations period (O&M)
<b>OMP Citizen/12 (PY) / 20 (O&amp;M years)</b>	Average FTE PY created each year (over 20 years)
<b>Working Age (WA) / 1 000</b>	Working age population (15-64) per every 1 000 working age people
<b>Total Citizen Jobs (PMs) / 1 000 WA</b>	Total citizens per 1 000 working age population
<b>CMP Citizens (PMs) / 1 000 WA</b>	CMP citizens per 1 000 working age population
<b>OMP Citizens (PMs) / 1 000 WA</b>	OMP citizens per 1 000 working age population
<b>OMP Citizens PY /20 / 100 000 WA</b>	Average number of OMP Citizens (FTE PY) working each year (over 20 years) for every 100 000 working age (WA) persons (15-64) (StatsSA, 2014)
<b>Rand Invested (Total Use of Funds)</b>	Rand amount invested by the project company and as defined by the REIPPPP (DoE 2014a). It does not include all project costs <sup>18</sup>
<b>Total Citizen Jobs (PMs) / 1m Rand</b>	Total citizen jobs per 1million rand
<b>Unit of Energy Produced (MWh) P90</b>	Total MWh in a P90 scenario for 20 years
<b>OMP Jobs (PY) / TWh P90</b>	OMP citizen FTE PY created each year (over 20 years) for every TWh produced in a P90 scenario
<b>Total Citizen Jobs (PMs) / GWh P90</b>	Total citizen jobs (PMs) per GWh in a P90 scenario

### ***Instrument design***

The initial survey was co-designed on Google Forms with a colleague in the South African Wind Energy Association (SAWEA) working group Wind for Communities (WfC) conducting preliminary PhD research on the socio-economic development and enterprise development aspects of the scorecard. The survey used Jalil & Muaz (2013) "Practical Guidelines", and was pilot tested on REIPPPP Economic Development Managers. Distributed in April 2014, the initial survey targeted individuals that had an expert view of the REIPPPP, and could reflect directly on the successes challenges and strategies used for job creation aspects of the REIPPPP.

<sup>18</sup> Total Use of Funds includes some items such as Total ZAR Capex (modules, invertors, Balance of Plant), Grid Connection Costs, Arranging and Underwriting Fees, Development Costs, DoE Contribution, Operating Costs, Working Capital and others (DoE 2014a).



The survey had several purposes: firstly, it was designed to extract preliminary information for a workshop hosted by SAWEA Wind for Communities working group, the IDC, and SANEDI the 22<sup>nd</sup> of May 2014; secondly, it was used to gauge the interest of respondents about job creation as a topic; thirdly, the success of the survey (number of respondents and quality of responses) would determine the effectiveness of the survey as a communication tool that could be used for this study and within the working group; and lastly, the survey was to identify potential panel members for a Delphi study (part of the original research design of this study).

The initial on-line survey (see Appendix G) was distributed through SAWEA's networks to 350 South African industry participants (kept confidential from the researchers and distributed by Jade-Sky who controls the SAWEA data-base). The database contains 10 000 individuals, yet the survey targeted respondents located in South Africa who had worked directly with the REIPPPP as a primary function of their job. They could not be someone that would only be able to express an opinion, but can first-hand express the successes and challenges of bidding and implementing REIPPPP projects.

### ***Interviews***

The preliminary design of this study included a survey to collect much of the quantitative and qualitative data, aimed at providing a confidential space for bidders. Thus far, as a result of the REIPPPP being more competitive than originally anticipated, the survey resulted in very few responses. Hence, the study design and methodology progressed to include additional collecting methods, by extracting raw data through semi-structured interviews, direct observation and personal experience to provide a deeper qualitative engagement.

The second suggestion for Chapter Three is a more qualitative engagement with REIPPPP job creation value chain stakeholders such as: bidders, economic development managers, local community members (job seekers), and companies responsible for construction activities in order to discuss specific experiences of individuals within the programme. These richer engagements aim to provide deeper insight not found in the parameters of the REIPPPP and scorecard (JB9), specifically how people experience, feel and interpret this social world (Mack 2005). Deeper engagements are a qualitative attempt to understand practical outcomes, successes and challenges, whilst identifying the different role each stakeholder plays in meeting the job creation goals of the programme.

The confidentiality of the programme and lack of transparency restricted a lot of normal data collection methods, such as the survey, email and some telephonic interviews. Others refused to speak about the programme at all, and therefore, special favours were employed by the researchers embedded position in industry to gain access to a few sites and individually interview people in their office. The selection of interviewees were primarily based on convenience, using 'snowballing' techniques while onsite (following every referral and lead by interviewees). Referrals was required to gain access to any person. A purposive paradigmatic case sampling was used, to investigate how job creation is implemented,

speaking to those that worked directly with job creation and also directly on IPP sites who would allowed the researcher access to conduct interviews and spend time with job creation stakeholders.

Data was recorded through extensive notes before, during and after the engagements to reflect on some of the key themes, direct observations, successes and challenges that emerged. The guiding questions are found below in Appendix M as well as the details of the interview participants.

## CHAPTER THREE: LITERATURE REVIEW AND REIPPPP ANALYSIS

### 3.1 Meaningful Job Creation

#### ***Decoupling (Green Jobs)***

Following the 2008 global economic crash, the world's governments have immense pressure to boost the global economy and create jobs. However, economic development (ED), and therefore job creation, is historically coupled to increased energy use, environmental depletion and carbon emissions (UNEP 2011; Dincer 2000; Swilling 2010). The seemingly parallel and over simplistic relationship between development and increased resource use is seen by Edwin Morin (1999:73) as a 'polycrisis,' or a global sustainability crises that interlinks the global economy with the environment, thus, elevating the global economic crash to a food, fuel, natural resource, poverty crises.

Swilling's (2010) position, in line with Morin (1999), is that resource limitations are not unequivocally linked to economic growth constraints. By *decoupling* economic growth models from resource extraction and environmental impacts, development economics must realise "*that sustainable resource use holds the key to innovation-led growth and development*" (Swilling 2010:74). Currently in the midst of a technical revolution, underpinned by the promises of a green economy, Swilling suggests that a sustainable long-term development cycle<sup>19</sup>, requires more than a technical revolution, making a case for an environmentally and socially just transition (Swilling, M. & Annecke 2012). While the renewable energy industry is perceived by Swilling (2013; 2010) as somewhat of a technocratic fix, it aims to increase clean energy production, create jobs, decrease poverty and specifically address South Africa's sustainable development goals of reducing inequality and unemployment (Renner et al. 2008; ILO 2012a; ILO 2012b; IRENA 2014).

#### ***Meaningful and Decent Job Creation***

When analysing job creation, the International Labour Organisation (ILO) emphasises that green job creation is not necessarily meaningful job creation (ILO 2012a) and there is a need for a deeper focus to define 'decent, meaningful or quality' jobs (*Ibid.*). In line with the ILO, the South African government supports creating 'decent' jobs in the NGP (2011), measuring its development success by "*the number and quality of jobs created*" (*Ibid.*:17); creating "*decent work (more and better jobs)*" (*Ibid.*:22), and supporting the ILO decent work framework with the four following objectives:

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<sup>19</sup> Swilling (2013:1), unpacks the "polycrisis" further, and attempts to root the interactive social, cultural, economic, and environmental crisis in the theory of *long-term development cycles*, proposing a new conceptual framework of three interactive '*long-wave dynamics*'. According to Swilling, the poly-crisis has different stages within the development cycle and the current global transition to sustainable development is narrow, where the African future is not taken into consideration.

*“Employment and income opportunities; fundamental principles and right at work and international labour standards (essentially organisational rights and freedom from coercion and discrimination); social protection (which includes decent working conditions) and social security and social dialogue and tripartism” (NGP 2011:11).*

However, the ILO emphasises the oversimplification of the framework and encourages that each country (or case) elaborate on the provided indicators (Anker et al. 2002; ILO 2014a). Secondly, the decent job concepts set out in the NGP are not further defined by the policy framework, and it is still uncertain of how to quantify meaningful or decent jobs to achieve the goals of equitable and sustainable development. Therefore, decent and meaningful job creation is still undefined in the South African context.

### ***Equitable Green Job Creation***

Conversely, it remains to be seen whether creating more “low-carbon” job opportunities to address poverty (i.e. inequality and unemployment) result in an equitable development process. In order for development to be equitable, equal opportunities to job openings are required (Saavedra-Chanduvi & Revenga 2010). One may even argue, that a job, even a green job, should be a means to living a fulfilled and socially sustainable life, as defended by Swilling & Annecke (2012:xviii) stating, *“a divided, poverty-stricken, conflictual and socially unsustainable low carbon world would then be the outcome of an unjust transition”*.

In order to reconcile development with environmental sustainability, South Africa has developed numerous policies (discussed in Chapter One) committing to creating ‘green’ and ‘meaningful’ jobs (UNEP 2013; van Wyk et al. 2011). To support the economic transformation of the country and further address the aforementioned development issues, the DTi created the 2007 Broad Based Black Economic Empowerment (B-BBEE) Codes of Good Practice (DTi 2007) and the recent B-BBEE Codes 2013 (DTi 2013a). The codes are important (and mandatory for some) for business and economic transformation as they address elements such as ownership, skills development, socio-economic development (SED) and job creation, but they are also important because they are the guiding parameters for the ED requirements of the REIPPPP and foundation of this study.

Further, the National Strategy for Sustainable Development and Action Plan (NSSD1) specifically supports *“a just transition towards a resource-efficient, low-carbon and pro-employment growth path”* (DEA 2011:9), in other words an equitable transition or just transition (Swilling, M. & Annecke, E. 2006; 2012).

This chapter intends to conduct a literature review of meaningful and decent job creation. Then takes a closer look at the REIPPPP bid documents; commenting on the programme’s capacity to quantify and create meaningful jobs. The chapter concludes by analysing the REIPPPP’s ability to quantify and create meaningful jobs in a meaningful job creation matrix.

## 3.2 Defining Job Creation

Job creation can be analysed both quantitatively and qualitatively. Quantitatively, job creation is often discussed in terms of percent and figures: job losses, job creation/opportunities, salary, and unemployment & employment. Qualitatively, one can analyse job creation when looking at socio-economic impacts such as the reasons for: strikes, unions, workers' rights, compensation, and retrenchment. Yet, it is only at the personal level that job creation takes on a purely qualitative meaning, or by some definitions of 'decent' and/or 'meaningful', where topics may include: fulfilment, success, job satisfaction, training and career opportunities, and identifying with colleagues. This personal level is also in line with the top tier of Maslow's (2013) human needs pyramid. Therefore, the analyses and discussions that surround job creation can vary depending on the specific context (and associated expectations of a programme's outputs/impacts), the drivers with the individuals, resulting in a very high-level quantitative connotation, a very personal and qualitative connotation or a combination of both.

If we provide a practical example, the difference between quantitative and qualitative is similarly understood when speaking with various REIPPPP job creation stakeholders. A bidder or developer's aim is to win preferred bidder status, and as a result of the scorecard, these means maximising job creation and decreasing costs (price per kW) and increasing profit). Associated elements may include budgeting and salary, the skill level, and where the skill may be sourced. Conversely, the concept of job creation to a local community member translates to an opportunity and/or an improved quality of life.

Practically, a positive job creation result to a bidder or developer may be an improved ED score or decrease in cost (numbers on a spread sheet) where the local community member may see a future where his/her children can eat healthier food, wear new clothes, or attend school. If job creation has such a wide range of connotations, defining the parameters of a job is essential for each specific context, specifically if we consider job creation to be green, meaningful and/or decent and if we are to analyse job creation outputs of the REIPPPP.

### 3.2.1 Defining a Job

This study uses commonly cited and accepted job creation definitions found in two primary sources: Statistics SA and the International Labour Organisation (ILO). This study also consulted journal articles and non-peer reviewed reports to review the following concepts and definitions: *employment, unemployment or underemployment; skilled, semiskilled and unskilled workers; temporary and permanent employment; as well as direct, indirect, and induced jobs*; while simultaneously analysing the REIPPPP bid documents. The result is an argument of how job creation is defined by the programme, thus, the outputs in which the programme delivers.

#### ***Unemployed, Employed and Underemployed***

Definitions of unemployed and unemployment vary between countries and consider factors such as age, health, and if the individual is actively seeking a job. Broadly speaking an

unemployed person is someone *“without a job and [is] actively seeking employment”* (Blyton & Jenkins 2007). Blyton & Jenkins (2007) attest that definitions are unlikely to capture all those who: do not have a job, would like to work, or that may have stopped looking for work for various reasons. Those who have stopped looking for work are defined in South Africa as ‘discouraged workers’ (ILO 2011). Discouraged workers are unique to South Africa and are left out of the ‘official definition,’ in order to compare comparable statistics with global data. In South Africa, discouraged workers are statistically included in the ‘expanded definition’ and include individuals that have never worked and are without employment for over a year, falling into the category of long-term unemployment according to Blyton & Jenkins (2007).

The ILO and StatsSA (2007) define an employed person as someone who is of the working age (15 to 64) that has worked for at least one hour in the previous week *“for pay, profit or family gain, in cash or in kind...or they were ‘temporarily’ absent during this period (for such reasons as illness, maternity, parental leave, holiday, training, industrial dispute)”* (ILO 2012b:23).

If one looks at the REIPPPP bid documents, a job created is essentially someone that benefits from being employed, and contributes directly to the project activities (DoE 2013a). To date, the bid scorecard (BWR1-3)<sup>20</sup> did not require bidders to specify the duration of work that is required by an individual, as jobs are aggregated and quantified and reported in person-months and not individual jobs (head-count). Typically a construction site peaks at anywhere between 300 to 1200 individuals, mostly employed by sub-contractors for ‘temporary employment’ (working for a few days, weeks or months to complete a specific task), where the operation and maintenance (O&M) period will require ‘permanent’ employees over the duration of the plant’s life (twenty years in the REIPPPP).

Blyton & Jenkins (2007) coined the term ‘underemployment’ to describe someone or a group of people that are considered employed (working at least an hour for pay or kind) yet the work is insufficient for a variety of reasons. Either their education and skills are underutilised; the pay is low for the duration; and/or the pay is suitable but there is not enough work (time-based). For a developing country such as South Africa, a low education level is common (according to StatsSA (2012) only 28.9% of people over the age of 20 have completed Matric or Grade 12 and only 11.8% have received higher education), thus the most prominent form of underemployment is time-based i.e. there are not enough jobs for the skill level or types of skills.

The underemployed suffer from an insufficient income to maintain a decent standard of living or improved livelihood, yet 24% of the population are looking for work with low levels of education. The number of unemployed and underemployed persons is high enough that underemployed and specifically unemployed people are more desperate. Therefore, the demand for jobs undermines the quality of job opportunities and decent salaries. Even when

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<sup>20</sup> Quarterly requirements of BWR1 changed to include additional items seen in Appendix F, which were carried over into bid submission documents of BWR4.

employees work full-time, defined as a person who works at least 35 hours a week (StatsSA 2007), they may still be underemployed due to income, lack of future job opportunities and/or may be an underutilized skills.

Underemployment gives us an indication if the job is decent or meaningful, providing indicators regarding duration, wage, future opportunities and underutilised skills.

### ***Skilled, Semi-Skilled and Unskilled***

StatsSA (2007) defines a semi-skilled person as someone that has undergone a few days/weeks training and can execute the task efficiently, where a skilled employee has received a minimum secondary education within his or her occupation, and includes two years' post matric training. An unskilled person has neither training nor any education. The Patterson Table (Appendix F: Semantic Skill Level Classifications) is often referred to in determining the skill level of employee. The REIPPPP bid submission requires that bidders determine the skill level (unskilled or skilled) of their employees to construct and operate the IPP. Where bidders are incentivised to create more skilled positions, the skill level is limited to two categories (see Section 3.3 below).

### ***Temporary & Permanent***

Temporary or permanent employment is either a time based measurement or a legal employment contract. Job offers of employment can be a contract position, therefore, temporary with an established end date. The employee will typically be referred to as someone who works 'on contract'. A permanent contract, has no established end date, and may have additional benefits (medical aid or pension). Terminating the contract requires an employee to give a written notice, be fired or be retrenched.

The REIPPPP does not require bidders to stipulate if a job is temporary or permanent but it is rather assumed that construction (EPC) jobs are temporary and O&M jobs are permanent. As previously mentioned, all EPC and O&M jobs are quantified in PMs. Yet, other permanent jobs, such as those involved in project development and other supporting services such as consultants, are not considered in the job creation input or output of the REIPPPP. The REIPPPP also does not quantify permanent EPC employees or contract employees that move from project to project. Thus, they are working on contract, but maintain full-time hours moving from one employment opportunity to the next.

Because the REIPPPP aggregates jobs into PMs, 'one job' is a 12-month full-time equivalent (FTE)<sup>21</sup> (DoE 2013d) or one person-year (PY). Therefore, anything less than a 12-month FTE is considered temporary and is less than 'one job'. Specifically in construction, a FTE does not indicate the number of people (a head count). For illustration purposes, ten PYs, can mean ten people working for one year, twenty people working for six months, or one person

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<sup>21</sup> The REIPPPP defines the FTE as 160 hours per month or 1 920 hours (12 months) for a person-year or "job" (DoE 2013, clarification question on BWR3 bid submission with regards to job creation and top management commitments).

working for ten years. It is impossible to devise individual employment opportunities for individual job seekers through PM and PY data.

Temporary and permanent employment gives us an indication of a meaningful job by dictating a time-based element or duration, but it does not provide an indication of individual benefits or the quality of the job.

### ***Direct, Indirect and Induced Jobs***

Direct jobs include jobs directly in the project activities, including development, implementation, construction, and O&M phases of the RE project. Steinberg, Porro, & Goldberg (2012:8) are quite detailed in describing the differences of direct, indirect and induced jobs, listing several job titles for each. They define direct jobs as project development and on-site labour; indirect (supply-chain labour) jobs to include manufacturing and acquisition of materials required for the project as well as the supporting legal and banking services; and induced jobs are created by the effect of direct and indirect employees spending their wages (often measured by a multiplier in relation to the direct and indirect jobs). Induced jobs are defined similarly across studies as jobs that are support services such as accommodation, food and beverage, a result of direct and indirect employees spending their earnings (Rutovitz 2010; Steinberg et al. 2012). However, South African studies do not use the common definitions for direct and indirect.

The most recent South African based study (non-peer reviewed) forecasts the direct job potential (Maia et al. 2011:3) of a green economy, which is different to Steinberg, Porro, & Goldberg (2012) as it includes manufacturing jobs as direct jobs. The most cited study (Williams et al. 2003) is more vague with regards to the definition of the three types of jobs stating that direct jobs involve the manufacturing activities and also include any job that is a direct result of the project or installation. Williams et al. (2003) continues that indirect jobs are an addition to direct jobs referred to above, and includes services and inputs to the direct processes, failing to give examples of titles or tasks.

Defining which jobs are included and not included are vital in the outcomes of quantifying job creation. The definition in the REIPPPP Implementation Agreement (DoE 2013a:44), indicates that bidders must include jobs that are “*seconded to or in direct relation to*” project activities, yet the agreement does not give a further definition on the types of jobs or an indication if induced jobs should be included. Therefore, for this study it is assumed that direct jobs (*in direct relation to*) and indirect jobs (*seconded to*) are included. However, it is not certain if this includes manufacturing, transport, or other jobs as it is not defined.

### ***Net Job Creation***

We have established that the term job creation is unstandardized throughout literature. When jobs are created we tend to think that new jobs are created. However, new jobs can also be filled by currently employed persons moving from one company to the next for better pay or benefits. The latter may potentially even result in a skills deficit in another sector, referred to as gross job creation while net job creation creates job opportunities for the unemployed - ultimately decreasing the unemployment percentage (Llera et al. 2013;



Kammen et al. 2004; Maia et al. 2011). To reiterate, net job creation does not consider parallel moves from one industry to the other i.e. moving employees from Eskom to the RE industry.

Gross job creation is more appropriately associated with labour migration rather than net job creation. Simas & Pacca (2014) explain that gross job losses are generally not taken into consideration when calculating job creation and can only be measured by qualitatively recording unemployment status on a case by case basis or through I/O models of the greater economy.

### 3.2.2 Quantifying Job Creation

Quantifying and qualifying job creation methodologies are not standardised across reports, studies, companies, countries or industries and can be either over simplistic or justified with 'ungrounded' complex assumptions and methodologies.

International research revealed ratios and various models that are used to understand the effects that RE has on economic development and potential job creation (Steinberg et al. 2012; Dalton & Lewis 2011; Llera et al. 2013; Frondel et al. 2010; Simas & Pacca 2014). The most recent reports on global RE job creation are the *Renewable Energy and Jobs: Annual Reviews* (IRENA 2014), and the *Renewable Energy Global Status Report* (REN21 2014). Both collectively report on global methodologies and outcomes emphasising the lack of normality and consistency of not only the methods but the data and outcomes. This section aims to review the most common job creation models and ratios and determine commenting on the synergies with the REIPPPP.

The most common methodologies include two types of models: forecasting models that use comparative ratios and projected installed capacity; and evaluative models (input/output and analytical) that measure outcomes post implementation.

#### ***Forecasting Models (Projected impacts)***

Most South African based studies are forecasting models (Williams et al. 2003; Rutovitz 2010; Maia et al. 2011), as the construction of IPPs in the REIPPPP was non-existent until 2012. These studies use international job factors with regional labour inefficiency multipliers and tend to combine manufacturing with construction and O&M activities<sup>22</sup> to emphasise the potential of RE employment in all types of jobs (direct, indirect and induced). Job forecast studies which are aimed at decision makers, almost always sit in this 'potential' category. Lambert & Silva (2012) and Wei, Patadia, & Kammen (2010), conclude that job creation cannot be standard and must be understood at a micro-level, supporting the development of national (South African) and regional (Provincial) job creation methodologies.

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<sup>22</sup> Potentially because forecasting models are commissioned by supporters of a RE industry, maximizing the outcome and motivating for manufacturing activities in the country and also to motivate for an increased local content percentage encouraging South African made products.

**Job Creation Ratios**

Comparative ratios such as jobs per MW (installed capacity), jobs per GWh (unit of energy generated) and jobs per investment (Rand, Dollar or Euro) aim to compare projects and technologies. The most common ratio is jobs per MW. Lambert & Silva (2012b:4669) present the most comprehensive job creation literature evaluation, state that jobs per MW installed *“is used to indicate the number of permanent jobs created in the operation and maintenance phase, while person-years (PY) per MW is used for temporary jobs in the construction phase.”* The REIPPPP; however, utilises a PY per MW installed ratio in the REIPPPP scorecard (JB8) for both the construction measurement (CMP)<sup>23</sup> and operation measurement periods (OMP)<sup>24</sup>.

Further to understanding this ratio, jobs per MW can be further be broken up into a per annum or cumulative ratio. Dalton & Lewis (2011) argue that a cumulative basis is a more reliable measurement than an annual, yet studies in this review failed to define the details of the ratio i.e. if they forecast jobs on a cumulative or annual basis. Thus projected outcomes and forecast are somewhat uncertain. The REIPPPP also does not stipulate in the Implementation Agreement if job creation numbers should be cumulative or annual, and therefore it is left up to bidders – compromising the standardisation of the data.

**Person-Months (PMs) and Person-Years (PYs)**

The REIPPPP bidding documents define Job Creation as a measurable element reliant upon the project that *“can account for as being employed or implemented to achieve employment...seconded to or in direct relationship to”* the design, construction, or O&M of the IPP facility, including the sale of power to Eskom (DoE 2013a:44, 45). Statistics South Africa (2007) defines a job as the individual post and does not measure or aggregate hours or persons into PMs or PTs, therefore, presenting a direct relationship between measuring a job and a single person being employed.

If a study or programme uses PMs or PYs, such as the REIPPPP, an outcome of 1 000 jobs created does not translate to 1 000 full-time employed individuals. It can also mean 1 000 FTE (i.e. 1 000 people working for one year, 500 people working for 6 months or 250 people working for four months). The methodology of a PM or PY is simple: all the job hours, months and years are added then divide by a common denominator (12-months). The result is total ‘jobs’. Therefore, all jobs including direct jobs, indirect jobs, induced jobs, temporary jobs and permanent jobs, and manufacturing jobs are all included, consolidated and divided by 12-months. This is also the case in the REIPPPP; aggregating the total number of hours in the construction and O&M phases than dividing by 160 hours (or FTE), to calculate one PM.

Aggregating job creation data into PMs and PY makes it seemingly impossible to evaluate if the jobs being created are decent or meaningful. Therefore, job creation is widely misunderstood in the REIPPPP and conclusions of its failure or success cannot be drawn based on PM and PY.

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<sup>23</sup> Also referred to as the EPC phase in this study

<sup>24</sup> Also referred to as the O&M phase in this study

*"I asked the DoE if they could report on the numbers of jobs created [aside from person-years/months], they responded by saying 'of course, you tell us what the definition of a job is and we will report on it'" – Andrew Greeff (2014)<sup>25</sup>.*

### ***I/O and Analytical Models (Economic impact of investment)***

The UNEP (Renner et. al. 2008) provides an overview of methods commonly used to calculate RE job creation once an industry begins to mature. Both models can be used in isolation of one another or are sometimes combined (Lehr et al. 2008).

Input/output models (I/O) are very resource intensive yet beneficial in large regions, *"represent[ing] the entire economy as a system of interactions or linkages between subsectors of the economy"* (Steinberg et al. 2012:7). Used by the US, the ED JEDI model developed by NREL, can quantify net and gross job creation as well as job losses in other sectors, and also looks at direct and indirect jobs creation (Lehr et al. 2008).

Survey/Analytical models, such as Wei et al. (2010), are considered more transparent than I/O models yet only calculate direct job creation (Bribia et al. 2010). Highly dependent on the quality of the survey, they are used in understanding quantitative RE job creation worldwide; they are not designed to understand qualitative aspects of job creation. Several studies are critical of both the I/O and analytical models inability to provide sufficient details in understanding job creation and the impacts of a RE industry.

Blanco & Rodrigues (2009:2848) critique current evaluation models, asserting that analytical studies, surveys or any written reports and government statistics are heavily dependent on comprehensiveness, and fail to examine gender skills gaps or any details regarding job creation qualifications. Although an I/O model is more comprehensive and effective, many research institutions do not use the I/O model because of its difficulty and cost, for example, Lehr et al. (2008) conducted over 1 000 interviews with very detailed questionnaires. Del Río & Burguillo (2009:1317) are also critical of both studies, making a point that analytical models ignore multiplier effects (used in evaluating indirect and induced jobs) and I/O *"are opaque, make[ing] several brave assumptions to achieve a high level of aggregation"*.

While job creation models tend to be somewhat standardised, del Rio & Burguillo (2008), Lambert & Silva (2012), REN21 (2014), and Wei et al. (2010) believe that standardisation is impossible because technologies, industries and countries cannot be fairly compared to one another. IRENA & CEM (2014) discuss that each location is unique in developing positive outcomes for socio-economic development benefits, and every case study has a different set of parameters in which the industry, technology or country is embedded. For instance, the REIPPPP ED requirements are uniquely designed around the B-BBEE Codes of Good Practice (DTI 2007; 2013), designed specifically for the transforming the South African economy (promoting job creation and other economic opportunities for previously disadvantaged

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<sup>25</sup> Andrew Greeff, RE-exchange, made this statement during the Wind for Communities workshop (Getting Community Development Right) May 2014 (Appendix H: Workshop Invitation) during a discussion about defining a job in the REIPPPP.

'Black' Citizens) and placing emphases on procurement aspects to reduce the negative legacy of the old pre-1990s apartheid regime. The variables that go into the planning, implementation and O&M of an REIPP project in South Africa will be infinitely different to any other economy.

Blanco & Rodrigues (2009) explain that variation in data, inconsistencies in data collection, ratios and metrics, sample sizes, methodology and study design give very different results due to the lack of detail in the statistics. If job creation studies are too simplistic or they lack consistency and reliability (Dalton & Lewis 2011; del Río & Burguillo 2008; 2009) policy makers and decision makers make misinformed decisions. This results in the need for deeper analysis and can include an alternative metric (i.e. jobs per population), that tells us more about the impact on a local area (del Río & Burguillo 2009; Dalton & Lewis 2011; del Río & Burguillo 2008; Renner et al. 2008; Lambert & Silva 2012).

This study does not use either a heavy resource dependant model such as the I/O, or an analytical model to evaluate the REIPPPP, but is rather an exploration of the job creation parameters, definitions and concepts of meaningful jobs; commenting on the REIPPPP's potential and capacity to contribute to the goals of national policy.

### 3.2.3 Alternative Job Creation Measurements

The success of a RE industry depends on the delivery of its promises to create green jobs, mitigate carbon and provide a clean source of reliable electricity generation for future economic growth (Eberhard et al. 2014). This success will be measured against its job creation benefits compared to the investment and energy output. Understanding the effect and complexity of job creation through jobs per MW is limiting (Dalton & Lewis 2011; Blanco & Rodrigues 2009). Other ratios and factors to consider are: jobs per GWh (unit of energy produced); jobs per Rand invested; skilled jobs per MW; women jobs per MW; net jobs per MW; indirect or induced jobs per MW; jobs per population i.e. per 1 000 or 1 million people (Dalton & Lewis 2011); previously unemployed jobs per total jobs (net jobs); and/or jobs per unemployed persons.

Alternative ratios provide more insight into the trends and local impact the programme has or can have for the investment. Firstly, the most quantitative metric, jobs per GWh and jobs per Rand invested metric are directly linked to an input (investment) and a GWh output (unit of energy) rather than jobs per installed capacity. If a project reports on the number of jobs it creates per MW, it only compares the project to other projects and technologies. Jobs per MW does not tell us anything about the job being skilled, unskilled or who the job benefactor is (i.e. an international or a local community member).

Jobs per MW has an opposite effect of creating meaningful jobs, as it puts an emphasis on creating a maximum number of jobs or total number of jobs (in the case of the REIPPPP this means PMs) and the best way to create more jobs is by employing unskilled labour that does not have a large cost implication. However, what matters in an attempt to reduce poverty, is not the *"number of jobs generated by growth but the productivity of that employment"* (Saavedra-Chanduvi & Revenga 2010:10). Using an alternative and more specific ratio such

as skilled, women, youth, and/or indirect/direct jobs per MW may provide a more specific understanding of the SED benefits of the project and incentivise bidders to create more quality jobs or jobs that create a bigger impact on those living in poverty.

Additional ratios that take the MW out of the equation potentially provide greater insight to the contribution to meaningful jobs when choosing a location of a project or looking at the benefits the project had on the local community. These may include jobs created per the size of the regional population i.e. jobs per 1 000 or 1 million people, and even look at the effect it had on unemployment using jobs per regionally unemployed (unemployment of the Province) or previously unemployed people per total jobs created.

One attempt to measure the quality of jobs comparing different RE technologies is a unique study that quantitatively rates jobs on their quality based on a localness factor using regional indicators specific to the case study. Briberia et al. (2010) coined the method an ‘outside-to-in’ placing employment at the core of a socio-economic development analysis (effectively arguing job creation the most important indicator of socio-economic benefits to regional communities). The jobs were rated +1 for a positive result and up to -1 for a negative result and the outcome was that wind had a higher ‘quality’ factor than that of PV or CSP. Therefore, alternative quantitative methods can be used to determine qualitative aspects of job creation and is recommended for further study.

### 3.2.4 Decent/Meaningful Jobs

Most RE studies and literature tend to focus on employment quantification- such as forecast studies and very few discuss the characteristics or what defines a decent or meaningful job. Creating green jobs can often shadow the importance of the job being decent or meaningful.

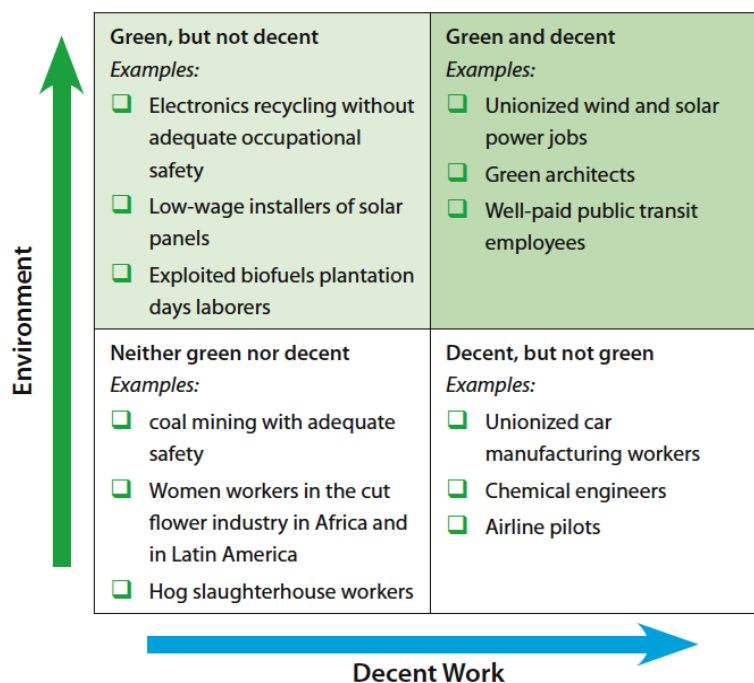


Figure 15 Green job and decent job matrix Source: (Renner et. al 2008:40)

Renner et al. (2008:40) argues that a green job is not necessarily a ‘decent’ or ‘meaningful’ job, and provides a schematic overview of some of these examples in Figure 15.

Using an example specific to South Africa, most of the jobs created in the REIPPPP are temporary construction jobs (i.e. “*low-wage installers*” of both solar and wind farm components) and cannot guarantee job security and reasonable career prospects. Therefore, without the horizon of a long-term construction and installation market, they may be considered green jobs but are not jobs that will eradicate poverty, increase dignity and provide a better quality of life.

Creating a job is more than just creating an opportunity and does not mean the end of poverty for an individual nor does it guarantee an improved quality of life. Saavedra-Chanduvi & Revenga (2010:10) state that “*in the poorest developing countries, poverty rates tend to be higher for the employed because labor markets are dominated by low-earning, low productivity jobs.*” The sections below indicate both South Africa’s support of the concept and exemplify the development of the concept and therefore there is no reason why green, decent and meaningful job creation should be excluded in evaluating the REIPPPP.

Decent and meaningful job elements and indicators have been developed by the (ILO 2012b), applied to country studies including South Africa (ILO 2010; van Wyk et al. 2011; ILO 2011), and further supported by the UNEP (2010), and IDC (2011). The UNEP defines decent work, “*as good jobs which offer adequate wages, safe working conditions, job security, reasonable career prospects, and worker rights. People’s livelihoods and sense of dignity are bound up tightly with their jobs. A job that is exploitative, harmful, fails to pay a living wage, and thus condemns workers to a life of poverty can hardly be hailed as green*” (Renner et al. 2008:8).

The ILO defines four pillars that overlap with much of the UNEP’s definition: Access to productive employment and income opportunities; Rights at work, particularly with respect to the core labour standards; Systems of social protection; and a voice at work through social dialogue. The pillars are substantiated by corresponding elements (ILO 2012b:15) and further by detailed indicators which are not listed entirely in this study (*Ibid.*:16-17).

#### **ILO Decent Work Elements**

- (i) employment opportunities;
- (ii) adequate earnings and productive work;
- (iii) decent working time;
- (iv) combining work, family and personal life;
- (v) work that should be abolished;
- (vi) stability and security of work;
- (vii) equal opportunity and treatment in employment;
- (viii) safe work environment;
- (ix) social security; and
- (x) social dialogue, employers’ and workers’ representation

The South African Government has committed itself to the ILO's definitions and indicators of a decent/meaningful job (ILO 2011; ILO 2012a; ILO 2012b) and is further supported by the National Growth Plan, and Green Economy job studies (Maia et al. 2011; Greenpeace 2009). Further, South Africa's legal framework to support a decent work agenda in established codes, acts, and policies, are listed in Van Wyk et al. (2011:xviii): Basic Conditions of Employment Act; Compensation for Occupational Injuries and Diseases Act; Code of Good Practice on Arrangement of Working Time and on Pregnancy; Employment Equity Act; Labour Relations Act; Occupational Health and Safety Act; Skills Development Act; and Unemployment Insurance Fund (UIF) Act.

### **3.2.5 Meaningful Job Creation framework**

If we take into account the definitions and literature above we can develop a new framework specific to South Africa and REIPPPP bid documents to analyse decent and meaningful jobs; determining if the programme (and data being collected from bidders by the DoE) can be used to determine meaningful job creation (see Figure 16).

The next section discusses the REIPPPP requirements in detail, followed by an assessment of how the REIPPPP creates meaningful and decent jobs using the framework.



Figure 16 Meaningful Job Creation Framework Source: Author

### 3.3 Case Study: REIPPPP

This section provides a high-level review of the REIPPPP, aiming to provide the details of the Job Creation element and includes a description of the scorecard and the job creation outcomes of the first three BWRs. An analysis will following (see section 3.4), concluding on the programmes ability to create and quantify meaningful jobs.



The Department of Energy (DoE) and National Treasury (DoNT) recently spearheaded the utility scale renewable energy programme, namely, the REIPPPP<sup>26</sup>. The programme is designed to not only contribute to a diversified energy mix, reduce national GHG emissions to mitigate climate change<sup>27</sup>, but also to contribute to economic development; creating jobs and alleviating poverty in rural areas where few development and job opportunities exist<sup>28</sup>.

*“High up in government, the REIPPPP is seen as a green jobs programme, not only as a solution to clean energy generation,”* Lucas Black, UNDP <sup>29</sup>

The REIPPPP allocated 3 725MW of RE capacity (primarily onshore wind, photovoltaic, and concentrated solar power) and developed a substantial procurement programme to support economic development benefits to the local economy. One of these requirements was to ensure that each project or IPP contribute to various job creation thresholds and targets of employing South African Citizens, Black Citizens, Black Women, Black Skilled (versus unskilled), and Local Community members (residing within 50km of the IPP) (DoE 2013a). Appendix K: REIPPPP Job Creation Definitions (see Table 22) lists the definitions relevant to each job-creation element.

*“Local Economic Development is an approach towards economic development which allows and encourages local people to work together to achieve sustainable economic growth and development thereby bringing economic benefits and improved quality of life for all residents in a local municipal area”* (StatsSA 2007)

The DoE recognises that the REIPPPP is an excellent opportunity to contribute to South Africa’s economic development (ED) objectives in a post-apartheid environment and drafted an IPP Economic Development Policy dated 15 March 2011. Some of the goals are listed in Volume 5 - Economic Development Requirements (DoE 2013a:9):

- a) job creation; a heavy emphasis has been placed on this element as South Africa is facing an unemployment crisis (*Ibid*);
- b) local content through, inter alia, increased local manufacturing (*Ibid*);
- c) education and the development of skills (*Ibid*);
- d) enterprise development, through the promotion of and packages for new entrants (*Ibid*);
- e) socio-economic development (*Ibid*); and
- f) participation by historically disadvantaged Citizens and marginalized regions, in the mainstream of the industrial economy (*Ibid*).

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<sup>26</sup> URL Website for the REIPPPP: <http://www.ipprenewables.co.za/>

<sup>27</sup> South Africa is one of the most carbon-intensive economies in the world, it’s higher than China and the USA with regards to CO2 emissions per GDPppp and one of the highest per capita (Letete et al. 2010).

<sup>28</sup> The Northern Cape and Eastern Cape, both considered rural Provinces with high levels of poverty – 63% and 70.3% respectively, also have the most wind and solar resource potential in South Africa evident in the number of Solar and Wind farms developed in these regions.

<sup>29</sup> Lucas Black from the UNDP made this statement at the monthly SAWEA networking event 29 May 2014

Qualifying large-scale REIPPPP bids must be utility scale (5MW to 140MW)<sup>30</sup> and can include: onshore wind (OSW), solar photovoltaic (PV), concentrating solar power (CSP), hydro, biogas, and/or biomass technologies. Once awarded and constructed, IPPs contractually connect to the grid and are managed through a power purchase agreement (PPA) with Eskom. The REIPPPP is designed to favour projects that primarily have a cheaper price and secondarily, that score higher on ED elements; ultimately supporting the South Africa government's mandate to create more jobs for local South African citizens and Black citizens<sup>31</sup>.

REIPPPP bids are evaluated on two primary criteria: 70% on tariff (Index Price) and the other 30% on economic development (ED) commitments. Sub-components of ED evaluation include job creation, ownership, preferential procurement, localisation, top management, SED and enterprise development contributions, and an additional point of evaluation, the percentage of South African Entity Participation (SAEP)<sup>32</sup>. Figure 17 illustrates the ED elements and sub-elements with their associated weighting with Job Creation and Local Content having the highest weighting of 25% each. Second to price, these two elements have the highest value in the bid.

The other six economic development compliance elements in the REIPPPP scorecard (JB8) are equally important in the economic transformation of the economy, and each element can arguably ultimately support the creation of economic and employment opportunities specifically for "Black" people (Blacks, Coloureds and Indians that are Citizens of South Africa). Table 7 lays out the REIPPPP ED elements, weightings, and threshold and target requirements within the scorecard (JB8).

In order to calculate the percentages of the first four subcategories, bidders provide total PMs in both the Construction Measurement Period (CMP) and Operating and Measurement Period (OMP) on an Information Sheet (JB8) found in Annexure E. Using simple division, PMs are then automatically converted to percentages on the Scorecard (JB9), (Appendix E: JB8 (Information Sheet) and JB9 (Scorecard)).

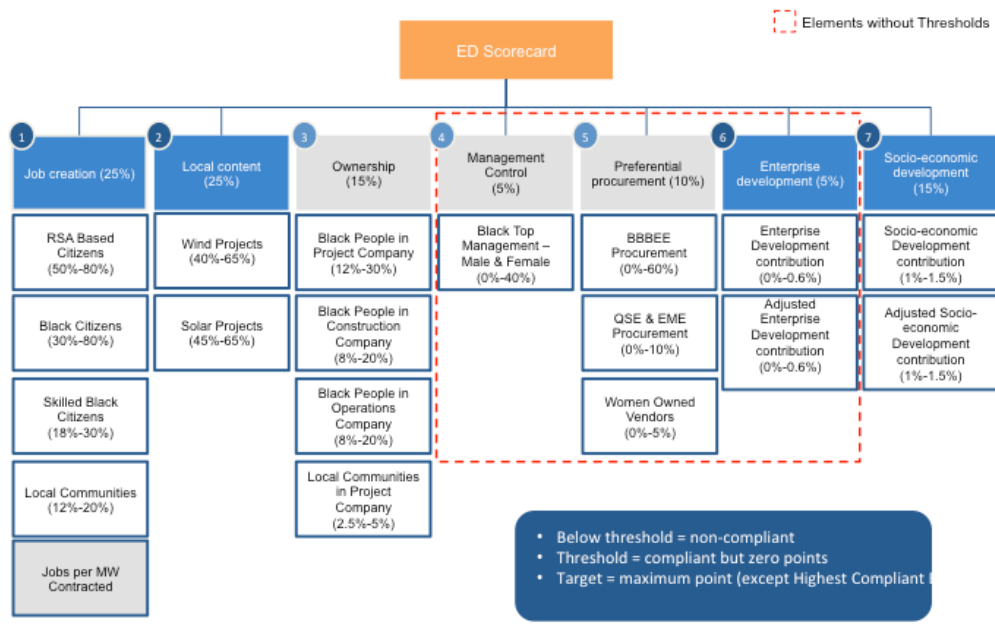
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<sup>30</sup> Installed capacity caps are different for on-shore wind - 140MW and PV - 75MW

<sup>31</sup> Zuma, Jacob, February 2012, State of the Nation Address. Quoted, *"the triple challenge of unemployment, poverty and inequality persists, despite the progress made. Africans, women and the youth continue to suffer most."* The National Development Plan (2011) and the New Growth Plan (2010) both address inequality and unemployment in the country. Source: <http://www.thepresidency.gov.za/pebble.asp?relid=5674>

<sup>32</sup> Measured as a percentage of the Project Company including Black Ownership in the main contractor/EPC, O&M and developer)

All 7 ED elements are evaluated and points accrued up to a maximum of 30 points based on the applicable weightings



Source: Volume 5: Economic Development Requirements, Part B: Qualification Criteria, Part C: Evaluation Criteria

Figure 17 REIPPPP ED Requirements Source: Letsema, RE Forum, Sandton, March 2014

Table 7 REIPPPP ED requirements scorecard (JB9) and measurement Source: (DoE 2013e)

Scorecard Economic Development Element	Measurement
<b>Job Creation</b>	Percentage of South African Citizens, Black Citizens, Skilled Black Citizens, Local Community Black Citizens and total (quantum) Jobs per MW (capacity)
<b>Local Content</b>	Percentage of the value of spend on local South African products
<b>Ownership</b>	Percentage of “Black” Shareholding in the Construction, O&M and Project Company and percentage of Local Community shareholding of the project
<b>Management Control</b>	Percentage of Black people in Top Management
<b>Preferential Procurement</b>	Percentage of procurement spend from Broad Based Black Economic Empowerment (BBBEE) contributors
<b>Enterprise Development</b>	Percentage of revenue spend for Enterprise Development
<b>Socio-Economic Development</b>	Percentage of revenue spend for Socio-Economic Development

To date, nearly 2.5 years from the inception of the REIPPPP four BWRs submissions have passed with three rounds attaining preferred bidder status. Each subsequent BWR has revealed new and refined ED requirements, where loopholes are closed to ensure ED commitments are met, thus increasing the overall competitiveness of the programme. One of the unique changes of BWR3 is the additional criteria for bidders to stipulate the number of jobs per MW that the IPP would create. This requires bidders to not only provide percentage commitments, but a quantum total.

While all six elements indirectly support the creation of jobs, this study focused on direct job creation commitments (rather than potential direct, indirect and induced job creation measured outside the REIPPPP scorecard) to prevent diluting the study's content, yet gives some high level mention to Top Management and Local Content.

### **Other important aspects of REIPPPP job creation requirements**

Three phases in which bidders provide job creation information was identified: bid submission, financial close and quarterly reporting<sup>33</sup>.

- For **bid submission**: bids must comply with the REIPPPP by completing and submitting Annexure JB8 and JB9 of Volume 1 Part B;
- For **financial close**, and in terms of the Annexure to Schedule 2, the Implementation Agreement includes: ED Matrix (Annex 1 of Schedule 2 to the IA);
- Quarterly Obligations (Annex 10 of Schedule 2 to the IA); and
- Economic Development Plan (Annex 11 of Schedule 2 to the IA).

In addition to the information sheet and scorecard Volume 5 clause 4.2.4 stipulates that bid responses set out both the *“actual number of Employees anticipated to be employed during the Construction Measurement Period and the Operating Measurement Period”* and *“the anticipated level of education and/or skills of such Employees”* (DoE 2013a). Bids must also indicate, in PMs, the number of employees who are people with disabilities, women and youth (Clause - 7.3.1.7). Many bidders responded with providing a table that indicated any additional information required outside the scorecard, yet it is unknown from an evaluation aspect, how the table would be used as it did not indicate a scoring methodology such as that in JB8 and JB9. The assumption made is that the table will substantiate the PM figures and generate an element of qualitative evaluation. BWR4 saw the REIPPPP bidding documents provide an example table (see Appendix F Table 20).

### **3.3.1 REIPPPP Job Creation Outcomes**

In November 2013, the DoE released job creation outcomes following the submission and announcement of BWR3 preferred bidders. Data included national PYs (12 PMs is one job) seen in Table 8. Additional information was provided per province combining all technologies in both the construction (CMP) and operations (OMP) found in Table 9.

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<sup>33</sup> Quarterly reporting once the Construction Measurement Period begins, which is defined in the REIPPPP as the period commencing on the Effective Date and ending on the day immediately preceding the Commercial Operation Date

**Table 8** Job Creation commitments BWR1-3 (PV, Wind and CSP) Source: (DoE 2013d)

BWR	Tech	Jobs <sup>2</sup> CMP	Jobs <sup>2</sup> O&M	Total <sup>2</sup> Jobs	MWs
1	PV	2381	6117	8498	632
2	PV	2270	3809	6079	417
3	PV	2119	7513	9632	435
1	Wind	1810	2461	4271	634
2	Wind	1787	2238	4025	563
3	Wind	2612	8506	11118	787
1	CSP	1883	1382	3265	150
2	CSP	1164	1180	2344	50
3	CSP	3082	1730	4812	200

**Table 9** BWR1-3 Job Creation outcomes per Province Source: (DoE 2013c:17)

PYs per Province		
Province	CMP	OMP
Eastern Cape	512	4908
Free State	414	1443
Gauteng	6	240
KwaZulu-Natal	96	240
Limpopo	160	1366
Northern Cape	6502	8736
Western Cape	223	1295
<b>Total</b>	<b>7015</b>	<b>18228</b>

Job creation data available to the public (see Table 8 and Table 9) is highly aggregated and the person-years is somewhat misleading. While it does give an indication of how each of the three technologies are performing in terms of each BWRs for the two different measurement periods (CMP and OMP), it does not provide any details on the beneficiaries, duration of any of the jobs, or any other meaningful job creation elements that are listed in JB8 and JB9. The next section attempts to analyse the outcomes and provide deeper insight into meaningful job creation aspects of the programme.

### 3.4 Analysis of REIPPPP documents

Through the analysis of the REIPPPP bid documents, one can establish that the Job Creation requirements are detailed and complex, continually evolving in each BWR to improve the ED contribution of the programme; still, the results presented by the DoE and available to public are limiting.

Analysis of job creation can be conducted on the limited amount of information, firstly, to determine the importance job creation has in the REIPPPP by analysing the percentage and weighting it holds in the overall bid, analysing each job creation sub-elements in the ED scorecard and then an analysis of the quantitative outcomes of BWR1-3. Because the quantitative outcomes and analysis are not sufficient to determine if the REIPPPP is a

meaningful programme, this section concludes with a decent and meaningful job creation matrix based on the Meaningful Job Creation Framework and the REIPPPP bid documents.

### 3.4.1 Job Creation weighting in the REIPPPP

By analysing the job creation element score weighting, this section discusses the importance of job creation as defined by the weighting it holds within the REIPPPP. The bid documents state that *“the creation of employment is one of the priorities of Government...in light of this fact, Job Creation is one of the important imperatives of the Department in the IPP Procurement Programme”* (DoE 2013b:13).

Job Creation in itself is 25% of the overall 30% of the ED elements. Top Management is also an opportunity to create jobs incentivising bidders to allocate top management positions for Black Citizens and provides an adjusted recognition for gender if allocated to black women (DoE 2013c:21). Job Creation (25%) and Management Control (5%) make up 35% of the total ED score and 9% of the total bid. Hence, 7.5% of the total bid is scored on job creation and 1.5% on Management Control.

*“One of the ways in which to create jobs is through localisation (increased local manufacture). Thus Local Content is one of the imperatives of Government in the IPP Procurement Programme”* (DoE 2013c:15). Thus if one includes Local Content (which includes another 25% of the ED score), the elements that may directly contribute to job creation in the REIPPPP contribute 16.5% of the total bid evaluation.

One would draw a conclusion that if this is a green job and meaningful job creation programme, *“one of the priorities of Government”* then one may argue: should job creation and the measurement of job creation have a higher percentage and/or is given more attention in the overall bid?

#### **Job Creation Sub-Category Weighting**

All subcategories have different weightings, thresholds and targets. If bids do not reach the threshold, the bid is incompliant and does not move to the evaluation stage of becoming a preferred bidder. The following table represents the thresholds and targets of each job creation sub-element, as well as the percentage weighting of each sub-element in the scorecard. The percentages account for 33% and jobs per MW account for 67% of the job creation aspect, therefore, jobs per MW as a sub-element, is the most important aspect of job creation.

**Table 10** REIPPPP Job Creation sub-elements targets and thresholds Source: (DoE 2013e)

Job Creation Sub-Element	Threshold	Target	Score Weighting
<b>RSA Based Citizens</b>	50%	80%	33%
<b>Black Citizens</b>	30%	80%	
<b>Skilled Black Citizens</b>	18%	30%	
<b>Local Communities</b>	12%	20%	

<b>Jobs per MW<sup>34</sup></b>	-	-	67%
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A suggestion for further study would include a deeper analysis into the Local Content aspects of the REIPPPP, even though studies are as recent as 2013 in the PV, CSP and wind sectors have been engaged (EScience Associates et al. 2013; Ahlfeldt 2013; E&Y & Enolcon 2013; Rennkamp & Boyd 2013), localisation is constantly evolving. A deep analysis of the current manufacturing activities, outputs, job creation, associate skills development, challenges and future opportunities would provide great value into RE industry, and required insight that a successful industry should aim to achieve.

### 3.4.2 REIPPPP Job Creation Outcomes Analysis

An IPPs success in the REIPPPP is determined by its ability to be competitive (achieving preferred bidder status) and deliver on the agreements that they have made to the DoE and to local communities through the bidding documents. Yet the job creation guarantees that bidders commit to are rather unclear to the public. The REIPPPP and the bidding documents show us broadly who are getting the jobs, but the current outputs are highly aggregated into person-years as seen above; it is seemingly impossible to get a comprehensive understanding of meaningful job creation within the programme.

In an attempt to understand the job creation outcomes of bid submissions, a further quantitative analysis reviewed the bid outcomes by calculating various jobs per MW metrics aimed to identify trends of BWR1-3. Table 11 reproduced the initial REIPPPP BWR1-3 job creation commitments published in November 2013, then through simple division, calculates jobs per MW in both the CMP and OMP, establishes a Total Jobs per MW factor over the 20 years, and demonstrates the total jobs (headcount) created in the OMP.

**Table 11** REIPPPP PM outcomes Source: Author (DoE 2013)

BWR	Tech	Jobs <sup>2</sup> CMP <sup>2</sup> (PY)	Jobs <sup>2</sup> O&M <sup>2</sup> (PY)	O&M <sup>2</sup> Jobs	Total <sup>2</sup> Jobs <sup>2</sup> (PY)	MWs	Jobs/MW <sup>2</sup> CMP	Jobs/MW <sup>2</sup> O&M <sup>2</sup>	Total <sup>2</sup> Jobs/MW	Total <sup>2</sup> Jobs <sup>2</sup> OMP/MW/20	Total <sup>2</sup> PY/MW/20
1	PV	2381	6117	510	8498	632	3,77	9,68	13,45	0,48	<b>4,25</b>
2	PV	2270	3809	317	6079	417	5,44	9,13	14,58	0,46	<b>5,90</b>
3	PV	2119	7513	626	9632	435	4,87	17,27	22,14	0,86	<b>5,73</b>
1	Wind	1810	2461	205	4271	634	2,85	3,88	6,74	0,19	<b>3,05</b>
2	Wind	1787	2238	187	4025	563	3,17	3,98	7,15	0,20	<b>3,37</b>
3	Wind	2612	8506	709	11118	787	3,32	10,81	14,13	0,54	<b>3,86</b>
1	CSP	1883	1382	115	3265	150	12,55	9,21	21,77	0,46	<b>13,01</b>
2	CSP	1164	1180	98	2344	50	23,28	23,60	46,88	1,18	<b>24,46</b>
3	CSP	3082	1730	144	4812	200	15,41	8,65	24,06	0,43	<b>15,84</b>
*		<b>19108</b>	<b>34936</b>	<b>2911</b>	<b>54044</b>	<b>3868</b>	<b>8,30</b>	<b>10,69</b>	<b>18,99</b>	<b>0,53</b>	<b>8,83</b>

\*The final row depicts all technology totals and average PYs and jobs are totals and ratios (i.e. jobs/MW) are averages

The results show a substantial jump in the total jobs for both wind and PV in the OMP, nearly doubling in BWR3. It is assumed that the increase is a direct result of the new point of

<sup>34</sup> The additional jobs per MW element is calculated by total person-months/12/total installed capacity (MWs). This sub-element had no threshold and target in BWR3 as it was a new element in the REIPPPP scorecard and BWR3 had a floating target; meaning, the highest compliant bidder (not just the highest compliant preferred bidder) set the new target on each factor of analysis.

analysis (jobs per MW) introduced to the BWR3 scorecard. Prior to BWR3, bidders were only evaluated on percentages (see section 3.3). BWR3 ensured bidders were scored on both the total number of jobs as well as the percentages, thus incentivising bidders to create as many jobs as possible to be the most competitive.

CSP in BWR2 shows a significantly higher ‘jobs per MW’ outcome than the other technologies, and also dropped again in BWR3, where the other technologies were similar in the first two BWRs and both had significant jumps in BWR3. The reason for the higher outcome in BWR2 is that CSP includes only one IPP of 50MW. Because the one project is not aggregated with any other project to obtain an average, and also it is relatively a low MW capacity compared to the other projects, the lower denominator in the jobs per MW equation results in a higher job per MW number. Therefore, smaller projects will create more jobs per MW.

Returning to Table 11, one can analyse the information to find an average jobs per MW created in primary technologies (wind, PV and CSP). Averages are found for both the CMP and OMP for each technology over all three BWRs. Additional averages were calculated including:

- OMP PY/year is the average OMP jobs per MW created each year;
- Total / year is the total FTE jobs created per year per MW and is probably the most indicative ratio of ‘actual’ jobs or headcount per MW; and
- Total jobs / MW is an average of CMP and OMP ratios.

**Table 12** Average Jobs per MW Source: Author using data from Table 11

Average jobs per MW over 3 BWRs			
	PV	Wind	CSP
<b>Average CMP</b>	4.69	3.12	17.08
<b>Average OMP</b>	12.03	6.22	13.82
<b>OMP PY/year</b>	0.60	0.31	0.69
<b>Total/year</b>	5.30	3.43	17.77
<b>Total jobs / MW</b>	16.72	9.34	30.90

Jobs per MW tell us how many jobs are being created per MW of installed capacity, yet the inconsistencies in the bid window rounds, as well as with international data and job creation factors, conclude that further analysis is required. The total PY outcome published by the DoE does not give us an indication of meaningful jobs. The highly aggregated outcome does not tell us anything about the job or who received the job. Therefore, the programme’s ability to create meaningful jobs is uncertain with the quantitative outcomes published by the DoE.



### **3.4.3 Meaningful Job Creation Matrix**

This section intends to further unpack the complexity of REIPPPP job creation, by reviewing bid documents and critically reflecting on personal observation and experience. The Meaningful Job Creation Matrix (see Table 13) aims to analyse the REIPPPP against the previously developed Meaningful Job Creation Framework (see Section 3.2.5). This analysis runs the risk of presenting invalid data as the results are based on opinions and personal observation rather than substantiated peer-reviewed references, yet attempts to find meaning behind the seemingly quantitative and highly aggregated data currently available to the public.

The Matrix applies the Framework's elements to the REIPPPP, asking if the REIPPPP considers the element with yes and no responses, then provides clarification points and analysis of each element. Yes means that the element is considered and can be evaluated in the REIPPPP and no means it cannot. A yes and no response means the programme has a partial indication of the element yet it may not be clear and lacks depth.

Table 13 Meaningful Jobs Creation Matrix Source: Author

Meaningful Job Element	REIPPPP (Y/N)	Clarification Points and Analysis
<b>Permanent or Temporary (how long is the job)?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y/N) Construction work is traditionally temporary by contract and as indicated in the REIPPPP but many EPCs and sub-contractors have full-time employees at the supervision level – perm employment is not taken into consideration</li> <li>• (Y) All O&amp;M positions are over a 20-year period, therefore permanent; a majority of employees reside in local communities</li> <li>• (Y/N) Although construction is deemed temporary work, most utility-scale implementation is longer than 12 months</li> <li>• (N) The duration of employment for each individual is not indicated in the REIPPPP and PMs are the unit of analysis/measurement</li> <li>• (Y) BWR4 is the first round that requires a table depicting the skill level, activities and total people employed</li> <li>• (Y) Top Management will also contribute to the O&amp;M skilled numbers yet many of the roles are part-time if working for one IPP</li> </ul>
<b>Direct, indirect or induced? (si the job defined)? Indication of the job title? Stage of the value chain (R&amp;D, Development, CMP, OMP)?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (N) No formal definition is provided and jobs are quantified by the CMP or OMP (start and end dates) not on the type of job (direct, indirect, induced)</li> <li>• (Y) BWR4 required a skills table and the number of people that would be employed with the anticipated activities for the duration of each phase</li> <li>• (Y) Bidders provided an organogram of Top Management, BEE status and gender, often indicating titles</li> <li>• (Y/N) CMP and OMP are the only indication of the jobs created leaving out the finer details of the jobs and also leaving out development, R&amp;D and other supporting services</li> </ul>
<b>Skilled, semi-skilled or unskilled?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y) The total number of skilled and unskilled employees are indicated in JB8 by person-months and in the skills breakdown table required in BWR4</li> <li>• (Y) Bidders are incentivised to employ skilled black employees over local community labour due to the bid scoring/weighting of both elements</li> <li>• (N) Skill level is limited to two categories but could include semi-skilled, highly skilled or specialised skilled</li> </ul>

		<ul style="list-style-type: none"> <li>• Recommendation for further study: Unskilled workers that learn skills on the job are not provided a certification; RE specific qualification is not nationally formalised for the artisan level (FET/TVET) except for a few training academies and higher learning universities and technician institutions (HETs)</li> </ul>
<b>Well-paid or adequate wages (A living wage)?</b>	<b>N</b>	<ul style="list-style-type: none"> <li>• Wages and salary structures are not indicated in bid submissions or quarterly reporting</li> <li>• Technical skills are rare and generally well paid<sup>35</sup></li> <li>• Bidders and sub-contractors are incentivised to keep costs low and therefore may maximise jobs through low cost labour</li> </ul>
<b>Provision of additional benefits?</b>	<b>N</b>	<ul style="list-style-type: none"> <li>• Not required or indicated in the REIPPPP and varies from each company</li> <li>• Many companies are recently established entities in South Africa and do not necessarily have proper HR processes and procedures in place</li> <li>• CMP labourers are sometimes provided with transport, meals, housing, on-site allowances and cover travel expenses, yet this is all project dependant</li> <li>• More benefits are given to supervisory roles than unskilled temporary labour</li> <li>• Benefits are becoming more common due to the competitive nature of retaining skill</li> </ul>
<b>Net job employment (previously unemployed)?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (N) Some IPP strategies mention previously unemployed persons yet it is not recorded and it is not quantified in the bid documents</li> <li>• (Y/N) Most of the unskilled or local community jobs are assumed to be filled with unemployed persons</li> </ul>
<b>Indicates beneficiary of the job (International, South African Citizen, demographic, local community resident, women, and youth)?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y) Beneficiaries are quantified/recorded in the Information Sheet (JB9) and the score/percentage provided in the Scorecard (JB9)</li> <li>• (Y) Black Women provide an adjustment factor (multiplier) rewarding bids with a higher score</li> <li>• (Y/N) Youth are mentioned but not given a formal score/weighting</li> </ul>
<b>Long-term career prospects or job security?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y) The IRP (2013) commits to annual roll-out of utility-scale REIPPs</li> <li>• (N) IRP is not law, it is policy, and can be altered at any time</li> <li>• (Y) IPPs operate for a duration of 20 years so O&amp;M jobs may potentially have a longer duration</li> <li>• (Y) Skills are transferable into other industries such as the power generation sector</li> </ul>

<sup>35</sup> An industry observation: international clients do not properly budget for the cost of technical skills in South Africa, and it is assumed that they are paid nearly 50% less than in actual terms.

		<ul style="list-style-type: none"> <li>• (Y/N) Most of the O&amp;M skills are unskilled or semi-skilled i.e. panel cleaners, groundskeepers and security guards, and therefore they will have job security, yet career prospects are not substantial</li> <li>• (Y) The RE industry is still maturing, therefore the future of the REIPPPP and a strong commercial and domestic RE industry has yet to be established</li> </ul>
<b>Safe working conditions?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y/N) Not indicated in the bid, but the REIPPPP is aligned with South African health and safety laws (i.e. the OSHA Act)</li> <li>• Recommendation for further study: Further analysis required on a case by case basis</li> </ul>
<b>Harmful or exploitative?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• South African labour laws and regulations apply</li> <li>• Construction Managers have indicated putting structures in place (i.e. minimum salaries, fair treatment of job seekers)</li> <li>• Recommendation for further study: Analysis of REIPPPP stakeholders following labour laws and what policing is done to ensure laws are not broken</li> </ul>
<b>Acknowledge workers' rights?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• Not measured in the bid and no plan must be indicated; South African laws and regulations apply and will be implemented internally with each South African Registered company</li> <li>• Industry observation: workers engage in illegal strikes to make demands</li> <li>• Recommendation for further study: Analysis of REIPPPP stakeholders following labour laws and what policing is done to ensure laws are not broken</li> </ul>
<b>Provides training and up skilling? Substantiated by a certificate or qualification?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (N) Not indicated in the bid unless it is part of the socio-economic or enterprise development plan</li> <li>• (N) Many companies send their employees overseas or train internally for practical training or required additional knowledge</li> <li>• (N) Formal artisan qualifications are limited to a one Artisan Academy, the Master Artisan Academy South Africa (MAASA) and the recent opening of the Renewable Energy Centre of Excellence (RECE)</li> <li>• (Y) May potentially be included in the IPPs enterprise development plan</li> </ul>
<b>Provides equal opportunities for individuals to obtain jobs?</b>	<b>Y/N</b>	<ul style="list-style-type: none"> <li>• (Y/N) Some bidders have set up job offices and work closely with local economic development offices, ensuring people from the local community and unemployed are obtaining jobs yet this is not a requirement and rather strategy for IPPs located close to local communities</li> <li>• (N) Many workers are not from the local community due to the lack of people, the lack of skills level and/or other SED issues such as alcohol abuse</li> </ul>

**Contribute to economic development of the local community?**

**Y/N**

- (Y) Socio-economic development and enterprise development plans are submitted at the time of bid submission and must be carried out over the 20-year period separate from the local community ownership aspects
- (Y/N) While local supply chain is encouraged (weighting in the scorecard 16.5% of the bid) to come from the local community, most rural locations do not have adequate suppliers or contractors; bidders and EPCs generally look toward more urban areas for procurement needs
- Recommendation for further study: Local community supply chain analysis for future bids before implementation; more thorough needs analysis pre-bid; training and up skilling pre-implementation to ensure local communities are prepared to receive the work

## 3.5 Key Findings

This section first provides a brief summary of the key findings of Chapter Three, and then places the findings in context by discussing how the REIPPPP does and/or does not create meaningful jobs in South Africa, and how the REIPPPP and its associated outcomes contribute to the national policy objectives stated in Chapter One.

### 3.5.1 Initial Key Findings

- The REIPPPP emphasises the **importance of job creation**. Clause 4.2.1 of Volume 5: Economic Development Requirements, puts a further emphasis on the importance of job creation, stating, *“The creation of employment is one of the priorities of Government...in light of this fact, Job Creation is one of the important imperatives of the Department in the IPP Procurement Programme”* (DoE 2013b:13).
- **Person-months (PMs) and Person-years (PYs)** are an overly simplistic aggregation used to analyse and record job creation across the value chain; however they do not refer to a job but are rather a ratio or fraction of a job. Yet, these commonly used metrics are used in the REIPPPP and also used to communicate REIPPPP job creation outcomes to the public. The use of such simplistic metrics can result in unrealistic expectations and undefined practical outcomes as discussed when analysed in section 3.2.2 (1 000 jobs does not necessarily mean 1 000 people will have jobs). “Job creation” is a multidimensional concept, and does not necessarily translate into PY when the DoE, National Treasury, bidders or the IPP-unit release job creation outcomes (DoE 2013d) or discuss jobs in general. Therefore, when referring to job creation, the correct terminology should be used i.e. jobs per MW to PY per MW to correctly reflect the meaning behind the figures.
- **Jobs per MW** is different than PY or PM per MW. By definition, the REIPPPP uses a PY per MW and not jobs per MW. Job per MW is suitable for forecasting O&M jobs (Dalton & Lewis 2011) where PY per MW can be used for forecasting aggregated construction jobs. Both metrics can be used to compare technologies and/or projects and they both favour lower capacity projects (fewer MWs) as is discussed below in the next section 3.5.2. Published outcomes by the DoE (2013c) are one-dimensional, without revealing whether the jobs being created are meaningful jobs. Renner et al. (2008) explains that you cannot extrapolate and aggregate job creation data to understand how a programme contributes to job creation potentials. The ratio of jobs per MW within the DoE is a misrepresentation, and therefore, insufficient in illuminating the meaningful impact a project will have on a local community. For example, section 3.4.2 discusses the average jobs per MW factor of the first three BWRs, yet a ratio does not provide sufficient information about the type of jobs that are being created and/or the job beneficiaries.
- **Bid window round three (BWR3)** introduced the jobs per MW element is perceived as a “game-changer” (see section 3.4.1). The addition of jobs per MW to the REIPPPP scorecard forced bidders to maximize their job creation potential in total numbers

(PMs) which potentially includes maximising unskilled and low paying labour; however, it does not incentivise bidders to create meaningful jobs. A recommendation for further study could confirm the impact that adding this element created.

- **The job creation scorecard weighting** has a more minor role in terms of its importance in the REIPPPP. Job creation does not have a huge priority in the bid weighting, and meaningful job creation is not taken into account in the bid requirements (see section 3.4.1). Only 16.5% of the bid is reserved for potential job creation elements (which includes management control and local content), and the official job creation element is only 7.5% of the bid.
- **The information sheet (JB8) and scorecard (JB9)** have the capacity to assist with the analysis of how many jobs are created for specific demographics (i.e. black, female, skilled), which does contribute to meaningful jobs creation. However, these items are recorded in PMs and the finer details of meaningful job creation (the type of jobs being created) and individuals receiving jobs are not indicated.
- **Permanent employment** is often considered more meaningful than temporary employment, and the RE construction industry can provide full-time, year-round employment all year round. For instance, the majority of construction jobs tend to be temporary even though construction in South Africa occurs all year round and according the IRP 2030 (DoE 2013c) an annual allocation (yet to be determined in March 2015) of RE will ensure a consistent RE construction industry. With the risk of contradicting the framework, construction can last for longer than 12-months per temporary contract. Consequently, one cannot conclude if a job is meaningful or not solely on the contracted time.
- **Training programmes are not indicated in the bid programme;** however, training is and one of the requirements in order for a job to be considered a meaningful job. A broad assumption can be made that if bidders are not required to indicate the training provided that they will rather employ previously trained individuals and not unskilled and unemployed individuals in order to ensure the successful completion of the job rather than uplift an individual and/or community. It takes time and investment to formally transfer skills from international companies (construction, and technical experts) to local citizens, and if not recorded in the bid, training may not be made a priority. To justify this assumption and claim, even though there is a utility-scale programme, there are still very few qualifications available for RE technicians—with most people learning informally “on-the-job”— thus RE technicians are not being formally qualified with a recognised certificate to continue a career in RE. Without a formal qualification or certificate, individuals will not be able to back-up their claims of newly acquired skills.

Most of the meaningful job creation elements in the developed framework are not clearly indicated or accounted for in the REIPPPP. Therefore, many questions and uncertainties remain about the creation of decent and sustainable jobs. Three rounds of forecasts and commitments were made in the bid submission, without being able to reflect on a practical case study, thus potentially contractually committing bidders to a twenty year period of job creation forecasts.

### 3.5.2 Economies of Scale

Smaller projects with lower capacity will always have higher jobs per MW outcome. For instance, if you have a 5MW project and a 10 MW project, the number of people and jobs created does not double from 5 to 10. Therefore, when you divide by the capacity denominator the result comes out in favour for the smaller project. In a competitive bidding process smaller projects will be rewarded more points, and in the case of the REIPPPP they will raise the floating targets. Therefore, jobs per MW is not a simple way of comparing which projects will a better investment in terms of creating more jobs for the country.

Another example to demonstrate the unreliability of quantitative analysis can be seen in the recent *Localisation potential of PV and a Strategy to Support Large Scale Roll-Out in South Africa* (EScience Associates et al. 2013). The study determines the following jobs per MW ratios for EPC activities in three different PV markets: large-scale and utility (>1MW); medium to large scale (10kW – 1MW); and small scale (<10kW).

- Large                    5.83 jobs per MW
- Medium                5.3 – 8.0 (6.7 average) jobs per MW
- Small                   6.1 – 9.2 (7.7 average) jobs per MW

The study concludes that more support should be given to the medium and large scale markets because it has the ability to create more jobs. Conversely, the job factor does not determine the number of jobs that can be created but only the intensity. Further, one 75 MW large-scale project may only create 5.83 jobs per MW, but this translates to 437.25 'jobs' (or PYs). If the medium-scale PV industry were to create the same amount of 'jobs' or PYs, there would have to be an annual installation of at least sixty-five 1MW systems over an 18-month period (the average CMP of a utility-scale PV IPP). Therefore, jobs per MW is widely misunderstood and high level quantitative analysis is not enough to draw definitive conclusions.

### 3.5.3 The REIPPPP's contribution to national policy

The National Strategy for Sustainable Development and Action Plan (NSSD) prioritises "*a just transition towards a resource-efficient, low-carbon and pro-employment growth path*" (DEA, 2011: 9) and the National Development Plan (NSP) aims to become a less resource intensive economy (NPC 2013). The RE programme creates low-carbon job opportunities (compared to conventional energy jobs in coal or petro-chemical industries) and encourages a maximum number of employment opportunities for previously disadvantaged citizens (i.e. black, women, youth and local communities). These job therefore support an industry that reduces the intensity of national resources while producing energy for the growth of the economy. Still, the quantifiable outcomes are unclear.

Creating green and decent jobs means creating equitable and quality opportunities for all (Saavedra-Chanduvi & Revenga 2010), therefore, equal access to meaningful job opportunities. A *pro-employment path* and the REIPPPP lend itself to maximising job creation (incentivising maximum PMs in bid documents), yet this does not imply maximising



the quality of the job or maximising the number of opportunities for the unemployed, women or youth to obtain meaningful jobs.

The REIPPPP framework supports opportunities for a diverse range of people, incentivising bidders to maximise the number of PMs allocated to local communities and black people, yet, the process of how job opportunities are communicated, managed and executed is unclear and therefore if it was done 'justly' is also not clear. Bid documents are insufficient to determine if the programme contributes to a 'just transition' set out by the NSSD.

While local communities are set out to benefit directly from job opportunities, these opportunities are mostly temporary unskilled or semi-skilled positions. The opportunities may be equal regarding the quantity, and local communities may even obtain 'more' PMs, yet the opportunities may not be equal in obtaining the same quantity of meaningful jobs such as those that require semi and highly skilled individuals.

### ***Create Meaningful Green Jobs***

The most recent green and meaningful policy targets are the New Growth Path (NGP)(2011) aiming to create 5 million "meaningful jobs" by 2020, targeting 300 000 direct green economy jobs (RSA 2011b), and the Green Economy Accord (2011) aiming to create 50 000 green jobs (EDD 2011). Both targets do not provide more specific details about how the jobs are quantified (i.e. head count, PYs and FTE, cumulative, and annual).

The REIPPPP creates 100% green jobs, as they support a 'green' technology industry (wind, PV, CSP,); but, the International Labour Organisation (ILO) emphasises that green job creation is not necessarily meaningful job creation (ILO 2012a). For these reasons, the REIPPPP does contribute to the NGPs target of 300 000 jobs, yet it is uncertain how many of the jobs created are 'meaningful' without a deeper investigation.

Many jobs created as a direct result of the REIPPPP are not accounted for in quarterly reporting and in the implementation agreement (i.e. development, supporting services, induced and indirect jobs), and therefore, the extent to which the REIPPPP is contributing to the creation of jobs is uncertain.

The REIPPPP and the aforementioned policy documents both do not indicate if job creation means 'new' or 'net' job creation (previously unemployed beneficiaries). For example, new jobs may be taken by individuals who are currently employed, and if a scarce skill, this industry migration may leave a skill deficit in another industry.

### ***Unemployment, Poverty and Inequality***

According to current South African President Jacob Zuma, the National Development Plan (NDP)(NPC 2013) is "the socio-economic development blueprint for the country" (Zuma 2014), aiming to: eliminate poverty (StatsSA 2013; NPC 2010); reduce unemployment from 27% to 14% by 2020 and to 6% by 2030 (*Ibid.*); and decrease inequality, as measured by the Gini coefficient, from 0.7 in 2007 to 0.6 in 2030 (*Ibid.*). The Millennium Development Goals (MDG) (StatsSA 2013) aim to eradicate extreme poverty, increase the employment-to-

population ratio (50%-70%) and reduce climate emissions by 34% below a business as usual scenario by 2015 (*Ibid.*)

Guided by the B-BBEEE Codes of Good Practice economic transformation framework, the REIPPPP requires that bidders develop and implement economic development plans with specific job creation targets defined in the JB8, JB9 and the IA. The REIPPPP targets and measures job allocation for local communities, unskilled labour, and previously disadvantaged citizens. For instance, 12% (threshold) and 30% (target) of job creation must be allocated to local community employment. Therefore, the programme may reduce unemployment by employing a large work force (54 044 FTE PYs within the wind, PV and CSP projects) (see Table 5) and at least 12% (6 485 PYs) are allocated to the local community, but PYs is not sufficient to conclude what the effect is on the NDP and MDGs targets of unemployment, poverty, and inequality.

### ***Clean Energy Production and Carbon Emissions***

The White Paper on RE Policy of the Republic of South Africa (2003) aimed to produce 10 000MWh of RE generation by 2013 and the Integrated Resource Plan (IRP) of 2010 – 2030 puts an emissions cap of 275 Mt/annum CO<sub>2</sub> coupled with an integrated RE target of 17.8 GW capacity by 2030 (DoE 2013c). Although the policy is not specific to job creation, the units of energy produced are important when using alternative ratios to measure job creation (i.e. jobs per unit of energy produced) discussed in section 3.2.3. Secondly, the RE industry is supported by government not only because it creates jobs but it also provides much needed energy on the grid (Eberhard et al. 2014).

The REIPPPP did not contribute to the target set in 2003 of 10 000MWh by 2013 because first round of bidders were finalising IPP construction in 2013. The contribution of electricity to the national grid began in September, November and December of 2013, including PV farms Kalkbult (75MW); RustMo1 (7MW); and Kokoonsies (10MW) and Aries (MW).

### **3.5.4 Recommendations for policy-makers**

Job creation in the REIPPPP, has a score weighting of 7.5% in the overall bid and a 25% weighting in the ED plan. If job creation is an essential outcome of the REIPPPP, the percentage should be reflected in the score weighting.

Job creation concepts and definitions found in bid documents lack depth in the REIPPPP (see section 3.2.1) and the outcomes and information communicated to the public contains even less detail (see section 3.4.2). Without thorough definitions and guided parameters, there are many benefits that are not measured.

The DoE could collaborate with other governmental departments to standardise job creation concepts such as: *direct, indirect, induced, skilled, unskilled, semi-skilled and highly skilled labour*. The collaboration may spearhead participatory workshops on exploring potential parameters with bidders and economic development experts in order to develop a more robust meaningful job creation framework. Research and collaboration, could also design

and develop a framework to best engage with communities and industry as to what job creation means (i.e. PMs and PYs) and how to identify and access job creation opportunities.

Sixty-four IPPs (three BWRs) had made job creation commitments before a project had been built due to the timing of the bid submission and implementation phases. As a result, many of the job creation numbers were an estimate and compromising the integrity of the initial submissions and therefore the published outcomes to the public. These commitments and outcomes could be analysed against the implementation agreement and quarterly report, substantiated with onsite job creation audits.

Additional studies could provide a deeper understanding of the impact that the REIPPP has on job creation, including: indirect and induced jobs, local content spend on products and procurement of services and other service providers such as: lawyer's fees, management consultants, economic development consultants, technical consultants, recruitment consultants, and land acquisition costs and/or services. While induced jobs, are difficult to measure within a scorecard<sup>36</sup> there are methods such as an input output (I/O) model or an analytical model, providing a more in-depth understanding of the economic impacts of the programme.

As mentioned in section 3.5.2, economies of scale are not considered in the jobs per MW analysis and, thus, has a large influence on comparing bidders (Del Rio & Burguillo 2008; SAPVIA 2013). While jobs per MW should not be removed or replaced, alternative ratios would assist in the validity and impact of the project as well as the depth of measuring decent job creation.

The REIPPPP could also implement qualitative measures to improve the outcome of meaningful job creation. To name a few:

- Implement a robust skills transfer and qualification programme, especially to unskilled and unemployed persons;
- Refine the definition of "skilled" to include semi, highly, and specialty skilled;
- Allocate a weighting to women, youth and disabled job creation on the scorecard;
- Conduct a rare skills analysis and national skills development plan;
- The industry lacks transparency and a central communication platform, therefore, one could be set up to share practical experiences of job seekers, construction workers, bidders and everyone else in the whole value chain effected by the IPP; and
- While bidders must indicate the successes of their projects, there are limited platforms where individuals along the value chain can express the obstacles and challenges. The Energy Resource Centre (ERC) (Tait et al. 2013) and the Wind for Communities working group in the South African Wind Energy Association (SAWEA)

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<sup>36</sup> This is a vital area of further research and a study is being currently being conducted by UCT PhD candidate Loveline Muluh: *The Impact of Solar Photovoltaic Technologies on Poverty: The Case of South Africa*.

host RE industry workshops aimed at decision makers to identify challenges and attempt to find solutions.

### 3.6 Chapter Three Conclusions

Economic development can be achieved through a robust RE programme, by decoupling resource use and the environmental impact underpinned by a 'green economy' (Swilling 2010). Through the analysis of the South African REIPPPP, the research presented in this thesis can contribute greatly to advancing both the theory and practice of how procurement processes within the renewable energy sector operate.

Having unpacked the complexity of defining and quantifying job creation (with special reference of the REIPPPP), the result is a clearer picture of our understanding, yet many more uncertainties arise around one of the most significant global economic development concerns. The findings emphasise the need for more research to ensure that quantifiable benefits and expectations of the public and Government are met. The vagueness is a result of the highly quantitative reporting mechanisms (i.e. quantified in PMs and PYs). That saying, some meaningful job creation elements were determined within the REIPPPP information sheet (JB9) (i.e. job creation beneficiaries targeting women, youth, black, skilled, local communities, and black top management).

Finally, this research further emphasises the importance of green and meaningful job creation to attain the vast and complex sustainable development goals set out by the South African government (within the National Development Plan (NPC 2013) and ensure the continued support of development and a RE future that does not undermine the ecosystem in which we depend on (Sitas 2013).

*"...You can do all the environmental good work you want, but if people don't have reasonably good prospects for jobs, incomes and dignified livelihoods, then they will not be supportive of what it takes to stabilize the climate and conserve nature."* - Michael Renner (Hitchcock 2008:4).

Our livelihoods, self-worth and dignity are strongly rooted in our jobs and the ability to work. Without the ability to hold a job, our sense of self-satisfaction and general fulfilment is compromised. Holding a job has a great significance; *"its anchoring function [gives] structure and purpose to people's daily lives...for most individuals the experience of unemployment is a difficult and debilitating one"* (Blyton & Jenkins 2007).

Environmental and climate change action depends on individuals having a means to improved livelihoods and contribute to the whole spectrum of human needs (*Maslow's hierarchy of human needs*, 2013). However, for people living in poverty, labour is at times their only asset to contribute to a meaningful and fulfilled life (Saavedra-Chanduvi & Revenga 2010). Therefore, job opportunities need to be decent and meaningful as well as equitable.

When analysing the quantitative data (available to the public) as well as the programme against the framework, one can conclude that the programme does aim to create decent jobs to a certain extent. To this extent, information is being collected and submitted at bid submission, followed with quarterly reporting as defined by JB8, JB9 and the Implementation Agreement. However, much of the aforementioned data and analysed information is not publically available and what is available is aggregated into PY, unspecific to the complexity of framing meaningful job creation. Consequently, if we refer back to our defining concepts, the publically available information revealed in a few tables quantifies employment and not meaningful job creation.

Publically available data and the REIPPPP documents are insufficient to understand job creation outcomes in the programme. Supplementary quantitative and qualitative research is required to unpack meaningful job creation in the REIPPPP, and intergovernmental departments could collaborate to develop a more substantial method to incentivise meaningful job creation; potentially such as a greater weighting allocation of job creation within the bid.

This study also preliminary concludes that many elements of meaningful job creation could not be analysed comprehensively using quantitative methods alone as many of the elements of meaningful job creation are qualitative in nature. In addition to an analysis of the original bid submission and quarterly reporting documents and data, the RE industry requires much interaction with a variety of stakeholders such as local communities and bidders in order to obtain more nuanced and rich data, grounded in practice, therefore, emphasising the need for further engagement beyond the scope of this study.

If the continued support of the South African Government hinges on the REIPPPP's ability to create decent and meaningful jobs, the current programme is not designed to provide substantial information into the realities of job creation, thus meeting the expectations of communities and the public. A more in-depth investigation into the utility-scale RE industry is recommended to unpack the effects of the programme and how and if the programme is contributing to the socio-economic and sustainable development goals of South Africa.

### **3.6.1 Limitations to Desktop Research**

The REIPPPP does not seem to be underpinned by a specific academic or conceptual framework. Rather, it is a legal document with a loose and very interpretive programme. With semi-uncertain definitions, bidders are left to define the parameters that are not clearly set out. Therefore, the programme and programme outcomes are not standardised and bidders are left to design and justify the outcomes.

Research to inform job creation and scorecard commitments were based on assumptions, international benchmarks and methodologies rather than actual South African RE specific case studies. Therefore, the published results (see section 3.4.2) could potentially be far off from the actual output. With a risk of 'incompliance' bidders will be incentivised to 'justify'

and comply with their original commitments rather than resubmit new plans and new justifications for plan deviations.

The source of the published results from the DoE is uncertain. They could be from bidding documents, the Implementation Plan (which is the ED plan of the IPP) submitted at financial close or actual numbers reported during BWR1 quarterly reporting. This is one of the factors compromising the integrity of the data and emphasises a need for further research directly with bidders and the DoE.

The integrity of the outcomes published by the DoE are questionable. Three rounds of bid windows of the REIPPPP were submitted before one RE generation plant had been constructed and commissioned; thus, job creation numbers may be more idealistic than what is practically achievable in reality. As bidders will be fined heavily for not reaching ED commitments, and potentially risk losing their projects, the incentives to skew results are quite substantial. Therefore, the quantitative outcomes that were published by the DoE, and thus, the analysis that was conducted may be over exaggerated, may be unrealistic because this is not what has occurred during implementation (i.e. fewer people from the community were given job opportunities than what was indicated in the bid), the quality management of the data being recorded along the value chain changes many hands and the final result may be skewed.

Global and South African RE job creation studies are funded and conducted by RE industry advocates. These include associations and organisations that support the development of a RE industry, including Greenpeace, Agama Energy, the South African PV Association (SAPVIA), GL-Garrad Hassan (Renewable Energy Consultants), the South African Wind Energy Centre (SAWEC) and, therefore, may have a positive job creation outcomes.

This research was predominantly a desktop study with both high-level and informal engagements with industry members. To understand the rich context of job creation, supplementary research is recommended that works directly with bidders (using a variety of tools such as surveys, workshops and focus groups) and engages with individuals along the REIPPPP value chain (e.g. EPC contractors, local community members, the DoE)

## CHAPTER FOUR: MIXED-METHODS RESULTS

### 4.1 Introduction

With 'green' job creation at the heart of South African Government development policy understanding what a job is and how to quantify it becomes central to achieve the development goals set out in the National Development Plan (NPC 2013; UN 2013; StatsSA 2013; RSA 2011b).

Chapter Three concluded that often the dialogue surrounding the concept of a 'job' is somewhat misleading, and can falsely imply that creating a job or getting a job means an end to an individual's poverty. Jobs are, therefore, not all decent, meaningful or quality jobs (ILO 2012b). By oversimplifying the term 'job', there is a risk of oversimplifying what is needed to mitigate development challenges. A second conclusion from the literature review and analysis, was that the publicly available data and the REIPPPP big documents are insufficient to understand job creation outcomes in the programme. Supplementary quantitative and qualitative research is required to unpack meaningful job creation in the REIPPPP.

Criticism of the green economy relates to the overinflated and ill-defined generalisations of improved livelihoods for the developing world (Lesser 2010; ILO 2012a; van Wyk et al. 2011; Renner et al. 2008), therefore, one must be careful about the claims that are made without overstating the benefits of creating jobs under the auspices of a green economy. Committing to a deeper investigation of job creation improves the understanding of what constitutes a meaningful job beyond the mere quantification. Thus this chapter intends to further explore the newly established RE procurement programme in South Africa and its potential to create meaningful jobs.

By engaging closely with REIPPPP job creation stakeholders (local community, bidders, developers, construction employees, the DoE, and economic development managers), this chapter is designed to extract more quantitative and qualitative raw data of the first three bid window rounds of the REIPPPP, aimed to address the following questions:

- What job creation commitments did REIPPPP bidders make?
- How many jobs are being created for South Africans?
- Can alternative ratios tell us more about the positive or negative outcomes of the REIPPPP in terms of job creation?
- What are the main challenges for job creation in the REIPPPP?
- What can qualitative interviews tell us about meaningful job creation?
- What suggestions can be made to improve the REIPPPP, the meaningful job creation framework?

The Chapter is structured to first present the results and major outcomes, then engages in a discussion.

## 4.2 Methodology Recap

This Chapter uses a combination of quantitative and qualitative, commonly known as mixed-methods (Creswell & Clark 2007; Creswell 2012; Johnson et al. 2007; Yin 2009; Mouton 2007) to explore job creation. By combining both existing numerical data (person-months) (DoE IPP-unit on-line database) and data from an initial survey, semi-structured interviews and direct observations, the outcome is a more nuanced understanding of meaningful job creation within the RE sector. Results are triangulated and analysed using the meaningful job theoretical framework that was developed in Chapter Three.

The justification for engaging with a multitude of methods reflects the confidentiality of the industry and the limited data sources accessible to the researcher. The end result was to utilise the most robust sources in an exploratory investigation of job creation in a pragmatic convergent parallel design (Creswell 2012). Practically speaking, one set of data, was therefore, not fully analysed before another set of data was collected and at times, quantitative data and qualitative data was collected at the same time, unable to inform one another in future studies.

## 4.3 Results

### 4.3.1 Survey Results

The survey resulted in a total of five respondents, while the personal details are left out to honour confidentiality requests, respondents were self-categorised: three Technical Consultants, one NGO, and one Developer/Equity Shareholder/O&M. Delineated questions and results can be Appendix G: Wind for Communities Survey, to accompany the summary below and qualitative themes that focused in the challenges and the successes were extracted from the answers and will be used in the triangulation analysis in the discussion.

According to Jalil & Muaz (2013) two things may have contributed to the survey's lack of responses, one, the questions may have required respondents to look up quantitative job creation data on-file and two, the survey asked for perceptions (successes and challenges) rather than simple quantitative answers. The lack of response could also be an indication that information is confidential and REIPPPP stakeholders would prefer to not share or publish quantitative results. Lidia Alfonso, from GreenMax Sustainability & Finance, substantiated unwillingness of bidders and other stakeholders to share information by means of an on-line survey regarding employment and skill requirements (Alfonso 2014)<sup>37</sup>, having distributed two and receiving minimal results.

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<sup>37</sup> During a personal discussion following her presentation to a SAPVIA networking event, Lidia Alfonso discussed her twice attempted survey (once from an IDC network and second through personal networks) also received minimal responses. Her research was to identifying skills requirements from bidders to inform the training needs of the newly established Renewable Centre of Excellence (RECE) in the Northern Cape, aimed at training local communities RE specific skills.



### **Survey Summary**

The primary obstacles to job creation (in no particular order) include the availability of needed skills, both skills from the local community or skilled South Africans willing to live on site. Skills difficult to find are those with previous RE experience and skilled individuals from the local community (within the 50km radius). Therefore, most of the jobs created in local communities for the duration of construction were 'unskilled labour' and options for long-term 'sustainable' O&M jobs are limited due to their technical nature. One response noted that people willing to work on site migrated into the local community. The ED Manager that provided a majority of the responses emphasised the challenges by stating local services providers (providing local products and services to the IPP) are very difficult to identify (if they exist at all), and the DoE and local municipalities have not grasped the implications of this, the ED Manager emphasising the lack of local procurement in local communities near projects has seemingly negative implications on stakeholder relationships with the IPP.

Other responses stated that there are challenges when communicating with communities about the potential benefits and expected outcomes of the RE plant (job creation, SED/ED, ownership), and that cultural differences in South Africa make it difficult to roll-out projects because communication and cultural empathy is compromised. One technical consultant stated that the programme lacks a long term (sustainable) plan or horizon, and therefore, sustainable job creation is affected.

Some of the main obstacles when quantifying job creation was the confusion around man-hour (PMs) requirements as requested by the DoE. The ED Manager elaborated that it is difficult when measuring actual job numbers on-site that have to be translated into aggregated man-hours.

Not all the job creation outcomes were negative, and all respondents recognised that the REIPPPP could provide a substantial contribution to job creation. Some of the positive aspects included that a great number of 'induced' jobs have been noticeably created in the local communities such as in hospitality and other service industries. Induced jobs and spin-off effects are noticeable in the hospitality and retail sectors. Further, employment streams have been created due to the job creation requirement and managing processes i.e. CLO, Stakeholder Engagement, and Consultants.

To assist local community members in receiving job opportunities, a local Community Liaison Officer (CLO) is appointed to manage a 'job desk'. As a result, the IPP project had met and exceeded all job creation commitments. Of the 602 people on-site, 271 (45%) were from the local community, and all previously unemployed. Lastly, one *"Project Company established a Social and Ethics Committee of the Board as the governance structure for the programmes. They determined the ED strategic mandate which is focused primarily on the development of emerging farmers in the 50km radius"*.

Although the survey was not a complete success, the follow-up workshop aimed to attract fifty participants was oversubscribed. The diverse group of attendees within industry (see Appendix I: Workshop Participants) and effort to attend (many attendees flying from other

parts of the country) made it was clear that the industry was willing to participate and sought engagement.

The lack of respondents to the survey was thus a result of not willing to share information on-line, lack of time, uncertainties of benefits of being a participant, or simply respondents did not have any answers. The lack of responses of the survey, yet willingness of stakeholders to engage on a more personal level, and as discussed in Chapter Two: Methodology, changed the scope of the methodology to include semi-structured interviews.

### 4.3.2 Database Results

Three tables of results are presented in this thesis. Firstly, Table 14, displays the total PMs in the categories of total jobs, total citizen jobs, citizen jobs of both the CMP and OMP, total OMP PY, and finally provides an estimate of how many total FTE jobs will exist during the OMP on an annual basis (OMP Citizen/12(PY)/20). PMs are further divided into each primary technology (OSW, PV and CSP).

Two additional tables of results are provided one in the Appendix N: IPP-unit Database Outcomes Table 24 Total Jobs per province and alternative ratios; and Table 15 Proportion of job beneficiaries below; followed by a discussion that focuses on significant outcomes.

**Table 14** Total Jobs per primary technology Source: Author (DoE 2014)

Preferred Bidders PM	PERSON-MONTHS PER TECHNOLOGY			
	Total PM	OSW	All PV	CSP
Total Jobs PM	716 853	249 274	341 461	145 710
Total Citizens (PM)	629 701	232 957	290 506	125 051
% of citizen PMs per international PMs	0.88	0.93	0.85	0.86
CMP Total Citizens (PM)	225 278	74 500	81 247	73 547
OMP Total Citizens (PM)	404 423	158 457	209 258	51 504
% CMP PMs per OMP PMs	0.56	0.47	0.39	1.43
% OMP PMs per CMP PMs	1.80	2.13	2.58	0.70
OMP Total Citizens (PY)	33 702	13 205	17 438	4 292
OMP Citizen/12 (PY) / 20 (O&M years)	1 685	660	872	215

#### **Total PMs**

Table 24 presents the following outcomes:

1. 716 852.9 PMs are committed for the first three BWRs;
2. This translates to 59 737 PY (59 737 people working 160 hours per month for one year);
3. 1 685 O&M jobs (1 685 people working full-time for 20 years); and
4. 59% of all PMs are allocated to the Northern Cape, followed by 20% in the Eastern Cape (see Figure 18).

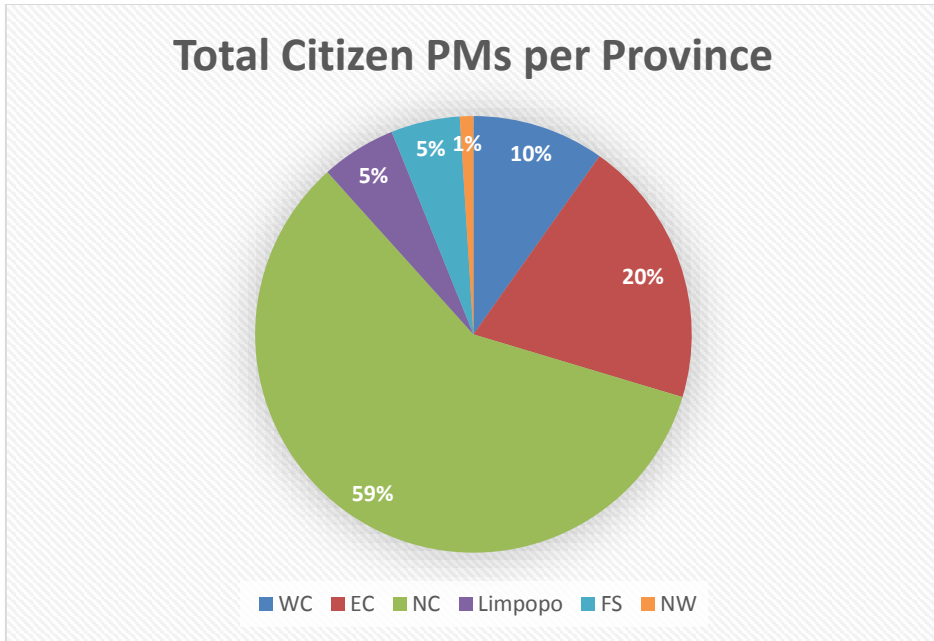


Figure 18 Citizen PMs per province Source: Author (DoE 2014)

Additional significant outcomes are depicted in Figure 19 Total PMs per primary technology, Figure 20 OMP Citizens versus CMP Citizens; Figure 21 Primary technology PYs for the CMP requirements for the Figure 20 OMP Citizen versus CMP Citizens Source: (DoE 2014) for the duration of the assumed construction period of each technology; Figure 22 Citizens PMs versus Total PMs per technology; and Figure 23 shows the percentage of total citizen jobs within each primary technology (biogas, biomass and hydro are not included, while PV is all combined into one figure).

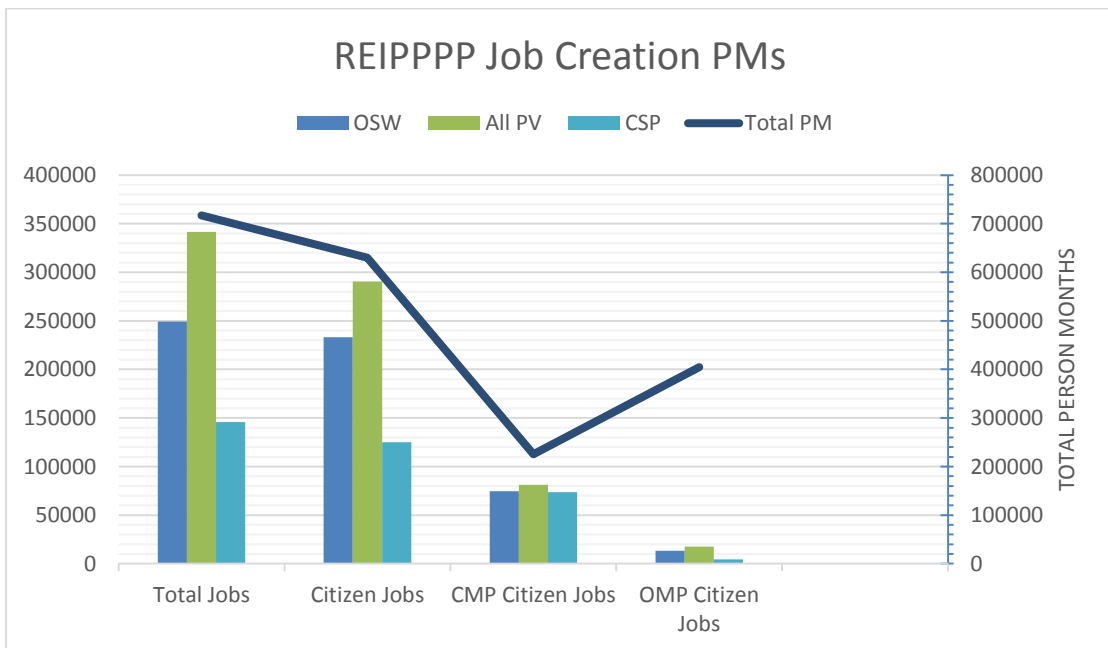


Figure 19 Total PMs per primary technology, Author's compilation Source: (DoE 2014)

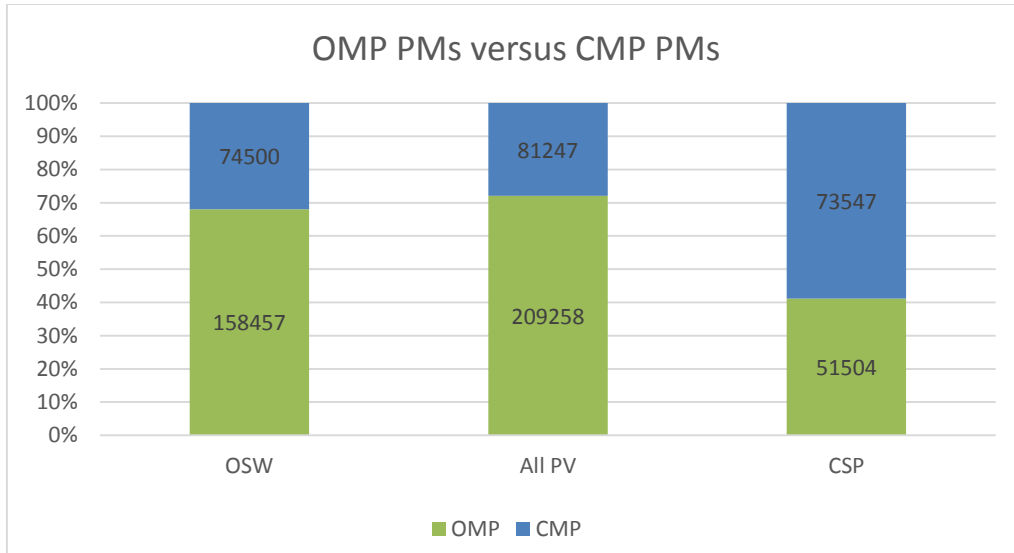


Figure 20 OMP Citizen versus CMP Citizens Source: (DoE 2014)

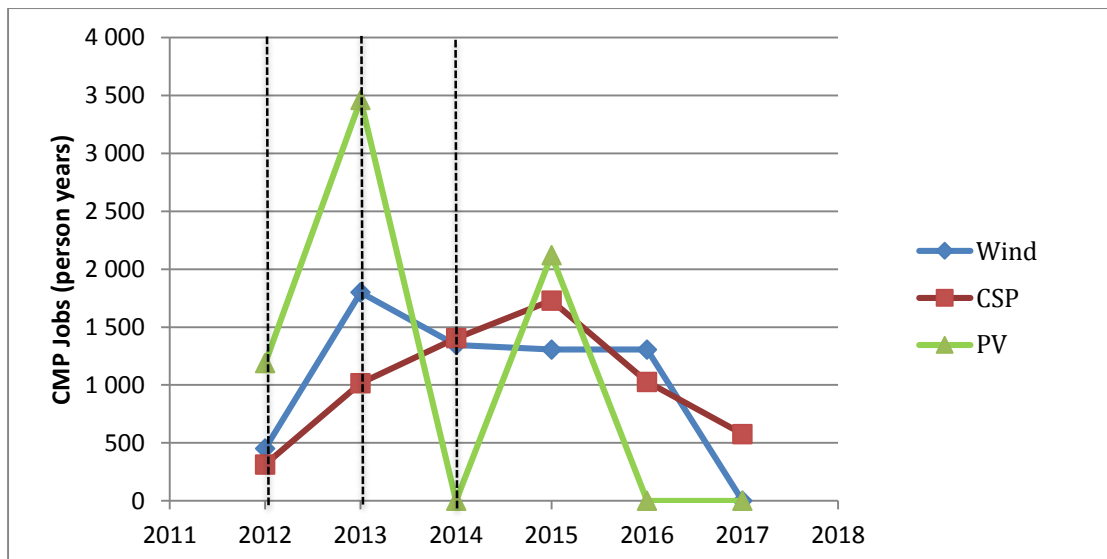


Figure 21 Primary Technology PYs for the CMP requirements Source: Author (DoE 2014)

The assumed durations for the three primary technologies in Figure 21 were 12-months for PV, 24-months for OSW and 36-months for CSP. The graph displays the PM booms and busts of the construction period, a boom being financial close and the bust being the beginning of the CMP. At the moment, 2016 does not have any PV jobs for the construction period, as BWR4 preferred bidders have not been awarded. Without any delays and financial close is achieved in July 2015, a PV PM boom will occur in 2015 and bust in the middle or end of 2016. The graph does not show the overlaps of projects but rather the total PM allocated for each year to show a trend of employment during the CMP.

**Alternative Ratios<sup>38</sup>**

Alternative ratios, displayed on the same table (see IPP-unit Database Outcomes Table 24), include, Citizen Jobs per Total Jobs (to identify what percent of job opportunities were allocated to internationals); Citizen Jobs created per 1 000 or 10 000 people (of the working age population) (age 15-64) (StatsSA 2014a); jobs per Rand invested (jobs/unit of energy generation (GWh) in a P90 scenario<sup>39</sup>). Significant outcomes include 88% of all jobs are reserved for South African Citizens and when assessing jobs per population, for every 100 000 people in the NC, 115 people will be working full-time on REIPPPP OMP activities.

Unemployment population per province was another ratio the researcher looked to analyse and is not included in the table; however, the only recent numbers were found in StatsSA, (2014) on a national basis (Jan-March 2014). Total unemployment (rounded) was 5.067million (2.607million men and 2.46million women). Therefore, if the REIPPPP creates 629 701 total citizen FTE jobs, if divided by 12-months and then again by the total unemployed population, 1.04% of the national unemployed population could potentially have jobs in the REIPPPP if all jobs created in the O&M phase were 'new' jobs.

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<sup>38</sup> Alternative ratios are primarily presented for further study, as a comparison with conventional technologies can be used for future decision making and policy development.

<sup>39</sup> A P90 scenario indicates a 90% confidence of the forecasted energy yield (MWh) over 20 years of the IPP

Table 15 Proportion of job beneficiaries jobs Source: Author (DoE 2014)

		PMs PER PROVINCE							PMs PER TECHNOLOGY		
Total Jobs		Total Percent	WC	EC	NC	Limpopo	Free State	NW	OSW	All PV	CSP
Total Jobs	Citizen Jobs	87.8%	88.5%	92.7%	86.5%	87.8%	84.7%	89.6%	93.5%	85.1%	85.8%
	International Jobs	12.2%	11.5%	7.3%	13.5%	12.2%	15.3%	10.4%	6.5%	14.9%	14.2%
	Total Black Person	65.4%	56.7%	76.2%	63.1%	67.6%	65.2%	71.0%	73.5%	61.2%	58.1%
	Black Female Percent	2.4%	2.4%	1.2%	2.8%	1.9%	1.8%	3.6%	2.3%	2.4%	2.0%
	Unskilled percent	58.3%	35.7%	62.4%	58.9%	62.8%	72.2%	72.1%	54.8%	62.9%	55.1%
	Black Skilled / Skilled	49.4%	38.3%	50.4%	51.4%	56.0%	45.4%	64.7%	52.0%	50.2%	41.3%
	Local Community	41.8%	33.5%	57.6%	37.4%	41.1%	45.3%	68.9%	50.9%	41.7%	25.2%
<b>CMP Jobs</b>		<b>Total Percent</b>	<b>WC</b>	<b>EC</b>	<b>NC</b>	<b>Limpopo</b>	<b>Free State</b>	<b>NW</b>	<b>OSW</b>	<b>All PV</b>	<b>CSP</b>
Construction Period Jobs (CMP)	Total CMP PMs	37.7%	35.3%	29.3%	44.6%	13.1%	24.6%	10.3%	34.5%	29.0%	61.1%
	CMP Citizen Jobs	83.5%	71.3%	87.7%	84.5%	84.6%	78.6%	51.8%	86.5%	82.2%	82.6%
	International Jobs	16.5%	28.7%	12.3%	15.5%	15.4%	21.4%	48.2%	13.5%	17.8%	17.4%
	Total Black Person	57.7%	44.0%	62.1%	58.9%	58.4%	52.5%	30.5%	64.5%	53.3%	55.7%
	Black Female Percent	0.9%	0.5%	0.3%	1.1%	1.0%	2.5%	1.7%	0.5%	1.8%	0.4%
	Unskilled percent	83.4%	85.2%	81.6%	82.8%	88.7%	92.5%	96.1%	75.2%	84.7%	90.1%
	Black Skilled / Skilled	44.8%	27.3%	44.3%	49.3%	45.0%	25.4%	23.1%	49.0%	46.7%	34.7%
Local Community	27.5%	16.9%	35.4%	27.3%	18.6%	32.7%	19.4%	35.3%	25.4%	22.7%	
<b>OMP Jobs</b>		<b>Total Percent</b>	<b>WC</b>	<b>EC</b>	<b>NC</b>	<b>Limpopo</b>	<b>Free State</b>	<b>NW</b>	<b>OSW</b>	<b>All PV</b>	<b>CSP</b>
Operation Period Jobs (OMP)	Total OMP PMs	62.3%	64.7%	70.7%	55.4%	86.9%	75.4%	89.7%	65.5%	71.0%	38.9%
	Citizen Jobs	90.5%	97.9%	94.8%	88.1%	88.3%	86.7%	94.0%	97.1%	86.3%	90.9%
	International Jobs	9.5%	2.1%	5.2%	11.9%	11.7%	13.3%	6.0%	2.9%	13.7%	9.1%
	Total Black Person	70.0%	63.6%	82.0%	66.4%	68.9%	69.3%	75.6%	78.3%	64.5%	61.9%
	Black Female Percent	3.2%	3.4%	1.6%	4.2%	2.0%	1.6%	3.8%	3.2%	2.7%	4.6%
	Unskilled percent	55.6%	30.2%	64.0%	53.7%	61.0%	72.8%	70.8%	57.7%	61.2%	29.1%
	Black Skilled / Skilled	51.7%	43.0%	53.3%	52.7%	57.1%	52.5%	67.4%	53.9%	51.4%	45.4%
Local Community	50.3%	42.6%	66.8%	45.5%	44.5%	49.4%	74.5%	59.2%	48.3%	29.2%	

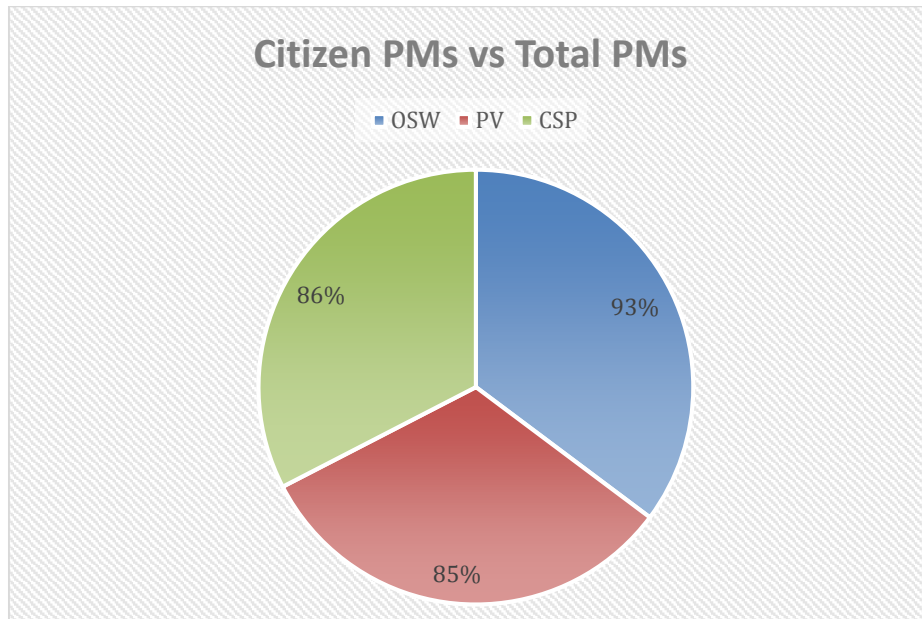


Figure 22 Citizen PMs versus Total PMs per technology, Source: Author (DoE 2014)

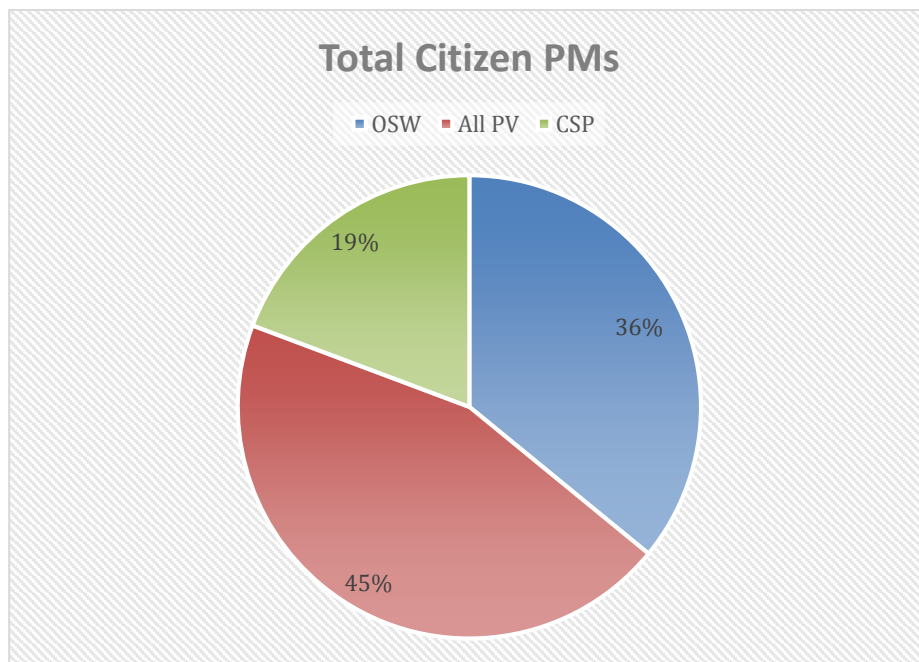


Figure 23 Total Citizen PMs per primary technology in BWR1-3 Source: (DoE 2014)

### **Job Creation Beneficiaries**

The final table, Table 15, presents a job creation beneficiary breakdown and comparison analysis of commitments made by bidders. The table assesses percentage across provinces as well as primary technology, and the percent reveals a percentage of the total PMs and is not measured against itself. Some of the significant outcomes are the top and low performers. The Eastern Cape performs well in allocating citizens, black persons, and local community to both OMP and CMP activities, but is the lowest provider of black women jobs.

Another significant outcome, local communities participation is only 27.5% (nationally) in CMP activities, but these nearly doubles to 50.3% during O&M activities when jobs are tend to be more permanent.

Unexpectedly, on average, when all job creation PMs are aggregated per province in all three BWRs, the programme has exceeded all thresholds and targets set out in the bid document scorecard (see Table 16). When averages were separated into primary technologies, OSW and PV both exceeded the scorecard target, while CSP only achieved 25% of the 30% target.

**Table 16** Average Job Creation targets and commitments Source: (DoE 2014)

Job Creation Beneficiary	Threshold	Target	Achieved (all provinces and all technologies)
<b>RSA Based Employees who are Citizens</b>	50%	80%	87,8%
<b>RSA Based Employees who are Black People</b>	30%	50%	65,4%
<b>Skilled Employees who are Black People</b>	18%	30%	49,4%
<b>RSA Based Employees who are Citizens from Local Communities</b>	12%	30%	41,8%

### 4.3.3 Interview and Direct Observation findings

The intimate approach of interviews and direct observations resulted in a favourable and sometime unexpected outcomes. For example, access to the DoE and IPP-unit did not only result in quantitative outcomes, but much could also be learnt through direct observation and casual unstructured interviews when interacting with contractors and employees of the IPP-unit. This included an impromptu one-on-one meeting with Karen Breytenbach (Senior Project Advisor at the South African National Treasury) who spearheads the REIPPPP in government; and much interaction with others consultants directly involved with the REIPPPP.

A total of sixteen interviewees participated in semi-structured interviews, nine in the *instrumental case* (Yin 2009) and an additional seven in-person engagements. The core nine interviewees in the instrumental case, were working directly for the implementation phase of a PV project in the Northern Cape. All but the local community members (job seekers) and the CLO, had experience working on more than one IPP. One participant had also worked on a wind farm managing construction and commissioning activities.

Table 25 and Table 26 (see Appendix O) organise the outcomes of the engagements into the perceived successes and challenges themes of REIPPPP job creation. The successes and



challenges themes are from the viewpoint of various job creation stakeholders and categorised by the researcher. As most of the results are from an *instrumental case (Ibid.)*, the results do not attempt to provide a generalised outcome of the entire industry, but rather to identify meaning and common themes within a few deep engagements that would normally be left unknown. Thus, these results are not claiming that this is what happens across the REIPPPP, yet are beneficial in supplementing various other cases used to understand the industry.

The outcomes of each interviewee are listed by the stakeholder category: Economic Development (ED) Manager (of the Bidder and EPC); Department of Energy (DoE); Engineering Procurement and Construction (EPC) service provider or Construction Manager; Labour Broker<sup>40</sup>, Sub-Contractor (to the EPC), Local Community (Job Seeker) and the Community Liaison Officer (CLO), and an indication of the method used to collect the data is provided preceding the data point; either a SSI or DO. More details are not revealed about the project and stakeholders to protect the identity of the projects and respondents, set out in the required NDAs<sup>41</sup>.

A majority of interviewees expressed the importance of confidentiality, and there is a risk of 'saying too much'. Nevertheless, common themes included the difficulty to source skills within the 50km radius border and the overwhelming amount of paperwork that was involved in compliance and day to day administration around job creation. Respondents were critical of the 50km radius defined by the REIPPPP, and expressed that not enough capable people (either were lacking skills or were in poor health) resided in the local community and rather required to source from two or three surrounding towns even if outside of the 50km radius. However, a majority of the people working onsite are from local communities, and are generally 'unskilled' who do not require any training.

Surprising was the empathy of interviewees for the local community members, the Construction Manager and sub-contractors commented specifically on their lack of their access to future opportunities once this project was complete; yet all interviewees of all skill level working on contract expressed an uncertainty of where they themselves may find another job once the project moved into an OMP stage.

A few additional surprising results emerged from the engagements. All stakeholders (except the DoE) commented on the RE industry provides the highest paying job opportunities in the area. A second surprising result was the contradicting position about women, some preferring to hire women and others forbid hiring women due to the environment and nature of the work. Additional contradicting themes, perceived similarities are deliberated further in the discussion.

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<sup>40</sup> Originally clustered with sub-contractor as a service provider to the sub-contractor, however, there were many responses during an semi-structured interview that the category needed a heading of its own

<sup>41</sup> NDAs were signed by the researchers to not reveal any details about the projects besides the technology and the province.

## 4.4 Discussion and Conclusion

### 4.4.1 Bidder Commitments

#### **Total Person Months**

Quantitative data collected from the IPP-unit is much more detailed than the publically available outcomes published in November 2013 (DoE 2013). In terms of providing meaningful job creation, the higher the percent indicates more opportunities are allocated to beneficiaries in respect of JB8, the BBEEE Codes of Good Practice and thus economic transformation. The result is a more in-depth analysis comparing beneficiary job creation results per province and primary technology.

Of the three primary technologies, OSW allocated the highest percentage of jobs to citizens as seen in Figure 22, 93%, compared to PV (85%) and CSP (86%). PV creates the most PMs (see Figure 20) for both CMP (81 247) and OMP (209 258), and every year the PV industry will employ roughly 872 individuals. This high number may be a direct result from PV having the highest number MWs for the first three BWRs.

The REIPPPP will employ 33 702 PYs (i.e. 33 702 individuals jobs for a one-year period or alternatively 1 685 individuals over a period of 20 years). Since these figures comprise only what is recorded on JB8, a large number of permanently employed people are not considered in these figures as they may be involved in development or indirect activities found along the RE value chain (see Figure 3).

CSP has an unexpectedly high job creation ratio when comparing CMP to OMP, 143% more CMP jobs will be created than during the OMP compared to OSW at 47% and PV at 39%. It was expected that CSP would create more jobs per ratio in construction than in the OMP. CSP's high percent of CMP PMs compared to OMP PMs (see Figure 20), is potentially a result of the long construction period (often exceeding 24 months).

To conclude on the CMP and OMP results (see Figure 20), OSW creates more permanent jobs than PV. However, it is uncertain to know the types of jobs and how many of the CMP jobs are permanently employed individuals, therefore, these results can only begin to show us trends in bidder's commitments, but cannot conclude on the ability to tell us if jobs are entirely meaningful.

#### **Job Creation Beneficiaries**

Surprisingly, overall internationals are only allocated 12% of the total PMs (fewer than one may have thought) (see Table 15). When distributed into the CMP and OMP, more international skills are utilised during construction (16.5%) than the OMP (9.5%). Black individuals hold 65.4% of all allocated PMs and 41.3% of all citizen PMs are allotted for local communities, leaving only 24.1% of all citizen jobs that do not permanently reside within the 50km radius surrounding the IPP. However, most citizen jobs are defined as 'unskilled' (58.3%), and during the CMP 'unskilled' jobs make up 83.4% of this ratio, dropping to 55.6% during the OMP. Lastly, only 2.4% of jobs are allocated to black females with 0.9% in the CMP and jumping up to 3.2% in the OMP. These percentages deliberate the overall averages

across all technologies and provinces; however, each province and technology have their own unique outcome.

The Eastern Cape has allocated the most citizen jobs when compared to total jobs at 92.7%, which is also the province that allocates the highest percentage of jobs for black persons (76.2%), when compared to total citizen jobs. OSW allocates the highest percent of PMs (93.5%) compared to PV and CSP (85% and 86% respectively) and, therefore, OSW also allocates the fewest percentage of PMs to international jobs (6.5%). Surprisingly, PV has allocated the most PMs to internationals even though OSW and CSP have a reputation to require more technical and specialist skills as a result of the specialised technology (i.e. blades, the nacelle, central receiver). Yet, when compare black women PMs allocation to total citizen jobs, the Eastern Cape allocate the least (1.2%).

Other interesting outcomes when determining which province and technology allocated the most and least PMs to specific job beneficiaries included the following:

- Highest black female: NW province (3.6%) and PV (2.4%)
- Lowest total black persons: West Cape (56.7%) and CSP (58.1%)
- Lowest unskilled: WC (35.7%)
- Highest unskilled: Free State and NC both around 72%
- All techs unskilled range: 55-63%
- Black skilled: lowest WC (38.3%) CSP (41%)
- Highest black skilled: NW (65%) and Limpopo (56%) highest tech is OSW (52%)
- Lowest local community: WC (33.5%), NC (37.4%) CSP (25.2%)

Other trends identified were the differences between the CMP and OMP. The CMP allocated more jobs to internationals, and black persons, than during the OMP. Yet, more black females and unskilled PMs are allocated to the OMP, except for the Free State where more black females are in the CMP than the OMP. Therefore, if referring to meaningful jobs, more job beneficiaries defined in the REIPPPP scorecard are benefiting from long term jobs than short term jobs in the CMP; however, a majority of these jobs are unskilled. Thus, quantitative data cannot conclude on if permanent jobs are meaningful and further research is required to determine how meaningful OMP jobs are in the REIPPPP.

### ***Short analysis of beneficiary terminology***

As defined by the bid documents (see Appendix K: REIPPPP Job Creation Definitions) black includes all racial demographics (Indian, Coloured or Black) yet the definition of 'unskilled' and 'skilled' is also not clearly defined and mean different things to different people.

Unskilled could mean that no training is required to do a job, yet an induction process is presumed to be required at every level, even cleaning crews would need a little training on how to treat the panels and look out for any damaged panels or infrastructure. Security guards are also most likely on this 'unskilled' list, and although they do not need a degree, they do receive a certificate. Further, as bidders receive more points on the scorecard for allocating skilled individuals PMs, and do not receive points for allocating unskilled PMs, bidders are incentivised to allocate more PMs to skilled positions.

The intent is to not define what is meant by skilled and unskilled, and it is rather to provide an example of the complexity behind the seemingly simple terminology.

Quantitative outcomes and percentages inform us about job creation beneficiary trends, yet do not tell about wages, benefits, if beneficiaries were previously unemployed individuals (new jobs or net jobs), or other meaningful job creation elements. Therefore, the qualitative engagements are essential in determining the richer aspects of job creation in the REIPPPP.

#### **4.4.2 Similarities and Conflicting results (Qualitative Engagements)**

Observations and site-visits provided aspects of meaningful job creation that could not be found during the quantitative data collection or when analysing bid documents.

A general authenticity was observed from multiple stakeholders wanting to devise appropriate strategies and plans to ensure that local communities benefited from the implementation of the IPP. A common obstacle to successful job creation was the lack of skill(s) within local communities, and evidence of this was found in many sources: the survey; during the SAWEA workshop; personal interviews; and by direct observation. For example, sub-contractors, construction managers and bidders were frustrated that they could not find suitable skills within the community, yet it was not only a lack of skills that prevented local community members from obtaining job opportunities, but also socio-economic challenges (i.e. drugs, alcohol and nutrition) played a part in the ability of individuals to do the job and provide a safe working environment for everyone else on site.

##### ***Local Skills***

Many contractors were investing in training, such as health and safety and other basic construction teachings. Contractors would rather train and upskill than use more efficient international labour, yet international labour at times were the only ones that had the skills to do the specialist work. Transfer of skills was often not possible due to international language barriers. Several contractors stated that they prefer to hire from the local community and it is actually easier than bringing in labour since accommodation and sustenance allowance is expensive and also causes much tension in the community to use outside labour. However, a conflicting result emerged, in that the jobs that most local community members were allocated were unskilled and no training was really required. This was stated in an interview with a sub-contractor and is also evident in the database PM allocation.

##### ***Women Beneficiaries***

From the local community perspective, an overall sense of unfairness was expressed during one site visit. Several women perceived that the individuals benefitting from job opportunities had been previously hired ('already had a turn'), were previously employed ('taking better pay'), and women were not getting hired because of the environmental conditions. Two confirm the women's perceived 'unfair' suspicions, two individuals (sub-contractors) confirmed that they do not hire women because of the labour conditions, either requiring heavy lifting or digging trenches. Yet a second sub-contractor confirmed that

they preferred to hire women which was also expressed on a CSP plant during an industry discussion. The preference of employers was a result of the women being more reliable and had less risk of alcohol and drug addiction.

### ***Meaningful Job Creation***

Local communities also confirmed aspects of meaningful job creation that would otherwise not be known unless site visits were conducted. Local communities perceive IPPs to be creating good opportunities for local communities, they had a good reputation for paying a better wage (higher than any other general labour job in the area and double what they would normally receive; from R18 an hour to R33 an hour) and individuals stated that they would rather work on the IPP than in the mining industry where most people had previously found work. This view from the local community is a contradiction by what some contractors say, in that the environment is a harsh working and living environment. Therefore, the perception of a 'better work environment' is relative. Communities claimed having worked in mines, they would much rather work in the hot dessert constructing a PV farm, due to the IPP being a much more favourable and higher paying environment.

Other meaningful job aspects picked up during site visits was that the communities perceived long term career options within the PV industry. Communities were well aware of the utility-scale programme across the country, and believed that if they obtained experience they could get jobs elsewhere in the programme.

A final aspect was revealed in both the survey and through an interview with a CLO, that an unemployment database was created and the processes was managed to ensure equal opportunity was given to all community members. The CLO reported that this process only works if strict management of the database is kept by one person, or it can be easily taken advantage of and used to manipulate and control who and who does not get job opportunities. This job creation office was also seen in the response of the survey from an ED Manager representing three individual IPPs, thus demonstrating the industries attempt to provide equal opportunities for local communities.

During interviews and through direct observation, it was apparent that information is kept very confidential and companies do not want to admit failure. During an interview with a labour broker on-site, there was an overwhelming sense of discomfort and mistrust felt from the interviewee. It was often that the interviewee seemed to be justifying their existence on the project, legitimising what they knew, and often over emphasising elements of workers' rights. The CLO was in accompaniment during the interview and it was apparent that there was tension with regards to the process and communication of getting unskilled and unemployed labour from the local community. The conversation was often directed by the interviewee to emphasise ethical behaviour, regulation procedures, and reiterated the level of transparency that was required with all players. It is possible that the respondent would have answered the questions differently if the CLO was not in the room as the Labour Broker seemed to give reference to past events or current tensions, and attempted to sympathise with the CLO as the auditor of ensuring sub-contractors are following labour laws.

### **4.4.3 Unexpected Incentives**

Semi-structured interviews, direct observation and personal experience revealed that every stakeholder in the RE value chain has different incentives and expectations of REIPPPP job creation. The South African Government and local government incentives are somewhat assumed, wanting to achieve high level goals set out in policy and legislation without policing and enforcement. During interviews, local community members and ED managers revealed that the Local Municipality can use job creation as a tool to provide good news to communities and may lead to false expectations. False expectations were observed when interviewing local community members, as they felt that more people would be getting job opportunities.

Incentives and drivers have different required outcomes. It is important to understand the required outcomes by different stakeholders so that we understand why individuals and groups of stakeholders have different priorities and actions to achieve these priorities.

#### ***IPP Incentives***

Bidders and IPP equity shareholders' have an incentive to ensure they comply with their commitments, and want to avoid major obstacles for the duration of the implementation and operations of the project. Bidders, are therefore, driven to employ as many individuals as possible to earn the highest score on the scorecard, and are also driven to employ high skilled individuals that can ensure a better outcome regarding the project's success.

That saying, an unexpected result of the research was that most bidders have a genuine interest to leverage IPP projects to uplift the local community, specifically if they themselves were South African residents. Bidders perceived obstacles were the unclear interpretations and undefined parameters of the REIPPPP, specifically from a compliance perspective. The second obstacle was also creating legitimate socio-economic opportunities for local communities within the confines of the IPPs ED plans. Further, from a recruitment perspective, many bidders necessitate the acquisition of black and black women skills even though they are not contractually obligated by the IPP or incentivised by the improvement of an internal BEE score/level. It was observed through personal experience and during interviews that bidders and some construction companies (EPC) understand the value of being a decision maker and the responsibility it holds in the economic transformation of the country.

#### ***Construction Company Incentives***

EPCs and sub-contractors have a similar incentive that is commercially driven, and that is to win and execute a contract on time and within budget. It was often heard in industry discussions, "we just want to build." Each entity will win the contracts by being the most competitive in terms of maximising the bid's ED score at the time of REIPPPP bid submission, as well as offering a 'higher' BEE rating (above a level 4) and of course costs and underwriting guarantees (risk). The second incentive of contractors and construction companies is to do the job as efficiently and quickly as possible to save on operational costs and perform well, and often it does not translate to hiring the maximum number of people, but the most skilled people that can operate and work in rural conditions.

### ***Local Community Incentives***

Local community members seem to have an opposite incentive to the EPC or sub-contractor; with engagements of job seekers and industry, the incentive is centred around the job, and maintaining the job for as long as possible, the longer the job the longer the pay check lasts and the less hard work has to be done. This is not conducive to completing a project quickly and efficiently. One interviewee claimed that communities intentionally miss days at work and stage strikes not only for higher pay and additional bonuses but also so the project lasts longer, and therefore, the pay check. Another obstacle to completing the job efficiently was local communities would sometimes miss work the day after pay days or after working a Sunday when they received double pay. Aside from the different incentives, these two entities depend on one another in the REIPPPP implementation and operations process. Divergent incentives of the EPC, sub-contractor and local community members, can potentially lead to conflict and friction.

Local communities are therefore perceived to have a personal stake, and look at the opportunity from the perspective of the 'self' and also for the benefits of the local community. Negative spin offs include that the individual does not buy into a company culture, and is not motivated to complete a project efficiently (on time and within budget). For some this is the only job that they may ever have, and therefore, the incentive is to take advantage of the situation and potentially make the job last as long as possible. As seen in the interviews, several managers confirmed that illegal strikes, unauthorised absences from work, intentional delays in the project, and a poor work ethic contribute to intentional delays. Therefore, working harder to complete the project is potentially a disincentive for a local community member.

The broader South Africa Citizen is not included in this discussion, and is categorised as second tier of stakeholders. This tier also includes international climate change organisations (i.e. UNEP, IPCC), international employees (providing skills transfer), service providers and consultants, rural communities outside the 50Km radius, and South African suppliers. This second tier of stakeholders are not direct beneficiaries of job creation, but they are direct stakeholders, and potential benefits) of a RE future, therefore, opening a dialogue to include this tier is essential; however out of the scope of this study and recommended for future research.

## CHAPTER FIVE: OVERALL CONCLUSIONS, RECOMMENDATIONS AND SYNTHESIS

*‘Least Develop Countries (LDCs) possess the economic conditions, the natural and cultural assets, and the policy setting to embrace, if not lead, a green economy transition, which would in turn accelerate their development’ (UNEP 2011).*

### 5.1 Value Add

This research adds value to many stakeholders in the development, job creation and RE value chain: the South African Government, job seekers and local communities, REIPPPP bidders, and the general South African population.

Job creation is a priority of the South African Government’s national development agenda, which aims to support programmes that have a high potential to create meaningful jobs. The REIPPPP is considered a green job creation programme, yet is in the preliminary stages of implementation and consequently lacks research and data outcomes. This research therefore adds value by providing insight and primary research into job creation and the RE industry.

Secondly, by unpacking meaningful job creation in the programme and an attempt to understand the preliminary outcomes of job creation, this research benefits job seekers within the local community, by presenting a more ‘educated’ and in depth understanding of the potential opportunities for local communities and job seekers.

*“...after presenting our elaborate rural development plans to a room full of 200 community members, explaining the benefits the community would see as a result of the wind farm, the only question from the audience was, ‘when are we going to get a job?’” – Anonymous Economic Development Manager (2013)*

This research provides value to the programme bidders and the general South African population. In a highly competitive environment, the REIPPPP naturally prevents bidders from sharing information. Any information about a bid, including job creation numbers, has a high commercial value embedded in the success of a bid under the REIPPPP. Therefore, information is only shared by higher institutions, academia utilising confidentiality agreements and strict NDAs, yet what can be discussed in public is highly aggregated and, therefore, unclear to the job creation outcomes and allows room for error.

This research intends to shed some light on the job creation topic, opening up a dialogue to the public, and providing a deeper understanding of the job creation outcomes of the programme. If the programme does not perform well in terms of ED, it runs the risk of losing government support and the rollout of future RE capacity. Therefore, the South African



Citizen and resident may not benefit from the development of a RE industry if not backed by government.

Three years into the REIPPPP the utility-scale RE industry is maturing quickly, yet very little research has been conducted. Twenty-one projects have reached their commercial operation date (COD) and are connected to the grid, an additional forty-three IPPs are in different stages of implementation and the fourth bid window and special concentrating solar power (CSP) bid window round (BWR) are awaiting preferred bidder results. From a preliminary analysis the lack REIPPPP job creation literature requires research to contribute to the future development of the programme, the green economy and meaningful job creation in South Africa.

### ***REIPPPP anticipated outcomes***

The primary outcomes set out by the DoE REIPPPP bid documents do not have quantifiable goals, therefore it is impossible to measure any sort of success of the programme. It is only possible to elaborate in-depth on how the programme may or may not contribute to the anticipated outcomes. For instance, Clause 1.3.2, emphasises job creation to address unemployment, which means creating 'new' jobs, jobs for people that are currently unemployed; however, this is not being recorded assumptions were therefore made that previously unemployed people are general unskilled people.

The RE industry demands highly skilled individuals (technically skilled) and there is a national shortage of these skills. Therefore, rather than emphasising job creation measured in person-months, a greater need is required to provide training to upskill the country and potentially be more flexible on the 50km radius in terms of job creation if trained skills are not being utilised as a result of the border. More funding and R&D around the severity of this problem should commence to develop appropriate training programmes to support the emerging RE industry.

## **5.2 Conclusions**

The result of this study is an enriched understanding of the REIPPPP in terms of meaningful job creation, identifying trends, similarities and unexpected outcomes across methods. The information is useful in providing a deeper understanding of how job creation, meaningful job creation, and RE energy job creation are defined and quantified in the REIPPPP. Although, the data and dialogue is specific to the South African utility-scale REIPPPP, the data, methods, and meaningful job creation framework can be used in other programmes and adapted further to the South African context. Further to the framework, this research is an example of the complexity that surrounds job creation and that a high level quantitative analysis is not capable to comment on a programme's success or failure to create meaningful jobs.

This thesis makes a contribution to South African RE job creation literature, using project specific data, and therefore, supplementing the pre-existing forecasting literature. The thesis

is completely unique, in that research about the South African REIPPPP has not engaged with a similar depth, nor has any previous research utilised or analysed all IPP job creation data that was accessed through the IPP-unit. And although an instrumental case study was employed, the outcomes of this study may be useful in other industries that struggle with the concept of job creation and specifically meaningful job creation.

After reading this thesis, one will understand that the term job in itself is an over simplistic term that contains much more meaning and significance. Often job creation is taken for face value (in the case of the REIPPPP PMs and PYs), and its associated success is measured on a positive or negative quantitative result. However, to really understand job creation, a full engagement of what is meant behind the term and the outcomes is required for each case and unique set of parameters.

If job creation is misunderstood by government, bidders, local communities and international players, the expectations of job creation to mitigate poverty, alleviate unemployment and decrease inequality, may result in disappointing outcomes. The study concludes that the programme does create meaningful jobs yet data is misaligned to quantify meaningful jobs and most data is currently unavailable to the public. Secondly, since job creation is a feature of South African Government development policy, a more vigorous emphasis is required in the REIPPPP weighting and auditing process, which includes further research of intended benefits and suggested improvements to align job creation data. Some main key findings include the following:

- Job creation commitments were made before any RE IPPs were implemented;
- Job creation is not well defined by the REIPPPP and does not include any indirect or induced job creation in quantification, therefore, the job creation of the RE industry is unknown;
- The programme is designed to maximise jobs which is counterintuitive of creating decent or meaningful jobs;
- The DoE does not have 'policing' resources, yet has invested in creating a programme to substitute ED, and is only really capable to manage the bid process and create an enabling environment for investors;
- Bidders and IPPs are committed to ED aspects of the REIPPPP yet the 'policing' and auditing that was discussed in the bid is undermining the amount of work and energy that is being put into substantiating compliance;
- Job creation promises have been oversubscribed resulting in communities and labour organisations to feel disappointed regarding the outcome of the programme;
- Job creation is published as PM FTEs rather than total number of positions, which is a confusing measurement to the public regarding the outcomes of the programme; and
- Mistakes and failure was not openly shared however, all outcomes of the programme cannot be positive. Mistakes will be made, and learning from those mistakes will be the key to the success of the programme – and the key to creating meaningful jobs.

### 5.3 Recommendations

Based on the conclusions, the following recommendations can be made:

- More emphasis should be put on the ED or job creation weighting of the scorecard and price should not be a trump card in the REIPPPP;
- Provide more details in defining beneficiaries and standardising the language of job creation, for instance, i.e. unskilled, semi-skilled, skilled, highly skilled and specialised skill;
- As the REIPPPP is currently in a prime position to collect job creation data for future policy planning and development, capitalising on the quality and robustness of job creation data collection;
- Training to occur in beneficiary community prior to the implementation of the project, to ensure maximum number of communities benefit;
- Remove 50km radius or implement a better definition - at the moment it is only geared to maximising the number of unskilled skills to receive opportunities and not meaningful long-term jobs and development. *Because what matters for poverty reduction is not the number of jobs generated by growth but the productivity of that employment (Saavedra-Chanduvi & Revenga 2010:10).*
- The DoE and IPPs to invest more time and effort into the ED auditing process, train auditors or external consultants to monitor compliance during the CMP and OMP;
- Increase community education regarding the benefits the REIPPPP brings nationally and potentially to local communities;
- Increase funding and support to FETs/TVETS and additional training programmes or courses to enable proper skills development and transfer opportunities;
- Develop a secondary job creation phase of the REIPPPP to measure skills transfer, certifications awarded, up-skilling, job creation impacts of the local area through on-site surveys and onsite research with communities;
- IPPs or industry associations to create clusters that share and disseminate information and/or share employees/skills specifically during construction<sup>42</sup>
- Increase regional analysis of RE projects to include in-depth quantitative and qualitative studies, for example a sustainable development framework to analyse the employment impacts and procedural sustainability which includes a stakeholder analysis and participation of the implementation of the project (Del Rio, P. & Burguillo, M. 2008, 2009);
- Conduct a qualitative (naturalistic) and empowerment evaluation of the REIPPPP, as is described in Mouton (2007:161), to analyse if the programme and specific IPPs created the intended impact from a qualitative rather than quantitative perspective;
- Broaden job creation quantification aspects to include development jobs, service providers and other indirect jobs;

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<sup>42</sup> Source: Creating the California Cleantech Cluster, How Innovation and Investment Can Promote Job Growth and a Healthy Environment. Principal Author Patrick R. Burtis Contributing Authors Bob Epstein, E2 Roland J. Hwang, NRDC, Natural Resources Defence Council Environmental Entrepreneurs, September 2004

## 5.4 Limitations of the Study

The first limitation to the overall quality and outcome of this study, specifically the literature review, is the lack of peer-reviewed studies specific to South Africa. Therefore, most of the research in terms of defining the parameters and current state of the country in terms of RE job creation and defining green or meaningful jobs in the South African context came from reports and commissioned studies. Many claims are made in these reports that are slightly biased to the consultant of the industry that they play in and also lack sufficient referencing. Therefore, this area of study is quite new and requires much more engagement.

The overarching lack of transparency within the REIPPPP results in several additional obstacles to the outcomes of the study. The outcomes are directed by the aggregate information that was available to leave the IPP Unit, resulting in limited data sets that could be analysed and published (specific project data was not allowed to leave the IPP-unit).

Being a highly competitive programme any specific information is highly guarded and is rarely available to anyone outside direct involvement with the IPPs. Therefore, access to data was the primary obstacle; the data that was available was protected by numerous non-disclosure agreements (NDAs) and data sources were based on accessibility rather than strategic sources.

For this research, five NDAs were signed from June 2013 to June 2014. The specifics of these contracts will not be discussed. However each entity, be it the DoE, AltGen, Letsema, individual IPPs, or site-based EPCs or Sub-EPCs, prevented any information from being personalised.

A third obstacle was the limited access to IPP implementation agreements and commitments with actual outcomes and quarterly reporting. Besides having little access to specific bidder information, the IPP-unit is divided internally that holds both the bidder's documents and the quarterly reporting data. Access was not given to the latter.

The fourth obstacle was the limited ability to conduct more thorough site based research both by limited access to sites from willingness of IPPs, but also because the timing of the projects in each phase of the development, construction and O&M. For instance, more researchers (more resources) would allow simultaneous data collection during the construction measurement period and collect a larger sample from the local community and construction workers. Rather, a very small sample was taken of 4 projects, 2 Wind and 2 PV, yet further details cannot be disclosed due to the confidentiality of the NDAs.

## 5.5 Suggested Further Studies

A summary of further studies are listed below with some additional questions (\* indicates studies currently in progress):

1. How many PMs are committed to the new quarterly reporting requirements (women, youth, interns, youth interns, disabled)? What is Government's intention to use the requested information?
2. What elements could be added to the REIPPPP to quantify and incentivise more of meaningful job creation elements?
3. How does a single project impact the local community? Are monitoring and evaluation (M&E) methodologies being employed to track local community development progress? Is the 50km radius the best way to ensure that local communities see the most benefit?

The following are topics of further study:

- RE Skills Gap analysis and National Skills Development Plan, identify emerging skills development and transfer initiatives;
- Review the quarterly reporting outcomes and evaluation documents of IPPs and analyse if IPPs are meeting their targets – this information was not available in quantitative form, but personal interviews did reveal some insight discussed in the study;
- As the REIPPPP is currently in a prime position to collect job creation data for future policy planning and development, capitalising on the quality and robustness of job creation data collection;
- Conduct an indirect and induced job creation analysis;
- Identify spin off benefits from REIPPPP development or other local skills transfer and rural electrification opportunities (IRENA 2012; Sukhdev et al. 2010), and specifically, the long term (20 year) financial benefits flowing to communities within the 50km radius of the projects;
- Provide more details in defining beneficiaries and standardising the language of job creation, for instance, i.e. unskilled, semi-skilled, skilled, highly skilled and specialised skill;
- Review the life cycle of a RE worker in order to understand the transferable skills for opportunities outside and beyond the life span of the REIPPPP; Compare and contrast different skills levels and occupations i.e. income inequality;
- Training to occur in beneficiary community prior to the implementation of the project, to ensure maximum number of communities benefit;
- Remove 50km radius or implement a better definition - at the moment it is only geared to maximising the number of unskilled skills to receive opportunities and not meaningful long-term jobs and development. *Because what matters for poverty reduction is not the number of jobs generated by growth but the productivity of that employment* (Saavedra-Chanduvi & Revenga 2010:10).

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## Appendices

Appendix A: South Africa's Poverty and Inequality

Appendix B: South African RE and Job Creation Policy

Appendix C: South African Job Creation Literature

Appendix D: SAWEA Wind for Communities Objectives

Appendix E: JB8 (Information Sheet) and JB9 (Scorecard)

Appendix F: Skills Level and Additional Items

Appendix G: Wind for Communities Survey

Appendix H: Workshop Invitation

Appendix I: Workshop Participants

Appendix J: Final WfC Workshop Report (Findings)

Appendix K: REIPPPP Job Creation Definitions

Appendix L: Global RE Job Creation

Appendix M: Semi-structured interviews

Appendix N: IPP-unit Database Outcomes

Appendix O: Interview and direct observation outcomes (Successes and Challenges)



## Appendix A: South Africa's Poverty and Inequality

With extreme unemployment, poverty and inequality, South Africa faces difficult developmental challenges. Stats SA reports in the 3<sup>rd</sup> Quarter of 2013 that South Africa has one of the highest unemployment rates (24.1%), poverty rates (56.8%) and inequality rates (Gini coefficient 0.7) in the world (StatsSA 2014b). The ILO, who obtains information and data from StatsSA, also supports that unemployment in South Africa is one of the highest in the world reporting a 24.88% unemployment rate as shown below in Figure 24 (ILO 2014b).

### Unemployment rate per country (%) \*

Year

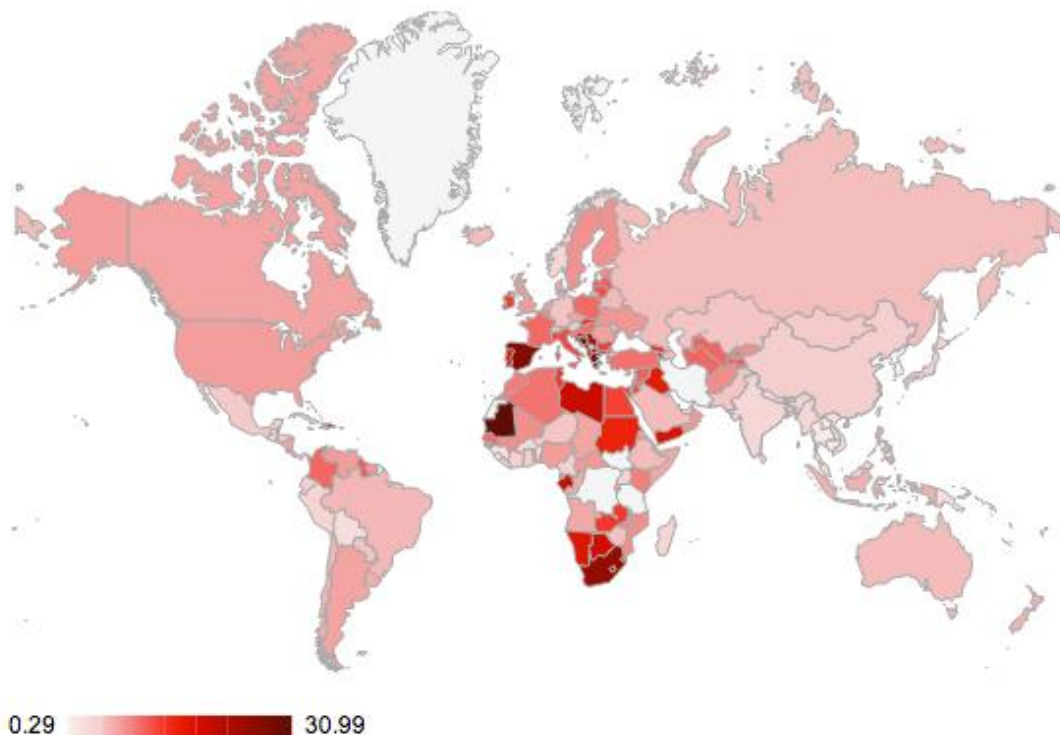


Figure 24 Global Unemployment Rates (ILO 2014b)

Using an expanded definition of unemployment in South Africa, the rate of unemployment is closer to 34%<sup>43</sup> as the 24.1% is a narrow definition which includes the active labour force<sup>44</sup> and is used to compare to global unemployment rates such as those with the UN ILO; the official rate (24.5%) does not include individuals that had worked for at least an hour in the

<sup>43</sup>The expanded view includes discouraged job seekers (persons who have not sought work for over weeks due to lack of opportunities, transportation obstacles, and others.). It is further important that over 65% of all unemployed are considered 'discouraged' in South Africa.

<sup>44</sup> Stats SA define anyone between the ages of 15-64 that has in the last 4 weeks searched for a job.

past week or discouraged workers. It is for good reason that job creation remains the largest policy challenges of the South African Government.

Also known as the 'inequality index', the Gini coefficient represents the socio-economic situation of a country by statistically measuring the gap in income of individuals of a nation over time. It attempts therefore to determine if a country is becoming more or less equal; a score of 100 would be perfectly unequal, where a score of 0 is completely equal. To give an example, most country's Gini (inequality) scores are under 50 and 40 (closure to an equal society versus an unequal society), where South Africa has had a consistent score of around 70 from circa 2000, meaning that the inequality has not changed over time, and it is relatively high compared to other countries in the world (CIA, 2013). As one can see below, South Africa, Namibia and Botswana, along with a few other African countries, are coloured dark red due to their scores being between 58-65, yet South Africa 's score of 70 is far above the maximum score<sup>45</sup>.

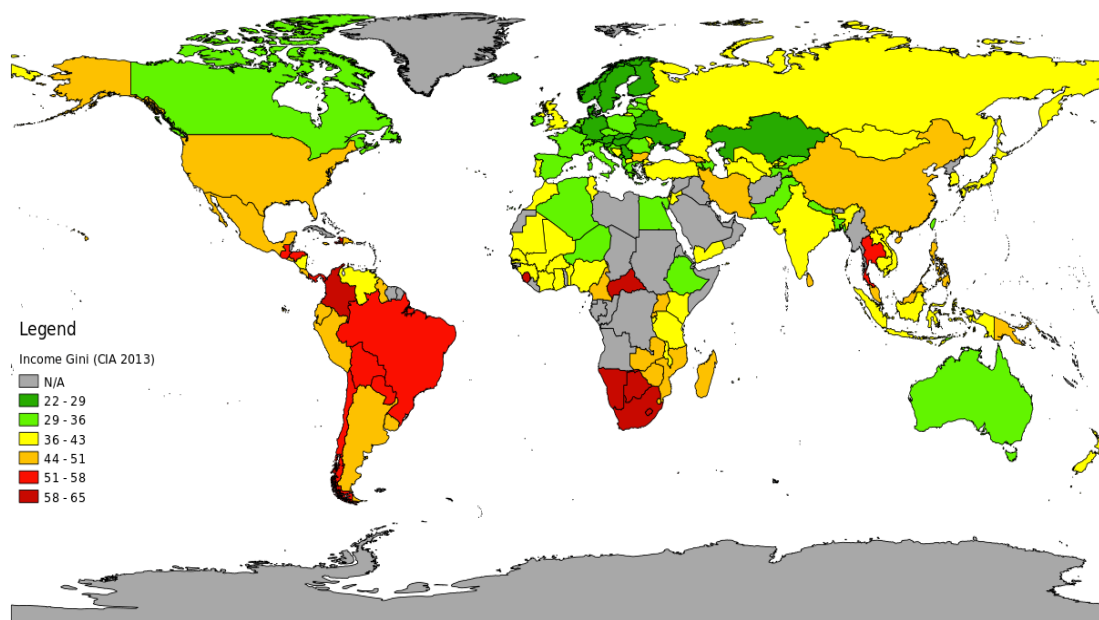


Figure 25 World inequality map, Gini Index Image created from CIA (2013) data (Wiki)

<sup>45</sup> A local study by Bosch & Rossouw (2010) found the Gini coefficient to be more like 59, but this is still a number that exceeds the normal or acceptable range of 29-36.

## Appendix B: South African RE and Job Creation Policy

In 2011, the National Planning Commission developed **the National Development Plan (NDP)**. According to President Zuma, it is “the socio-economic development blueprint for the country” (Zuma, 2014). The NDP sets guidelines and RE targets (see below) to: create jobs, eradicate poverty and reduce inequality by 2030 and is also a response to South Africa’s high GHG emissions from coal based energy usage<sup>46</sup>. The importance of this document was recently reemphasised in the 2014 State of the Nation Address (Zuma, 2014) as well as the Budget Speech (Gordon, 2014) and some of the key points are as follows:

- a. At least 20 000MW of renewable energy capacity contracted by 2030
- b. Increase employment from 13 million in 2010 to 24 million in 2030
- c. Eliminate income poverty – Reduce the proportion of households with a monthly income below R419 per person (in 2009 prices) from 39 percent to zero
- d. Reduce inequality by closing the Gini coefficient gap – The Gini coefficient should fall from 0.69 to 0.6, as this would give evidence that the inequality gap is becoming smaller, people are able to attain employment and, therefore, an alleviation of poverty is a result.

**The National Climate Change Response White Paper** (2011) identified RE as one of the key near-term flagship Programmes to contribute to mitigating global carbon emissions by:

- *“limit[ing] job contraction to those areas of the economy where excessive carbon intensity is unsustainable, whilst promoting and expanding the green economy sector<sup>47</sup> (RSA 2011: 7);*
- *prioritising climate change responses that have...significant economic growth, job creation, public health, risk management and poverty alleviation benefits (Ibid: 11);* and
- *moving to a less emissions-intensive energy mix... coupled with increasing investment in a renewable energy programme in the electricity sector” (Ibid: 26).*

**The National Strategy for Sustainable Development 2011-2014** (DEA, 2011) supports the green economy as the 3<sup>rd</sup> priority that is supported through a number of interventions and

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<sup>46</sup> “In 2000, average energy use emissions for developing countries constituted 49% of total emissions, whereas South Africa’s energy use emissions constituted just under 80% of total emissions. Even in some fast-developing countries with a similar reliance on coal for energy, energy use emissions are lower than South Africa... **the majority of South Africa’s energy emissions arose from electricity generation**, which constituted around half of South Africa’s energy emissions and just under 40% of total emissions in 2000.” (National Climate Change Response Paper 2011:26)

<sup>47</sup> Green jobs are defined by the UNEP as jobs that “contribute substantially to preserving or restoring environmental quality...that help to protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high- efficiency strategies; de-carbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution” (Renner et al. 2008:3).

indicators. Interventions include creating green jobs and clean energy and energy efficiency programmes by:

*“diversification of energy sources and implementation of energy efficiency programmes that are crucial for ensuring green growth, as contained in the IRP [and] encouraging investment in renewable energy on a scale sufficiently large to justify the localisation of competitive technologies, along with active support for local renewable technology manufacturing to present an opportunity for sustainable economic development and job creation” (Ibid: 27).*

A second priority is responding effectively to climate change, and reduce dependency on fossil fuels and enhance security of electricity supply which supports the RE White Paper generation goal of 10 000MWh, the development of the IRP2 and the RE to contribute to the national grid (*Ibid*).

The **Millennium Development Goals** (MGD) 2013 update (StatsSA 2013), set several goals and development targets specific to South Africa. MDG 1 (Eradicate Extreme Poverty and Hunger) and MDG 7 (Ensure Environmental Sustainability) are both relevant to the goals of job creation and alleviation of poverty in the green economy. The updated MDG report highlights the following statistics:

- a. *“While poverty levels and depth of poverty are declining, levels of inequality have remained high in South Africa. The Gini coefficient has remained at around 0.7 since 2000; a level which places South Africa amongst some of the most unequal countries in the world” (Ibid: 8);*
- b. *“In 2009, a total of 34.8% of employed are found in households living below R577 per person per month and about 3.9% are found in households living below \$1.25 per person per day” (Ibid: 31);*
- c. South Africa contributes to 65% of Africa’s emissions.

In August 2011, the South African Department of Energy (DoE) officially released the **RFP for the REIPPPP**, inviting bidders to respond to a request for proposal (RFP) to develop, finance, construct, operate and maintain renewable energy generation facilities as independent power producers (IPPs)<sup>48</sup> (see Section **Error! Reference source not found.**).

In November 2011, the South African Government, business, community and organised labour signed the **New Growth Plan, Accord 4: Green Economy Accord**. In support of the IRP 2010-2020, Commitment Three: Rollout of Renewable Energy commits to the following job creation targets by 2020 (EDD 2011):

- *“Accept the employment and transformation thresholds set by the renewable energy procurement process as a minimum baseline from which business will work in partnership with government to attain higher percentages*
- **50 000 green jobs, of which approximately 6 500 will be engineers and technicians, (this is part of the wider green economy target of 300 000 new jobs)**

- *Use the rollout of renewable energy as a vehicle to promote rural, socio- and economic development”*

In October of 2012, the South African Government introduced the **National Infrastructure Plan** (PICC 2013) to develop the economy, create jobs and provide basic services to rural and poor areas. To support implementation challenges the Presidential Infrastructure Coordinating Committee (PPIC) was formed and 18 strategic integrated projects (SIP) were created in different industries. Energy SIPs included SIP 8 and 9:

**SIP 8: Green energy in support of the South African economy**

- Support sustainable green energy initiatives on a national scale through a diverse range of clean energy options as envisaged in the Integrated Resource Plan (IRP2010).

**SIP 9: Electricity generation to support socio- economic development**

- Accelerate the construction of new electricity generation capacity in accordance with the IRP2010 to meet the needs of the economy and address historical imbalances.
- Monitor implementation of major projects such as new power stations

Leading up to the release of the REIPPPP Request for Proposal (RFP) in August 2011, South Africa walked a long road to finalise the renewable energy programme. Table 1 provides an overview of the key dates, policy documents, research and events that have contributed to the development and continued support of the REIPPPP, job creation and the green economy. This table, although a repeat of some of the information above, provides a visual representation to chronologically show the delays and time it took to roll-out an effective RE programme once commitments were made in 2003 to both reduce carbon emissions and to produce renewable energy.

## Appendix C: South African Job Creation Literature

### ***Agama Energy South African Job Creation Study (2003)***

The same year the Cabinet approved the RE White Paper, 2003, a South African Study was completed by Agama Energy (Williams et al. 2003), to anticipate job creation in a potential South African RE. Well cited in past and current literature, the Agama Energy Study predicted a positive outlook regarding potential job creation across the value chain. Using a 100% local manufacturing target the study concluded that 36 373 jobs (not including biomass/gas and solar water heaters) if the national energy demand was 267TWh by 2020.

While the study is influential in its positive outlook, the methodology and conclusions are brave, based on a lot of assumptions as a result of the non-existence of an industry. Further, assumptions were a result of very few existing baseline studies (if any) and the country's energy mix prediction (as seen in the IEP and IRP) was unknown. The study was exceptional and novel for the time, but the changing landscape requires new empirical research for future decisions.

One example of the changing landscape from the 2003 Agama study is the prediction of RE allocation: 50% of the overall energy mix was wind by 2020 and solar a mere 0.5%, thus effecting the total job allocation for each technology. Figure 26 Direct jobs for coal and RE in 2020 Source: (Williams et al. **2003**) and Figure 27 2020 Gross direct RE jobs (electricity generation) Source: (Williams et al. **2003**), underestimate solar PV's part to play in the REIPPPP in 2014 than what is reflected in the study.

Secondly, the energy demand in South Africa has changed. In 2012 the energy demand was 249TWh, less than the expected 270TWh in the 2011 IRP (IRP 2013). The current updated IRP (Draft) (*Ibid.*), predicts a future energy demand of 345-416TWh, a reduction from the original 2010 IRP of 454TWh due to more efficient practices. Thus, the original prediction of 267TWh by 2020 of the Agama study has since shifted and therefore the outcome of required jobs will also shift.

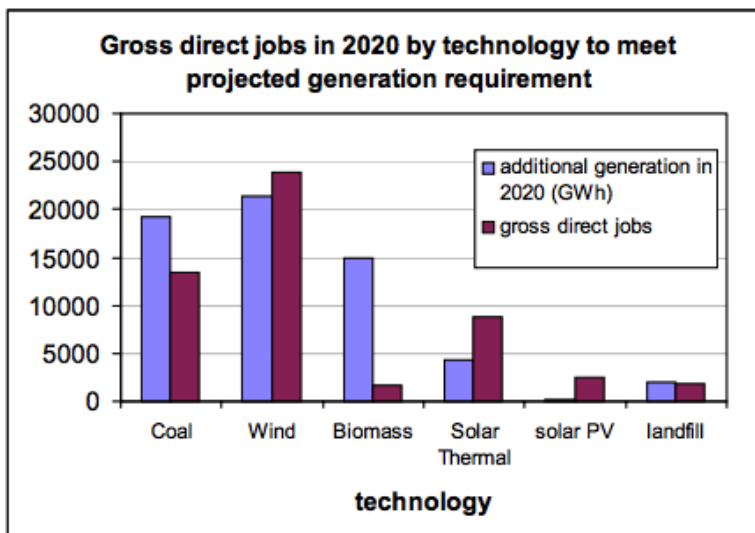


Figure 26 Direct jobs for coal and RE in 2020 Source: (Williams et al. 2003)

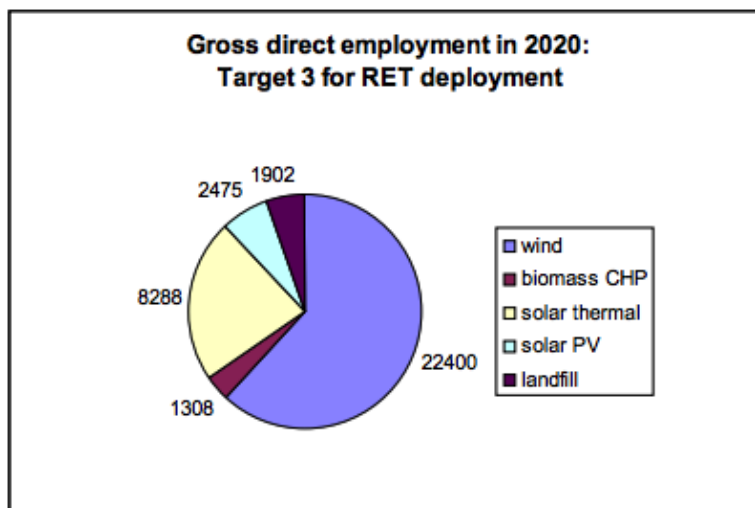


Figure 27 2020 Gross direct RE jobs (electricity generation) Source: (Williams et al. 2003)

Leading up to the 2011 launch of the REIPPPP, two additional projection studies were published to anticipate potential direct job creation opportunities if a new RE industry emerged, the first examined a range of energy generation technologies commissioned by Greenpeace (Rutovitz 2010)<sup>49</sup> and the second was commissioned by the Industrial Development Corporation (IDC), South Africa, looking at the total job creation potential across industries of a Green Economy (Maia et al. 2011).

**Greenpeace South African study (2010)**

Greenpeace commissioned several job creation studies, the earliest one in 2010 (Rutovitz 2010), to compare job creation projection outcomes of three different energy scenarios and three separate timelines (2010, 2020 and 2030). The Greenpeace study is similar to Agama’s three ‘Target’ scenarios. The three Greenpeace scenarios include the IEA Reference (total

<sup>49</sup> Boasts the same lead author of well cited global RE job creation studies (Rutovitz & Atherton 2009; Rutovitz & Harris 2012b)

allocated MWs to each power production technology), the business-as-usual or Growth without Constraints (GWC), and the Energy [R]evolution scenario, the outcomes are displayed in

Table 17. Figure 28 shows a visual distribution of the three scenarios and how the outcomes compare in 2020. All three scenarios support that South Africa is mostly run on coal, yet the Energy [R]evolution scenario implements a strong RE and energy efficiency implementation growth path to benefit the country in terms of job creation, reduction in carbon emissions.

**Table 17** Energy jobs (conventional and RE) Source: (Rutovitz 2010:26)

JOBS	IEA REFERENCE			GROWTH WITHOUT CONSTRAINTS			ENERGY [R]EVOLUTION		
	2010	2020	2030	2010	2020	2030	2010	2020	2030
Coal	47 000	64 000	69 000	43 000	61 000	81 000	47 000	52 000	35 000
Gas, oil, diesel	1 100	1 200	1 900	1 100	400	200	1 100	2 500	4 300
Nuclear	1 200	1 200	1 200	1 200	5 700	37 000	1 200	900	-
Renewable	3 600	8 000	11 000	800	2 100	2 800	3 600	58 000	76 000
<b>Electricity supply</b>	<b>53 000</b>	<b>74 000</b>	<b>83 000</b>	<b>46 000</b>	<b>70 000</b>	<b>121 000</b>	<b>53 000</b>	<b>113 000</b>	<b>116 000</b>
Energy efficiency	-	-	12 000	-	-	-	-	4 500	27 000
Coal exports	17 000	20 000	22 000	17 300	20 000	22 000	17 000	5 200	6 500
<b>TOTAL JOBS</b>	<b>71 000</b>	<b>94 000</b>	<b>117 000</b>	<b>63 000</b>	<b>90 000</b>	<b>142 000</b>	<b>71 000</b>	<b>123 000</b>	<b>149 000</b>
<b>Electricity generation TWh</b>									
Coal	263	343	410	261	337	437	263	271	225
Gas, oil, diesel	1.1	3	5	0.0	1	0	1.1	7	13
Nuclear	11	11	11	13	22	86	11	8	0
Renewable	3.2	9	18	2.5	2	3	3.2	51	135
<b>Total generation</b>	<b>279</b>	<b>366</b>	<b>443</b>	<b>276</b>	<b>362</b>	<b>527</b>	<b>279</b>	<b>337</b>	<b>372</b>

Note: Base case energy efficiency jobs are not calculated, so the energy efficiency jobs shown are only those additional to the Reference scenario.

The Energy [R]evolution scenario supports the development of a RE industry and implementation of energy efficiency (therefore reducing the total 2030 energy demand of the IEA scenario of 443TWh and the GWCs demand of 527TWh to 372TWh). The study concludes that more jobs (149 000 jobs versus 117 000 jobs in the IEA scenario) can be created in the Energy [R]evolution while reducing South Africa's emissions by 60% (of the 2005 level) by 2030 with RE supplying 36% of South Africa's energy needs.

Besides the study pre-dating the implementation of a RE industry in South Africa, the energy demand and predicted demand has changed since 2010. The current IRP (2013) predicts the 2030 demand is 345TWh-416TWh with renewables accounting for 33.5%, which doesn't include co-gen (800MW) and imported hydro (2 609MW)<sup>50</sup>. The energy landscape will continually change with project delays and needs of the country, therefore, job creation data and research requires sustained research.

<sup>50</sup> If imported hydro (Inga in the Congo) and co-gen are included, the total RE mix of South Africa would equal 39.6% of the total energy mix in 2030 seen in the IRP up to 2030.



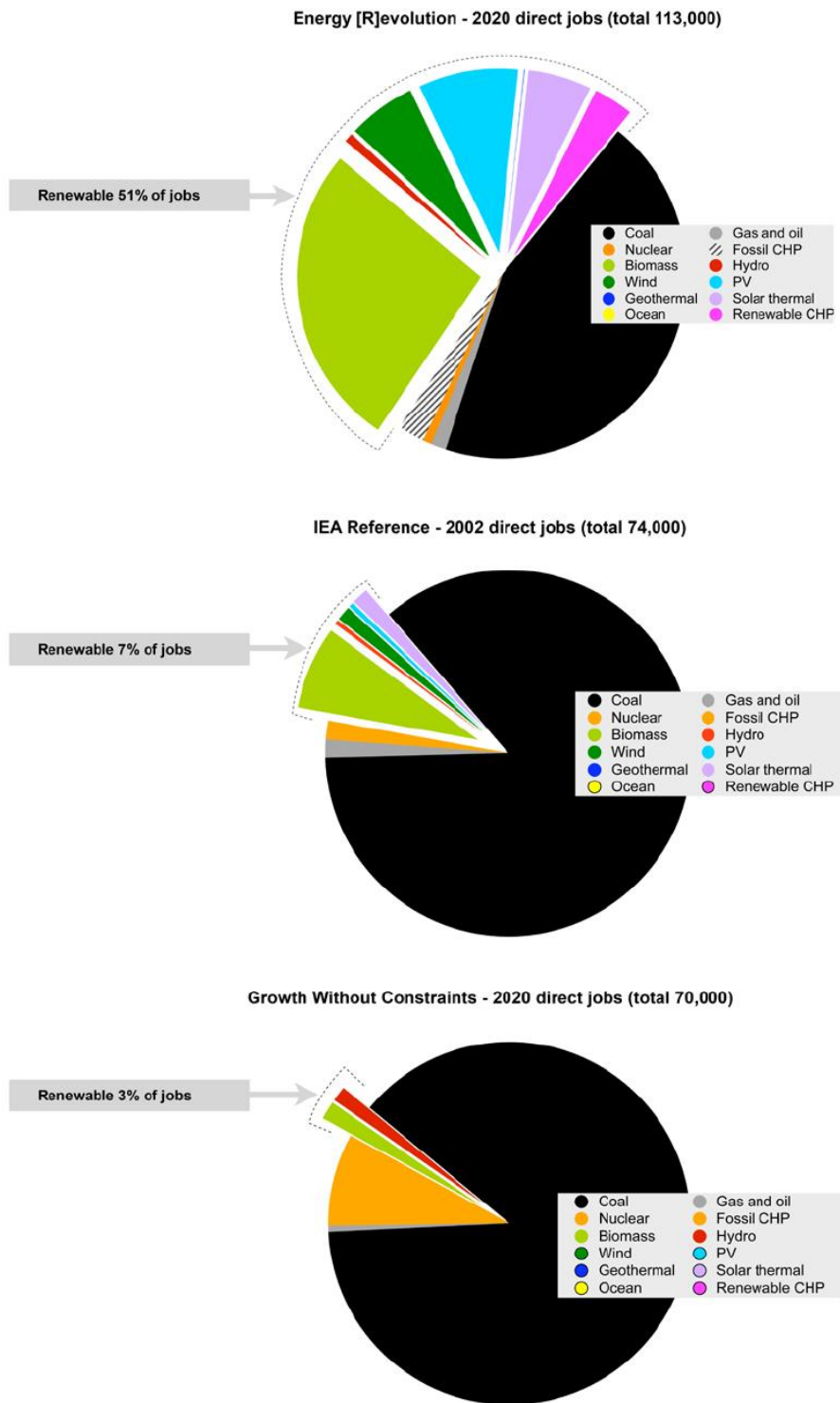


Figure 28 Proportion of energy sector jobs in different scenarios (Rutovitz 2010:28)

**IDC Green Jobs (2011)**

By far the most detailed and country specific study, Maia et al. (2011) looks at green job potential “over the short term (2011 – 12); the medium term (2013 – 17); and the long term (2018 – 25)...estimating the employment potential associated with: building, construction and installation activities; operations and maintenance services; as well as the possible localisation spin-offs for the manufacturing sector” (Ibid:3).

The outcome of the study, as seen in Table 18 (Ibid:8), reveals the potential job creation of RE is **130 000 net direct jobs (including energy efficiency) by 2025** – significantly more than the Rutovitz (2010) Energy [R]evolution scenario that predicted 63 500 in 2020 to 103 000 in 2030, where both studies included an element of energy efficiency.

**Table 18** Net direct green jobs potential (IDC 2011:8)

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

Notes:

- VH = very high (total employment potential > 20 000 direct jobs; manufacturing employment potential > 3 000 direct jobs)
- H = high (total employment potential > 8 000 but < 20 000; manufacturing employment potential > 1 000 but < 3 000)
- M = medium (total employment potential > 3 000 but < 8 000; manufacturing employment potential > 500 but < 1 000)
- L = low (total employment potential > 1 000 but < 3 000; manufacturing employment potential > 150 but < 500)
- VL = very low (total employment potential > 0 but < 1 000; manufacturing employment potential > 0 but < 150)
- N = negligible/none (total employment potential = 0; manufacturing employment potential = 0)

The potential job creation outcomes of the studies (see Table 19) all utilised an employment factor. The studies all predated the existence of a RE industry and therefore further research is required with the recent implementation of the REIPPPP that can use more robust data.

Table 19 Key South African Job Creation Projection Studies Source: Author

South African Job Creation Research Studies				
Year	Study	Total Outcome	Total Jobs/installed capacity estimation	Manufacturing
2003	(Agama) Employment Potential of RE in South Africa	36 373 jobs <sup>51</sup> by 2020 (100%local manufacturing) (Williams et al. 2003)	22 400 (Wind) 2 475 (PV)	N/A
2010	(Greenpeace) South African Energy Sector Jobs Report	72 400 (20% includes local manufacturing) by 2030; 58 000 by 2020 (Rutovitz 2010)	46 400 by 2020	11 600 by 2020
2011	(IDC) Green Jobs	130 000 direct job potential by 2025, (Maia et al. 2011)	21 711 by 2025 5 156 (Wind)/7 100MW 13 541 (PV)/4 900MW 3 014 (CSP)/5 620MW	11 176 by 2025 2 105(Wind) 8 463(PV) 608(CSP)

#### **Additional South African Employment Forecast Studies**

Several other reports have been commissioned in South Africa to determine the employment and job creation potential of a RE industry were industry specific. For wind GIZ/GL Garrad Hassan conducted two studies, *Assessment of training and skills needs for the wind industry in South Africa Final report*, (2012) and a second study that intended to determine skills requirement for newly established South African Renewable Energy Training Centre (SARETEC) (Wiesegart et al. 2011). For PV, the most substantial study was a local content and job creation study (EScience Associates et al. 2013), estimating a potential of 389 282 FTE jobs between 2013 and 2035 ('high adoption rate') and 244 489 FTE ('low adoption rate'). All studies utilise an employment factor (jobs per MW) to predict a potential outcome of a RE future.

<sup>51</sup> Does not include biogas, biomass or solar water heaters yet when included job creation projection numbers were just over 500,000.

## Appendix D: SAWEA Wind for Communities Objectives

### SAWEA Communities for Wind Working Group Objectives and Activities

1. Develop and disseminate advice on good practice for working with communities
  - a. Collect and document experience of SAWEA members
  - b. Investigate good approaches, practices, development strategies and engagements through partnerships with other industries and organisations
  - c. Workshop ideas on how to overcome challenges
  - d. Develop ideas for good practice and generation criteria/guide for designing SED/ED programmes
  - e. Design and disseminate appropriate information material
2. Monitor progress and assess impact of community partnerships of industry
  - a. Survey SAWEA members on their SED, ED, local ownership and local employment strategies, commitments and challenges reaching those commitments
  - b. Identify appropriate mechanisms for industry to evaluate socio-economic impact in communities
  - c. Establish agreement on reporting and learning within SAWEA
3. Support positive relationship building with partner communities
  - a. Identify opportunities to improve community partnerships
  - b. Establish relationships with community development organisations and companies active in other sectors (mining, agriculture, tourism, IDZ) to foster cross-sectorial learning
  - c. Design appropriate responses i.e. mentorship programmes for community trustees, trainings for trustees, education workshops, etc.
4. Influencing policy/DoE
  - a. SAWEA to establish its own independent relationship with the DoE aimed at being in a position to inform policy and RFP
  - b. Propose and pilot alternative approaches to SED engagement with partner communities

## Appendix E: JB8 (Information Sheet) and JB9 (Scorecard)

### Volume 1 Part B JB8 - Information Sheet

<b>Job Creation JB8</b>		
<b><i>Job Creation during the Construction Measurement Period</i></b>		
Total RSA Based Employees jobs created during the Construction Measurement Period	Person-months	
RSA Based Employees who are Citizens during the Construction Measurement Period	Person-months	
RSA Based Employees who are Black People during the Construction Measurement Period	Person-months	
Skilled Employees during the Construction Measurement Period	Person-months	
Skilled Employees who are Black People during the Construction Measurement Period	Person-months	
RSA Based Employees who are Citizens from Local Communities during the Construction Measurement Period	Person-months	
<b><i>Job Creation during the Operating Measurement Period</i></b>		
Total RSA Based Employees jobs created during the Operating Measurement Period	Person-months	
RSA Based Employees who are Citizens during the Operating Measurement Period	Person-months	
RSA Based Employees who are Black People during the Operating Measurement Period	Person-months	
Skilled Employees during the Operating Measurement Period	Person-months	
Skilled Employees who are Black People during the Operating Measurement Period	Person-months	
RSA Based Employees who are Citizens from Local Communities the Operating Measurement Period	Person-months	

**Volume 1 Part B JB9 - Scorecard**

Element	Measurement	Threshold	Target	Weight	Points	Bidder
<b>1: Job Creation</b>						
100-SR-01 RSA Based Employees who are Citizens	Number of RSA Based Employees who are Citizens *100 / Number of South African Based Employees	50%	80%	2.00%	0.6	%
100-SR-02 RSA Based Employees who are Black People	Number of Black People employed *100 / Number of RSA Based Employees	30%	50%	1.67%	0.5	%
100-SR-03 Skilled Employees who are Black People	Number of Skilled Employees who are Black People *100 / Skilled Employees	18%	30%	2.00%	0.6	%
100-SR-04 RSA Based Employees who are Citizens from Local Communities	Number of Employees resides in Local Communities employed *100 / Number of RSA Based Employees	12%	30%	2.67%	0.8	%
Jobs for RSA Based Citizens per MW of Contracted Capacity	Number of RSA Based Employees who are Citizens / 12 / MW Contracted Capacity of plant	NA	NA	6.67%	5.0	

## Appendix F: Skills Level and Additional Items

The REIPPPP Economic Development requires the bidder to indicate in JB8 (information sheet) the number (in PMs) of skilled and unskilled Citizens and Black Citizens that are directly involved in the activities of the construction and operations of the IPP. As defined by the bid documents a ‘skilled’ person is from a level B to F and therefore an ‘unskilled’ person is a level A. The Paterson table below indicates the skill level and associated semantic scale. Secondly, bidders are also required to indicate the anticipated education and skill level, activity and number of employees. BWR4 saw the addition of an example table, a Skill Level (see Table 21 Quarterly Reporting additions from July – Sept 2014) that asked for more details and provided guidance to bidders in what was expected of them. This research did not examine each table in the bid documents, as the information had not been entered into the database and time did not allow all sixty-four bid documents to be reviewed. Further, some bidders choose to use a table and some did not, as it was only in BWR4 that the example table below was provided. Therefore recommended for future studies could utilise the table to review the outcome of the projects to determine ‘real’ numbers.

### Semantic Skill Level Classifications

Semantic Scale	Paterson	Peromnes	Hay	Castellion	
Top management	F	F	1++	14	
			1+		
Senior management	E	E UPPER	1	1	13
			2	2	
		E LOWER	3		
Professionally qualified, experienced specialists and mid-management	D	D UPPER	4	3	12
			5	4	11
		D LOWER	6		10
Skilled technical and academically qualified workers, junior management, supervisors, foremen, superintendents	C		7	5	
		C UPPER	8	6	9
			9	6A	
			10	7	8
		C LOWER	11	8	
Semi-skilled and discretionary decision making	B	B UPPER	12		
			13	9	7
			14	10	6
			15	11	5
Unskilled and defined decision making	A	B LOWER	16		4
		A	17	12	3
			18	13	2
		19		1	

## DoE Skill Level Table

Table 20 REIPPPP BWR4 Skill Level Table Source: (DoE 2014a)

Construction Measurement Period						
Project Activity	Entity conducting the Project Activity	Job Description	Anticipated level of Education and/or Skills	Actual Number of Employees	Duration of Employment	Total Person Months Committed
<b>Total for the Construction Measurement Period</b>						
<b>Duration of Construction Measurement Period</b>						

### Operating Measurement Period

Operating Measurement Period						
Project Activity	Entity conducting the Project Activity	Job Description	Anticipated level of Education and/or Skills	Actual Number of Employees	Duration of Employment	Total Person Months Committed
<b>Total for the Operating Measurement Period</b>						
<b>Duration of Operating Measurement Period</b>						

#### *'Additional data required by the Department for Governmental purposes'*

The following points were quoted in a letter sent to all IPPs September 2014, requesting the additional job creation reporting elements. Personal discussion held off the records with bidders revealed that the purpose of the extra reporting was uncertain and unclear. Secondly, it allocated more costly work to be done by individuals responsible for ED matters and potentially implement additional reporting mechanisms (backdating) some of the information, as the request was for what had been done and not what was going to happen in the future.

7. The Department itself must report on the Economic Development achievements of the REIPP Procurement Programme, in order for government to be able to measure the benefits of the REIPP Procurement Programme with reference to the National Development Plan and other government policies and strategic plans. In order for the Department to meet its own reporting obligations within government, it requires certain additional information from sellers which is not directly linked to the achievement of a Seller's Economic Development obligations.

8. The Department is aware that such additional information, listed in paragraph nine below, is not strictly speaking required to be reported on by you under the Implementation Agreement, but requests that you co-operate in providing such information in order for achievement of the broader aims of the REIPP Procurement Programme to be monitored, and to ensure its continued existence and support. Moreover, to the extent that your project(s) contribute to the achievement of national objectives the reporting framework of government not only serves to monitor compliance but also presents an opportunity to showcase contributory success, in particular when reporting to the Presidential Infrastructure Coordinating Commission. Accordingly, you are requested to attend to this correspondence with a view to reliable and comprehensive reporting demonstrating meaningful change.



In this regard, quantitative responses must be supplemented by a portfolio of evidence as indicated in Annexure B.

9. The additional information required for these purposes is as follows:

9.1. RSA Based Employees who reside in rural areas, in Person Months;

9.2. Interns accommodated on the Project (if any), in Person Months;

9.3. Interns accommodated on the Project who are Youth (if any), in Person Months.

**Table 21** Quarterly Reporting additions from July – Sept 2014

<b>Employees who are People with Disabilities</b>
<b>Employees who are Women</b>
<b>Employees who are Youth</b>
<b>RSA Based Employees who reside in rural areas</b>
<b>Interns accommodated on the Project (if any)</b>
<b>Interns accommodated on the Project who are Youth (if any)</b>

## Appendix G: Wind for Communities Survey

A survey<sup>52</sup> was formulated and distributed to 350 SAWEA members for the purposes to gather information regarding job creation, socio-economic development, enterprise development and local community ownership. Further to understand some of the obstacles to the aforementioned aspects of REIPPPP Economic Development. This information would inform the working group as well as the Wind for Communities (WfC) workshop. The responses are provided below.

[Edit this form](#)

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# SAWEA Communities for Wind Industry Survey

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Thank you for your participation in the first SAWEA Communities for Wind industry survey.

Developed by the South African Wind Energy Association (SAWEA) working group Communities for Wind (CfW), this survey contributes to the knowledge base regarding economic development (ED) benefits of wind energy development within the South African RE IPPPP.

The purpose of the survey is to contribute to SAWEA's understanding of the strategies, commitments and implementation challenges faced in respect of socio-economic development (SED), enterprise development (ED), local ownership and job creation. The information will assist in developing solutions to overcome these challenges and will inform the follow-up workshop you are invited to by the working group in May 2014.

You can also choose to make your responses available directly to the academic research, SAWEA members Holle Wlokas and Sarah Stands.

Instructions:

The survey is designed for IPPs, however, valuable input from service providers and other companies and organisations is also equally valuable within the questions that are not specific to the IPP in terms of obstacles and challenges.

This survey is confidential and anonymous. No information about you, your affiliated company, or project (including the identity thereof) will be shared with a third party. The survey responses will be managed by Sarah Stands and Holle Wlokas and only anonymous and aggregated information will be shared at your discretion.

1. The survey will take you about 20 mins to complete
2. If you can speak about more than one IPP, please respond to the survey for each project separately.
3. Please forward the survey to relevant colleagues and ED decision makers

Many thanks for your cooperation and participation.

Kind regards,  
SAWEA Working Group: Communities for Wind

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<sup>52</sup> The survey can be found on-line:

[https://docs.google.com/forms/d/1LYtRpc45b2ueFy5isekymeznyOXLSOQ9Kdlikvy4IAA/viewform?c=0&w=1&usp=mail\\_form\\_link](https://docs.google.com/forms/d/1LYtRpc45b2ueFy5isekymeznyOXLSOQ9Kdlikvy4IAA/viewform?c=0&w=1&usp=mail_form_link)

**In your opinion, what is/are the greatest challenge/s you face with regards to job creation, community engagement, local ownership and SED/ED?**

<b>Technical Consultant 1</b>	For job creation, the limited skills base; for community engagement, the level of misinformation regarding renewable energies generally; for local ownership, lack of access to capital; and for SED/ED, excessive expectations of what is achievable
<b>Developer, Bidder, Equity Shareholder, O&amp;M</b>	In respect to job creation the major obstacle has been the lack of skilled labour in the communities where the projects are located resulting in a migration of skilled people into those communities. The majority of jobs created during construction were unskilled labour. There is also a need to quantify the number of jobs that were created in the hospitality and other industry's as a result of the influx of people into these communities. The creation of long term sustainable jobs on these projects is limited given the numbers of technical people required to operate the plants. This message is sometimes not understood clearly by the Dept of Energy and the local Municipalities. The which is a challenge is looking identifying local service providers in communities where such services don't currently exist and the implications this has for local stakeholder engagement. Second problem is the confusion by stakeholders of the difference between SED obligations and the Dividend distributions derived from local ownership held in community trusts and at which points engagement of local communities should happen.
<b>Technical Consultant 2</b>	Industry needs a long term and sustainable perspective. A roll-ou programme was the best mechanism to get the price of the renewable energy down, but it is not enough so establish long term commitments from the industry sector. And without industry job are only created on the installation and maintenance segments.
<b>NGO or Community Development Consultant</b>	generating actual impact
<b>Technical Consultant 3</b>	Finding skill people, cultural differences and definition of the SED.

The Developer provided all the following responses as all other responders left these questions blank.

**Briefly, describe the structures and processes put in place to govern and spend the Enterprise Development investments.**

*An Economic Development Manger was employed to manage the stakeholder engagement process. The Project Company established a Social and Ethics Committee of the Board as the governance structure for the programmes. They determined the ED strategic mandate which is focused primarily on the development of emerging farmers in the 50km radius. given the high prevalence of unskilled labour it was determined that farming enterprises if linked to take off agreements offer the opportunity to create the most number of jobs.*

**Briefly describe the methodologies and strategies used to calculate job creation?**

*There has been some confusion around this issue as the Department of Energy requires all parties to report on Man hours worked, which does not always correlate easily into the numbers of individuals employed on the site. Statistical data on the man hours worked as well as the actual numbers of employees employed on site where kept by the EPC contractor and where reported to the project company on a monthly basis. Information on the former was submitted to the Dept. of Energy and information on the later was reported into the Municipality at the bi monthly meetings held as well as to media and other related entities as requested.*

**If the local communities were informed about job opportunities, please indicate how?**

*Local media (radio, newspaper), Local government channels, Enterprise Development Days were held and a Community Liaison officer was appointed and he set up a job desk*

**Has the project met, exceeded or fallen short of job creation commitments?**

*Met all job creation requirements*

**Are more jobs being created than what is submitted to the DoE (Y/N)? If YES, please elaborate (numbers, titles, skill level, etc.)**

*Yes there were more jobs created. The researchers have access to this information from the DoE Economic Development Reports submitted to the Dept. of Energy on a monthly basis.*

**Please estimate how many people were previously unemployed (% or quantum)?**

*271 employees of the 602 employees employed on the project were from the local community and they were previously unemployed*

**Has your organisation had difficulty finding South African skills (Y/N)? If yes, what skills are lacking in the RSA RE market?**

*Yes especially finding SA citizens with wind experience willing to relocate on-site*

**In your opinion, what is/are the greatest successes with regards to job creation, community engagement, local ownership and SED/ED?**

<b>Technical Consultant 1</b>	For job creation, the requirements of the bids that job creation be a specific output; for community engagement, the emergence of some consultants reasonably skilled at managing community engagements (by no means all consultants!); I know of few successes for local ownership; and SED/ED has been fostered by the Department's bidding requirements.
<b>Developer, Bidder, Equity Shareholder, O&amp;M</b>	The large numbers of contract labour that were employed during construction from the local community and the resultant impact on the economy in local towns is noticeable especially the impact on the hospitality industry and the retail industry in the Jeffreys Bay area.
<b>Technical Consultant 2</b>	NA
<b>NGO or Community Development Consultant</b>	if actual impact is generated
<b>Technical Consultant 3</b>	The great success would be to achieve it, train people, create jobs and truly contribute to the development of the country.

## Appendix H: Workshop Invitation



The banner features a collage of images: a close-up of a wind turbine blade, a SAWEA logo (South African Wind Energy Association), a field of wind turbines, a woman in a pink raincoat, and a group of people sitting on the ground in a community meeting. A red starburst graphic on the left says 'FREE WORKSHOP'.

**WORKSHOP INVITATION**

**SAWEA**  
South African Wind Energy Association

### Getting Community Development Right: Challenges and Possibilities for the REIPPP

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The South African Wind Energy Association's (SAWEA) working group Communities for Wind (CfW), hereby invite all interested stakeholders to participate in a workshop focused on the economic development (ED) benefits of wind energy development within the South African REIPPP Programme.

**Date:** Thursday 22 May, 2014  
**Venue:** Industrial Development Corporation (IDC)  
**Time:** 8am – 3pm

**The event aims to address the following:**

- Provide a platform for IPP's/ Developers to discuss what worked and what did not work in the first few years of the REIPPP Programme.
- Learn about best practice in working with communities and enabling collaboration among multiple developers working with one/same community.
- Generate ideas for developing guidelines for drafting and implementing good Socio Economic Development plans.

This inaugural CfW workshop is sponsored by the IDC and SANEDI and FREE of charge to those who RSVP. Seats are limited to 60, all no-shows will be charged a conference rate of R950 (excl. VAT) for non-members or R550 (Excl.VAT) for members.

Please book your seat via email to [Yolanda@sawea.org.za](mailto:Yolanda@sawea.org.za) or telephone 021 448 5226 or 011 214 0660 by no later than Friday, 17 May 2014.

[WWW.SAWEA.ORG.ZA](http://WWW.SAWEA.ORG.ZA)



**WORKSHOP INVITATION**

**SAWEA**  
South African Wind Energy Association

**FREE WORKSHOP**

## Getting Community Development Right: Challenges and Possibilities for the REIPPP

### Inaugural, annual workshop

**Venue:** IDC offices, Sandton, Johannesburg  
**Date:** 22nd May 2014  
**Time:** 8am – 3pm

Hosted by



**Objectives of the Workshop**

The workshop will develop a shared understanding of the key issues and best practices in planning, engaging and implementing long-term community development programmes in the wind industry in South Africa. It will bring together relevant wind stakeholders and experts in community engagement and development from other sectors in South Africa. The workshop will:

- Provide an update and overview of what is happening at government, industry and community level;
- Deepen participants' understanding of the principles and practices of good and sustainable community development as they apply to wind power in South Africa;
- Provide a platform for dialogue and experience exchange around community development between stakeholders;
- Contribute towards a clearer vision for local socio-economic development around wind farms through the REIPPP.

The workshop will be facilitated by Doug Reeler of the Community Development Resource Association ([www.cdra.org.za](http://www.cdra.org.za)) with key inputs from Holle Wlokas and Sarah Sands, members of SAWEA's Wind for Communities Working Group who are conducting research into the local developmental benefits of the REIPPP.

### Workshop Programme, 22nd May 2014

<b>8.15 – 8.55</b>	<b>Registration and coffee</b>
<b>9.00 – 9.15</b>	<b>Welcome and introduction: "Placing the subject matter within the imperatives of a successful South Africa and a successful wind industry"</b> <i>Dipolelo Elford, SAWEA Chair, and Johan van den Berg, SAWEA CEO</i>
<b>9.15 – 9.35</b>	<b>"Government's socio-economic expectations of the REIPPP"</b> <i>TBC - IPP Office</i>
<b>9.35 – 10.10</b>	<b>What is really happening on the ground?</b> <i>Emerging findings from research from Holle Wlokas and Sarah Sands, SAWEA Wind for Communities Working Group</i>
<b>10.10 – 11.00</b>	<b>What is the real work? "The essential principles and elements of sustainable community development applied to the wind sector and REIPPP in South Africa"</b> <i>Doug Reeler of the Community Development Resource Association</i>
<b>11.00 – 11.45</b>	<b>Brunch</b>
<b>11.45 – 1.45</b>	<b>Working with our experience.</b> Applying the principles and elements of good practice to the experience of the participants. Participants will bring their experience, dilemmas and problems to a group-work process for sharing and exploration. Key findings and questions will be taken forward to the plenary that follows.
<b>1.45 – 1.55</b>	<b>Short break</b>
<b>1.55 – 2.45</b>	<b>Towards a common understanding of good practice:</b> Plenary dialogue session drawing key lessons and recommendations.
<b>2.45 – 3.00</b>	<b>Closing: IDC and SAWEA</b>

[WWW.SAWEA.ORG.ZA](http://WWW.SAWEA.ORG.ZA)

## Appendix I: Workshop Participants

Company	Title	Name	Surname
German International Cooperation (GIZ)	Mr	Jan-Wilhelm	Krebs
Mainstream Renewable Power	Ms	Linda	Thompson
University of Johannesburg		Tshibanda	Mbuyamba
Letsema Consulting	Mr	Hilton	Amsel
Letsema Consulting	Mr	Sizwe	Kuzwayo
Letsema Consulting	Mr	Simphiwe	
Letsema Consulting	Mrs	Leigh	
Eskom	Mr	Yousuf	Haffejee
Department of Energy (PP Office)	Mr	Frisky	Dominguez
Department of Energy (PP Office)	Ms	Thulisile	Dlamini
InnoWind	Mr	Louis	Dewavrin
InnoWind	Ms	Angela	Hobbs
Stellenbosch Wind Energy Technologies (SWET)	Mr	Pierre	van Aswegen
TechnoServe	Mr	Sagay	Moodliar
TechnoServe	Mr	Fredrik	Hedborg
Policy and Research Unit of the National Union of Mineworkers	Ms	Rita	Ndlhovu
REXchange	Mr	Andrew	Greeff
Industrial Development Corporation	Ms	Nosipho	Mdlalo
Genesis Analytics	Mr	Paul	Zille
Genesis Analytics	Mr	Paul	Jackson
Barui Petroleum	Mr	Zuko	Tofile
Industrial Development Corporation	Ms	Marcia	Rozana
Industrial Development Corporation	Mr	Peter	Mokomele
Red-Cap	Mr	Mark	Tanton
Greenpeace	Ms	Ruth	Mhlanga
Urban-Econ Development Economists	Ms	Elena	Broughton
Khana Economic Development	Mr	Devon	Pather
Industrial Development Corporation		Tendani	Nelwamondo
Cacadu District Municipality	Ms	Wendy	McCallum
National Union of Metalworkers of South Africa	Mr	Woody	Aroun
Globeleq	Ms	Marion Green	Thompson
Watt Energy	Mr	Mark	Scheepers
Green Connections	Ms	Liziwe	McDaid
3s Media	Ms	Maryke	Foulds
German International Cooperation (GIZ)	Mr	Alejandro	García
BioTherm Energy	Mr	Tulani	Koom
Umoya Energy	Mr	Ricardo	Amansure
Industrial Development Corporation	Ms	Lindiwe	Zwane
University of Copenhagen	Ms	Katrine	Lerhard
University of Copenhagen	Ms	Marie Louise	Schaumburg-Müller
Embassy of Spain	Mr	Enrique	Manzanres
Embassy of Spain	Mr	Rafael	Martin
Embassy of Spain	Ms	Cristina	Moragues
Embassy of Spain	Mr	Alejandro	Urizar
Spain & Africa Renewable Energy Consortium	Mr	Luis	López-Polín
Trade Winds	Mr	Gert	Shoeman
SAWEA Wind for Communities Working Group	Ms	Holle	Wlokas
SAWEA Wind for Communities Working Group	Ms	Sarah	Stands
South African Wind Energy Association	Ms	Dipolelo	Elford
South African Wind Energy Association	Mr	Johan	van den Berg
Community Development Resource Association	Mr	Doug	Reeler
Just Energy	Mr	Neil	Townsend
Stream Equitable Ownership Initiative	Ms	Karen	Tibbo
	Ms	Victoria	Boshoga
Economic Development Solutions	Ms	Ugeshree	Thakurpersad
Bureau Veritas		Joaquim	Macia
Department of Energy (PP Office)	Mr	Gary	Lloyd
EDPR	Mr	Guzman	de Lacalle

## Appendix J: Final WfC Workshop Report (Findings)

**Concrete challenges were explored and recommendations** were identified through a participatory World Café workshop process, in groups and plenary discussion. A full report can be accessed from SAWEA.

### Initial community liaison

Local communities should be involved in the initial stages of a project, prior to bid submission. Developers need to be prepared for a time, budget and resources consuming process, constantly managing changing expectations. It is important that communities are educated about the project; that they feel included and understand the project and its practical implications for their community. Influential stakeholders within the community can help secure buy-in and ownership sentiment. To identify these key people requires both expertise and time. The liaison process is ideally accompanied by an in-depth study of the local assets and needs. How are appropriate responsibilities established within the partnering community for its role in the IPP project?

### Changing business's practice with communities

The private sector can at times be its own worst enemy. Project promotion and public events and inaugurations, when plants are connecting to the grid, raise expectations. Questions raised by local residents are often not followed-up or communities are not provided relevant or thorough feedback. If and when communities are left alone with their questions, project owners underestimate the associated risks for project failure, potentially resulting in confusion and conflict. It is therefore crucial to invest in education and raising awareness to make everyone understand the full process and associated risks. Also terminology used to speak about communities, as 'other' or 'them' might deepen the divide felt by companies and communities. How does the IPP stimulate transformation while being stuck in this paradigm?

### Job creation is a challenge, but manageable

The bidding process is not geared towards meaningful job creation. While the local content objective should build industrial and service base supporting socio-economic development and job creation, most opportunities for employment are during the construction period. Despite the challenge to create meaningful employment, there have been some important successes. However many feel there are cases of overpromising. Over-promising is also a result of a lack of understanding how job creation is calculated and measured.

### Learning from other industries, leapfrogging mistakes

The RE IPPPPP criteria for socio-economic development (SED) and enterprise development (ED) are classic elements of the Broad Based Black Economic Empowerment legislation (BBBEE). They have found implementation in other sectors for many years already. Lessons learnt have to be transferred to the emerging renewable energy industry.



#### Foreign companies specifically challenged

Foreign companies participating in the RE IPPPP are in powerful positions within consortia. Successful community engagement can be hindered if these companies lack sufficient understanding of South Africa's development and social challenges. Or lack a long-term personal investment in the country, aside from a financially profitable project.

#### Challenging hot-spot areas

Some areas across the Provinces have a number of IPP projects in close proximity. In such places risk for duplication and competition of projects to spend their funds exists. Such hot-spot areas might lead to wasteful expenditure and competition for communities through poor collaboration between projects. Therefore, it is suggested that Government insist on collaboration of projects if located near and targeting the same communities. Another recommendation is to relax the 50km radius both with and without hot-spot areas (for different reasons), allowing benefits to be spread more widely and supporting a more inclusive identification of beneficiary communities.

#### Communities can only develop themselves

Development cannot be imposed. Communities and companies have to engage in order to allow communities to formulate ideas for the future and make their own decisions to pursue their dreams. Companies can provide inspiration, create opportunities and empower through skills transfer and training, but measures need to be informed and guided by the community. There are various ways to go about identifying projects and programs in support of positive social and human development, tackling long-term issues but also serving immediate needs. In some instances active support from the outside is required to overcome challenges associated with rural communities with ageing populations.

#### Business role in development

The strength of business lies with the creation of employment, value and wealth. The slow processes of engaging with human and social development, of consultation and participation, as a prerequisite of local economic development is foreign to business practice. The fact that business can deliver well, if told what to provide, needs to be used to the best possible outcome for the implementation of the SED and ED requirements. How to harness the value created by business and share it more broadly? Does this include tapping into the local supply chains and aligning development with the skills already within the project company?

#### Need for intermediaries to bridge business and communities

Bridges are needed between business and communities. Prioritizing community liaison. Such bridges could be constituted by an independent agency that is tasked to coordinate, plan and implement community development measures.

#### Preventing political agendas to influence

Politics can get into the way of development and transparent processes. An ANC Ward in a DA governed municipality for example, creates a huge challenge for projects, in particular when it comes to community engagement and promises made by leadership. Communities also become sceptical of all decisions and use parties as scapegoats to unfavourable outcomes.

The RE IPPPP as a funded program for social transformation

The RE IPPPP is appreciated as a great program with outstanding potential to contribute towards the development objectives of South Africa. Poverty is however, structurally determined and the program places companies under pressure to identify appropriate contributions. While this is tackled with business enthusiasm, an indication from government and the associated vision to commonly work towards, would be welcomed. i.e. what is the common root cause we are keen to fight together with this money?

Companies are wondering, in order to make a real contribution to poverty alleviation, if an alternative broad based vehicle might be required to enable households to benefit from the wealth created by the wind industry. Cash hand-outs and charity projects, both have their limits and for a positive contribution suitable support and knowledge, education and training are essential.

Green economy- can it be better than extractive economy?

There is a hope that the green economy could be protected from corruption. Thoughts were also around the fact that the renewable energy assets largely benefit the wealthier population. How can low-income households benefit from these assets too?

## Appendix K: REIPPPP Job Creation Definitions

Table 22 REIPPPP Definitions Source: Author (DoE 2013a)

Group	Description	Measurement	Definition Window 3
Job Creation	100-SR-01 RSA-Based Employees who are Citizens	Number of Citizens employed *100 / Number of RSA Based Employees	<b>RSA based Employees</b> - means those Employees based in the Republic of South Africa.
			<b>Citizens</b> - means people who have obtained citizenship of the Republic of South Africa by birth, descent or naturalisation in terms of the South African Citizenship Act No. 88 of 1995
	100-SR-02 RSA-Based Employees who are Black Citizens	Number of Black Citizens employed *100 / Number of RSA Based Employees	<b>Black Citizens</b> - Black People who are Citizens
			<b>Black People</b> - Refers to Africans, Coloureds and Indians, limited to those who are Citizens.
	100-SR-03 Skilled Employees who are Skilled Black Citizens	Number of Skilled Black Citizens employed *100 / Skilled Employees	<b>Skilled Black Citizens</b> - means Black People employed in Occupational Level C or higher as defined in Annex 2 of the Employment Equity Regulations, and includes skilled technical and academically qualified workers, junior management, supervisors, foremen, superintendents, which shall for purposes of this Schedule 2 (Economic Development Obligations) be equivalent to the Paterson Decision Band B or better.
			<b>Skilled Employees</b> - means Employees employed in Occupational Level C or higher as defined in Annex 2 of the Employment Equity Regulations, and includes skilled technical and academically qualified workers, junior management, supervisors, foremen, superintendents, which shall for purposes of this Schedule 2 (Economic Development Obligations) be equivalent to the Paterson Decision Band B or better.
	100-SR-04 RSA-Based Employees that are Citizens from Local Communities	Number of Citizens from Local Communities employed *100 / Number of RSA Based Employees	<b>Local Communities</b> - means a community or communities in the Republic of South Africa: (a) in one or more residential areas or villages within 50km from the Project Site; and (b) in the event that there are no residential areas or villages within 50km from the Project Site, in the nearest residential areas or villages to the Project Site.
			<b>Person Month</b> - means the total number for Employees in each of the Contract Months, within the Construction Measurement Period and the Operating Measurement Period, as applicable, which are adjusted for the actual working time, compared to normal working time.
			<b>Contract Month</b> - means a calendar month save that: (a) the first Contract Month shall be the period from and including the Effective Date up to and including the last day of the month during which the Effective Date occurs; and (b) the final Contract Month shall be the period from and including the first day of the month during which the Termination Date occurs up to and including the Termination Date.
	Jobs for RSA Based Citizens per MW of Contracted Capacity	Number of RSA Based / MW Contracted Capacity of plant	

## Appendix L: Global RE Job Creation

In an interview with Michael Renner in 2008, a Senior Researcher and global green job expert from the Worldwatch Institute, claimed that in 2006 the wind and PV markets, globally, directly employed a total of 300 000 and 170 000 people respectively (Hitchcock 2008). Further, Renner adds evidence through the UNEP (2008) report that job opportunities in the conventional energy industries are depleting, giving examples such as the reduction in general mining and in coal production in South Africa<sup>53</sup>.

Global studies by lead author Rutovitz (Rutovitz & Atherton 2009; Rutovitz & Harris 2012a; Rutovitz & Harris 2012b) use intricate methodologies to predict the number of jobs that could potentially be created. The Job creation methodology is developed around a job creation factor per capacity (i.e. jobs per MW) specific to each technology and phase of the project (the most common include construction, operating and maintenance and manufacturing). The factor is then applied to an equation, multiplying the factor by different growth scenarios in a specific country – usually determined by governmental policy support, resource potential (capacity) and a regional job multiplier (depending on the local labour efficiencies, learning rates and other factors specific to the region). Figure 29 provides a summary Rutovitz (2012a:2) global methodology used to calculate job creation in the energy supply industry, based on a capacity, employment factors and regional job multipliers.

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<sup>53</sup> Renner states that although coal production increased by 10%, during the same time period (1999 – 2005) the total jobs decreased from 603 000 to 398 000.

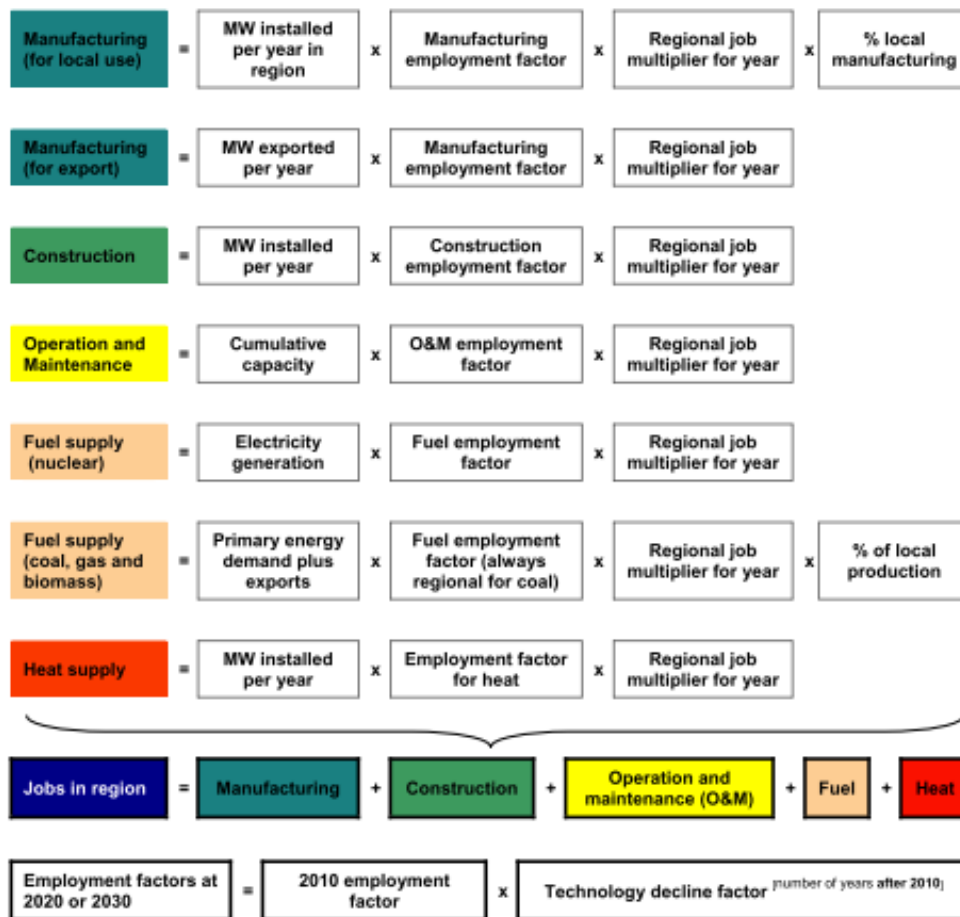


Figure 29 Calculation of energy supply jobs Source: (Rutovitz 2012a:2)

In 2009, Rutovitz’s forecast methodology was an attempt to produce a global study and combined methodology for the entire global energy sector to determine direct job creation and again in 2012 with a follow up study and refined methodology seen in Figure 1. While the study did not include indirect and induced jobs (said to create 50%-100% and 100%-350% more jobs respectively) as these are more difficult to measure, the global analysis looked at three different energy scenarios and concluded that a RE based scenario would enable growth, reduce carbon emissions and could potentially create more jobs than conventional energy sources by 2030. For example, in Africa nearly 40, 000 more jobs could be created in 2020 in the [R]Evolution Scenario (Rutovitz & Atherton, 2009:51) than in a business as usual or conventional scenario. These job creation figures, along with the production of clean energy, substantiate the decisions of governments to support the development and implementation of utility-scale RE programmes.

Figure 30 uses several individual global studies and shows the projected outcome of global job creation, across all technologies to be around 1.3 million jobs. Yet, complex methodologies that differ from one another do not give us an indication of the actual numbers; rather it is a highly conceptual estimate.

RENEWABLE ENERGY SOURCE	Selected countries	Employment estimates
Wind	United States	16,000 <sup>a</sup>
	Spain	32,906 <sup>b</sup>
	Denmark	21,612 <sup>c</sup>
	India	10,000 <sup>d</sup>
	<b>World estimate</b>	<b>300,000<sup>f</sup></b>
Solar PV	United States	6,800 <sup>a</sup>
	Spain	26,449 <sup>b</sup>
	<b>World estimate</b>	<b>170,000<sup>f</sup></b>
Solar Thermal electricity	United States	800 <sup>a</sup>
	Spain	968 <sup>b</sup>
Solar Water Heating	China	600,000 <sup>g</sup>
	Spain	8,000
	Germany	12,500 <sup>h</sup>
	South Africa	300 <sup>i</sup>
Biomass power	United States	66,000 <sup>a</sup>
	Spain	4,948 <sup>b</sup>
Hydropower	Europe	20,000
	United States	8,000 <sup>a</sup>
	Spain (small hydro)	6,661 <sup>b</sup>
Geothermal	United States	9,000 <sup>a</sup>
All sectors	<b>World estimate</b>	<b>1.3<sup>e</sup> – 2.3<sup>f</sup> million</b>

Figure 30 Global RE job creation figures (Rutovitz 2009:8)

These studies, amongst others, are important because the projected outcomes are highly referenced sources and inform global governments into making huge changes in their countries energy landscapes and overall economic strategies. They have therefore informed the support and development of the South African REIPPPP mostly due to its potential to create more jobs than conventional energy, create decent jobs and development opportunities in rural locations, and create jobs within the green economy. Bribia et al. (2010) concludes that RE creates 4 to 1.8 times as many jobs per MW installed than conventional energy, and more jobs per MW is supported by Williams et al. (2003), Rutovitz (2009, 2012a); Renner et al. (2008: 6) stating, “*RE generates more jobs per unit of installed capacity, per unit of power generated and per dollar invested*”.. However, despite the complex and well thought-out methodologies, Rutovitz (2009, 2012a, 2012b) explains that data is often patchy and disaggregated even in established industries such as coal. Therefore, the support for studies and in-depth investigations and research be designed and specific to each country is mutual throughout literature.

## Appendix M: Semi-structured interviews

Many different stakeholders were interviewed to unpack job creation in the REIPPPP. Every stage was explored: conceptual estimates, bid evaluation, implementation and reporting. Relevant questions were asked to each stakeholder including how commitments were estimated, the evaluation process, the practical experiences that occur on the ground and a focus on the challenges and successes of job creation and employment for the duration of the project.

**Table 23** Semi-structured interviewees

Participant Number	Title	Organisation	Technology	Project Location	Date	Method of interview
1	ED Manager 1	EPC	PV	Northern Cape	February 2014	In person
2	ED Manager 2	Bidder	PV	Northern Cape	August 2014	In person
3	ED Manager 3	EPC	Wind	Several	April 2014	In-person
4	Sub-Contractor 1	Sub-Contractor to EPC	PV	Northern Cape	May 2014	In-person
5	Sub-Contractor 2	Sub-Contractor to EPC	PV	Northern Cape	May 2014	In-person
6	Sub-Contractor 3	Sub-Contractor to EPC	PV	Northern Cape	May 2014	In-person
7	Construction Manager 1	Bidder	PV	Northern Cape	May 2014	In-person
8	Project Manager 1	EPC	PV/Wind	Northern Cape and Eastern Cape	May 2014	In-person
9	Project Manager 2	Bidder	PV	Northern Cape	August 2014	In-person
10	CLO	Bidder	PV	Northern Cape	May 2014	In-person
11	Male Job Seeker 1	Local Community	PV	Northern Cape	May 2014	In-person

<b>12</b>	Female Job Seeker 1	Local Community	PV	Northern Cape	May 2014	In-person
<b>13</b>	Female Job Seeker 2	Local Community	PV	Northern Cape	May 2014	In-person
<b>14</b>	Female Job Seeker 3	Local Community	PV	Northern Cape	May 2014	In-person
<b>15</b>	Female Job Seeker 4	Local Community	PV	Northern Cape	May 2014	In-person
<b>16</b>	Bid Evaluator 1	DoE	All	-	April 2014	In-person

### ***Semi-structured interview themes and open ended questions***

#### **Onsite Questions:**

1. Tell me about your role in the REIPPPP, explain a typical day
2. What is your title and what are your primary responsibilities
3. When did you start your position? How did you find out about the position?
  1. Are you on contract or perm?
  2. What aspects of your job do you enjoy? What aspects of your job do you least enjoy?
  3. Do you live around the area? Are you from the area?
  4. Where did you gain an interest in the RE sector?
  5. What are the greatest challenges you face and see with regards to job creation?
  6. Are the obstacles unique to the REIPPPP and renewable energy industry, or is this similar to the construction industry?
  7. Are employees generally satisfied with the opportunity?
  8. If on contract, are there other opportunities after this project ends?
  9. In your opinion, do you feel that anyone employed is not utilised? Could the project use more skills?
  10. What are the greatest successes? i.e. Training, easy to find skills, skills transfer?
  11. In your opinion, how many people were previously unemployed before being hired?
  12. How many people have come to ask for work?
  13. What percentage of women work on site?
  14. Are there opportunities to advance and develop your career?

#### **ED Interview Questions:**

1. In a nutshell, what are your primary responsibilities?
2. What do you spend a majority of your time doing?
3. What percentage of your time is spent on reporting? Community development strategies? Community liaison?
4. Has the project company exceeded job creation targets set out in the REI4P?
5. Are these exceeded numbers documented in quarterly reporting of the IA?
6. In your opinion, what the reasoning behind an increase of job creation (Jobs/MW) from BWR1-BWR3?
7. Are the obstacles unique to the REIPP and renewable energy industry, or is this similar to the construction industry?
8. Were you involved in developing the overall job creation strategy?
9. If yes can you reflect on this, if not, can you tell me who was? This would include, population, unemployment, and specific skills?



**DoE Interview Questions:**

1. Why does the RFP utilise person-months as a form of analysis?
2. Is it a national standard across industries or was it used to combine both temporary and permanent jobs?
3. What is the rationale behind the job per MW element in BWR3?
4. Has the unit discussed economies of scale?
5. Will there be additional job creation elements added to the bid?
6. How are bidder's performing in regards to job creation in quarterly reporting?
7. How many audits have been conducted on job creation within IPPs?
8. How are bidders required to support their job creation claims?
9. What obstacles to you think bidders face in terms of job creation?
10. What obstacles does the Unit face in terms of understanding and measuring job creation on the ground?
11. What are the desired outcomes in terms of Economic Development?
12. Where is the programme heading? And what is the vision and strategy of the programme?

## Appendix N: IPP-unit Database Outcomes

Table 24 Total Jobs per province and alternative ratios Source: Author (DoE 2014)

* Working age 15-64 (StatsSA 2014)		All Technologies	PERSON-MONTHS PER PROVINCE					
Preferred Bidders PMs		Total PMs	Western Cape	Eastern Cape	Northern Cape	Limpopo	Free State	North West
Citizen Jobs	Total Jobs PMs	716 852.85	69 745.33	134 793.80	427 466.72	39 864.00	37 961.00	7 022.00
	Total Citizens (PMs)	629 701.43	61 713.73	124 949.10	369 581.59	35 007.00	32 156.00	6 294.00
	CMP Total Citizens (PMs)	225 278.10	17 568.73	34 622.20	160 964.17	4 407.00	7 342.00	374.00
	OMP Total Citizens (PMs)	404 423.33	44 145.00	90 326.90	208 617.43	30 600.00	24 814.00	5 920.00
	OMP Citizen/12 (PY) / 20 (O&M years)	1 685.10	183.94	376.36	869.24	127.50	103.39	24.67
*Working Age	Working Age (WA) / 1 000	35 177.00	4 153.00	4 065.00	754.00	3 482.00	1 852.00	2 367.00
	Total Citizen Jobs (PMs) / 1 000 WA	17.90	14.86	30.74	490.16	10.05	17.36	2.66
	CMP Citizens (PMs) / 1 000 WA	6.40	4.23	8.52	213.48	1.27	3.96	0.16
	OMP Citizens (PMs) / 1 000 WA	11.50	10.63	22.22	276.68	8.79	13.40	2.50
	OMP Citizens PY /20 / 100 000 WA	4.79	4.43	9.26	115.28	3.66	5.58	1.04
Rand	Rand Invested (Total Use of Funds)	127 180 333 857	10 390 019 251	25 339 175 134	79 850 332 999	3 592 413 047	6 434 812 906	224 124 413
	Total Citizen Jobs (PMs) / 1m Rand	4.95	5.94	4.93	4.63	9.74	5.00	28.08
MWh	Unit of Energy Produced (MWh) P90	187 055 702	19 942 929	55 005 042	99 797 689	4 389 821	7 719 491	200 730
	OMP Jobs (PY) / TWh P90	9.01	9.22	6.84	8.71	29.04	13.39	122.88
	Total Citizen Jobs (PMs) / GWh P90	3.37	3.09	2.27	3.70	7.97	4.17	31.36

## Appendix O: Interview and direct observation outcomes (Successes and Challenges)

Table 25 Qualitative method themes: Perceived Successes Source: Author

<b>ED Manager</b>	<p><b>(SSI)</b> EPCs and sub-contractors are performing well on their job creation commitments and scorecards. meeting, and at times, exceeding all the job creation targets</p>	<p><b>(SSI)</b> Community partnerships and relationships are being formalised through robust election processes and established alongside the community</p>	<p><b>(DO)</b> Bidders and ED Manager expressed a lot of passion for the industry, participating in voluntary working groups, and getting together independently to speak about job creation issues and strategies to continue making progress</p>	<p><b>(SSI)</b> Several external services providers are not taken into account when accounting for RE job creation quantities</p>	<p><b>(DO)</b> Many bidders have been involved in renewable energy for a long period of time i.e. Greg Austin was a founding member of Agama energy responsible for the most cited South African job creation study</p>		
<b>DoE</b>	<p><b>(PO)</b> The IPP-unit had a dedicated and passionate team, working long hours and into the night on REIPPPP matters, this job creation is not being taken into account when quantifying numbers</p>	<p><b>(PO)</b> Processes and procedures are well thought out, and consistently refined and improved, yet the DoE lacks resources to dedicate to the project and consultants (hire to work internally) take on much of the work in the fast paced environment to avoid long tender processes</p>	<p><b>(PO)</b> Confidentiality within the IPP-unit and therefore strict limitations to information is being maintained for the integrity of the programme to protect the bidders and not because of incompetence.</p>	<p><b>(SSI)</b> ED elements are continually being reviewed and altered where general improvements can be made</p>	<p><b>(DO)</b> The environment was highly guarded, computers had restricted access, video cameras, and security guards were constantly tracking individual movements of visitors</p>		

<p><b>EPC/ Construction (Manager)</b></p>	<p><b>(SSI)</b> The work ethic in the Eastern Cape is relatively high compared to the Northern Cape and the work environment is less harsh (more favourable)</p>	<p><b>(SSI)</b> If comparing technologies, wind energy may create less jobs overall, but the jobs are more skilled, have a longer duration and are in a more favourable environment</p>	<p><b>(SSI)</b> 70-90%+ of sites are staffed with local people; Everyone is utilised fully on-site</p>	<p><b>(SSI)</b> RE sites that are located with several communities in the 50km radius have a larger pool of skilled labour to pull from</p>	<p><b>(SSI)</b> To maintain a project culture and to prevent infighting, a min/max sub-contractor day wage for LC job seekers is set; normal rate for unskilled labour is R20/hour (5.5 days)</p>	<p><b>(SSI)</b> Personal services for construction workers are sometimes not available in local communities, and they are opportunities lost (i.e. banking facilities, car services, restaurants)</p>	
<p><b>Labour Broker</b></p>	<p><b>(SSI)</b> The relationship with the local community is quite good, and Municipalities have been kind to facilitate with conducting Interviews, translators, facilities and CVs of unemployed</p>	<p><b>(SSI)</b> Treatment of community with respect earns respect, some of the best workers are also the most difficult employees</p>	<p><b>(SSI)</b> Empathetic to community; because work is temporary and it may be the only job they get</p>				
<p><b>Sub- contractor</b></p>	<p><b>(DO)</b> Sub-contractors often take on work that is out of the scope of their works, thus developing new skills and providing services rather than utilizing international contractors and skills</p>	<p><b>(SSI)</b> The use of unskilled community skills is relatively high for onsite skills, up to 90%, and includes sometimes five or six local foreman; no international skills used, Paid for training, first aid, firefighting, safety and other brought down people from their training centre. 90% of people unemployed of 90 from local community.</p>	<p><b>(SSI)</b> It is an incentive to hire people from the local community as it cuts down costs (housing, transport) and a necessity to provide opportunities for the local people; it is the responsibility of the sub-contractors to ensure the most job creation benefits are awarded to local communities</p>	<p><b>(SSI)</b> The local community has definitely benefitted from this project, even though there will not be a lot of perm jobs, but there will be a couple and this has a big impact in the local community of high unemployment</p>	<p><b>(SSI)</b> Over 90.5% of employees from local community (88 labourers and 8 other contractors, 10 management); Prefer to have women on site, and are often perform better than men; up to 35 females – close to 200 total labourers (17.5%); 'more reliable'/better work ethic'</p>	<p><b>(DO)</b> Authenticity of some sub-contractors to want to use local people from the community, investing in the training, using supervisory skills from the local communities</p>	<p><b>(SSI)</b> Most technical skills come from the mining sector, retrenched people are often sent to the PV farm</p>

<p><b>Local Community (Job Seeker)</b></p>	<p><b>(DO)</b> The RE projects and industry has a very good reputation with the local community and is viewed in a positive way</p>	<p><b>(SSI)</b> RE IPPs have a reputation for paying higher than other industries/jobs in the local area; Labour jobs in other industries pay R14.5 – 18; R33 (Solar PV), solar pay more but the jobs are shorter</p>	<p><b>(SSI)</b> The work includes long productive days and people are learning much needed skills</p>	<p><b>(SSI)</b> Future perceived opportunities at other solar sites in the country;</p>	<p><b>(DO)</b> Very proactive to accept life challenges, stating, <i>“there is always something to do in life, volunteering is something”</i> yet people really want jobs</p>	<p><b>(SSI)</b> Preference to work on a solar site than in the mining industry</p>	<p><b>(DO)</b> One community member was very aware of the process and the understood the O&amp;M job opportunities, and could describe the whole job hiring</p>
<p><b>CLO</b></p>	<p><b>(SSI)</b> An unemployment database was created specifically for the area which if managed properly it can be a large success; one person must take control</p>	<p><b>(DO)</b> The CLO worked intimately between the community and the project during construction, although a very demanding role as job seekers were quite aggressive wanting opportunities</p>	<p><b>(SSI)</b> Communities wait for an SMS after registering and submitting their CVs</p>	<p><b>(DO)</b> The CLO's role is essential in detouring strikes and being a positive voice of the project when communicating the sometimes negative realities of not everyone benefitting from job creation</p>			

**Table 26** Qualitative method themes: Perceived Challenges Source: Author

<b>ED Manager</b>	<b>(SSI)</b> The primary focus of time and energy is spent on ED compliance. This is overwhelmingly administrative and time wasted that could be spent on implementing ED opportunities for Local Communities	<b>(SSI)</b> The whole REIPPPP lacks transparency, there and understanding of the auditing process by DoE is unclear	<b>(SSI)</b> Not all construction and O&M jobs being created are accounted for as there is little or no reward for excellent performance; no reward for performing better than commitments and the administration is intense for compliance	<b>(DO)</b> International bidders complained often about the amount of 'paperwork' involved in the programme compared to other programmes abroad; joking that an engineer requires a high degree of	<b>(SSI)</b> Illegal striking was common, even after long laborious negotiations and agreements; communities had worked out that striking will enable them to have a job for a longer duration rather than finishing the job early (on-time) to the bidders and EPC's needs	<b>(SSI)</b> Bonuses were offered for local community employees to show up on time and to come in the day after their weekly pay (often choosing to drink and therefore not suitable for work the day after)	<b>(SSI)</b> Definition of a job is unclear and if not defined in PM it is not recorded in the DoE	
<b>DoE</b>	<b>(DO)</b> Lack of resources to implement the aspirations and visions, many uncertainties about the right way forward to provide solutions	<b>(SSI)</b> Communication from IPPs and bidders as to what was happening "on-the-ground" is minimal						

<p><b>EPC Construction Manager</b></p>	<p><b>(DO)</b> Local communities lack of work ethic; many people that are hired and put through medicals do not pitch</p>	<p><b>(SSI)</b> Supervision is mandatory for most on-site workers, therefore a balance of 1 foreman to every 5-30 labourers required</p>	<p><b>(SSI)</b> Subcontractors often just want the contract and are not too concerned about the meaning behind the data</p>	<p><b>(SSI)</b> Many of the local communities lack needed skills; Sub-contractors usually only hire English and Afrikaans speaking employees, “which is wrong”</p>	<p><b>(SSI)</b> During O&amp;M, the plant will run itself, this may be the one opportunity for a job in someone’s life, poverty will even be worse, as would have made a little money (from working on the project) – then back at square one, potentially the one and only time they will earn this type of money</p>	<p><b>(SSI)</b> Obstacles of job performance can include health, drugs, alcohol, nutrition, the harsh environment language still a huge barrier</p>	<p><b>(SSI)</b> Sub-contractors take time to get up to speed in order to work productively and efficiently, as they will take a whole area of the IPP up to the electrical connection</p>	
<p><b>Labour Broker</b></p>	<p><b>(DO)</b> Labour Broker was generally misinformed: technical aspects (i.e. speaking about wattage rather than MW capacity); unaware of future locations of projects; and stated the local community border was from 50-70km (border in which they could source skills) providing a buffer outside the 50km radius defined by the DoE.</p>	<p><b>(SSI)</b> International companies “have the knowledge and the skill” and therefore necessary in the IPP rather than using local skills</p>	<p><b>(SSI)</b> Different people are paid different rates for various reasons, which can cause friction on site</p>	<p><b>(DO)</b> Broker is responsible to do preliminary investigations for determining wage in the local community through research and a series of investigations</p>	<p><b>(SSI)</b> All management and supervisory skills must be imported; Finding any skills within the 50km is quite a challenge: not enough skilled people in one town; people have been trained and cannot be utilised on other sites; people that are ‘earmarked’ for natural talent cannot be used; newly skilled people not able to continue in industry</p>	<p><b>(DO)</b> Very physical job, ‘no discrimination’ yet women get cleaning and office jobs, total of 10 had been hired for one contractor, “it’s not a healthy environment for the level of work that is involved for a women”</p>	<p><b>(SSI)</b> Communities are desperate and they will phone and send SMS and ‘wats aps’ at 2h00, begging for work</p>	<p><b>(SSI)</b> RE is a much different skill set to hire for, whereas mining you can advertise and qualified people are available, often in the community. When hiring 200-300 the task can seem impossible.</p>

<p><b>Sub-Contractor</b></p>	<p><b>(DO)</b> Contractors often take on new provision of services, where there is a learning curve and can create delays</p>	<p><b>(SSI)</b> Once cables are in the ground (using a pick and shovel) skilled labour is required and the local community general worker is no longer needed</p>	<p><b>(SSI)</b> Most local communities do not have bank accounts, there is no bank in the town, only an ATM and costs are high for bank account holders</p>	<p><b>(SSI)</b> The local labour should be provided more training that is conducive to the RE project skills required, as the areas are mostly generally farmers</p>	<p><b>(SSI)</b> Many obstacles are not expected in terms of labour requirements, trenching, trenching in the very hard ground, making the job seemingly more difficult and not able to hire enough labour or hire too much labour</p>	<p><b>(SSI)</b> Every day is a challenge, the time and attendance, getting individuals to sign in, also setting up a system to automate is difficult; Labourers will often move between sub-contractors for better pay</p>	<p><b>(SSI)</b> Language, grammar can often be an obstacle, and education lacking on the bigger picture – why they are building a PV farm; only given a photograph of some of the activities that make up the full site</p>	<p><b>(SSI)</b> Communities are desperate to obtain a job, i.e. 100 people will show up for a medical where 20 people booked; lots of ‘wats aps’ and phone calls from communities</p>
<p><b>Local Community (Job Seeker)</b></p>	<p><b>(DO)</b> Overarching theme of “unfairness” for employment opportunities from women, men tend to speak more casually and mentioned “if I’m lucky</p>	<p><b>(SSI)</b> More men being hired than women because they are stronger, “unfair” and should be 50/50</p>	<p><b>(SSI)</b> Information about potential job opportunities is not communicated clearly</p>	<p><b>(SSI)</b> Promises made by local politicians about job opportunities for all</p>	<p><b>(SSI)</b> There are many people migrating from other areas for the opportunities, and individuals quit their jobs to take opportunities with the RE farm, or take double pay if they can send someone that looks like them and split wages</p>	<p><b>(SSI)</b> More women were getting opportunities at other sites, uncertain of the perceived change</p>		



<p><b>CLO</b></p>	<p><b>(SSI)</b> Communities were not aware of the entire job creation process and therefore had big expectations</p>	<p><b>(SSI)</b> Process can be improved if Local Municipality took more control of the unemployment database, CLO claimed it was left “hanging” and was rather abused not providing fair opportunities for all unemployed persons</p>	<p><b>(SSI/DO)</b> Sub-contractors hiring people that have been declared unemployable, and CLO is often blamed for not providing enough employment and CVs</p>	<p><b>(SSI)</b> Contractors are often given permission to hire out of outside of the 50km radius because there is a lack of suitable individuals</p>	<p><b>(SSI)</b> The municipality formed an Unemployment committee because of the database, yet often the committee would push their own people and this can result in a lack of unfair opportunity</p>	<p><b>(SSI)</b> Communities are desperate and they will follow the CLO and phone during the night to ask for work</p>		
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