

Market Intelligence Report: Renewable Energy



greencap 

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Overview of Renewable Energy in South Africa

South Africa, through the Independent Power Producer Procurement Program has contracted renewable energy installations for just under 4000 MW from various technologies. The first utility scale projects in South Africa were grid connected 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 coal and nuclear dominated supply. The current target of 42% of all new build being renewables is set to be adjusted upwards in the latest iteration of the integrated resource plan.

This market intelligence report is designed to give a snapshot overview of each of the four renewable energy markets in South Africa. There is a focus of policy and regulations and how to execute projects.

Regulatory Framework:

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

National Development Plan

The National Development Plan (NDP) is the planning document that has been put forward as the development path for South Africa. This plan has not been universally accepted in South Africa, and has yet to be officially adopted by Government.

However, in this context, there is some relevance of the NDP on shaping the energy sector in South Africa. The NDP supports the procurement of at least 20GW of renewable energy by 2030. There are a number of electricity related infrastructure suggestions, perhaps the most important of which is the independent system and market operator (more below).

Integrated Energy Plan

The Integrated Energy Plan (IEP), as distinct from the Integrated Resource Plan (IRP), focusses on all the energy requirements of the country and how these are most economically provided. Where the IRP focusses specifically on electricity, the IEP concentrates on all the energy requirements. The IEP has these stated objectives;

Objective 1: Ensure the security of supply;

Objective 2: Minimise the cost of energy;

Objective 3: Increase access to energy;

Objective 4: Diversify supply sources and primary sources of energy;

Objective 5: Minimise emissions from the energy sector;

Objective 6: Promote energy efficiency in the economy;

Objective 7: Promote localisation and technology transfer and the creation of jobs; and

Objective 8: Promote the conservation of water.

The IEP forms the broader context for the electricity focussed IRP.

IRP2010 – and Revisions;

The Integrated Resource Plan is the policy document that governs the technology choices, timing and procurement of the various electricity generation technologies that will underpin the South African grid. The first iteration, 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, the experience of renewables has been that they have been cheaper than anticipated. This increases the likelihood that renewables will be favourably viewed in the IRP2010 revisions. Considering this, GreenCape expects that the roll out for renewables will continue, and we anticipate an annual allocation of 1GW for wind, 1GW for PhotoVoltaic (PV), 200MW for CSP and approximately 200MW for landfill, Hydro, Biomass, Biogas etc.

Independent System and Market Operator (ISMO)

The Independent System and Market Operator (ISMO) bill is designed to separate the distribution, transmission infrastructure and the generation assets of the National utility.

This bill was expected to be passed in 2013, however, this was not the case. The structure of the National utility is as a State owned monopoly. The introduction of multiple Independent Power Producers (IPP) raised concerns around the monopolistic nature of the utility. The intention is for the ISMO to control the transmission and distribution business. There have been numerous delays and difficulties in finalising this bill.

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

Accords and Relevant Policy

South Africa has a strong focus on infrastructure in the strategic plans. In order to ensure that as much of the spending on infrastructure and the burgeoning green economy is kept in South Africa, Business, Labour and Government have signed;

- i) **Green Economy Accord:**
Signed at the end of 2011, the Accord brings together a coalition of interests in an effort to shift South Africa towards a lower-carbon intensity economy and to bolster job creation and industrial development. It contains commitments in twelve areas, ranging from installation of solar water heating systems, to increased investment in green industrial activities and the promotion of green skills at the technical level.
- ii) **Local Procurement Accord:**
This Accord sets an aspirational target of 75% local manufactured products, and 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 goals of the Accord are met.

Markets for Renewable Energy in South Africa

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

Utility Scale Renewable Energy

The Utility Scale Renewable Energy Programme in South Africa has signed contracts for almost 4000MW of renewable energy over the last two years. This programme follows a competitive bidding process. The requirements to bid are high and projects need to show that they have all of the land permissions in place and that they have their finance in place in order to bid. (See Appendix A: How to become an IPP).

The long term planning for renewable energy procurement is done through the IRP, however, there have been two ministerial determinations for renewables. The first 3725 MW was largely taken up in the first two rounds of bidding with a further allocation of 3200MW made thereafter.

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 photovoltaic	632	417	435	1 041
Wind	634	563	787	1 336
Concentrated solar	150	50	200	200
Small hydro (≤ 40 MW)	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

The expectation from the IRP is that there will be an allocation of 1GW each to wind and PV, and an allocation of 200MW to CSP, with a small allocation to the remaining named technologies (Hydro, Landfill gas, Biomass, Biogas).

The bidding process has seen rapid price digression and highly competitive bidding for projects. In the third round there were 93 bids. Of these 93 bids only 17 projects were awarded preferred bidder

status. The DoE announced after the bid that due to the competitiveness of the projects bid, an extra allocation would be made. 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 thus far.

Technology	Allocation Round 1	Allocation round 2	Allocation round 3
Wind	634 mw @ average price R 1.14kwh	562,5 mw @ Average price R 0,89 kwh	787 mw @ average R 0,74 kwh
Solar PV	632 mw @ Average price R 2,75	417 mw @ Average price R1,65 kwh	435 mw @ average R0,99 kwh
CSP	150 mw @ R2.68 Kwh	50 mw @ R2,51 kwh	200 mw @ R1.60 kwh*
Small Hydro	-	14,3 mw	-
Landfill gas	-	-	18 mw @ R0,94 kwh
Biomass	-	-	17 mw @ R1,40 kwh

*The pricing structure of CSP changed in round three. There is now a base price – reflected as the R1.60kwh. 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 saw strong utility participation and a number of successful projects were bid ‘on balance sheet’, rather than ‘project finance’ – this evolution has seen increasingly competitive bids. GreenCape predicts that future rounds will be similarly competitive, with an increasing focus of the economic development contributions.

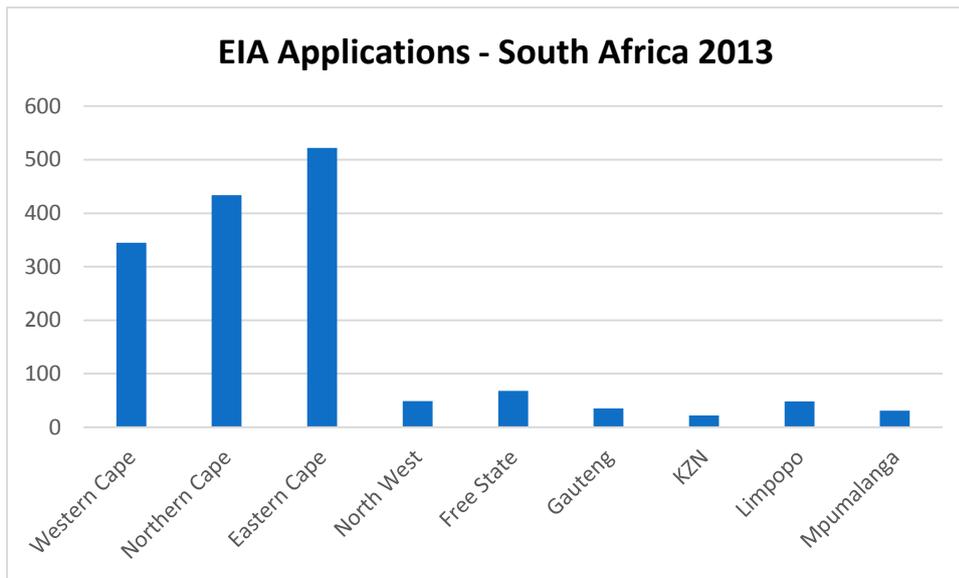
The evaluation of the projects is split 70/30, with the bulk of the score (70 points) going to the price component of the bid. The remaining 30 points of the score is made up through the economic and social development score card. The scorecard carries the following weightings.

Economic Development Elements	Weighting
Job Creation	25%
Local Content	25%
Ownership	15%
Management Control	5%
Preferential Procurement	10%
Enterprise Development	5%
Socio-Economic Development	15%
Total	100%
Total points	30 points

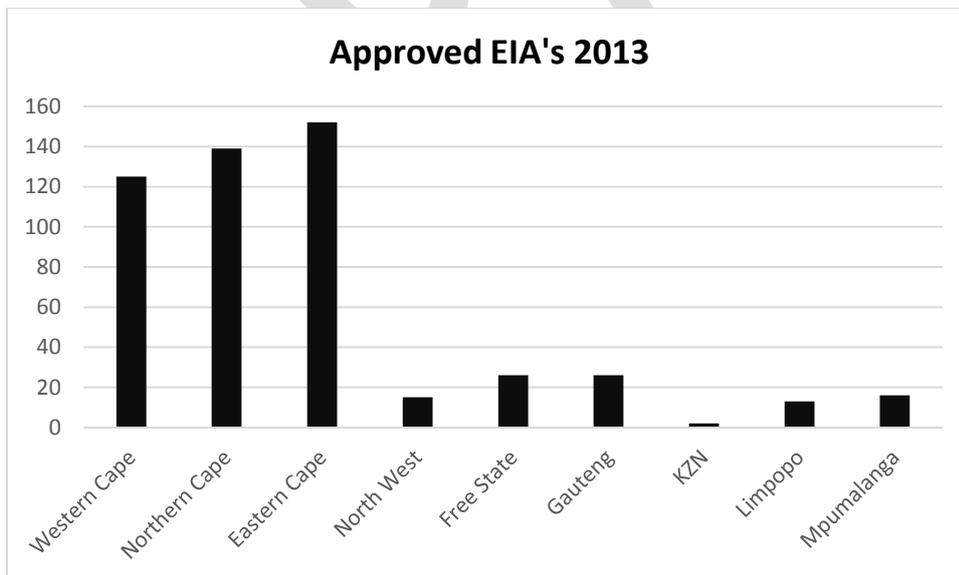
Where will we expect to see projects in the future?

There have been over 1500 environmental authorisation applications for renewable energy projects in South Africa. In total this represents 177 GW of projects applied for. Of these a total of 512 have received environmental authorisation – the total number of projects with environmental authorisation is slightly more than 66GW.

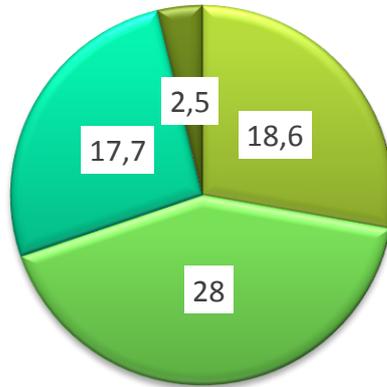
For the utility scale projects, environmental authorisation typically take 2 years and is a significant cost item (R2-R6mil). Environmental authorisation is just one of many permissions required to bid (see Appendix A) it has the longest lead time. The graphs below show a breakdown of where the EIA's have been applied for, and where they have been approved.



These graphs are based on 2013 information, and it is likely that some extra EIA would have been approved in the interim.



GW of EIA's approved by Region



■ Western Cape ■ Northern Cape ■ Eastern Cape ■ Other Province's combined

Grid Capacity Constraints:

One of the increasing constraints to 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 (Steady state and stability limit). This is an extract for the Western Cape Province. The full study is available on request.

Substation name	Trfr voltage levels (kV)	Trfr Capacity (MVA)	N-I Trfr limit (MVA)	HV Busbar Gen limit (MW)	Committed Gen Capacity (MW)	2016 Generation limit	Stability limit (MW)
6.21 Southern Cape area							
Bacchus	400/132	2x500	500	940	62	438	3318
Droërivier	400/132	2x120	120	953	0	120	
Kappa	765/400	1x2000	0	926	0	0	
Proteus	400/132	1x500	0	499	0	0	
TOTAL			620	3318	62	558	
6.26 West Coast area							
Helios	400/22	2x45	45	554	0	45	2616
Juno	400/132	2x120	120	441	109	11	
Aurora	400/132	4x250	1250	1622	161	1089	
TOTAL			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 costs of 'bringing' the power to the substation is borne by the IPP. 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.

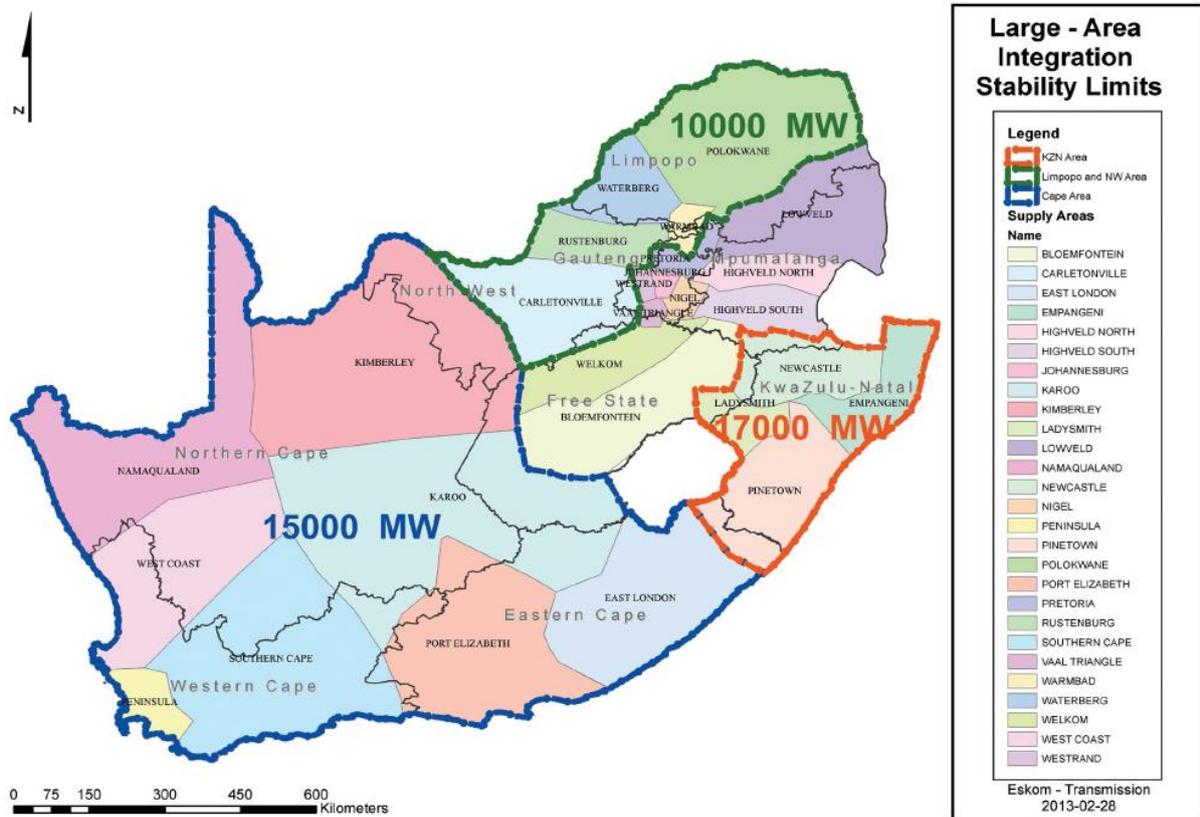


Figure 6.28 Geographic location of larger areas and the stability limits

Small Projects Bidding Programme

In 2013, The DoE announced a Small Projects Programme for renewable energy. This programme followed a very similar process to the Utility scale program, but is for projects between 1-5MW. The small projects 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 will be up to the bidder.

There are ceiling prices that may be bid for each technology – these are reflected below:

Technology	Price Cap
Onshore wind.....	R1 000/MWh
Solar photovoltaic.....	R1 400/MWh
Biomass	R1 400/MWh
Biogas	R900/MWh
Landfill gas	R940/MWh

In order to bid in the Utility scale programme, all of these steps were required at bid submission. In order to make the small bid slightly easier, the bidding has been split into two phases, with the first phase not requiring 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 concerns that have been raised around the small bid is the transaction costs. The level of contracting and due diligence seems to be the same for small and large projects alike. This will make the small projects very expensive. The IDC has taken the lead on broaching the possibility of standardised agreements. This should relieve some of the pressure of transaction costs.

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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 Department to issue Briefing 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 - 09 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 - 01 June 2015

Fourth Stage 2 Bid Submission Date - 21 March 2016

* IPP website.

Standard offer Programme from Eskom

The Eskom Standard offer Programme (SoP) is part of the energy efficiency and demand side management unit. The programme had an initial application period for up to 20MW of projects. The size of individual projects was limited to between 10kw and 1MW. Further, the projects were limited to self-consumptions – in other words, nothing could be sent back into the grid.

Eskom would pay successful projects R1.20 per kwh, which they 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 term of the R1.20 per kwh payment is over three years, but that 70% of the deemed generation over the three years would be paid up-front.

This SoP was attractive and there was an over subscription of projects. The SoP window is now closed. There is an expectation that the programme will re-launch either through Eskom or the Department of Energy. Eskom has currently put the project on hold as the full allocation of 20MW has been surpassed.

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

Private Market

The private market for renewable energy in South Africa has really grown in 2013. There are a large number of domestic and commercial systems that have been installed.

The PV localisation roadmap for South Africa, developed in conjunction by WWF, the industry association and the DTi identified the private market as having 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.

i) Positives in the private market:

- The top end of private households can pay as much as 1.60 kwh of 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. The top end domestic consumers are anticipating further increases in electricity and domestic generation is an opportunity to take control.
- As more domestic generation becomes visible, the market will continue to grow.
- There are innovative finance packages. IDC offers Prime less 2% for energy efficiency and renewable energy, in their Green energy fund.
- The grid code, standards, and regulations around grid tied systems is progressing.
- There is a huge amount of pressure to allow net or bi-directional metering for embedded systems. Some municipalities have begun to allow this.

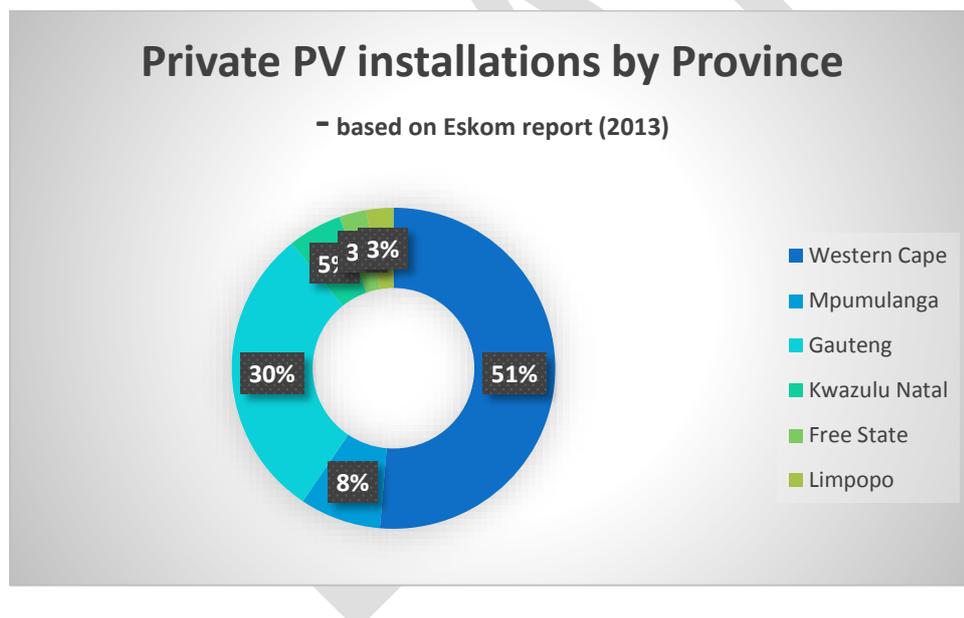
ii) **Negatives in the private market:**

- There is still considerable consumer awareness that needs to be created in South Africa before this is a well-known option.
- Municipalities make a surplus from the sale of electricity and there is a fear of revenue issues if domestic generation is allowed. This is a structural perverse incentive in the private market - the higher paying consumers, who are most attracted to self-generation, cross-subsidise the free basic allocations of the poorest customers.
- There is no standard approach for bi-directional or net-metering. This means each municipality utility can come up with their own pricing scheme.
- The standards, grid code and safety issues are being addressed but are still a hamper.

The private market is in its infancy stages in South Africa, but as this market begins to grow the opportunities for job creation and economic development will follow.

Data collected for an Eskom presentation shows that there are at least 37 private projects – these projects add up to just over 7MW in total. Of the projects identified by Eskom, the geographic distribution is indicated below;

Please note: This is not an exhaustive list, and is limited to projects larger than 10kwp. The installations are typically on office blocks, farms, factories – private households is excluded.



Manufacturing Renewable Energy Components in South Africa

The bidding programme is putting increasing pressure on developers to include locally manufactured 'key components'.

Wind:

In the wind sector the key components that are being focussed on are wind turbine blades and towers. Already in South Africa there are two tower manufacturers beginning to set up. DCD in Coega, and Gestamp in Atlantis.

LM wind power has also announced that they have developed business cases for two regions in South Africa.

PhotoVoltaic:

In the PV industry the focus has been on panels, inverters, mounting structures, cables and trackers. There is already considerable manufacturing set up in the Western Cape to support the PV industry.

Modules: SunPower, Jinko, SolarDirect, ZnShine (pending).

Inverters: AEG, SMA, Gefran, MLT-Drives.

The above mentioned manufacturers could supply a significant portion of the South African market. The increasing local content requirements are leading to increasing interest in setting up manufacturing in the country, specifically in the Western Cape.

Doing Business in the Western Cape

The Western Cape is home to the bulk of the renewable energy industry in South Africa. The majority of 'successful' developers are in Cape Town. The majority of professional services, the majority of EPC companies, and the majority of manufactures are based in the province. As mentioned above the bulk of the manufacturing for renewables is based in the Western Cape.

Many successful developers have chosen to base themselves in the Western Cape, of the 64 successful projects bid in the first 3 rounds, 39 projects were bid by developers based in the Western Cape, representing a share of over 60%. While not all of the projects are based in the Western Cape – we believe that this is an indication of where the industry is based.

GreenCape attempts to increase the natural advantages of the Western Cape to leverage an even higher concentration of successful project companies, sub-contractors and suppliers. This is achieved through our regular networking events, which focus on a particular sector or current issue within the green economy. (To participate, sign up as a member on the GreenCape website – membership is free of charge).

The Province has launched a broader Green Economy strategy – this strategy focuses on enshrining the green economy principles in a transversal strategic framework.

Tangible Opportunities for New and Existing Companies:

1) Green Economic Hub in Atlantis:

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

The DTI in collaboration with GreenCape will be establishing a special economic zone (SEZ) in Atlantis focussed on Green technology manufacturing. This zone, when promulgated, will offer significant incentives for investment – the most exciting of which is a 15% company tax rate. It is expected that the SEZ will be designated in the latter half of 2014.

2) Networking Opportunities:

GreenCape provides its members with invaluable networking opportunities. Typically, the speaker will be an expert in the field. Previously, we have hosted events with speakers from Eskom, AEG, Actom,

Cape Africa, CSIR, CCDI, Emergent Energy, Webber Wentzel, Mazars, Cliffe Dekker, Standard Bank, Nedbank, Willis Group, Mazars and most recently, REDISA. These events have provided a platform for industry to share their knowledge, communicate challenges and successes, and form beneficial working relationships.

3) 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.

4) Co-location:

The Western Cape, and Cape Town, offer companies massive co-location benefits. The majority of the industry is located in the Western Cape, making it an easy decision to locate here.

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Appendix: How to become an IPP

1. Find a Site (Purchase outright or lease sub-division)

After locating a suitable site for wind or solar energy, the first step towards acquiring a Purchase Power Agreement (PPA) from The Department of Energy depends on whether the investor intends on purchasing the land outright or leasing a portion of the land from the land owner. If the first is true 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

Act 70/70 governs the sub-division of agricultural land. 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 in order to build renewable energy plants but will allow leases of up to 25 years under certain conditions. An investor wishing to lease land should, however, apply for Act 70/70 approval of the lease prior to signing such a lease. The application requires a draft of the lease agreement, a lay-out of potential wind turbine or solar sites and a soil analysis from an agronomist to indicate the cultivation potential of the site.

DAFF has indicated that they will require the lease to meet certain conditions in order to get Act 70/70 approval. The conditions are as follows:

- a) The farmer is entitled to continue farming;
- b) The lessee is responsible for any erosion of land or soil damage incurred during the lease period;
- c) At the end of the lease all equipment will be removed and the land restored to the original condition;
- d) The land owner should be made aware that the existence of the lease could affect the value of his land;
- e) There can be an option to renew the lease;
- f) The lease may not affect the water rights of the farmer.

3. Apply for Planning Permission

Planning permission needs to be obtained for any development and in the Western Cape; this is subject to the Land Use Planning Ordinance (LUPO) 15/1985. This ordinance requires that planning permission 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 who is used to working with the local municipality should do 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. The Department of Environmental Affairs will in all likelihood require the following specialist studies:

- Visual impact assessment;
- Paleontological study;
- Archaeological study;
- Avifauna and bat study – there is a proposal which will require 12 months monitoring of bat and bird life both before and after construction;
- Botanical, zoological, and Environmental Impact Assessment;
- Agronomy report.

The Department of Environment Affairs (national and provincial) has been working on mapping the criteria that they use for assessing potential wind sites and solar sites so that potential developers can use this as a pre-selection criteria when looking for sites with wind or solar potential.

5. Get a Tie-in Agreement with Eskom

In order to sell power via the grid, the potential IPP will need to get a tie-in agreement with Eskom. The process for this is currently as follows (although it might change in future):

- You will need to speak to the regional head of distribution for Eskom for the region in which your plant is expected to be built and determine:
 - Whether the grid at that point can take the power you wish to produce,
 - Whether Eskom will allow you to tie in at the line or substation at that point and what the conditions would be;
- You will need to apply for a cost-estimate letter (at this stage Eskom will only negotiate and agree tie-in agreements with parties that have been selected by the Department of Energy (DoE) for negotiating a PPA). This cost estimate letter will give you 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, then Eskom will update these costs and the IPP will need to accept responsibility for these costs before a tie-in agreement can be concluded.

6. Apply for a Generating License

At present you can only apply for a generating license from the National Energy Regulator of South Africa (NERSA) once you 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 present the indication is that the DoE and National Treasury (NT) will run a rolling Request For Proposal (RFP) process that will call for proposals from prospective IPP's regarding projects that have sufficiently progressed to the point that proof of financing is available. This rolling process will be run multiple times each year until the annual allocation of renewable energy projects according to the IRP2010 have been approved. Whilst every indication exists that it is intended this process be governed by repeated rounds of bidding, determined periodically.

8. Civil Aviation Approval (Wind)

The applicant will need to get civil aviation approval for the development of the site.

9. Department of Water Affairs

A letter of approval is needed from the Department of Water Affairs. They are interested in the water requirements during construction and operation of the site.

10. Section 53 at Mineral Resources

It is prudent to apply for a sterilization of mining rights at the Department of Mineral Resources. This is not a requirement to bid, however, it could be a problem.

11. How much Renewable Energy will be purchased?

The IRP is currently under revision. The allocation is expected to be approximately 1000MW wind, 1000MW PV, 200MW CSP and 200MW others – every year until capacity is reached. This capacity is set at 20GW by the National planning commission and 17.8GW by the original IRP. The revised IPR is expected to have something of that order.

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