



Market Intelligence Report

Renewable Energy 2014

1.	Executive summary	4
2.	Regulatory framework	5
2.1	National Development Plan	5
2.2	Integrated Energy Plan	5
2.3	IRP2010 – and revisions	6
2.4	Independent System and Market Operator (ISMO)	6
2.5	Accords and relevant policy	6
	i) Green Economy Accord	6
	ii) Local Procurement Accord	6
3.	Markets for renewable energy in South Africa	7
3.1	Utility-scale renewable energy	8
3.2	Where will we expect to see projects in the future?	9
3.3	Grid capacity constraints	10
3.4	Small Projects Bidding Programme	13
3.5	Standard offer Programme from Eskom	14
3.6	Private market	14
	i) Positives in the private market	14
	ii) Negatives in the private market	15
4.	Manufacturing renewable energy components in South Africa	16
4.1	Wind	16
4.2	Photovoltaic	16
5.	Doing business in the Western Cape	17
5.1	Tangible opportunities for new and existing companies	17
	Appendix: How to become an independent power producer (IPP)	16

List of acronyms

CCDI	Cape Craft & Design Institute
CSIR	Council for Scientific and Industrial Research
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DoE	Department of Energy
DEA	Department of Environmental Affairs
DoMR	Department of Mineral Resources
dti	Department of Trade and Industry
DWA	Department of Water Affairs
EDD	Economic Development Department
EIA	Environmental Impact Assessments
EPC	Engineering, Procurement and Construction
GW	Gigawatt
IDC	Industrial Development Corporation
IEP	Integrated Energy Plan
IPP	independent power producers
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan
IRP	Integrated Resource Plan
ISMO	Independent System and Market Operator
Kwp	Kilowatt peak
LUPO	Land Use Planning Ordinance 15/1985
MW	Megawatt
MWh	Megawatt hours
NDP	National Development Plan
NERSA	National Energy Regulator of South Africa
PPA	Power Purchase Agreement
PV	Photovoltaic
REDISA	Recycling and Economic Development Initiative of South Africa
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for Proposal
USREP	Utility-Scale Renewable Energy Programme
WWF	World Wildlife Fund for Nature



The latest iteration of the Integrated Resource Plan (IRP) sets a target for 42% of all new planned power stations built in South Africa to be renewable energy.

1. Executive summary

Through the Independent Power Producer Procurement Programme (IPPPP), South Africa has contracted renewable energy installations for just under 4 000 megawatts (MW) of power using various technologies.

The first utility-scale projects in South Africa were connected to the grid in late 2013. There is an increasing drive towards higher local content and job creation, which has seen multiple manufacturers establish themselves in the country.

The national strategy around electricity has placed a strong focus on renewable energy providing support to the traditional supply, which is dominated by coal. The latest iteration of the Integrated Resource Plan (IRP) sets a target for 42% of all new planned power stations built in South Africa to be renewable energy. This is set to be adjusted upwards.

This market intelligence report (MIR) is designed to give a snapshot overview of each of the four renewable energy markets in South Africa.

In particular, the report focuses on policy and regulations and how to execute projects.

2. Regulatory Framework

The regulatory framework for energy in South Africa is governed by the Department of Energy (DoE) and the National Energy Regulator of South Africa (NERSA). There are several key stakeholders involved in the development of energy policy, including the national utility, Eskom, the National Treasury, the Department of Trade and Industry (dti) and the Economic Development Department (EDD). Each has a very specific role to play in the policy context.

2.1 National Development Plan

The National Development Plan (NDP) lays out the development path for South Africa. At the time of writing this plan had not been universally accepted in South Africa, and had yet to be officially adopted by government.

However, in this context, it is relevant to know how the NDP shapes the energy sector in South Africa. The NDP supports the procurement of at least 20 GW of renewable energy by 2030. There are a number of electricity-related infrastructure proposals. Of these, perhaps the most important is the independent system and market operator. This is discussed in more detail later in this report.

2.2 Integrated Energy Plan

The Integrated Energy Plan (IEP), which should be distinguished from the Integrated Resource Plan (IRP), focuses on all the country's energy requirements and how these are most economically provided. Where the IRP focuses specifically on electricity, the IEP concentrates on all the energy requirements.

The IEP has the following stated objectives:

1: Ensure the security of supply

2: Minimise the cost of energy supply

3: Increase access to energy

4: Diversify supply sources and primary sources of energy

5: Minimise emissions from the energy sector

6: Promote energy efficiency in the economy

7: Promote localisation and technology transfer and job creation

8: Promote the conservation of water.

The IEP forms the broader context for the electricity-focused IRP.

2.3 IRP 2010-2030 – Update

The IRP is the policy document that governs the technology choices, timing and procurement of the various electricity generation technologies that will support the South African grid. The first version, written in 2010 and promulgated in 2011, allocated 17,8 GW to renewable energy technologies over the next 20 years.

The IRP revision, which was released in late 2013, is currently out for public comment. This edition increases the pace at which renewable energy is to be integrated into the grid allocation, averaging 2,2 GW per year to renewable energy. As public comments are considered, it is anticipated that the plan will adjust. However, experience has shown that renewables have been cheaper than anticipated. This increases the likelihood that renewables will be favourably viewed in the IRP2010 revisions. Accordingly, GreenCape expects that the roll out for renewables will continue. We anticipate an annual allocation of 1 GW for wind, 1 GW for photovoltaic (PV), 200 MW for concentrated solar power (CSP) and approximately 200 MW for landfill, hydro, biomass and biogas.

2.4 Independent System and Market Operator (ISMO)

At the time of writing The Independent System and Market Operator (ISMO) bill was designed to separate the distribution, transmission, infrastructure and the generation assets of the national utility.

This bill was expected to be passed in 2013, but this was not the case. The national utility is a state-owned monopoly. The introduction of multiple independent power producers (IPP) raised concerns around the monopolistic nature of the utility. The ISMO is intended to control the transmission and distribution business. There have been numerous delays and difficulties in finalising the bill.

As far as IPPs are concerned, Eskom is currently the signatory on the 20-year power purchase agreements. This agreement is underwritten by National Treasury.

2.5 Accords and relevant policy

South Africa's strategic plans have a strong focus on infrastructure. Business, labour and government have signed accords to ensure that as much of the spending on infrastructure and the burgeoning green economy is kept in South Africa. These accords are:

i) Green Economy Accord

Signed at the end of 2011, this accord brings together a coalition of interests in an effort to shift South Africa towards a less carbon-intensive economy and to bolster job creation and industrial development. It contains commitments in 12 areas, ranging from installation of solar water heating systems, to increased investment in green industrial activities and the promotion of technical skills for the green sector.

ii) Local Procurement Accord

This accord sets an aspirational target for 75% of all products to be manufactured locally. The accord represents commitments by government, trade unions and business to achieve a high level of localisation. The Local Procurement Accord includes a monitoring and evaluation mechanism to ensure that the accord's goals are met.

3. Markets for renewable energy in South Africa

There are four broad markets for renewable energy in South Africa which are considered in detail below.

3.1 Utility-scale renewable energy

The utility scale market opportunity, comprised of the renewable energy independent power producer procurement programme (REIPPPP/ REI4P), in South Africa has signed contracts for almost 4 000 MW of renewable energy over the last two years. This programme follows a competitive bidding process. The requirements to bid are high: projects need to show that they have all the land permissions in place and that they have secured finance to support the bid. See Appendix A: How to become an IPP, for more detail.

The long-term planning for renewable energy procurement is done through the IRP. But there have been two ministerial determinations for renewables. The first, for 3 725 MW, was largely taken up in the first two rounds of bidding, with a further 3 200 MW allocation later.

Technology	MW capacity allocated in first bid window	MW capacity allocated in second bid window	MW capacity allocated in third bid window	MW capacity remaining
Solar PV	632	417	435	1 041
Wind	634	563	787	1 336
Concentrated solar power	150	50	200	200
Small hydro (≤40MW)	0	14	0	121
Landfill gas	0	0	18	7
Biomass	0	0	16	43
Biogas	0	0	0	60
Total	1 416	1 044	1 456	2 808

According to the IPP website, allocations stand at:

1.8 GW for wind and

1.4 GW for solar PV

The bidding process has seen rapid price digression and highly competitive bidding for projects. There were 93 bids in the third round. Of these 93 bids, only 17 projects were awarded preferred bidder status. After the bid, the DoE announced that an extra allocation would be made due to the competitiveness of the projects that submitted bids. At the time of writing, this allocation had not yet been made.

The table below outlines the average bidding prices in the third bidding round.

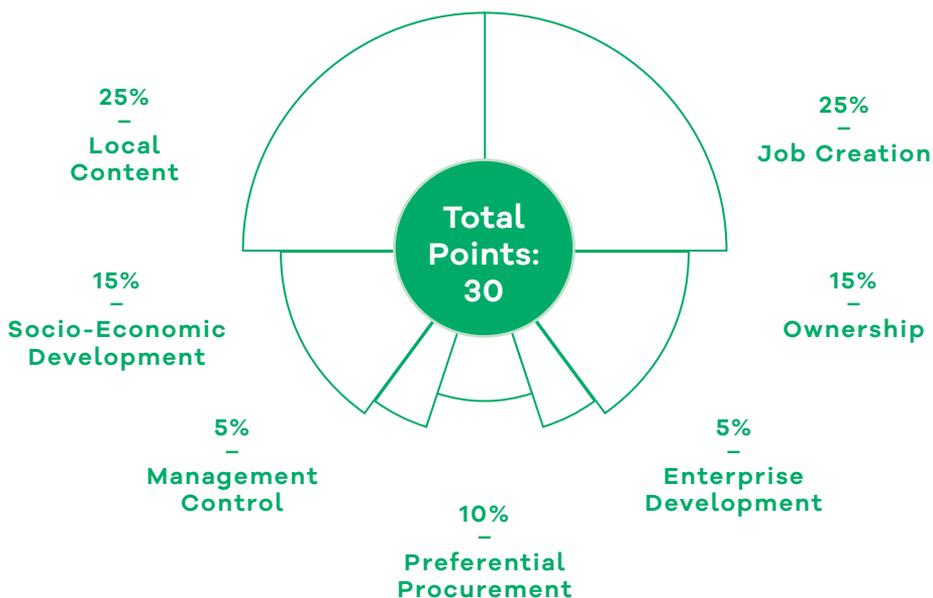
Technology	Allocation Round 1	Allocation Round 2	Allocation Round 3
Wind	634 MW @ Average Price: R1.14/Kwh	562,5 MW @ Average Price: R0.89/Kwh	787 MW @ Average Price: R0.74/Kwh
Solar PV	632 MW @ Average Price: R2.75/Kwh	417 MW @ Average Price: R1.65/Kwh	435 MW @ Average Price: R0.99/Kwh
CSP	150 MW @ R1.14/Kwh	50 MW @ R2.51/Kwh	200 MW @ R1.60/Kwh
Small Hydro	-	14,3 MW	-
Landfill Gas	-	-	18 MW @ R0.74/Kwh
BioMass	-	-	17 MW @ R1.40/Kwh

* The pricing structure of CSP changed in round three. At the time of writing, a base price had been set, reflected as the R1,60 Kwh. The project will receive 270% of the base price during the peak power period. The logic is to ensure that the CSP projects include storage.

The price digression in the programme is self-evident. The third round of bidding attracted strong utility participation and a number of successful projects were bid on balance sheet, rather than project finance. This evolution has led to increasingly competitive bids. GreenCape predicts that future rounds will be similarly competitive, with an increasing focus on the economic development contributions.

The projects evaluation has a 70/30 scoring split, with the bulk of the score – 70 points – going to the price component of the bid. The remaining 30 points are made up through the economic and social development score card. The score card carries the following weightings:

Economic and Social Development Scorecard Weightings



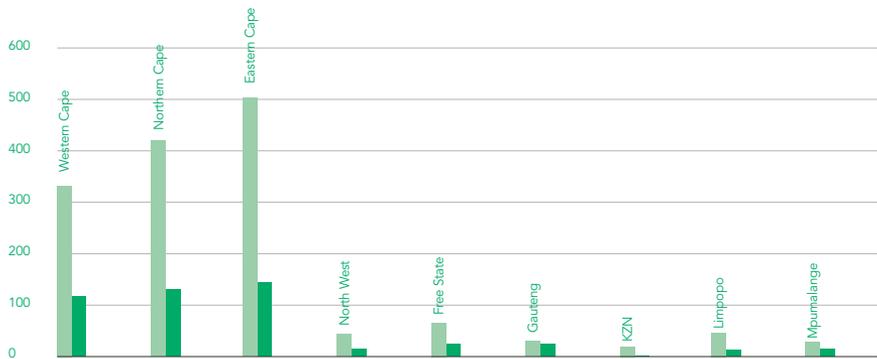
3.2 Where will we expect to see projects in the future?

There have been over 1 500 environmental authorisation applications for renewable energy projects in South Africa, representing 177 GW of projects applied for. Of these, a total of 512 have received authorisation. The total rated capacity of projects with environmental authorisation is just over 66 GW.

For the utility-scale projects, environmental authorisation typically takes two years and can cost between R2 million and R6 million. Environmental authorisation has the longest lead time and is just one of many permissions required to bid (see Appendix A for detail).

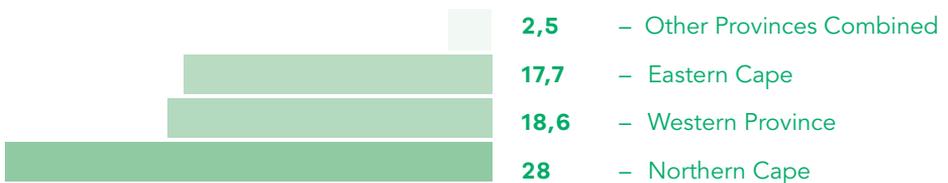
The graphs below show a breakdown of where the environmental impact assessments (EIAs) have been applied for, and where they have been approved.

These graphs are based on 2013 information, and it is likely that some extra EIAs would have been approved by the time this report is published.



■ EIA Applications By Province – 2013

■ Approved EIAs by Province – 2013



GW of EIA approved EIAs by region – 2013

3.3 Grid capacity constraints

One of the increasing constraints affecting the South African renewable energy system is the ability to evacuate power. Unlike many other countries, the developer has a responsibility to bring the power to a substation that can evacuate that power. Eskom has provided a comprehensive grid study of the stability, which analyses the steady state and stability limit. This is an extract for the Western Cape. The full study is available on request.

Substation-Name	Trans-former Voltage Levels (kV)	Trans-former Capacity (MVA)	N-1 Trans-former Limit (MVA)	HV Busbar Gen Limit (MW)	Committed Gen Capacity (MW)	2016 Generation Limit	Stability Limit
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Southern Cape Region

Bacchus	400/132	2x500	500	940	62	438	
Droerivier	400/132	2x120	120	953	0	120	
Kappa	765/400	1x2000	0	926	0	0	3318
Proteus	400/132	1x500	0	499	62	438)	

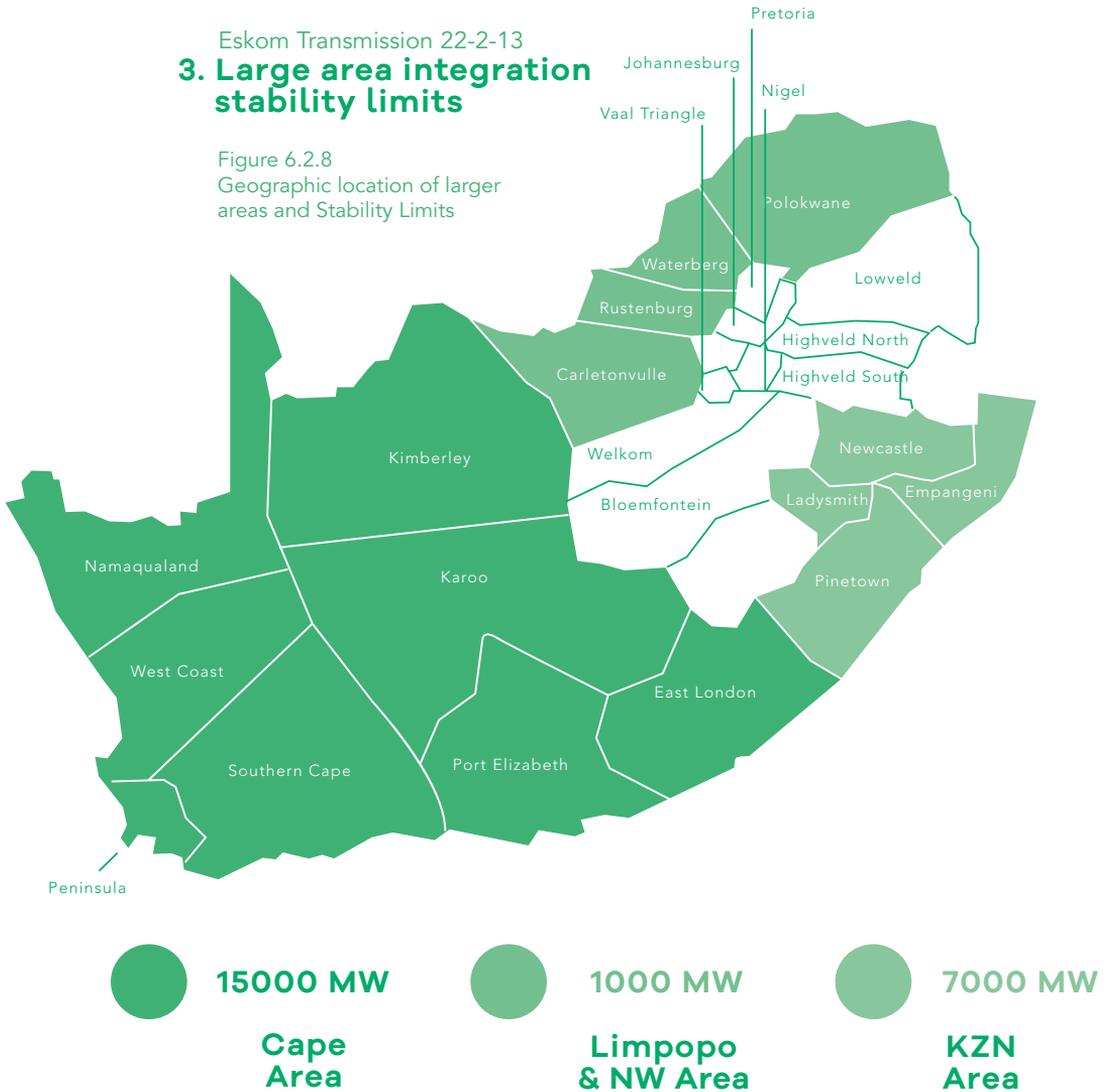
West Coast Region

Helios	400/22	2x45	45	554	0	45	
Droerivier	400/132	2x120	120	641	109	11	2616
Aurora	400/132	2x250	1250	1622	161	1089	
TOTALS			1380	2616	270	1145	

This is an overview of the maximum theoretical renewable energy grid capacity. The ability to match suitable, available sites to the location of the substation is a challenge, particularly as much of the land area is unsuitable, and the IPP bears the costs of bringing the power to the substation. It is also critical to bear in mind that the individual thermal capacities of each individual line, or the connection size for individual substations, will vary.

Eskom Transmission 22-2-13
3. Large area integration stability limits

Figure 6.2.8
 Geographic location of larger areas and Stability Limits



3.4 Small Projects Bidding Programme

In 2013, the DoE announced a Small Projects Bidding Programme for renewable energy. This programme followed a very similar process to the Utility-Scale Programme, but is for projects of 1 MW to 5 MW. The Small Projects Bidding Programme will be broken into two stages and four bidding opportunities. Different to the utility-scale bid, contracts will be between five and 20 years, which the bidder will define.

There are ceiling prices that may be bid for each technology, as follows:

Technology	Price cap
Onshore wind	R 1 000/MWh
Solar PV	R 1 400/MWh
Biomass	R 1 400/MWh
Biogas	R 900/MWh
Landfill gas	R 940/MWh

All of these steps were required at bid submission to be eligible to bid in the Utility-Scale Programme. To make the small bid slightly easier, the bidding has been split into two phases. The first phase does not require the full financial models.

Evaluation criteria	Stage 1	Stage 2
Legal criteria and evaluation	•	•
Land acquisition and use rights	•	•
Environmental criteria and evaluation	•	•
Technical criteria and evaluation	•	•
Economic development criteria	•	•
Financial criteria and evaluation	x	•
Structure of project	x	•
Value for money	x	•

The biggest concern raised around the small bid is the transaction costs: the level of contracting and due diligence appears to be the same for both small and large projects. This will make the small projects very expensive. The Industrial Development Corporation (IDC) has taken the lead on exploring the possibility of standardised agreements. This should relieve some pressure on transaction costs.

Milestones

First stage 1
Bid registration
date –
16 September 2013

Last date for bidders
to submit written
questions in terms
of clause 30
–
14 September 2013

Last date for depart-
ment to issue brief-
ing notes in terms of
clause 43
–
30 September 2013

First stage 1 bid
submission date
–
14 October 2013

Second stage 1 bid
submission date
–
10 February 2014

Third stage 1 bid
submission date
–
14 July 2014

Fourth stage 1 bid
submission date
–
9 February 2015

First stage 2 bid
submission date
–
14 April 2014

Second stage 2 bid
submission date
–
23 March 2015

Third stage 2 bid
submission date
–
1 June 2015

Fourth stage 2 bid
submission date
–
21 March 2016

* IPP website

3.5 Standard offer Programme from Eskom

* For more information on this and other Eskom energy efficiency and demand-side management programmes, please see the Energy Efficiency desk market intelligence report.

The Eskom Standard offer Programme (SoP) is run by the Energy Efficiency and Demand-Side Management (EEDSM) Unit. The programme had an initial application period for up to 20 MW of projects. The size of individual projects was limited to between 10 kw and 1 MW. In addition, the projects were limited to self-consumptions, with nothing being sent back into the grid.

Eskom would pay successful projects R1,20 per Kwh, which projects produced and consumed themselves. This was in effect a double saving. The consumer would not have to pay Eskom for the power, and would receive a subsidy of R1,20 for doing so. This project was designed to take pressure off the national grid.

The R1,20 per Kwh is paid over three years. 70% of the expected power that would be generated over the three years would be paid up front.

This SoP was attractive. It became over-subscribed and the SoP window is now closed. It is expected that the programme will launch again, either through Eskom or the DoE. Eskom has put the project on hold as the full allocation of 20 MW has been exceeded.

3.6 Private market

The private market for renewable energy in South Africa has grown significantly in 2013, with many domestic and commercial systems installed.

The PV localisation road map for South Africa, developed in conjunction with the World Wildlife Fund (WWF), the industry association and the dti, identified that the private market had the potential to be as large as the utility-scale market. The opportunity to have distributed embedded generation is attractive.

This market is bolstered by falling PV prices, increasing electricity prices and attractive funding packages.

Positives in the private market

Wealthier private households can pay as much as R1,60/kwh for electricity. This is competitive with rooftop PV

Businesses see this as a visible marketing tool and a way to take some control over their electricity

As a result of increasing environmental awareness in South Africa, private electricity generation is becoming more popular

The carbon tax draft has been published. Top-end domestic consumers are anticipating further increases in electricity prices and domestic generation is an opportunity to take control

The market will continue to grow as domestic generation becomes more visible

Innovative finance packages are available. In its Green Energy Fund, the IDC offers prime less 2% for energy efficiency and renewable energy

The grid code, standards and regulations around grid-tied systems are progressing

There is a huge amount of pressure to allow net or bi-directional metering for embedded systems and some municipalities have begun to allow this.

Negatives in the private market

There is still a need to create significantly more consumer awareness in South Africa before private generation becomes a well-known option

Municipalities make a surplus from the sale of electricity and there is a fear that revenue will fall if domestic generation is allowed. This is a perverse structural incentive in the private market, since higher paying consumers who are most attracted to self-generation cross-subsidise the free basic allocations to the poorest customers

There is no standard approach for bi-directional or net metering. This means that each municipal utility prices its electricity differently

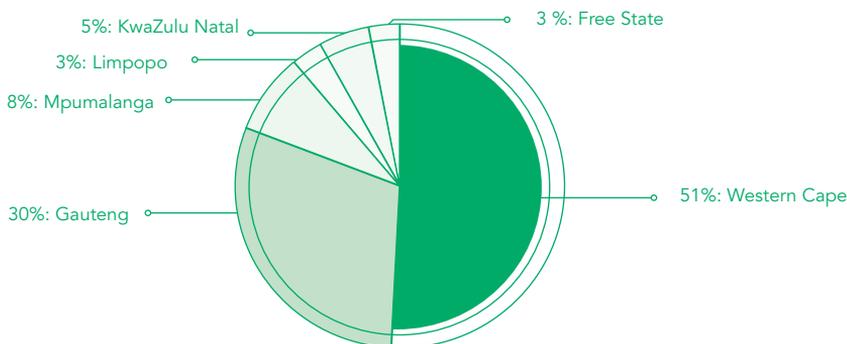
The standards, grid code and safety issues are being addressed but still hinder progress in the private market.

In South Africa, the private market is still in its infancy. But as the market begins to grow, there will be opportunities for job creation and economic development.

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Data collected from an Eskom presentation show that there are at least 37 private projects, equating to just over 7 MW in total. The geographic distribution of the projects identified by Eskom is shown below. This is not an exhaustive list, and it is limited to projects larger than 10 Kwp. The installations are typically on office blocks, farms and factories. Private households are excluded from this graph.

Private PV Installations by Province



4. Manufacturing renewable energy components in South Africa

The bidding programme is increasing pressure on developers to include locally manufactured key components. Greater requirements for local content are attracting more manufacturers to the country, with many establishing themselves in the Western Cape.

4.1 Wind

In the wind sector, the key components in focus are wind turbine blades and towers. Two tower manufacturers – DCD in Coega and Gestamp in Atlantis – have already been set up in South Africa.

LM Wind Power has also announced it has developed business cases for two regions in South Africa.

4.2 Photovoltaic

In the PV industry, the focus has been on panels, inverters, mounting structures, cables and trackers. The Western Cape is home to significant manufacturing capability to support the PV industry.

Modules:	SunPower, Jinko, SolarDirect, ZnShine (pending).
Inverters:	AEG, SMA, GEFran, MLT-Drives.

These manufacturers could supply a significant portion of the South African market.

5. Doing business in the Western Cape

The bulk of the South African renewable energy industry is based in the Western Cape. Most of the successful developers are based in Cape Town, while the majority of professional services, engineering, procurement and construction (EPC) companies and manufacturers are based elsewhere in the province.

Of the 64 successful projects bid in the first three rounds, 39 projects were bid by developers based in the Western Cape, representing a share of over 60%. While not all the projects are based in the Western Cape, we believe this statistic indicates that the province is the industry's home base.

GreenCape aims to promote the natural advantages of the Western Cape to attract an even higher concentration of successful project companies, sub-contractors and suppliers. We aim to achieve this through our regular networking events, which focus on a particular sector or current issue within the green economy. To participate, sign up for free as a member on the GreenCape website.

The Western Cape Government has launched a broader Green Economy Strategy. This strategy focuses on embedding the green economy principles in a cross-sector strategic framework.

5.1 Tangible opportunities for new and existing companies

1) Green Economic Hub, Atlantis

The City of Cape Town has made a large area of industrial land available for manufacturing of renewable energy components. This is a perfect opportunity for manufacturers who are interested in greenfield sites.

In collaboration with the dti, GreenCape will be establishing a special economic zone (SEZ) in Atlantis focusing on green technology manufacturing. When promulgated, this zone will offer significant incentives for investment, the most significant of which is a 15% company tax rate. It is expected that the SEZ will be designated in the second half of 2014.

2) Co-location

The Western Cape in general – and Cape Town in particular – offer companies significant co-location benefits. Most of the industry is located in the Western Cape, making it an easy decision for others to locate their operations here.

3) Networking opportunities

GreenCape provides its members with invaluable networking opportunities, featuring speakers who are experts in the field. Previous speakers include representatives from Eskom, AEG, Actom, Cape Africa, Council for Scientific and Industrial Research (CSIR), Cape Craft & Design Institute (CCDI), Emergent Energy, Webber Wentzel, Mazars, Cliffe Dekker, Standard Bank, Nedbank, Willis Group, Mazars and most recently, the Recycling and Economic Development Initiative of South Africa (REDISA). These events have provided a platform for people in the industry to share their knowledge, communicate challenges and successes, and form beneficial working relationships.

4) Market intelligence

This report is part of the intelligence that GreenCape has acquired over three years of working in the green economy. GreenCape is a free and public resource for companies and individuals interested in accessing the market in South Africa.

Appendix: How to become an independent power producer (IPP)

1. Find a site

After locating a suitable site for wind or solar energy, the first step towards acquiring a Purchase Power Agreement (PPA) from the DoE depends on whether the investor intends to purchase the land outright or to lease a portion from the land owner. If the former is the case, then the investor can proceed directly to acquiring planning permission. If a lease is intended, the process becomes slightly more rigorous.

2. Obtain Department of Agriculture approval for the lease agreement

The Sub-Division of Agricultural Land Act 70 of 1970 (Act 70/70) governs the sub-division of agricultural land, as its name indicates. Agricultural land may only be sub-divided if it can be argued that both sub-divided portions will be economically viable independent entities. A lease of longer than nine years is deemed by the Act to require the same approval process as sub-division. The Department of Agriculture, Forestry and Fisheries (DAFF) has decided that it will not allow sub-division to build renewable energy plants but will allow leases of up to 25 years under certain conditions.

However, an investor wishing to lease land should apply for Act 70/70 approval of the lease before signing such a lease. The application requires a draft of the lease agreement, a layout of potential wind turbine or solar sites and a soil analysis from an agronomist to indicate the site's cultivation potential.

To give approval under Act 70/70, the DAFF has indicated that it will require the lease to meet certain conditions, as follows:

The farmer is entitled to continue farming

The lessee is responsible for any land erosion or soil damage
Incurred during the lease period

At the end of the lease, all equipment will be removed and the land
restored to its original condition

The land owner should be made aware that the existence of the lease
could affect the value of his/her land

There can be an option to renew the lease

The lease may not affect the farmer's water rights.

3. Apply for planning permission

Planning permission needs to be obtained for any development. In the Western Cape, this is subject to the Land Use Planning Ordinance (LUPO) 15/1985. This ordinance requires planning permission to be applied for from the local authority in which the land is situated. The government has decided that the appropriate planning permission for a power plant on agricultural land is a 'consent use'. A town planner familiar with working with the local municipality should submit this application.

4. Conduct an environmental impact assessment*

An environmental impact assessment (EIA) will be required. This process requires the assistance of an EIA consultant and takes between 12 and 24 months. It is likely that the Department of Environmental Affairs (DoEA) will require the following specialist studies:

Visual impact assessment
Paleontological study
Avifauna and bat study.

Agronomy report.
Archaeological study
Botanical, zoological and EIA

* Note that there is a proposal which will require 12 months' monitoring of bat and bird life both before and after construction

Both national and provincial DoEA have been working on mapping the criteria they use for assessing potential wind and solar sites so that potential developers can use the information to guide their site selection.

5. Secure a tie-in agreement with Eskom

The potential IPP will need to obtain a tie-in agreement with Eskom to sell power via the grid. While the process may change in the future, the current process is as follows:

Contact the regional head of distribution for Eskom for the region in which your plant is expected to be built and determine:

Whether the grid in that location can take the power you wish to produce
Whether Eskom will allow IPPs to tie in at the line or substation in that location and what the conditions would be

Apply for a cost estimate letter.

At the time of writing, Eskom will only negotiate and agree tie-in agreements with parties that have been selected by the DoE for negotiating a PPA. This cost estimate letter will provide an estimate of the costs involved in tying to the grid at the requested point, a quote on an upfront connection charge and a quote on an annual agency fee

Once the IPP has been selected by the DoE and a PPA is being negotiated, Eskom will update these costs.

The IPP will be required to accept responsibility for these costs before a tie-in agreement can be concluded.

6. Apply for a generating licence

At the time of writing, IPPs can only apply for a generating licence from NERSA once they have been preselected by the DoE and have agreed a tie-in agreement with Eskom. This procedure is a formality and should not prove an additional hurdle.

7. How do you get your project selected by the DoE for a PPA?

At the time of writing, the indication is that the DoE and National Treasury will run a rolling request for proposal (RFP) process that will call for proposals from prospective IPPs regarding projects that have sufficiently progressed to the point that proof of financing is available. This rolling process will be run a number of times each year until the annual allocation of renewable energy projects as set out in the IRP2010 have been approved. At the time of writing, it is expected that this process will be governed by repeated rounds of bidding.

8. Civil aviation approval

Wind power applicants will need to obtain civil aviation approval for the development of the site.

9. Department of Water Affairs (DWA)

A letter of approval is needed from DWA, whose interest is focused on the water requirements during the site construction and operation.

10. Section 53 at the Department of Mineral Resources (DoMR)

It is prudent to apply for a sterilisation of mining rights at the DoMR. This is not a bid requirement but it could pose problems at a later stage.

11. How much renewable energy will be purchased?

The IRP is currently under revision. The annual allocation is expected to be approximately 1 000 MW for wind, 1 000 MW for PV, 200 MW for CSP and 200 MW for others – until capacity is reached. The National Planning Commission has set this capacity at 20 GW. The original IRP set it at 17,8 GW. The revised IRP is expected to set the capacity at a similar level.

Notes:

Notes:

