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Proposed Greentech Special Economic Zone at Atlantis

Pre-feasibility Study

Final Report
Commissioned by the Department of Trade and Industry
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Contents

List of Acronyms

AADD	Average Annual Daily Demand
ACSA	Airports Company of South Africa
ASEZ	Atlantis Special Economic Zone
AWRMS	Atlantis Water Resource Management Scheme
B-BBEE	Broad-based Black Economic Empowerment
BPO	Business Process Outsourcing
CAD	China-Africa Development
CBD	Central Business District
CCTC	Cape Clothing and Textiles Cluster
CDE	Centre for Development Enterprise
CIPC	Companies and Intellectual Property Commission
CoCT	City of Cape Town
CSP	Concentrated Solar Power
CST	Concentrated Solar Thermal
CTIA	Cape Town International Airport
CTSDF	Cape Town Spatial Development Framework
DCC	Divisional Council of the Cape of Good Hope
DEA&DP	Department of Environmental Affairs and Development Planning
DFI	Development Finance Institution
DoE	Department of Energy
DTI	Department of Trade and Industry
ECAMP	Economic Areas Management Programme
EEDSM	Energy Efficiency and Demand Side Management
EGS	Economic Growth Strategy
EIA	Environmental Impact Assessment
ELIDZ	East London IDZ
EMPr	Environmental Management Programme
EPRI	Economic Policy Research Institute
EPZ	Export Processing Zone
EST	environmentally sound technologies
FEED	Front End Engineering Design
FET	Further Education and Training
FIAS	Foreign Investment Advisory Service
GBCSA	Green Building Council of South Africa
GDP	Gross Domestic Product
GEEF	Green Energy Efficiency Fund

GHG	Greenhouse Gas
GTMEC	Greentech Manufacturing Evaluation Committee
HP	High-pressure
HVAC	Heating Ventilation and Air Conditioning
ICT	Information and Communication Technology
IDC	Industrial Development Corporation
IDM	Integrated Demand Management
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IES	Income and Expenditure Survey
IGP	Ibhubesi Gas Project
IOZ	Incentive Overlay Zone
IPAC	Immovable Property Adjudication Committee
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
ISC	Institute for Sustainable Communities
ITP	Integrated Transport Plan
LC	Local Content
LCOE	Levelised Cost of Electricity
LDZ	Low-carbon Zone
LNG	Liquefied Natural Gas
LP	Low-pressure
LSM	Living Standard Measure
MCEP	Manufacturing Competitive Enhancement Program
MIP	Manufacturing Investment Program
MTEF	Medium-term Expenditure Framework
Mtpa	Million tons per annum
MV	Medium Voltage
MVA	Megavolt ampere
MYPD	Multi-year Price Determination
NDP	National Development Plan
NDRC	National Development and Reform Commission
NEMA	National Environmental Management Act
NEMWA	National Environmental Management Waste Act
NERSA	National Energy Regulator of South Africa
NLTA	National Land Transport Act
NNR	National Nuclear Regulator
NQF	National Qualification Framework
NT	National Treasury
NWA	National Waste Act
OECD	Organisation for Economic Cooperation and Development
OEM	Original Equipment Manufacturer
PAYE	Pay as You Earn
PICC	Presidential Infrastructure Coordinating Commission
PPA	Power Purchasing Agreement

PPP	Public Private Partnership
PSDC	Penang Skills Development Centre
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
R&D	Research and Development
REIPPPP	Renewable Energy Independent Power Producer Procurement Program
RFP	Request for Proposal
SABS	South African Bureau of Standards
SACU	Southern African Customs Union
SADC	Southern African Development Community
SAIA	South African Insurance Association
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAPVIA	South African Photovoltaic Industry Association
SAREBI	Seda Atlantis Renewable Energy Business Incubator
SARETEC	South African Renewable Energy Technology Education Centre
SAWEA	South African Wind Energy Association
SEDA	Small Enterprise Development Agency
SESSA	Sustainable Energy Society of South Africa
SEZ	Special Economic Zone
SIC	Standard Industry Classification
SIP	Strategic Infrastructure Project
SMME	Small Medium and Micro Enterprise
StatsSA	Statistics South Africa
SWH	Solar Water Heater
TEU	Twenty-foot Equivalent Unit
TFR	Transnet Freight Rail
TIASA	The Thermal Insulation Association of Southern Africa
TNPA	Transnet National Ports Authority
UN	United Nations
UNEP	United Nations Environment Programme
UPZ	Urgent Potective Action Planning Zone
VAT	Value-Added Tax
WCIF	Western Cape Infrastructure Framework
WCPG	Western Cape Provincial Government
WtE	Waste-to-Energy
WWF	World Wildlife Fund
WWTW	Wastewater Treatment Works

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1. Executive Summary

1.1. Background

1.1.1. History of Atlantis and development of a greentech park

The concept of establishing a green technology (greentech) industrial park in Atlantis was borne out of a City of Cape Town (CoCT) initiative in 2011 to promote the revitalisation of this industrial node. The suburb of Atlantis was established during the 1970's by the Apartheid government as an industrial centre and a community for the coloured population of Cape Town under the infamous Group Areas Act.

In order to attract industry and residents to Atlantis the government introduced various incentives to attract manufacturing firms via an elaborate system of relocation tax credit. In its heyday in the early-to-mid 1980s there were approximately 50 industrialists in Atlantis employing people drawn from nearly 8 000 households. These industries included large manufacturing concerns such as Tedelex and Atlantis Diesel Engines.[1]

Manufacturing activities in Atlantis declined with the termination of the incentive programmes and the defence manufacturing contracts from the mid-1980s. The withdrawal of incentives significantly reduced the attractiveness of the area and while Atlantis has since been through a series of mini-economic booms and busts the trend decline in the economy of the area persisted.

In late-2011 the council of the City of Cape Town provided support for an initiative to establish a greentech industrial park in Atlantis and approved the release of two large parcels of vacant city-owned land for this purpose. The CoCT also approved a number of incentives to attract investors to the identified sites in the area which included:

- Greenfield land offered for purchase or lease at very competitive prices
- Environmental authorisation for development in place
- A fast-tracked application process for developers
- 'One-stop shop' support and information provided to greentech investors by the GreenCape initiative
- Small business support and incubation provided through the South African Renewable Energy Business Incubator (SAREBI)
- Access to a range of existing CoCT incentives available to firms investing in Atlantis including exemption from land use and building plan application fees, development contribution deferral and a municipal electricity tariff subsidy.

In 2014, GreenCape - working together with the CoCT and WCPG - was successful in securing its first investor to the sites earmarked for the greentech industrial park. Gestamp, a Spanish wind tower manufacturer purchased a portion of Site 1 in May 2014. Gestamp is in the process of building its plant and will be producing components for utility-scale wind projects that are currently being commissioned in South Africa as part of the Renewable Energy Independent Power Producers Procurement (REIPPP) programme.

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[1] Department of Water Affairs: The Atlantis Water Resource Management Scheme: 30 years of Artificial Groundwater Recharge 2010

1.1.2. Special economic zones

A Special Economic Zone (SEZ) is an economic development tool to promote national economic growth and export by using targeted support measures to attract foreign and domestic investments and technology[2]. Traditionally SEZs geographically delineated and fenced- in areas that allowed for the duty- and tax-free import of raw and intermediate materials for processing and re-export. Modern forms of SEZs are not exclusively export focused and can encompass larger areas and support a wider range of economic activities or have a specific technology or sector focus. The typical SEZ policy package includes, "import and export duty exemptions, streamlined customs and administrative controls and procedures, liberal foreign exchange policies and income tax incentives."[3]

In 2012 the Department of Trade and Industry announced that it would replace its Industrial Development Zone (IDZ) programme with a more inclusive model of industrial facilitation in the form of the Special Economic Zones. The DTI notes that the purpose of SEZs is to support and accelerate industrial development by facilitating targeted investment in certain manufacturing and tradable service activities. The SEZs are also envisaged as a mechanism to promote regional development, exploit existing technological and industrial capacity and attract foreign and domestic investment.

The SEZ bill and policy was released for public comment in 2012 and applications for designation as an SEZ were invited by the DTI in 2013. After a process of extensive consultation, the SEZ Act was gazetted in May 2014.

1.2. Purpose of the study

In 2014 the DTI commissioned Deloitte to undertake a prefeasibility study for the proposed Atlantis Special Economic Zone. The purpose of the prefeasibility study is to investigate the viability of establishing a greentech SEZ in the suburb of Atlantis and to consider how the proposed SEZ might best be configured to achieve the stated objectives of key stakeholders and maximise the associated economic and social benefits.

1.3. Current-state analysis of Atlantis

International experience on SEZ development suggests the failure or success of a special economic zone is linked to its policy and incentive framework, where it is located and how it is developed and managed.[4] An important aspect of the prefeasibility study was to assess the inherent advantages of Atlantis as a site for greentech and other activities in terms of its location, socio-economic and business environment and the quality of its infrastructure.

Our assessment of businesses in Atlantis Industria suggests that manufacturing-related activity still dominates the local economy. There are a number of small industry clusters in Atlantis including steel products, textiles, automotive and machinery, wood and wood products, food and consumer electronics. In addition at least 9 of the 81 manufacturing and services firms identified offer some greentech products and services.

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[2] SEZ Act
[3] FIAS (2008) Special Economic Zones – Performance, Lessons Learned and Implications for Zone Development

[4] FIAS (2008) Special Economic Zones – Performance, Lessons Learned and Implications for Zone Development

Some of the key characteristics and comparative advantages of Atlantis include:

- **Land availability** - The two sites identified by CoCT have been made available at very low cost (R27m^2 to R180m^2) to potential investors and environmental authorisation for development has been obtained. There is also ample vacant land (100 to 150ha) zoned for industrial use in Atlantis which could provide for future expansion
- **Ample existing industrial property** - Developed property at R900-R2000/m2 is inexpensive and rentals at R15-R19/m2 are half the provincial average of R32/m2
- **Location and spatial attributes** – The two sites are on the identified future urban growth corridor between Blaauwberg and Atlantis (north-west) and are well located to serve renewable energy plant in the Western and Northern Cape. The City of Cape Town is a strong local demand hinterland.
- **Transport –** There is access to both Saldanha (110km) and Cape Town (50km) ports and integrated with the regional freight movement/ abnormal load network
- **Infrastructure** - There is an adequate supply of bulk services for most manufacturing applications on existing developed industrial land and the new greenfield sites with exception of electricity for which upgrades are planned and budgeted.
- **Labour**- There is an ample supply of unskilled and semi-skilled labour live in Atlantis in close proximity to the industrial area, and access to an adequate supply of skilled labour within the broader Cape Town region and a small local skills pool in electronics, steel work and other manufacturing because of the long legacy in the area.

Some of the challenges of operating in Atlantis include:

- **Relatively far from Cape Town** - Atlantis is 40km from Cape Town and although it considerably more integrated with Cape Town than it was originally, it is still 50km from the port and is somewhat dislocated from the urban centre. Existing firms noted that a disadvantage of Atlantis is that it is more remote from the urban centre, suppliers and customers than all the other industrial nodes in Cape Town
- **Inadequate training facilities -** While there is an FET college in the area (West Coast College), the training does not align with firm needs and is often not at a high enough level. The quality of training provided has also been questioned by some firms
- **Social problems –** Atlantis suffers from a variety of social ills including crime, gangsterism and drug abuse – this does impact existing firms to some extent with complaints of business burglaries, drug abuse on premise and stock theft. These issues however are also prevalent in other areas of Cape Town and South Africa

Market sizing for greentech

The Atlantis SEZ (ASEZ) has been envisaged by the City of Cape Town and Western Cape Provincial Government as a hub for the delivery of a range of greentech products and services. Most of the effort in sizing the market for the proposed ASEZ was spent on developing a granular understanding of the specific opportunity for Atlantis in the greentech sector.

The greentech industry cannot be defined in terms of the conventional standard industry classification (SIC) system and there is also no unique or universally accepted definition of the term. In this report we have adapted the United Nations Environment definition of greentech which was used originally to describe environmentally sound technologies[5]:

Greentech refers to technologies that limit or prevent harm to the natural environment relative to conventional alternatives because they:

- are less polluting; or
- use all natural resources in a more sustainable manner; or
- recycle more of their wastes and products; or
- handle residual wastes in a more acceptable manner.

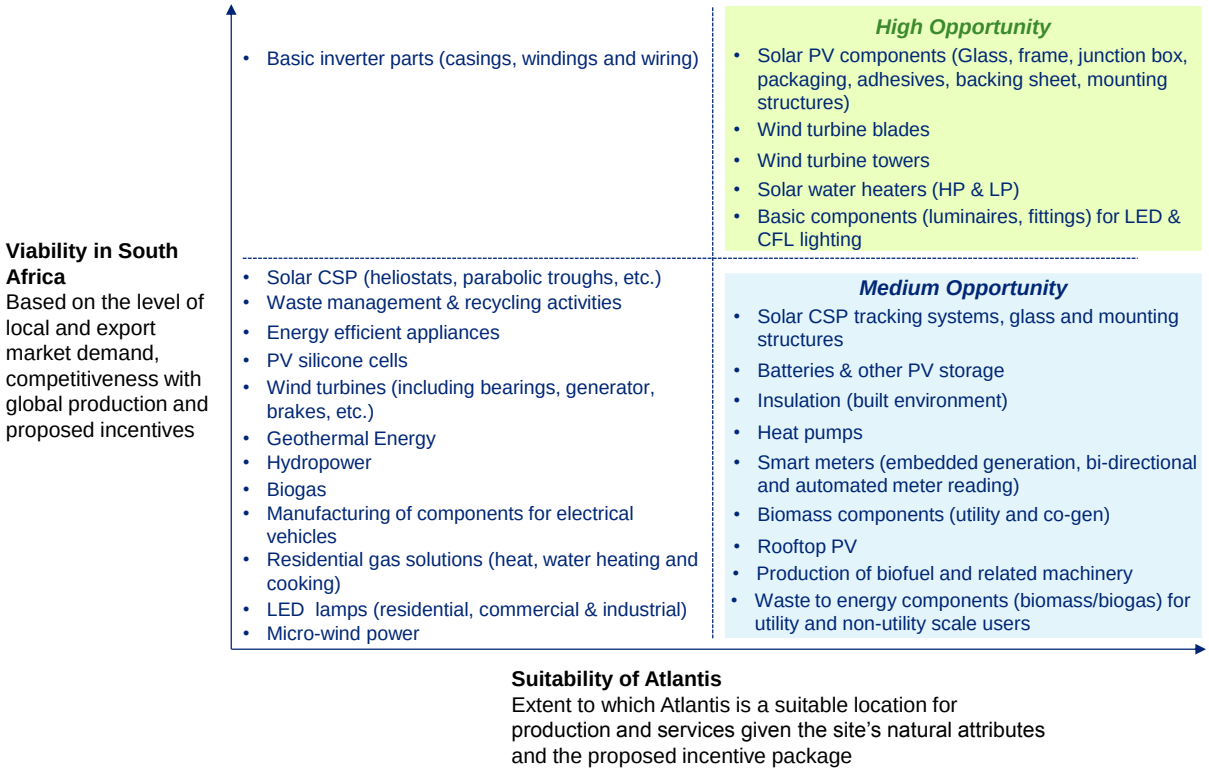
Furthermore greentech refers not just to the 'individual technologies', but total system around these which include know-how, procedures, goods and services, equipment as well as organisational and managerial procedures.

A summary of our overall ranking and prioritisation of greentech activities for the proposed ASEZ is provided in Figure 3. The high-opportunity activities (and in some cases specific components) are highlighted in the top-right quadrant while medium-opportunity activities are in the bottom-right quadrant.

The immediate (next 3 years) high-potential opportunities for Atlantis include the manufacturing of selected PV module components, wind turbine blades and towers, solar water heaters and basic components of CFL and LED lights. These activities, with the exception of lighting components are all directly supported through targeted government initiatives and would likely have setup without SEZ incentives. The purpose of the SEZ therefore would be to attract these activities to a relatively under-utilised industrial node and to promote the 'clustering' of these activities to foster greater collaboration and development of greentech activities in future.

[5] UNEP international environmental technology sector, available at: http://www.unep.org/ietc/WhatareESTs/tabid/56309/Default.aspx. "Working towards a balanced and inclusive green economy", United Nations, 2011.

Figure 1: Overall greentech opportunity prioritisation



Source: Deloitte analysis

The medium-opportunity activities represent future opportunities for the ASEZ to attract because growth in these markets is still contingent on additional government interventions (in terms of regulation, standards or direct support) or movement in other key demand drivers (e.g. falling cost of the technology or higher energy prices).

The IRP allocations and REIPPP programme together with local content requirements is the key driver of demand within the utility-scale market, especially within the wind, solar PV, CSP, biomass and biogas technologies. These technologies are capable of providing power to the national grid while also providing opportunities for additional local manufacturing in the proposed ASEZ.

There are a wide range of greentech products and services in the residential, commercial and industrial market. The technologies which we assessed as providing the greatest short-to-medium term opportunities for manufacturing in Atlantis are solar water heaters, heat pumps, rooftop PV, components of inverters, LED and CFL luminaires, building insulation and components of waste to energy technologies.

1.4. Greentech demand scenarios

We translate the identified greentech market opportunities into specific demand scenarios in terms of the size, number and nature of the firms that would likely setup in the ASEZ .These estimates provide the basis for two demand scenarios –'conservative' and 'moderate'.

Differences in outputs of the scenarios are summarised in

Table 1.

Table 1: Size of likely uptake, conservative and moderate scenarios

	Conservative				Moderate			
Firm Size	Large	Medium	Small	Total	Large	Medium	Small	Total
No. greentech firms	2	5	3	9	2	11	6	18
No. of greentech suppliers	-	3	7	10	-	3	8	11
Direct permanent jobs created per year	550	370	140	1 060	550	690	200	1 440
Industrial floor space required, m^2	41 000	30 500	9 100	80 600	41 000	60 500	11 100	112 600
FDI, million	R500	R100	-	R600	R500	R150	-	R650

Source: Deloitte analysis

Our analysis of the greentech industry in South Africa suggests that demand will be sufficient, even under the more conservative scenario, to support the development of a small-scale greentech SEZ at Atlantis, particularly if the SEZ entity adopts and incremental approach to investment based on realised demand.

In the short-term (2014 to 2017) the ASEZ would focus on trying to attract manufacturers of Solar Water Heaters (SWHs) and components for wind and solar PV as well as basic LED/CFL lighting components and/or assembly. The SEZ would also focus on supporting a number of SMME greentech suppliers focusing on servicing the larger anchor tenants such as Gestamp or a wind blade manufacturer

The opportunity for the ASEZ is also likely to improve over the medium-to-long term (beyond 2018) because of increased IRP allocations and movements in demand drivers, such as rising electricity prices or falling technology costs. In the medium term the ASEZ could potentially attract two large greentech firms and 14 medium and small firms with a host of smaller suppliers creating 1 440 direct and permanent jobs once fully realised.

1.5. Broader opportunity

While our analysis suggests that there is sufficient demand to support the development of a small-scale greentech SEZ at Atlantis, we also explored whether value could be added to this concept to create a greater economic impact and still more jobs. The broader opportunities identified included:

- **Extended sector focus to support existing or emerging clusters**– the SEZ could be used to support the further development of the existing manufacturing cluster in Atlantis while maintaining a focus on greentech and commitment to the 'green economy' more broadly.
- **West Coast SEZ corridor** - Designating the SEZ as a wider-scale "West-Coast economic growth corridor" to unlock greentech opportunities that are tied to particular locations outside Atlantis and to use the SEZ as a catalyst for a broader West Coast regional development initiative.
- **Emergence of a natural gas supply** – Understanding the positive spill over effects from the likely emergence of a natural gas supply in Atlantis through either local production or imports could have on the proposed ASEZ and understanding how it can support the business case.

Our key conclusions in each area were as follows:

- There is an opportunity to support the further growth and development of the existing small manufacturing clusters in Atlantis with the SEZ. For firms who are not currently constrained by domestic growth and are able to serve a broader and growing export market in Africa, SEZ incentives may indeed tip the business case in favour of incremental expansion into new product lines and markets.
- A wide-area SEZ act as a catalyst for regional development and could unlock a broader range of activities (greentech and\or 'low-carbon and resource efficient') that are suited or tied to particular locations outside Atlantis but still within the broader Blaauwberg-Atlantis-Saldanha corridor. It could attract investors who cannot feasibly locate in Atlantis because of their sensitivity to time\distance parameters from ports and the urban centre by providing them with alternative location options that are within or at least closer to the current urban edge.
- Post 2020 there is the possibility of excess gas being available for a range of end-users at prices lower than other forms of power, including electricity and diesel. Should the gas be competitively priced relative to grid electricity it could attract a range of energy consumer and intensive users to locate/re-locate to Atlantis and firms already established in Atlantis would benefit from a cleaner, potentially cheaper source of energy

1.6. Business case options

We considered the business case for the proposed SEZ on the basis of four different options. In the first three options we considered the impact that different approaches to land-use may have on the business case and in the fourth we consider the impact of extending the proposed sector focus. These are summarised in **Figure 67**.

Figure 2: Business case options for the proposed Atlantis SEZ

	Option 1: Greentech SEZ, develop greenfield sites	Option 2: Greentech SEZ, existing industrial property and greenfield sites	Option 3: West Coast SEZ corridor	Option 4: Greentech and low-carbon manufacturing SEZ
Description	Remains close to the existing concept of the 'green technology industrial park'. A new industrial park however would be developed on a portion(s) of the earmarked sites in order to attract investors who prefer to lease developed property.	The SEZ entity would make portion(s) of existing developed industrial property in Atlantis available to potential greentech investors. Greenfield sites are reserved for development by the few firms with specific requirements for large vacant portions of land.	Designate a 'West Coast Corridor' SEZ rather than 'Atlantis SEZ'. A wide-area SEZ could unlock additional location sensitive opportunities and act as a catalyst for development in the identified future urban growth corridor.	Extend sector focus to include resource-efficient low-carbon manufacturers in addition to greentech. This option could support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus.
Sector focus	Greentech	Greentech	The sector focus could be limited to greentech but it might be desirable to extend it include a range of resource-efficient low-carbon activities that are in keeping with the broad values of the 'green economy'.	Extend sector focus to include resource-efficient low-carbon manufacturers to support the growth and development of the existing and emerging
Land use	A new industrial park would be developed on a portion(s) of the two sites currently earmarked by the CoCT for the 'green technology industrial park'. Most investors indicated that they will only lease developed industrial sites. Portions of the sites would be left vacant for the one or two large firms who specifically require large pieces of vacant land for development.	Vacant or underutilised industrial property in Atlantis Industria would be refurbished and made available to potential SEZ investors. This is to make better use of existing property at lower cost and would allow the SEZ entity to respond incrementally to demand. The greenfield sites would not be developed but would be available to investors who have specific or large-scale land needs	The SEZ corridor could extend from Blaauwberg to Atlantis and possibly even including the geography north of Atlantis to Saldahna. It could unlock a range of greentech and 'low-carbon resource-efficient activities' along this corridor. Could provide marginal investors sensitive to time\distance parameters with alternative location options closer to the current urban centre or ports.	Same land-use as option 2.

Source: Deloitte analysis

We also produced some initial infrastructure cost estimates for the scenarios to gauge the impact of different land-use alternatives on the overall cost of developing the SEZ and highlight the benefits and drawbacks of each option. The key findings from this analysis are summarised below.

1.7. Key Findings

Option 2 would be recommended over option 1 for the following reasons:

- **Significantly less costly** - initial estimates of the cost of developing a focused greentech SEZ as suggest that it would be considerably cheaper to make use of and refurbish some of the existing vacant and underutilised industrial property in Atlantis than to build a new industrial park. This may lower the overall costs associated with accommodating 19 firms in the first 3 year period by as much as R50%
- **Lower risk -** In addition the SEZ entity would be less exposed in option 2 than in option 1 to the risk of speculative development of industrial property and factory shells for demand that may never be realised

The only obvious drawback of option 2 is that it may be more complex to implement as it is contingent on the assumption that there is sufficient underutilised and vacant industrial land available and that existing owners would be willing to lease or sell this property to the SEZ entity at fair and market-related rates.

The choice between option 2 and 4 is a choice between an extended or narrower 'green' SEZ. The pros and cons would need to be considered by the relevant stakeholders but can be briefly summarised as follows:

- Extending the greentech sector focus to include resource-efficient low-carbon manufacturers could support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus.
- Interviews held with firms in Atlantis suggest that for those firms who are able to serve a broader and growing export market in Africa, SEZ incentives may indeed tip the business case in favour of incremental expansion into new product lines and markets.
- The SEZ employment tax incentive could provide an opportunity to attract new low-skill labour intensive manufacturers to Atlantis where growth in the domestic and broader regional market is also supportive.
- The concept of 'resource-efficient low-carbon' manufacturing is not as clearly defined as greentech and while there are several international guidelines emerging, there may be Increased administration in assessing on what grounds a firm may qualify as a resource-efficient low-carbon manufacturer.

1.7.1. Strategy to implement the SEZ

In terms of implementing the SEZ it appears a good short-term strategy would be to:

- Apply for the designation of an SEZ in Atlantis under either option 2 or 4 which assume that the greenfield sites currently earmarked by the CoCT for the development of a 'green technology industrial park' would not be developed but would continue to be made available to investors who have specific or large-scale land needs.
- The SEZ entity could then work to identify existing industrial property to suit the needs of potential greentech investors the first period (2014 to 2017) and facilitate the refurbishment of the property and upgrading of surrounding public infrastructure including security
- Further industrial property in Atlantis could be incrementally acquired and upgraded based on proven demand.

In the medium-term Atlantis SEZ could consider applying to be designated as a 'West Coast corridor' to unlock a broader range of other greentech and possibly 'low-carbon resource-efficient activities' along the Atlantis-Blaauwberg corridor.

1.8. Key requirements to unlock Atlantis

During the course of the study we also identified key requirements to unlock the potential of the SEZ, these include:

- Greater certainty around government policy – improve certainty around policy implementation specifically IRP allocations, existence of funding support and continuation of key programmes such as Eskom IDM and DoE solar water programme
- Enabling regulation and increased government support – unlock additional greentech opportunities through enabling regulation and support. For example enable embedded generation through the provision of attractive time-of-use tariffs and other enabling regulation
- Demonstration effect – fund use of greentech in the ASEZ to provide a visible demonstration of the use of greentech in practice.
- Fiscal incentives – we have recommended some improvements on the design of the Corporate and Employment Tax incentives in line with global best practice
- Eligibility criteria – we have recommended that eligibility criteria be flexible rather than narrow and should cater for early-investors.
- One-stop shop - this service should be provided including consolidated and expedited government approvals, marketing and investment promotion amongst others
- Skills and capability audit– perform a skills and capability audit of the labour force in Atlantis to identify deficiencies from green tech skills requirements
- Work with education institution to address gaps – forge partnerships between FET colleges, green tech firms and SETAs to ensure that the curriculum provided is aligned with the needs of the green-tech industry
- Skills and training – expedite foreign work permit administration for highly-skilled foreign workers
- Organised Labour - attempt to broker an agreement between firms and labour representatives to avoid labour disputes as was achieved at Coega
- Other - facilitate with B-BBEE compliance particularly with respect to foreign companies
- Other - expedite SABS certification, customs clearance, logistics support
- Other – provide small business incubation support including R&D testing facilities

2. Background

2.1. Location

Atlantis is located approximately 40km north of the central business district (CBD) of Cape Town, 19 kilometres north of Melkbosstrand and 76km south of Saldanha. It lies between the N7 route to Namibia and the R27 West Coast road (Figure 3).

Figure 3: Location of Atlantis

Source: GreenCape (2014) Atlantis Greentech Industrial Park

2.2. History of Atlantis

Atlantis was established during the 1970's by the Apartheid government as an industrial centre and a community for the coloured population of Cape Town. This was in accordance with the provisions of the Group Areas Act which, at that time, forced the residential separations of South Africans according to race. The local government at the time, the Divisional Council of the Cape of Good Hope commonly referred to as DCC, was tasked to build a town that could provide housing for approximately 500 000 people in six interlinked towns.[6] However, only one town known as Wesfleur was developed and over time has become known as Atlantis. The policy rationale for the development of Atlantis was purportedly to build a coloured town that would help to ease the over population in Elsie's River. In 1976 Atlantis was declared a National Growth Point under the governments "decentralised initiative".[7]

[6] Department of Water Affairs: The Atlantis Water Resource Management Scheme: 30 years of Artificial Groundwater Recharge 2010

[7] ACCESSanitation Case Study Atlantis, South Africa 2012

In order to attract industry and residents to Atlantis, which was far from Cape Town at that stage, the government introduced various incentives to attract manufacturing firms via an elaborate system of relocation tax credit. These included firms that were part of the apartheid government's defence arms manufacturing projects, textile, and automotive parts manufacturers. The transport of people and goods to Cape Town was greatly subsidised.

According to official statistics 12 788 jobs were created in Atlantis in 1984 due to the large number of industries that relocated to Atlantis in order to take advantage of the subsidies.[8] By 1987, there were approximately 50 industrialists employing people drawn from nearly 8 000 households (i.e. 40 000 inhabitants). These industries included big companies such as Tedelex and Atlantis Diesel Engines.[9] During this period, manufacturing accounted for approximately 50% of economic activity.[10]

Manufacturing activities in Atlantis declined with the termination of the incentive programmes and the defence manufacturing contracts in the mid-1980s. A number of companies closed factories and permanently relocated. Some of the smaller branch plants that chose to remain in Atlantis battled to remain competitive within the changing South African and global economic environment and eventually closed down in the early nineties. These firms tended to be in sectors that were highly impacted by cheaper imports into the South African market. The withdrawal of incentives significantly reduced the attractiveness of the area, contributing to the long-term decline of the Atlantis economy.

In 2007 there was a mini-boom in Atlantis driven by Eskom which established an Open Combustion Gas Turbine plant in Atlantis, and it received an Energy Information Agency approval to triple the footprint and size of their installation.[11] This boom attracted some new manufacturers (often business buy-outs) but soon dissipated and the limitation remained that the majority of new firms were in the retail and finance sectors and could not absorb the large numbers of unemployed.

In 2010 Tedelex closed its doors leaving more than 150 people unemployed. In 2011 the CoCT together with the WCPG produced a draft framework for the revitalisation of Atlantis. A report to the Mayoral Committee on this framework noted that approximately ten factories in Atlantis closed between 2008 and 2010 with a direct loss of nearly 900 jobs.[12] Atlantis was further described as a 'distressed area in severe socio-economic crisis'. The cessations of tax exemptions and poor public transport between Atlantis and Cape Town have been mentioned as contributors to this decline.[13]

2.2.1. Recent developments

The *Atlantis Business Retention & Expansion* (BR&E) report, March 2012, states that "whilst the numbers of firm closures during the 1980s and 1990s were significant, and substantial job losses were incurred, the Atlantis economy as a whole remained dynamic evidenced by the fact that of the 91 firms interviewed for the BR&E study, 43 established during the same period." These firms were not dependent on incentives being offered but located primarily for market-competitive reasons, including a favourable business climate linked to land availability and prices.

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[8] Atlantis BR&E Survey Report, March 2012

[9] Department of Water Affairs: The Atlantis Water Resource Management Scheme: 30 years of Artificial Groundwater Recharge 2010

[10] Atlantis BR&E Survey Report, March 2012

[11] There are also prospects for a Pebble Bed Nuclear Power generation facility in the area. (Atlantis Socio-Economic review)

[12] Mayoral Committee report, City of Cape Town, September 2011 MC 14/10/11

[13] Department of Water Affairs : Rodney Bishop 2009

Moreover, 40% of firms in Atlantis in 2012 indicated increasing revenue over the period 2008 to 2012, with 17% by contrast reporting declining revenues. In the first quarter of 2014 the My CiTi bus routes were expanded to include Atlantis, making traveling more affordable and convenient for those working in the area. Firms in the area however have indicated in interviews that their staff continue to rely mainly on traditional taxis services because of their convenience but acknowledged it was too soon to assess the impact of My CiTi bus on addressing transport issues.

Some of the notable recent investments in Atlantis include the establishment of a Tellumat factory in 2012 and Hisense plant in 2013. The Tellumat factory will be closing down in 2014 due to the unforeseen termination of a key international contract, but Gestamp, a Spanish wind tower manufacturer has invested in a new facility at Atlantis and is due to commission and begin production in 2014.

Tellumat, a black-empowered company, acquired the assets of the Tedelex television factory in 2010 and opened a new fully modernised electronics factory in 2012. The state-of-the-art facility was supported by a multi-million rand investment from the Department of Trade and Industry (DTI) and the Industrial Development Corporation. This included a manufacturing investment grant of R2.64 million, a capital outlay of R12 million to resuscitate the old Tedelex factory. The company has also benefited from an Industrial Development Corporation loan of R8.2 million for surface-mounting technology expansion for this facility.[14] In 2014, Tellumat lost one of their major contracts with struggling European electronics producer Sony. In an interview with the Deloitte Team in May 2014, they confirmed that will be closing the newly refurbished facility. Some of the workers will be relocated to the Retreat factory and others retrenched.

Hisense which opened a factory to produce televisions and refrigerators for the African and South African markets in June 2013 injected R350 million into the first phase of the Atlantis plant. The factory currently employs 450 people – 150 more than it initially projected. The DTI Manufacturing Investment Programme (MIP) assisted Hisense with a R26.8 million cash grant, while the IDC signed an MOU with Hisense Company of China and the China-Africa Development Fund (CAD Fund) covering finance for the expansion of the company to cover the assembling of air-conditioners as well as other products.

Gestamp, a wind tower manufacturer for wind energy plants, purchased a greenfield site in Atlantis from the city of Cape Town in 2014 and will be developing a R300 million facility in the second half of 2014. The decision by Gestamp to locate their plant at Atlantis was influenced by the concerted efforts of the CoCT and GreenCape Initiative to promote a city-owned parcel of land adjacent to the existing Atlantis Industria as the site for the establishment of a Greentech Industrial park (see section 2.4.2for details on support offered).

[14] Engineering News, March 2013: Tellumat opens new Atlantis TV manufacturing facility

Atlantis Foundries, which was established by the Industrial Development Corporation in 1978 as Atlantis Diesel Engines, remains the 'anchor tenant' in the area has been recognised as one of the country's top-performing manufacturing plants. Established to produce diesel engines for the South African market as part of the apartheid government's strategy of inward-facing industrialisation, it was acquired by the Daimler Chrysler group in 1999 and now produces automotive castings and machines cylinder blocks and crankshafts, predominantly for the export market. Premier Helen Zille in her state of the province address noted that ''Atlantis Foundries has also become one of the top performing plants in the country". It employs 1,170 people mostly from Atlantis and surrounding communities. All modern freightliner trucks in America use Atlantis Foundries engine blocks, which are the most modern and technically sophisticated engines available overseas. Last year, the foundry surpassed its sister plant in Germany when it comes to quality.[15]

2.2.2. Outlook

The demand for industrial property in Atlantis remains relatively low compared to Cape Town's more central industrial nodes which include Airport Industria, Epping, Montague and Killarney Gardens, Paarden Eiland and South Bellville among others. This is evident from significantly lower rental rates and land value.

Vacancy rates in Atlantis for developed property currently stand at about 5% which is slightly higher than the Western Cape average of 1.5%[16]. Rental rates for existing industrial floor space currently range between R15m^2 and R19m^2 as compared to the Western Cape average of R31.50 m^2 and up to 50m^2 in premier industrial parks such as Montague Gardens.

Atlantis currently offers the lowest rental rates on industrial property and the some of the least expensive industrial land (vacant and developed) on the Cape Peninsula. Data from the CoCTs Economic Areas Management Programme (ECAMP)[17] suggest that Atlantis, in general, exhibits average industrial location potential, with a significant concentration of conventional industries coupled with extensive, cheap industrial land. These positives are weighed down by its geographic remoteness to logistics gateways, regional markets, skilled workers and consumers (see section 5.7).

2.3. Understanding and defining the green economy and greentech industry

Given that the proposed focus of the Atlantis SEZ is the greentech industry it is important to have a sound understanding of what is meant by the 'green economy' and 'greentech industry'. In this section we have provided a brief overview of the concepts of the green economy and greentech industry and 'resource-efficient low-carbon production' as well as definitions of the terms as they are used in the remainder of this report.

The term green economy has gained significant currency since it was first coined some 20 years ago, and represents the promise of a new economic growth paradigm that is more sensitive to the impact of development on the earth's ecosystems and that can also contribute to poverty alleviation.[18]

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[15] State of the Province Address, Western Cape Premier Helen Zille, February 2014.

[16] SAPOA, Industrial Property Report, October 2013. Interview with Atlantis Realtors, Rolf Franke, 19 June 2014

[17] A diagnostic model which consolidates a wide range of raw City data (together with open source and proprietary data) into actionable information about changing area-specific business conditions. – -

[18] "Working towards a balanced and inclusive green economy", United Nations, 2011.

The following United Nations Environment Programme (UNEP) working definition of the green economy is one of the most widely acknowledged[19]:

Table 2 Definition of a Green Economy

Definition of a Green Economy
"A green economy is one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities."

Source: UNEP, 2011

UNEP suggests that in practical terms a green economy is one whose growth in income and employment is driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. And, in its simplest form**, a green economy** can be thought of as one which is **low carbon**, **resource efficient** and **socially inclusive**.[20]

The mobilisation of green technologies and nurturing of green technology innovation has been identified as one of key means of practically enabling the green economy. UNEP notes that technological innovation in product design, production processes, service systems and organisational management has played, and always will play, a major role in reducing negative environmental and social impacts and improving resource efficiency.

According to UNEP the term 'cleantech' became popular with the investment community in the last decade and refers most often to an asset class of climate friendly or renewable energy technology. They note that the terms cleantech and greentech are used interchangeably today and broadly refer to cleaner or environmentally sound technologies (ESTs) and the systems and processes around them.[21]

The greentech industry cannot be defined in terms of the conventional standard industry classification (SIC) system and there is also no unique or universally accepted definition of the term. The UN however recommends the following broad definition of greentech used originally to describe environmentally sound technologies in Agenda 21, their 1992 plan to achieve sustainable development[22]:

Greentech includes technologies that "protect the environment, are less polluting, use all resources in a more sustainable manner, recycle more of their wastes and products, and handle residual wastes in a more acceptable manner than the technologies for which they are substitutes…furthermore, [greentech] refers not just to the 'individual technologies', but total systems which include know-how, procedures, goods and services, equipment as well as organizational and managerial procedures."

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[19] "Green Economy Report: Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication", UNEP, 2011.

[20] What is the Green Economy", UNEP, available at: http://www.unep.org/greeneconomy/aboutgei/whatisgei/tabid/29784/default.aspx

[21] "Working towards a balanced and inclusive green economy", United Nations, 2011.

[22] UNEP international environmental technology sector, available at: http://www.unep.org/ietc/WhatareESTs/tabid/56309/Default.aspx. "Working towards a balanced and inclusive green economy", United Nations, 2011.

The following definition of greentech, a slight adaptation of the UNEP definition of environmentally sound technologies will be used to describe the sector in this report:

Table 3 Definition of greentech

Definition of Greentech
Greentech refers to technologies that limit or prevent harm to the natural environment relative to conventional alternatives because they: • **are less polluting and\or** • **use all natural resources in a more sustainable manner and\or** • **recycle more of their wastes and products and\or** • **handle residual wastes in a more acceptable manner** Furthermore greentech refers not just to the 'individual technologies', but total system around these which include know-how, procedures, goods and services, equipment as well as organisational and managerial procedures.

Source: Based on "Working towards a balanced and inclusive green economy", United Nations, 2011.

Examples of greentech services and products are provided in Figure 4. This taxonomy is by no

	Utility scale	Non-residential self generation	Residential self generation
Renewable energy generation	• Solar PV • Solar CSP • Biomass • Biogas • Hydro &ocean • Wind • Geothermal	• Solar PV • Solar CSP • Biomass • Biogas • Micro-Hydro • Wind • Geothermal	• Solar PV • Solar water heaters • Biomass (heat) • Mini-Wind
Energy efficiency	• Geothermal heating • Heat pumps • Energy efficient lighting and sensors • Smart meters • Smart grids • Building design and insulation • Waste heat recycling • Energy efficient heaters and air conditioning • General energy efficient consumer electronics • Energy efficiency / carbon footprint labeling of appliances		
Transport	• Biofuel and Biodiesel • Congestion reducing technology and infrastructure • Batteries • Energy efficient car motors and assembly/production • Energy efficient (environmentally friendly) vehicle parts • Electrical vehicles and other EE public transport		
Materials and chemicals	• Bio-based fabrics, plastics and other environmentally friendly materials • Environmentally friendly chemicals (bio-chemistry)		
Environmental and waste services	• Environmental protection and emissions reduction technology • General waste (incl. water) recovery technology or processes • Recycling and waste treatment technology • Biogas and landfill gas production		
Each category above includes manufacturing of all related components, maintenance and operations as well as research and development activities.			

means exhaustive and simply provides examples of the types of services and products that are typically referred to as greentech and could be classified as such, in terms of the definition provided above.Figure 4: Greentech taxonomy - examples of greentech products and services

Source: Deloitte analysis based on several sources [23]

[23] ("How can we meet the worlds environmental challenges and ensure economic prosperity", Siemens, "Definition of Clean Tech" - Innovation Policyworks,2013; "GreenTech made in Germany 3.0", 2012)

As illustrated in Figure 4, the greentech industry incorporates aspects of or activities in many of the conventionally defined industries including amongst others - electronic goods, petrochemical, plastics, automotive and construction industries.

The greentech sector is dynamic in nature and additional products, services and technologies continually emerge. Some additional examples (in addition to those already listed in Figure 4) of greentech products and services provided in the 'Greentech China Report 2012' include:

- **Cleaner Conventional Energy** – for example cleaner gas (e.g. methane gas and shale gas), cleaner coal conversion processes (e.g. clear coal-to-liquid technologies and processes)
- **Clean Water** – processes, products and technologies related to the improved extraction, treatment, distribution and use of water resources.
- **Sustainable Forestry and Agriculture** - processes, products and technologies related to the more sustainable management of forestry and agricultural resources.

There is however a distinction between greentech activities and resource-efficient low-carbon industrial production. While greentech as defined above would include activities like the manufacture of energy-efficient windows and electric vehicles the industrial processes to produce them are not necessarily resource-efficient and low-carbon. A factory uses green technologies and renewable energy to produce normal petrol-fuelled vehicles and regular windows, would have resource-efficient low-carbon processes but would not classified as greentech.

There is no scientific definition of resource-efficient low-carbon production because it is a broad concept that refers the production of goods and services in a manner that aims to have the minimum environmental impact under present technological and economic limits.

The terms resource-efficient low-carbon production and resource-efficient cleaner production (RECP) are used interchangeably. In this report we use the United Nations definition of RECP provided in Table 4 when referring to either term.

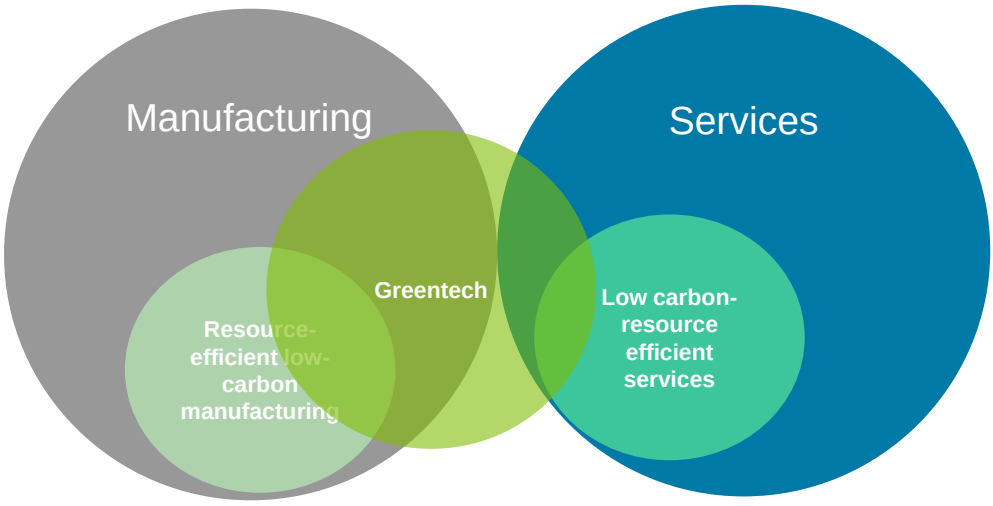
Table 4 Definition of resource-efficient cleaner or low-carbon production

Definition of resource-efficient cleaner or low-carbon production
The application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment. RECP addresses the three sustainability dimensions individually and synergistically: • Production Efficiency: optimisation of the productive use of natural resources (materials, energy and water); • Environmental management: minimization of impacts on environment and nature through reduction of wastes and emissions; and • Human Development: minimization of risks to people and communities and support for their development.

Source: UNEP, 2014

The venn diagram in provides is an attempt to illustrate of how these concepts are distinct and where they overlap. Greentech includes activities that produce products and services that reduce harm to environment. Greentech spans manufacturing and services but the activities to produce greentech can be, but are not always, resource-efficient and low-carbon.

Figure 5 Greentech vs resource-efficient low-carbon production



Source: Deloitte analysis

2.4. Progress to-date in establishing the greentech hub at Atlantis

In 2011 the CoCT constituted an intergovernmental technical task team (consisting of representatives of both WCPG and the national department of economic development) to develop a framework to promote the revitalisation of Atlantis. The initiative was in response to a severe socio-economic crisis in the area which had been exacerbated by the recent closure of several factories and loss of almost 900 jobs.

The establishment of a greentech manufacturing hub at Atlantis was identified as one of the potential medium to long-term interventions that could be undertaken to revitalise the area. It was noted that both a re-engineering of the existing business clusters and support for future-focused sectors would be required. The 'greentech' sector was identified as one that was future-focused.[24]

At its Council Meeting in September 2011, CoCT provided its support for an initiative to establish a Greentech Manufacturing Cluster in Atlantis. CoCT noted that the cluster would be positioned to take advantage of the multi-billion rand investments in utility-scale renewable energy investments driven by the DoE and its REIPPP programme. It was anticipated that at as a result of this programme, a number of manufacturers (including contractors, subcontractors and service providers) of wind and solar energy generating equipment, would need to secure land to establish manufacturing plants.[25]

In a proposal to the Mayoral Committee on the Green Industrial Hub at Atlantis in 2011, GreenCape noted that it would seek to attract the following anchor tenants:

- A wind blade manufacturer
- A wind tower manufacturer
- A wind turbine manufacturer

[24] Draft Atlantis Revitalisation Framework, Intergovernmental Technical Task Team, September 2012.
[25] City invites green technology manufacturers to apply for land in Atlantis Green Hub, media release, NO. 486 / 2012, 11 June 2012

- A PV manufacturer
- A PV inverter manufacturer

It was noted, that the City's Property Management Department would facilitate the location of 'green' industry manufacturers on City-owned land in Atlantis at highly competitive rentals. The land-earmarked was undeveloped and the initiative was aimed at the rapid release of land in Atlantis Industria for the establishment of greentech industries.[26]

In December 2011 the CoCT Council approved a land release procedure for this initiative whereby land was allocated for purchase or lease within a short timeframe and at very competitive land prices, to interested parties qualifying in terms of greentech criteria. Two vacant portions of undeveloped land, approximately 29ha and 38ha respectively, within the existing Atlantis industrial area were allocated by the City for this purpose.

Establishment of the greentech hub has been part of the City's 'Atlantis Revitalisation Framework' , Atlantis has been identified as a focus area in the Cape Town Spatial Development Framework, and establishing a Green Manufacturing Hub forms part of this strategic intent as reflected in the City's recently approved Integrated Development Plan (IDP).

2.4.1. Sites identified by CoCT for the greentech industrial park

In early 2012, CoCT advertised in local and national newspapers inviting greentech manufacturers, contractors and service providers that qualify, to apply for industrial land in Atlantis to establish manufacturing plants.

The sites identified for the 'greentech park' consist of two land parcels within close proximity representing nearly 75 hectares land available for development. The first abuts Dassenberg Road and the second Neil Hare Road. Both properties are zoned General Industrial and are wholly owned by the City of Cape Town. The land is fully serviced with utilities and offer good access to the major highway infrastructure and port opportunities.

Descriptions of the properties are provided in Table 5. The site diagrams are illustrated in Figure 6 and aerial photographs of the site are provided in Figure 7 and Figure 8.

Table 5: Description of greentech park sites

	ERF	APPROXIMATE EXTENT	LOCATION	ZONING
1.	Site 1 - Portion Cape Farm CA 1183 and Cape Farm 4 portion 93	±29,99 hectares	Dassenberg Road/ John van Niekerk Road	General Industrial
2.	Site 2 - Portion Cape Farm CA 1183 portion 4 portion 1	±38,65 hectares	Neil Hare Road	General Industrial

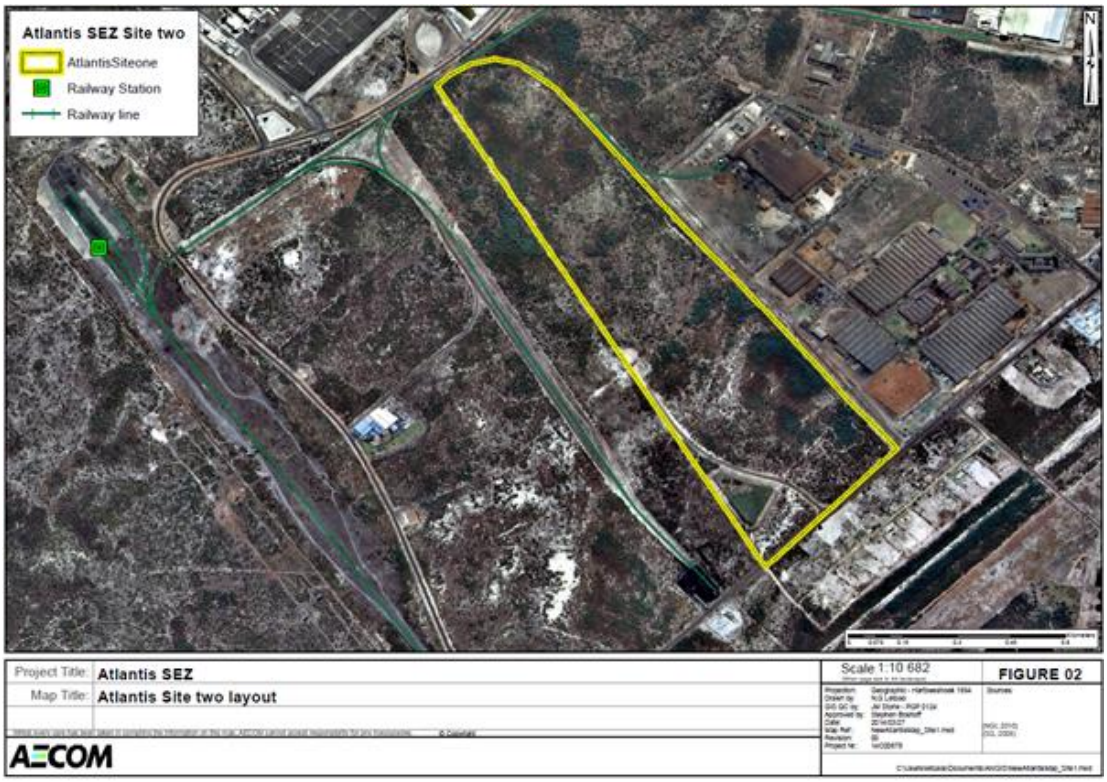
Source: AECOM analysis

[26] City supports green technology with new project in Atlantis, media release NO. 606 / 2011, 06 September 2011

Figure 6: Site diagrams

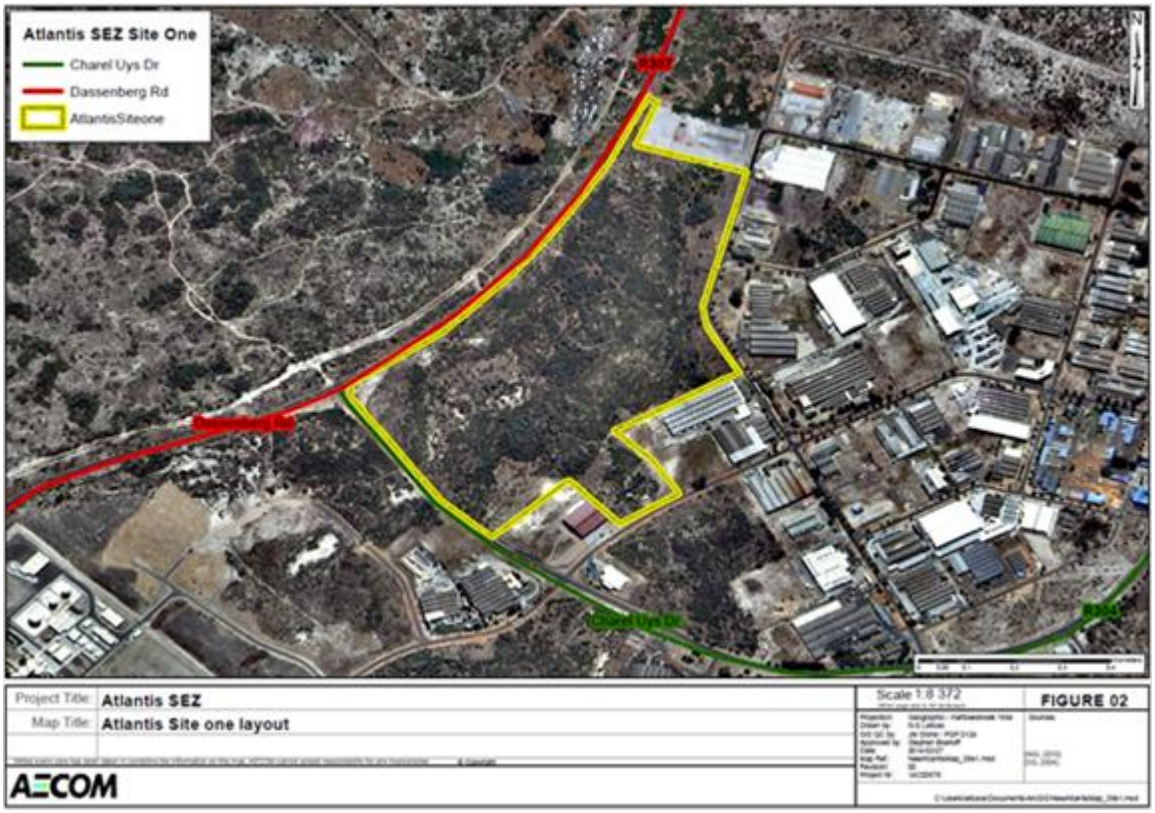
Source: AECOM analysis

Figure 7: Site 2 - Portion Cape Farm CA 1183 portion 4 portion 1



Source: AECOM analysis

Figure 8: Portion Cape Farm CA 1183 and Cape Farm 4 portion 93



Source: AECOM analysis

2.4.2. Incentives and support currently provided

The city currently offers potential investors a number of incentives to invest in the area identified for the greentech park.[27] These include:

- Land offered at very competitive prices for purchase or lease
- A quick application process for developers
- Environmental authorisation in place
- 'One-stop shop' support and information provided by the GreenCape initiative
- Small business support and incubation through the South African Renewable Energy Business Incubator (SAREBI)
- Access to a range of existing CoCT incentives available to firms investing in Atlantis

2.4.2.1. Land disposal and lease arrangements

The Atlantis Greentech Industrial Park provides attractive leasing and disposal rates for prospective tenants and developers as presented in Table 6. This includes:

- Leases in multiples of 5 years up to 30 years.
- Periods of rental review can be negotiated to give security of tenure while retaining the principle of market related rental.

[27] Atlantis Green Technology Industrial Park Information Brochure, Arup and GreenCape, 2014

- Option to purchase after a period of 5, 10, 15 years or upfront.

Table 6: Atlantis Greentech Industrial Park leasing and disposal rates

Extent	Rate/m²	Market Value Disposal ('000s)	Monthly Rental ('000s) utilising 8% return on land value	Rate in Rand (Rental)
0 - 500m²	180	R 90	R 0.6	R1.20/m²
501m² - 1 000m²	180-165	R90 – R165	R 0.6 – R1.1	R1.20/m² - R1.10/m²
1 000m² - 5m²	165-150	R165 – R 750	R1.1 – R5	R1.10/m² - R1.00/m²
5 001m² - 10m²	150-120	R750 – R1 200	R5 – R8	R1.00/m² - R0.80/m²
10 001m² - 50 000m²	120-100	R1 200 – R5 000	R5 – R33	R0.80/m² - R0.67/m²
50 001m² - 70 000m²	100-80	R5 000 – R5 600	R33 – R37	R0.67/m² - R0.53/m²
70 000m² - 100m²	80 -65	R5 600 – R6 500	R37 – R43	R0.53/m² - R0.43/m²
100 001m² - 150m²	65-50	R6 500 – R7 500	R43 – R50	R0.43/m² - R0.33/m²
150 001m² - 200 000m²	50-40	R7 500 – R8 000	R50 – R53	R0.33/m² - R0.27/m²
200 001m² - 250m²	40-35	R8 000 – R8 750	R53 – R58	R0.27/m² - R0.23/m²
250 001m² - 300m²	35-30	R8 750 – R9 000	R58 – R60	R0.23/m² - R0.20/m²
300 001m² - 350m²	30-27	R9 000 – R9 450	R60 – R63	R0.20/m² - R0.18/m²
350 001m² - 386 500m²	27-25	R9 450 ± R9 700	R63 – R65	R0.18/m² - R0.17/m²

Source: Atlantis Greentech Industrial Park, Application Form - APPLICATION A01P/2011/12

2.4.2.2. Quick Application process

There is a clear, transparent application process in place for those businesses interested in applying for a site. It involves submitting an application form to the Greentech Manufacturing Evaluation Committee (GTMEC), who then provide a recommendation to the Immovable Property Adjudication Committee (IPAC). IPAC which meets weekly will either approve or decline the disposal or lease.

2.4.2.3. Environmental authorisation

Environmental Authorisation and exemptions were awarded for both sites in January 2013 so that investors will be able to develop the sites immediately on lease or purchase.

2.4.2.4. Investment support provided by GreenCape

The GreenCape Initiative is a Sector Development Agency established by the Western Cape Provincial government and The City of Cape Town in November 2010. The GreenCape Initiative was established to unlock the manufacturing and employment potential in the Green Economy in the Western Cape. Through partnerships with WESGRO, Provincial Government and academia, GreenCape provides 'one-stop shop' information and investment facilitation support.

2.4.2.5. Small business support and incubation through SAREBI

SAREBI is a small business incubator located in Atlantis with the goal of growing and nurturing small and medium enterprises operating within the "Green Economy". SAREBI provides business support, facilitation of access to markets and access to finance as well as technology transfer and joint ventures.

SAREBI is in the process of identifying candidates for incubation - it is envisaged that successful applicants will be established in the incubator facilities which include recently refurbished factory floor space and will receive full support from incubator staff and enjoy shared services and resources. This will enable companies to focus on their core activities.

It is envisaged that SAREBI will be a feeder for both upstream and downstream opportunities in the Atlantis Greentech Industrial Park. SAREBI is funded by the CoCT and DTI.

2.4.2.6. CoCT incentives available to firms investing in Atlantis

The CoCT offers a range of additional incentives to firms investing in the broader Atlantis area including the site identified for the Greentech Park[28].

These include:

- Fast-tracked development approvals in respect of land use and building plan applications
- Fee exemption from land use and building plan application fees
- Development contribution deferral/debt write off which applies in respect of both civil and electrical DCs where enhanced development rights granted.
- A municipal electricity tariff subsidy - "Time of Use" tariff for Atlantis pegged at 2012/2013 level (thus no increase for the 2013/2014 financial year)

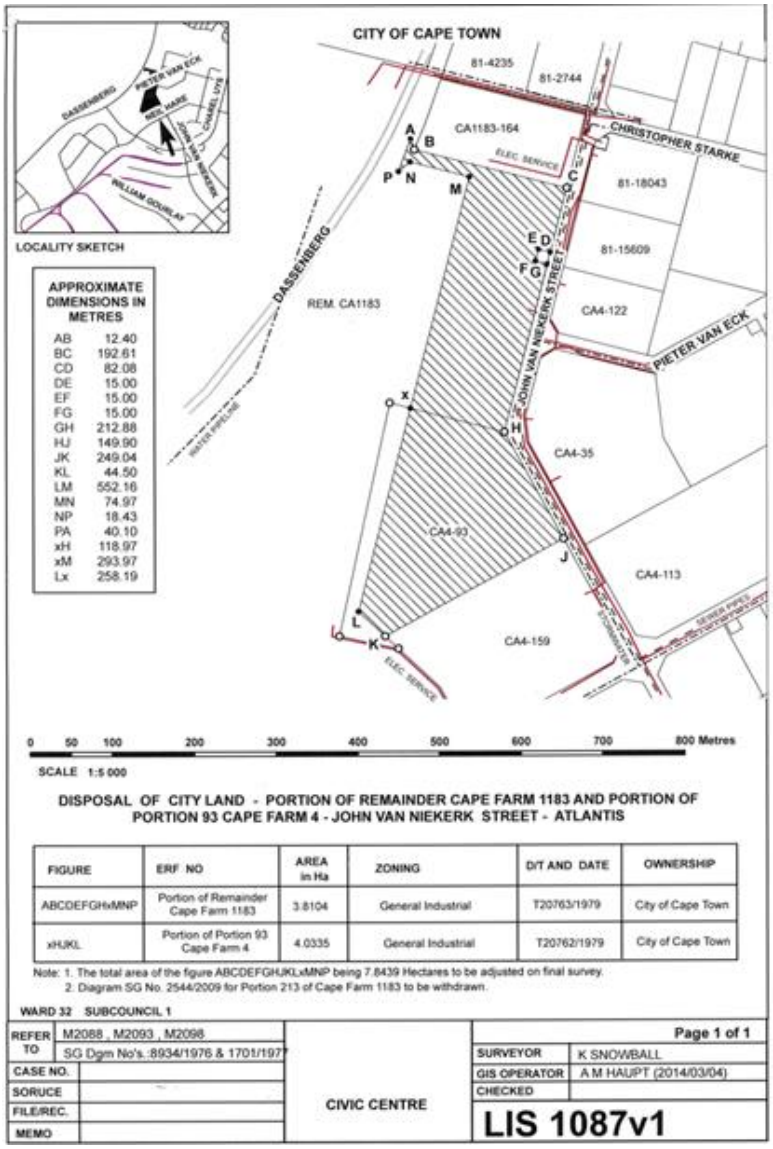
2.4.3. Success in attracting investors to-date

In 2014, GreenCape working together with the CoCT and WCPG was successful in securing its first investor to the sites earmarked for the greentech industrial park. Gestamp, a Spanish wind tower manufacturer purchased a portion of Site 1 in May 2014, they will be producing components for utility-scale plants mostly in the Northern Cape and Western Cape to meet the requirements of independent power producers that were successful in the Renewable Energy Independent Power Producers Procurement (REIPPP) programme bid rounds 2 and 3. Gestamp Corporation (Gestamp) was a successful bidder in round 2 and will be developing Noblesfontein wind farm in the Northern Cape in its entirety. Beyond the REIPPP bid rounds Gestamp envisages it will export wind towers to the African and Middle Eastern Market.

Gestamp have purchased the eastern 1/3rd of what is referred to as site 1 (Portion Cape Farm CA 1183 and Cape Farm 4 portion 93). The land portion purchased by Gestamp measures 7.8ha in extent is illustrated in Figure 9. Gestamp will be investing in the development of a R200 million wind tower manufacturing facility on the site (their total investment will be in the order of R350 million).

[28] City of Cape Town, Atlantis Investment Incentives: 2013/14

Figure 9 Land Portion purchased by Gestamp



Source: CoCT

GreenCape noted that it also played a role in attracting the investment of a number of component manufacturers for the REIPPP programme utility-scale renewable projects to the City of Cape Town[29]. These firms include SMA Solar Technology (producers of inverters and system monitors located in Centurion and Cape Town), Jinko Solar (producers of PV modules located in Epping), SARETEC (providers of specialised renewable energy training located in Belville) and AEG Power Solutions (producers of solar inverters and combiner boxes located in Milnerton).

[29] Personal Communication with Mike Mulcahy, Operations Manager at GreenCape, 3 July 2014.

While a number of these firms considered the sites identified for a greentech industrial park in Atlantis they chose to locate at other sites in the Cape Town metropolitan area. This GreenCape notes, was chiefly because they preferred to rent floor space in suitable existing brownfields industrial property. Should developed industrial property (or upgraded existing facilities) be made available as part of the proposed Atlantis Special Economic Zone (ASEZ), together with SEZ incentives, Atlantis could well become the preferred location for these types of greentech investors in future.

2.4.4. Comments and observations on the current strategy and evolution towards an SEZ

The concept of establishing the greentech hub was borne out of the Atlantis Revitalisation Framework and as such, the spatial planning objectives and focus on Atlantis as the site for the green hub have been inherent to the concept since its inception.

The concept of the 'greentech park' as it stands is focused on capturing a share of the domestic utility-scale renewables market and suppliers to this market. The undeveloped 'greenfield' sites and incentives provided have been designed to capture the interest of these relatively large-scale capital-intensive manufacturers. This concept, which has been successful in attracting at least one firm in this category of investors to Atlantis, will need to be adapted to suit the broader objectives of the SEZ as a policy tool. This is particularly true if the SEZ is aiming to attract a broader range of greentech and/or manufacturing activities.

It is also clear that the CoCT and WCPG recognised the concept of greentech hub as an opportunity to capture a share of a growing and future-focused manufacturing industry for the Western Cape economy. The focus on a growing manufacturing sub-sector is strategic, particularly given that the regional manufacturing sector had been in decline and was particularly hard-hit when the South African economy entered recession in 2009.

The Atlantis revitalisation framework also sought to 're-engineer' the existing sectors which include textiles, food –processing, consumer electronics and automotive amongst other. In interviews with existing firms in Atlantis it is clear that the majority of manufacturers are focused on the domestic market and are therefore constrained by growth in the domestic and regional market and ability to compete with imports. In general these firms noted that they were not able to compete in the international export market given a number of factors in including the fact that South Africa is geographically remote from major markets, our local market is relatively small and does not provide sufficient economies of scale in production and labour is relatively costly. The notable exceptions are Atlantis Foundries and CA Components who produce largely for export and Swartland that exports 50% of output. An assessment of the ability of existing manufacturing firms to expand operations under the SEZ incentive framework is provided in Section 9.

3. Rationale for the Atlantis SEZ

3.1. Introduction

The rationale for the use of special economic zones as a policy tool varies and typically differs between developing and developed countries. In developing countries SEZs and particularly export processing zones are typically used to:

- To boost the competitiveness of manufacturers and service providers and reduce business entry and operating costs
- To realise agglomeration benefits of concentrating an industry in geographic place
- To promote economic reform in support of exports when the country has an anti-export bias and strong protectionist trade measures in place.
- To attract foreign direct investment
- To test new policies and approaches before introducing them more widely

In developed countries SEZs most often seek to:

- Enhance trade efficiency and manufacturing competitiveness
- Attract foreign direct investment as is the case in Japan
- To revitalise economically distressed urban and rural areas- often the motivation in enterprise-zone style programmes in Europe and the US.

3.2. Primary goals and desired outcomes for the Atlantis SEZ

A clear understanding of the primary objectives and desired outcomes for the proposed Atlantis SEZ is crucial in that it informs recommendations on the overall design, commercial and operating structure, and monitoring and evaluation of strategic outcomes. Since SEZs gained popularity as a policy tool, their forms and objectives have become increasingly wide-ranging. In light of this it is also necessary to have a clear view of the primary objectives of the Atlantis SEZ in order to evaluate it against relevant 'good practice' examples that have similar objectives.

The key rationale for the SEZ must be evaluated from the perspective of key project stakeholders - CoCT and WCPG who submitted the application for designation.

Based on input from a workshop held with representatives of GreenCape and the WCPG on 28 May 2014, we have summarised the primary objectives and desired outcomes of the Atlantis SEZ in Figure 10.

The primary objectives of establishing an SEZ with a greentech focus at Atlantis are:

- To grow the greentech sector in the Western Cape
- To further the CoCT's objective of revitalising Atlantis as a key industrial node in the region.

In achieving these objectives, CoCT and WCPG would hope to create employment, enable smart green economic growth, to revitalise the area and attract foreign direct investment and domestic investment. These can be thought of as desired outcomes.

Key stakeholders also recognised that in working towards these objectives and in support of the outcomes the CoCT and WCPG would need to ensure that certain key enablers were in place. This would include providing supporting infrastructure, developing and strengthening institutional arrangements between government academia and business to support the vision of 'green is smart' growth and more general to continue to work towards creating an enabling environment for business to flourish.

Figure 10 Primary goals and desired outcomes for the Atlantis SEZ

Primary Goals

- **To grow the green technology sector in the Western Cape**
- **To promote the revitalisation of Atlantis as a key industrial node in the region**

Desired Outcomes

- **To create employment**
- **To enable economic growth that is smart and green**
- **Attract foreign direct investment and domestic investment**

Key Enablers

- **Develop and strengthen institutional arrangements between government, academia and business to enable green is smart**
- **Providing supporting Infrastructure**
- **Support SMME development**
- **Creating an enabling environment for business**

Source: Deloitte analysis

4. International experience in the development of SEZs

4.1. Global trends in SEZ models and types

Special economic zones (SEZs) as a policy tool to promote economic development and competitiveness encompass a wide range of variants. According to FIAS (2008:12), the typical SEZ policy package includes, "import and export duty exemptions, streamlined customs and administrative controls and procedures, liberal foreign exchange policies and income tax incentives."

Traditionally SEZs were geographically delineated and fenced- in areas that allowed for the duty- and tax-free import of raw and intermediate materials for processing and re-export. While 'free trade zones' and 'export processing zones' (EPZs) are still among the most common form of SEZ more modern forms are not exclusively export focused, encompass larger areas, support a wide range of activities thought a broader set of incentives.

Examples of the more modern forms of SEZ include;

- **Freeports –** large areas encompassing a wide range of activities including services like retail and tourism. Residents live on site and incentives are typically broad. They are described as demand-driven liberalised platforms for diversified economic growth. Examples are found in city-states in Asia like Hong Kong, Macau and Singapore and they are now prevalent in inland areas of China.
- **Enterprise Zones –** intended to revitalise distressed rural or urban areas through the provision of tax incentives and financial grants. Mostly in developed countries and currently being explored in South Africa.
- **Single Factory EPZ –** provide incentives to single firms regardless of location – there isn't a designated zone. Popular in Mauritius, Madagascar and Fiji.
- **Specialized Zones** – configured to the need of specific industries and activities such as petrochemicals and heavy industry which rely on cheap energy and can benefit from sharing of specialised facilities. Popular in Asian countries like Singapore, Thailand and Malaysia**.**

The DTI in its policy on the development of Special Economic Zones in South Africa, 2012 also identifies the following zone types[30]:

- **Science and technology parks –** consist of infrastructure for the establishment and development of knowledge-based companies based in a location formally linked (and usually physically close) to a centre of technological excellence, usually a university. It normally incorporates business management and other services, and a technology link to the centre of technological excellence.
- **Sector development zones –** focus on the development of specific sectors or industries such as agriculture, ICT, BPO, etc.; through the facilitation of general or specific industrial infrastructure, technical workforce and business support services.
- **Spatial development corridors –** connect two or more economic nodes through transportation networks, and accommodate various economic activities along the corridors.

[30] Policy on the Development of Special Economic Zones in South Africa, 2012, No.34968 Government Gazette, 23 January 2012

- **Industrial development zone –** a purpose-built industrial estate linked to an airport or sea port that leverages domestic and foreign ·fixed direct investments in value-added and export-oriented manufacturing industries and services.

Based on the rationale for the Atlantis SEZ discussed in section 3, the proposed ASEZ may be conceptualised as an enterprise zone, specialised zone or sector development zone or perhaps hybrid these forms.

The general trend in SEZ policy is for the traditional EPZ to be augmented and more flexible formats introduced. There is also a trend to integrate zones into their domestic economies rather than treat them as isolated ring-fenced enclaves. Another important trend has been to encourage balanced economic development rather than promote reliance on one industry like apparel or electronics. There are successful examples of SEZs in many types and forms ranging from traditional EPZs to Freeports.

4.1.1. Common obstacles to the SEZ success and risks for Atlantis

In a comprehensive report that distils lesson learnt from three decades of SEZ experience, FIAS (2008) identified the most common obstacles to SEZ success. In the table below we have listed the obstacles and commented on the extent to which they could be risks in the case of the proposed ASEZ.

Table 7: Common obstacles to the SEZ success and risks for Atlantis

Common obstacle	Risk	Comments and Observations
Poor site location entailing heavy capital expenditure	Medium	Atlantis has some locational disadvantages as a site in that it remains geographically dislocated from Cape Town. It is however, on the identified future urban growth corridor between Blaauwberg and Atlantis and over the next 30 years will become increasingly integrated with the growing urban area. While it currently competes with more centrally positioned industrial nodes like Montague Gardens, Investec Commercial property noted that in the context of shortage of industrial facilities in the Western Cape means that Atlantis is becoming a more attractive as a location.[31] The recent extension of the MyCiti Bus Rapid Transit (BRT) routes to Atlantis will assist in lowering commuter costs. There are also a number of actions that can be taken to mitigate this risk – if well designed to make use of ample existing industrial property and infrastructure, the proposed SEZ will not require much capital expenditure and as such the risk of heavy capital expenditure is low.
Uncompetitive policies (labour and other) and over-reliance on tax holidays, rigid performance requirements	Medium	Atlantis like much of the rest of South Africa has failed to attract sufficient labour-intensive activity to absorb a large pool of unemployed, unskilled and semi-skilled labour. The SEZ framework and incentives however cannot be viewed as the panacea to these complex social challenges but can play a part as a testing ground for policy interventions and reform.
Poor zone development practices – like over-designed facilities, inadequate maintenance and promotion practices	Low	The risk of poor development practices can be effectively mitigated by carefully considered design and planning. Development and expansion of the zone should be incremental so as to avoid over-designed facilities. Operations and maintenance can be subcontracted to private sector with appropriately defined service-level agreements in place.
Subsidised rent and other services	Medium	While the initial value proposition to investors for the greentech hub was partly based on low rentals and slightly subsidised electricity tariffs, there is no indication that heavily subsidised rentals would be required to attract tenants. Rentals on industrial property in Atlantis are already in general much lower than elsewhere in the City of Cape Town.

[31] Based on Interview with Investec Commercial property, 4 July 2014.

Common obstacle	Risk	Comments and Observations
Cumbersome controls and procedures	Low	Every effort has been made by the CoCT to ensure that the initial concept has been free of cumbersome controls and procedures.
Inadequate administrative structures or too complex	Low	Will likely be avoided.
Poor coordination between private developers and government in infrastructure provision	Low	Assessed as a low risk - can be avoided through clear delineation of responsibilities in infrastructure provision

Source: Deloitte analysis

4.1.2. South Africa's experience with the IDZ programme and lessons learnt

South Africa's IDZ policy launched in 2000, while achieving some modest success did not meet the expectations of stakeholders with respect to its contribution to economic growth, enterprise development or employment creation. South Africa's IDZs are defined as 'purpose-built industrial estates, linked to an international port or airport, specifically designated for new investment in export-oriented industries and related services'. The zones designated and licensed prior to 2013 were Coega, East London, Richards Bay, and OR Tambo International Airport. OR Tambo is the only inland IDZ and is not yet operational.

From 2002 to 2010, a total of 40 investors were attracted into the three coastal IDZs and 33 000 jobs were created. This however was below expectations given that the investment by government in the IDZs was over R7bn and the majority of total jobs created were in the construction phase. Of the three IDZ's the ELIDZ was arguably the most successful – its achievements include 23 on-site investors with investments estimated at R1.5 billion and an estimated total of 5 524 direct jobs (including construction jobs) created.

In a report by the Centre for Development and Enterprise (CDE), 2012[32], the poor performance of the IDZ programme in South Africa was attributed to the following factors:

- **Lack of fiscal incentives** - unlike many SEZs around the world, investors in South Africa's IDZs received no special incentives. It was initially envisaged that businesses in the zones would be treated expeditiously in the management of VAT and tax obligations relating to imports and exports but in practice it was business as usual.
- **Little relaxation of restrictive labour or other regulations** - Regulations in the zones also do not deviate from the social, labour and environmental rules in force elsewhere.
- **Lack of a comprehensive policy framework -** weaknesses in governance, planning, implementation, management and operations
- **Lack of political commitment at highest-levels and intergovernmental coordination**- Political commitment at the highest level is required to facilitate coordination between levels of government and different departments. In adequate coordination between different national government departments and agencies resulted in a failure to provide effective tax and fiscal incentives as originally envisaged.

[32] CDE Roundable (2012) Special Economic Zones – International Experience and Lessons Learnt for South Africa.

- **Government ownership**- all SA IDZs were exclusively government-owned, promoted and financed. The management and delivery of services to firms is the responsibility of a zone operator, all of which are owned by provincial and local governments. The lack of private sector involvement in zone operation and management and the associated private-sector know-how and efficiencies was identified as one of the reasons for underperformance..

It was also generally noted by various authors in the CDE report that IDZs had relied too heavily on public sector investment and had tended to attract capital-intensive rather than labour-intensive firms. The recommendation was that SEZs in a bid to meaningfully contribute to lower unemployment and to unlocking economic growth should deliberately seek to attract labour-intensive activities in addition to the capital-intensive firms they tend to attract. They should also seek to attract a higher proportion of private investment relative to public investment[33].

Inadequate planning, governance and coordination were also identified as weaknesses in the IDZ programme by the DTI in its policy on the development of Special Economic Zones in South Africa, 2012. Some additional observations from the DTI include[34]:

- **Design** - the programme focused exclusively on one type of SEZ (the IDZ) to the exclusion of other types.
- **Nature of support** - support provided by government was too narrowly focused on on-site infrastructure and did not include a comprehensive package of business development support (e.g. skills, technology, R&D)
- **Financing arrangements** – all IDZs were fully reliant on the state for both operational and capital expenditure but the provision of funding was ad-hoc and tended to be short-term and did not provide a role for Development Finance Institutions (DFIs).

Lessons learnt in the implementation of the IDZ programme as represented in the DTI's policy on the development of Special Economic Zones in South Africa, 2012, include[35]:

- SEZs are the key tools used in all of the fastest growing economies including China, India, Brazil, and others; to accelerate the development of targeted industries **and attract desired foreign and domestic direct investment.**
- **Leadership and effective implementation** may be more important than even a good policy or strategy.
- **Coordination across all tiers of government** and public entities is necessary to speed up implementation.
- A SEZ is a tool for economic development and not an end in itself. It is therefore important to **focus on the goal of economic or industrial development** rather than just the tool.
- The potential benefits of SEZs are not automatic but depend on whether the necessary conditions are created for their success. These conditions include strong political and technical leadership, commitment over the long-term, integrated development planning, sufficient resourcing, etc.
- SEZs tend to work where the strategic investment opportunities and desired industrial capabilities are clear.

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[33] CDE Roundable (2012) Special Economic Zones – International Experience and Lessons Learnt for South Africa.

[34] Policy on the Development of Special Economic Zones in South Africa, 2012, No.34968 Government Gazette, 23 January 2012

[35] Policy on the Development of Special Economic Zones in South Africa, 2012, No.34968 Government Gazette, 23 January 2012

- SEZs are **not necessarily permanent** but are used as a development tool until an area has achieved industrial sustainability.

4.1.3. Good Practice Guidelines

A study by the multi-donor investment climate advisory services of the World Bank Group (FIAS) suggests the failure or success of a zone depends on the choice of location, the policy and incentive framework provided and how the zone is developed and managed. FIAS (2008) notes that successful SEZs are typically designed around the following principles[36]:

- **Policy reform incubator** - National government does not view the SEZ as a substitute for broader policy, labour market and other reforms but rather treats them as a 'testing ground' and catalyst for proposed reforms – e.g. fewer restrictions on foreign ownership and investment etc. They can be used to test whether the country could attract more private investment if it was less constrained by red tape and restrictive regulations and had an improved investment climate.
- **Co-location** - Allow SEZ qualifying and non-qualifying enterprise to co-locate within the same area. The development of separately fenced-off areas for SEZ enterprises is less preferable.
- **Eligibility for benefits** - Do not narrowly stipulate which type of enterprise can qualify, rather promote a flexible regime which allows for a range of commercial and manufacturing activities. Allow for expansions of existing enterprises and both foreign-owned and local firms.
- **Private Sector Involvement** – develop models than include the private sector as a major partner in the development and operation of zones. The approach where zones are regulated, developed and operated exclusively by government is less successful based on international experience (with the exception of East Asian public zones that have been highly successful). There is evidence from the IDZ experience in both Egypt and South Africa that a public sector-dominated model does not produced the desired results. Zones of this nature tend to be supply rather than demand-driven and the infrastructure and services available to investors are often inadequate compared to private sector alternatives. In addition they are often associated with large and wasteful public-sector investments. In a typical partnership model the public sector finances all external infrastructure and provides land on a long-term lease basis and sometimes takes an equity stake in the industrial estate. The public sector also formulates and provides incentives and is the regulator. The private sector finances all internal infrastructure and manages the zones including master planning and drives investment promotion.
- **Strong institutional framework** - Develop an appropriate legal regulatory and institutional framework to ensure adequate facilitation and regulation.
- **Ownership** – no limitation on foreign vs local ownership and equal treatment
- **Labour** – have labour policies that are consistent with the ILO and specialised dispute resolution. Introduce and pilot labour market reforms that are likely to face resistance if introduced more broadly.

[36] Foreign Investment Advisory Service (2008) Special Economic Zones. Performance, Lessons Learned, and Implications for Zone Development.

Expanding on the need for a strong institutional framework, it has been argued that much of the success of a zone programme depends on the effectiveness and autonomy of the public sector body charged with regulating the zone operations. Good-practice guidelines for the development of an effective institutional framework include[37]:

- Autonomy of the zone authority, particularly over staffing, budgets, spending, and policy making
- Political commitment at the highest levels
- Adequate authority through a board comprised of private sector individuals and key government ministers who in turn report into government at the highest levels
- Private sector representation on the board or ideally even constitutinge the majority to ensure flexibility, results-orientation, and customer-focus
- A one-stop shop approach linking potential investors to all relevant government agencies
- Outsourcing of all non-core functions

Planning must be pervasive throughout the entire life-cycle of a SEZ as ongoing planning contributes significantly to successful execution. The SEZ strategy represents a key component of the SEZ planning process. Based on selected case study analysis it is clear that a good SEZ strategy should endeavour to[38]:

- Identify and exploit the local comparative advantage;
- Identify and adjust for endowment deficiencies (e.g. infrastructure, skills);
- Promote integration and coordination in all spheres of government;
- Dynamic and responsive in nature (i.e. regular monitoring and evaluation); and
- Provide more than just fiscal incentives[39].

In particular, the incentive scheme (including fiscal incentives and, more importantly, other business enabling incentives) should support the overall SEZ strategy and effectively seek to mitigate the impact of constraints which limit business growth in the rest of the economy.[40] The efficacy of an incentive scheme should therefore be assessed against its ability to support the overall SEZ strategy and applicability to the constraints to business at a given point in time.

Measuring the effectiveness of incentives requires constant monitoring and evaluation of strategic outcomes and where incentives are considered to be ineffective or not strategically aligned they should be modified. A dynamic policy environment with feedback loops between strategic objectives, policy tools and outcomes is recommended. The policy environment should be flexible enough to adjust to economic realities.[41]

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[37] "Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development", Foreign Investment Advisory Service, 2008.

[38] "Acquisition of Technology Capability Through Special Economic Zones (SEZs): The Case of Shenzhen SEZ", Xie Wei , 2000; "A Global Electric Valley for Sustainable Energy Production: A Litmus Test for the World's Commitment to Renewable Energy", WWF, 2008; "Special Economic Zones in Africa", World Bank 2011

[39] "Special Economic Zones in Africa", World Bank 2011; "Special Economic Zones: Performance, Lessons Learned, and Implications for Zone Development", Foreign Investment Advisory Service, 2008.

[40] "Special Economic Zones in Africa", World Bank 2011

[41] "Acquisition of Technology Capability Through Special Economic Zones (SEZs): The Case of Shenzhen SEZ", Xie Wei , 2000; "A Global Electric Valley for Sustainable Energy Production: A Litmus Test for the World's Commitment to Renewable Energy", WWF, 2008

4.2. Lessons from other greentech SEZs

4.2.1. Case Study: Baoding China

The Chinese city of Baoding was approved as a National Development Zone in 1992 as part of a development initiative by the Chinese government which included the creation of 53 other zones. Under this initiative by the early 2000s Baoding established itself as a major centre for automotive and textile manufacturing.[42] It shifted its industry focus in 2002 off the back of the closure of 400 polluting factories and a desire for sustainable development. [43] In 2003, the National Ministry of Science and Technology recognised Baoding as China's industrial base for its new energy sector.[44]

The move to renewable energy initially achieved moderate success (65 companies with $700m revenue), but only gained significant momentum in 2005 with legislative support from the national Renewable Energy Law.[45]

In 2006 it implemented a 5 to 10 year development plan with the renewables energy sector forming the foundation of local economic development,[46] which was integrated into the city's overall operating structure and aligned to an overarching green political agenda.[47] This plan included over 20 new manufacturers for wind and solar PV components with production value of approximately USD13bn per annum (Table 8).

Table 8: Baoding Municipal Development Plan Selected 2006 5-10 year targets

Sector	Component	No. of suppliers	Output capacity	Production Value
Wind	Turbines	3-5	1600MW	> RMB30b (+-USD4.8bn) per annum
	Blades	3-5	2400MW	
	Control systems	3	N/A	
	Other components and spare parts	10+	N/A	
Solar PV	PV cells	3+	800MW	> RMB50b (+-USD8bn) per annum
	New product lines including silicon-film battery	N/A	N/A	

Source: WWF, 2008

[42] "Shanghai Manual – A Guide for Sustainable Urban Development", UN, 2011

[43] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012. "China's 'Solar City,' Baoding, Rushes to Catch Clean Energy Boom", Huffington Post, 2011. "How Baoding, China Becomes World's First Carbon Positive City", The Christian Science Monitor, 2009.

[44] "A Global Electric Valley for Sustainable Energy Production: A Litmus Test for the World's Commitment to Renewable Energy", WWF, 2008

[45] "Baoding: Carbon Positive in the Green Electric Valley", WWF, 2012. "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.

[46] "A Global Electric Valley for Sustainable Energy Production: A Litmus Test for the World's Commitment to Renewable Energy", WWF, 2008

[47] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.

To support the development plan the incentive package included: [48] [49]

- Free or below-market priced land and office space;
- Access to low-cost financing;
- Financial assistance for research and development;
- Relocation assistance for employees and their families; and
- Business incubation services.

The net effect of this overarching green strategy was a rise in renewable energy manufacturing companies in Baoding from 65 in 2005 to 200 in 2008 with revenue more than quadrupling from $700 million to $3.5 billion over the same period.[50] This is well beyond the targets set out in the development plan (Table 8). As of 2010 these companies generated USD7b in revenue and are expected to grow at 30% per year till 2016, demonstrating the sustainable success of the SEZ.[51] [52]

This success was not only seen in Boading, but for the green sector in China as a whole. In 2010 China was the world's largest exporter of solar PV panels, had 4 of the world's top 10 wind turbine companies and was the world leader in manufacturing of solar water heaters with more than 5 000 firms. In addition to exports and manufacturing, China concurrently had the largest installed renewable energy capacity in the world.[53] However, it is relevant to note that these successes were facilitated through R&D and innovation in Boading. Boading has built five national and nine provincial R&D institutions[54] and is in the process of establishing the first national renewable energy college.[55]

The low-carbon "demonstration effect"

In 2007 local authorities invested USD7.6m so that Boading could become a "city of solar energy".[56] This entailed promoting the use of photovoltaic lighting equipment in public buildings, on major roads, and in selected communities. The government also invested in converting billboards, road signs, traffic lights, and other public infrastructure to solar energy in a bid to reduce pollution in a still heavily polluted city.[57]

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[48] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.
[49] "Shanghai Manual – A Guide for Sustainable Urban Development", UN, 2011.
[50] "Baoding: Carbon Positive in the Green Electric Valley", WWF, 2012
[51] "China's 'Solar City,' Baoding, Rushes to Catch Clean Energy Boom", Huffington Post, 2011
[52] "China Green Development Index",J. Zhang et al, 2011
[53] "Baoding: Carbon Positive in the Green Electric Valley", WWF, 2012
[54] "Chinese Web Library", http://en.0430.com/cn/web20888/, Accessed 25/03/2014
[55] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.
[56] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.
[57] "The Emergence of "Low-Carbon Cities" in Post-Industrial Urban China", Institution for Building Efficiency, 2012

In 2010 the National Development and Reform Commission (NDRC), the agency under the Chinese State Council that guides economic system and industrial restructuring, announced that eight cities including Baoding and five provinces[58] were to become 'low carbon economy pilots'.[59] The idea was that the city of Boading would target urban growth with reduced reliance on electricity generated from coal-fired plants through the development of large-scale energy efficiency and renewable energy installations, and would employ green technologies to reduce pollution and the city's carbon footprint by using green technologies in everything from building-integrated solar to streetlights. Funding for these initiatives was provided through government support.

In 2014 efforts by the city to reduce pollution through its low-carbon economy pilot projects were criticised because by 2013, Baoding was still the third most polluted city in China. Failure to significantly reduce pollution has ironically been attributed to its growing industrial base, including renewable component manufacturing and growing urban population. While the city is the centre of a successful renewable energy manufacturing industry it is also still home to a number of very dirty manufacturing industries such as steel and cement production, and is not expected to see noticeable improvement in pollution levels for at least five years.[60]

From the above it is clear that the Boading success story as a renewable energy component manufacturing hub can be attributed to three critical factors, namely, the ability to evolve from an existing strong manufacturing base, the holistic integration with a national and local development plan and innovation promoting uptake of green technology. While the notion that green technology manufacturing hubs should provide "demonstration effects' and also serve as examples of low-carbon manufacturing and living is laudable, it should also be noted that Boading received a lot of criticism for failing to reduce overall pollution levels and for the fact that it remains one of the most heavily polluted cities in China.[61]

4.2.2. Case Study: Masdar City, Abu Dhabi, UAE

Masdar City, A wholly-owned subsidiary of the Abu Dhabi Government-owned Mubadala Development Company is part of the government's vision to diversify the economy away from crude oil towards clean energy and other 'knowledge economy' services. It is envisaged that the modern Arabian city will provide an example of sustainable living and is designed to use low carbon technologies to achieve a car-free, zero waste, and carbon neutral community.[62] When completed in 2025 is expected to house 40000 people with an additional 50000 commuting every day to work and study. The city provides all the benefits typically associated with a special economic zone with a focus on attracting clean technology and renewable energy industry and services.[63]

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[58] "Baoding: Carbon Positive in the Green Electric Valley", WWF, 2012

[59] "China Clean Revolution Report III:Low Carbon Development in Cities", the international climate group, December 2010.

[60] "Pollution plagues China's Baoding despite bid to clean up act", Reuters, 14 May 2014.

[61] "Role of Local Governments in Promoting Renewable Energy Businesses", ICLEI, 2012.

[62] Project Case Study Masdar City, WSP

[63] http://masdarcity.ae/en/38/special-economic-zone/

With a demarcated area of 6 million square metres, Masdar city The SEZ is being developed in seven phases with a projected cost of completion of approximately USD18.7-19.8b.[64] Major incentives include:

- 100% tax exemption on companies and individuals;
- No restrictions on capital movements, profits or quotas;
- No foreign exchange controls;
- A one-stop shop for registration, government relations and fast-track visa processing; and
- No import tariffs.

Much of the city is still a work in progress with the Masdar Institute of Science and Technology being the only completed building on site. The original timeframe for completion has been adjusted from 2015 to 2025 due to the impact of the financial crisis and to ensure alignment with market demand.[65]

Despite the fact that the first office buildings in Masdar city are still under development, more than 70 firms have committed to transacting in Masdar city and have been put up in temporary office space in Abu Dhabi.[66]

Therefore, while Masdar City is an interesting example of a greentech SEZ, it is difficult to take away any lessons that would apply to the Atlantis SEZ. Predominantly this is due to the amount of funding available and the significant incentives provided (especially 100% tax exemption on companies and individuals).

4.3. Key learnings for Atlantis from international and local experience

Based on the rationale for the Atlantis SEZ discussed in section 3, the proposed Atlantis SEZ could be classified as an enterprise zone, specialised zone, a sector development zone or hybrid of these forms.

The proposed ASEZ is intended to revitalise Atlantis, an area characterised by severe socio-economic distress. As such it is perhaps best classified as an enterprise zone. It could also however be classified as a specialised zone or a sector development zone because it is envisaged that it would seek to promote the 'greentech' and related industries specifically.

In the review of local experience with IDZs and international good practice and greentech case studies we identified the following as the key areas of relevance for Atlantis:

1. Governments play a critical role in supporting demand for greentech
2. Greentech SEZs should aim to attract low-skill labour-intensive activities
3. Attempts to attract investors to remote areas often leads to costly over-investments
4. SEZs should consider models that include the private sector as a major partner
5. Greentech SEZs often adopt low-carbon practices as a "demonstration effect"

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[64] www.2daydubai.com, Masdar City: Abu Dhabi Green Clean Tech Project

[65] www.utilities-me.com, Masdar city testing times

[66] www.masdarcity.ae, registered entities

In each of these areas we have noted the particular lessons learnt. These are summarised in the figures that follow:

Figure 11 Governments plays a critical role in supporting the demand for greentech

1 Governments play a critical role in supporting demand for green technology	Lessons learnt
• While market forces such as the rising cost of energy and falling cost of renewable technologies do play an important part in driving uptake of green technology, large-scale uptake is typically supported by government regulation, policy and law • This is because the decision to invest in green technology seldom makes pure financial sense as the business case often rests on the inclusion of non-financial benefits including environmental and social benefits • Baoding, China's green technology manufacturing SEZ achieved only moderate success until the government passed the National Renewable Energy Law and implemented local and national green strategies. These combined drove a significant increase in demand for renewable energy manufacturing and energy efficiency equipment	• Strong co-ordination between different levels and spheres of government required to support green technology investment Intervention by government is needed to address market failures and unlock the potential in the local green technology industry. There must be strong coordination between different levels and spheres of government to provide required support in terms of regulation, legislation and policy interventions • Actively seek alternative funding and delivery models for programmes that are being discontinued • Where government funding has been put on hold or discontinued, the SEZ licencing company and its board will need to proactively lobby for alternative funding or delivery models

Figure 12 Attract low-skill labour intensive activities

2 Attract low-skill labour-intensive activities	Lessons learnt
• It was noted that by some SEZ policy specialists that the South African IDZ programme had tended to attract mainly capital-intensive firms. • In the context of high local and national unemployment rates and the availability of a large pool of unemployed semi and un-skilled labour the ability of the SEZ policy to attract low-skill labour intensive activities is important.	• Understand the needs of relatively labour intensive activities and actively seek to attract and grow these industries through appropriate incentives and support. This is not to say that capital intensive activities should be discouraged but special focus and consideration should be given to labour absorbing activities

Figure 13 Attempts to attract investors to remote areas often leads to costly over-investments

3 Attempts to attract investors to remote areas with generous incentives often leads to costly over-investments	Lessons learnt
• Revitalization of economically distressed urban and rural areas is the key rationale for many enterprise style SEZ programmes in the UK, France and US. • Local and international experience however suggests that good site location is an important determine of SEZ success. While SEZs in the past were often used to stimulate investment in remote areas or 'growth poles', the approach has become less popular due to the failure of many government-run zones in these areas. • According to FIAS (2008), "One of the major changes in thinking has been to permit zone development countrywide, rather than to restrict zones to remote areas. This change was in response to the failure of many government-run zones and the growing interest of private property groups in zone development. • Attempts to attract investors to a relatively poorly located areas through the use of generous fiscal incentives and infrastructure provision also often leads to costly over-investments. • Since the proposed ASEZ seeks to revitalise the currently underutilised industrial node in Atlantis, this was one of the risks identified.	• **Re-use existing infrastructure to limit the extent of public sector investment required** Poland successfully used SEZs as a tool to promote regional development partly by re-using existing infrastructure. In the case of the Pomeranian SEZ, established in 2001, the government developed the grounds of a discontinued nuclear power station project in Zarnowiec. The SEZ was able to attract 60 enterprises employing 13 866 people at the cost of $870 million • **Eligibility for SEZ benefits should be flexible and broad** international good practice guidelines suggest that SEZs should avoid too narrowly stipulating which type of enterprise can qualify for incentives. Rather authorities should promote a flexible regime which allows for a range activities to qualify. A demand-driven SEZ is more likely to attract enterprises that can adapt to apparent locational disadvantages. • **Boundary extensions to include other land parcels that may be non-contiguous** The SEZ authorities should continuously assess the need for boundary extensions based on potential opportunities and investor needs. Consider extension of the boundaries to non-contiguous land parcels that may unlock specific opportunities or be better suited to investor needs. E.g. Landfill sites south of Atlantis for waste-related activities

Figure 14 Consider models that include the private sector as a major partner

4 Consider models that include the private sector as a major partner	Lessons learnt
• The failure of many government-run zones and the growing interest of private property groups in zone development has led increasing participation by the private sector in zone operation and development. FIAS (2008:2) suggest that "perhaps the most notable trend [in SEZ development]over the past 15 years has been the growing number of privately owned, developed, and operated zones worldwide…62 percent of …zones in developing and transition countries are private sector developed and operated." • Evidence from the IDZ experience in Egypt and South Africa also suggest that the public sector-dominated model does not produced the desired results • While South Africa's SEZ Act (2014)does not provide for zones that are exclusively private sector developed and operated it does provide various options for private sector participation • While there are also examples of successful government run zones (especially in East Asia) on the whole experience suggests that private sector operated zones, usually run on a cost-recovery basis, tend to offer better facilities and amenities, command higher prices from tenants. They are generally more responsive to tenant needs, can exploit networks and experience and therefore provide a wider range of property management services and amenities.	• Within the remit of the PPP guidelines provided by the DTI, investigate models in which private sector could take a role. • International literature suggests there are a variety of models for private sector participation not of all which entail a formal PPP. In a typical PPP model the public sector finances all external infrastructure and provides land on a long-term lease basis. The public sector also formulates and provides incentives and is the regulator. The private sector finances all internal infrastructure and manages the zones including master planning and drives investment promotion

Figure 15 Greentech SEZs often adopt low-carbon practices as a "demonstration effect"

5 Greentech SEZs often adopt low-carbon practices as a "demonstration effect"	Lessons learnt
• Green technology SEZs focused on the manufacturing of renewable energy plant components or clean technologies often also aim to serve as examples of low-carbon living and industrial production. • The 'demonstration effects' typically include clearly visible examples such as the use of renewable technologies in public infrastructure such as street lighting and billboards. Government support and grant funding are often provided. • Larger city-wide SEZs like Boading have also promoted the widespread adoption of energy-efficient technologies in residential homes and the development of renewable energy plants to reduce heavy reliance on electricity from coal. • In 2012 the Institute for Sustainable Communities (ISC) released the 'Guide for Low Carbon Industrial Development Zones' in China. The guide provides a set of practical quantitative assessment procedures and technical instructions to establish and evaluate low carbon IDZs. These IDZs are not focused on the manufacture of clean or green technologies but rather focus on low-carbon sources and processes in general manufacturing.	• Green technology SEZs in additional to providing components and services to the green technology and renewable energy industries can also be used to provide a practical example of the benefits of using the technologies they produce. • In some cases this is simply a 'demonstration effect' where public infrastructure such as street lighting and transport make visible use of renewable energy technologies. • There is however also a strong drive for industrial development zones in general to meaningfully reduce their carbon footprints through use of utility-scale renewable energy, waste reduction and management processes and greener transport among other levers and ISC provides guidelines on how this can be achieved and assessed. • Typically these initiatives are support through government grants, incentives and other sources of funding.

5. Current state analysis of Atlantis

5.1. Introduction

Three decades of special economic zone development experience suggest the failure or success of a special economic zone is linked to its policy and incentive framework, where it is located and how it is developed and managed. It has also been shown that attempts to use generous incentive packages to offset other disadvantages such as poor location or inadequate facilities are seldom successful.[67]

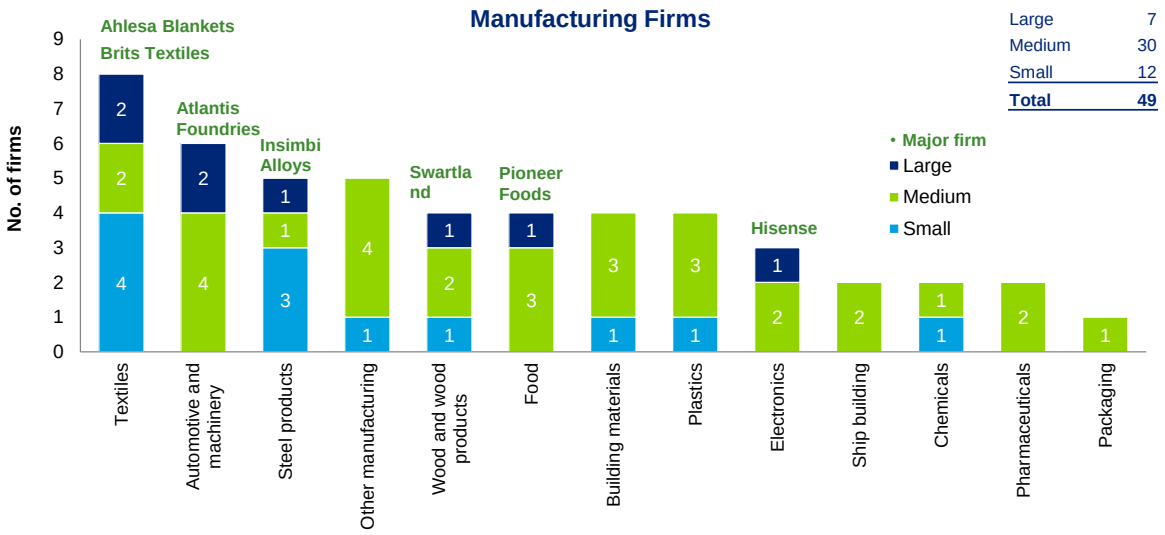
A fundamental aspect of the feasibility study therefore is to assess the inherent advantages of Atlantis as a site for greentech activities in terms of its location, socio-economic and business environment and the quality of its infrastructure.

In this section we make an assessment of the attributes of Atlantis from its socioeconomic profile, natural endowments (such as its geographic location and environmental qualities), to the quality of existing and planned infrastructure and its current economic profile. These are all factors that are relevant to potential investors in the green SEZ and the analysis also informs further investment that would be required to address any challenges and support the proposed SEZ.

5.2. Local economy – existing firms and industry clusters

There are no official statistics on the composition of the Atlantis local economy as the area is a suburb of the City of Cape Town and Statistics South Africa only report GDP at provincial level. Third party data provider's estimates are derived and often inaccurate at sub-metropolitan level.

Figure 16: Summary existing manufacturing clusters in Atlantis, 2014



Source: Various including CIPC, GreenCape, mbendi, google maps and primary research

[67] FIAS (2008) Special Economic Zones – Performance, Lessons Learned and Implications for Zone Development

Through desktop research and interviews, we have compiled a list of firms that are active in Atlantis in 2014 and their type of business activities.[68] We also tried to gauge their relative size in terms of operations and employee numbers although no formal census of firms was conducted so our summary is indicative rather than precise. We based our classification on the size of firm on the basis that large firms employ more than 200 people, medium firms to employ between 20 and 200 and small less than 20. Where possible, information on revenue and plant size was also taken into account. A summary of the manufacturing cluster is provided in Figure 16.

On the basis of these sources, we identified 81 firms of which 49 are manufacturing firms. A survey conducted on business retention and expansion in Atlantis in 2012[69] interviewed 91 firms in the area of which 41 were manufacturing. This this would appear to be roughly the number of firms in Atlantis Industria. According to the Companies and Intellectual Property Commission database there are 477 active business enterprises registered in Atlantis more generally – this list includes small and micro enterprises such as bed and breakfasts.[70] It appears that manufacturing is still the basis of the local economy - manufacturing firms outnumbering those in retail and other services and they are also larger on average. All of the major firms we identified in Atlantis Industria including Atlantis Foundries, Hisense, Pioneer Foods, Insimbi Alloys, Ahlesa blankets and Brits textiles are manufacturers.

Atlantis Foundries, which was established by the Industrial Development Corporation in 1978 as Atlantis Diesel Engines, remains the 'anchor tenant' in the area and has been recognised as one of the country's top-performing manufacturing plants. Acquired by the Daimler Chrysler group in 1999, it now produces automotive castings and machines cylinder blocks and crankshafts, predominantly for the export market.

Aside from Atlantis foundries we identified five other firms in the automotive industry. Other large firms in the area include Insimbi Alloys (steel products), Hisense (consumer electronics), Ahlesa Blankets and Brits Textiles (textiles), Swartland (wood products), Pioneer food weetbix (food). These firms are the anchors for a few small industry clusters of between 3 to 6 firms:

- Automotive
- Steel products
- Consumer electronics
- Textiles
- Wood and wood products
- Food processing
- Building materials
- Plastics

In addition to manufacturing activities there are a number of small retail and services firms that predominantly serve the local community of Atlantis (Figure 17). The one mining firm is Atlantis Sands, involved in the mining of gravel and sands.

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[68] Sources included GreenCape, Google Maps, Mbendi as well as individual firm websites.

[69] Atlantis Business Retention & Expansion, Final Report, NB Ideas, 2012

[70] Based on extract obtained from CIPC database for postal area codes 4349 and 4350

Figure 17: Summary of other existing firms (non-manufacturing) in Atlantis, 2014

Source: Various including GreenCape, mBendi, google maps and primary research

5.2.1. Existing greentech firms in Atlantis

There are several firms already operating in Atlantis that produce some greentech products and services in terms of the definition provided in section 2.3. A summary of the general activities of these firms and specific greentech products and services is provided in Table 9.

Table 9 Firms currently providing greentech products and services in Atlantis

Company Name	Description	Category	Greentech product or services
CAE r/a Cape Advanced Engineering	CAE provides research, design, development, prototyping and testing services to the Automotive Industry. Capabilities include the development and evaluation of petrol and diesel engines, development and evaluation of fuel and lubricant products and the development and manufacture of specialised test equipment for the automotive industry.	Manufacturing and Services	The manufacture of products and provision of project management services for Biogas and Biomass electricity generation.
C A Components	The C A Component product list includes complete diesel engines, natural gas engines, long blocks, short blocks, cylinder heads, with and without EVB, specialized cylinder heads for natural gas engines, manifolds, crank shafts, connecting rods, camshafts, valves, valve seats, sumps and oil pans.	Manufacturing	The manufacture of natural gas and biogas engines
Isofoam	IsoBoard Thermal Insulation	Manufacturing	The manufacture of energy efficient building insulation some of which is made from recyclable and reusable materials.
Jocastro	manufacturer of Medium Voltage Transformers, Switchgear, Miniature Substations, Metering Units and LV Distribution Panels	Manufacturing	The manufacture of specialised electronic equipment which can be utilised in the production of renewable energy or energy efficient products
Hisense	Manufacturer of consumer electronics and home appliances including televisions and refrigerators	Manufacturing	Have an eco-friendly and energy saving product range
Cape Town Recycling & Manufacturing	Waste Disposal & Recycling	Manufacturing	Recycling
SA Tyre Recyclers	tyre recycling	Services	Recycling

Swartland	Manufacturers of wooden windows, doors and timber products. All products are carbon conscious, fire resistant, class E certified.	Manufacturing	Sustainably harvested timber. All products are carbon-conscious. Manufacture some particularly green products including energy-efficient windows (and frames) and eco-friendly sealants.
Wade Refuse	Waste Disposal & Recycling	Services	Waste Management

Source: Deloitte analysis

The largest facility in the area however, just north of Atlantis Industria is Eskom's Ankerlig power plant, an open cycle gas turbine. The first phase of the R3 billion project was completed in 2007 and the second phase in 2009. The plant produces electricity for the national grid and currently has few direct linkages with the rest of Atlantis Industria. A project currently underway to convert the feedstock for this plant from diesel to natural gas, may however have some positive spin-offs for Atlantis Industria, this is explored further in Section 9.1.4.

Our assessment of the economic clusters in Atlantis suggests that manufacturing-related activity still dominates the local economy. There are a number of small industry clusters in Atlantis including steel products, textiles, automotive and machinery, wood and wood products, food and consumer electronics. In addition at least 9 of the 81 manufacturing and services firms identified offer some greentech products and services.

5.3. Socio-economic profile and ease of doing business

Atlantis was established during the 1970's by the Apartheid government as an industrial centre and a community for the Cape Town coloured population and 'flourished' in the mid –to-late 1980s under a programme of significant and deliberately targeted government support. Manufacturers in South Africa at the time were also heavily shielded from global competition, through a combination of protectionist measures and economic sanctions. After the withdrawal of incentives in the mid-1980s economic activity in the area has been on a trend decline albeit with cyclical highs and lows.

In 2011 the population of the suburb of Atlantis was 67 491 and the number of households was 15 564.[71] Atlantis accounts for 2% of the total population of the City of Cape Town Metropolitan Area of 3 740 025. The average household size in Atlantis is 4.34 compared to 3.5 in Cape Town in general. The population of Atlantis is predominantly coloured (85%) and almost 40% of the population is under the age of 18 years.[72] The predominance of Coloured residents is the legacy of the 1970s apartheid government settlement plan for the area under the Group Areas Act.

5.3.1. Labour – skills availability and employment levels

Business in Atlantis employed approximately 5 500 people in 2012 and the vast majority of these employees (80%) were semiskilled or unskilled.[73] The majority of these workers come from Atlantis, but there are also employees from surrounding areas and suburbs of Cape Town.[74]

[71] South African National Population Census, Statistics South Africa, 2011.

[72] F. Abrahams: The key requirements for the establishment of a successful renewable energy Manufacturing hub in Atlantis 2012

[73] Atlantis BR&E Survey Report, March 2012

[74] Atlantis BR&E Survey Report, March 2012

Average levels of educational attainment are poor - 29% of the population have achieved a matric, whilst only 3% of the population have completed education at a tertiary level.[75] Firms in Atlantis have varied views on the quality of staff in Atlantis. Some indicated their employees displayed a great attitude and commitment, while others mentioned poor quality and work and attitudes.[76]

In Table 10 we have compared the key socio-demographic information for Atlantis and the Cape Town as a whole.

Table 10 Comparison of key socio-demographic information for Atlantis and Cape Town

Aspect	Atlantis	Cape Town
Population make-up	85% Coloured	Predominantly Coloured (42%) and Black African (39%)
% of those aged 20 years and older who have completed Grade 12 or higher	32	46
% of the labour force (aged 15 to 64) is employed	73	76
% of households have a monthly income of R3 200 or less	50	47
% of households live in formal dwellings	85	78
% of households have access to piped water in their dwelling or inside their yard	88	87
% of households have access to a flush toilet connected to the public sewer system	82	88
% of households have their refuse removed at least once a week	96	94
% of households use electricity for lighting in their dwelling	85	94

Source: CoCT/ Census 2011

Atlantis has been described by the CoCT as an area in severe socio-economic distress, but while employment rates are indeed very low and by implication unemployment is high (only 73% of the total working age population is employed) this is not too dissimilar from the employment profile of Cape Town as a whole (76%).

The number of households who earn less than R3 200 per month at 50% is also slightly higher than Cape Town (47%) while household size, as noted above, is also slightly larger.

Recent research by the City of Cape Town, into the socio-economic conditions and social problems and needs within Protea Park community of Atlantis – in support of a new sports and recreation project – provides information on social problems Atlantis more generally.[77] Issues identified were:

- The prevalence of drugs and drug abuse
- Widespread poverty and unemployment
- A lack of employment opportunities for the youth after they have left school
- A lack of development of sport for the youth within Atlantis
- The predominance of gangsters in Atlantis
- A lack of role models for the youth in the community

[75] Atlantis Suburb Profile, 2011 Census

[76] Atlantis BR&E Survey Report, March 2012

[77] " Atlantis: Building Communities through Sport and Recreation", City of Cape Town, April 2011

The community emphasised the following needs during a number of workshops related to the Atlantis Sports and Recreation study:

- Economic development and employment creation
- A higher education facility for the youth in Atlantis to further their education
- Improvements to currently poor or non-existing sports infrastructure
- Increased priority in the allocation of budgets for the development of sport in school
- Training education for sports trainers
- The upgrading of hospitals
- A greater number of activities for children

Employment opportunity remains the community's key concern. More than three-quarters of the baseline household survey respondents felt that the introduction of a new sports and recreation initiative should assist in creating jobs for the community. In other words, while the sports and recreation project was welcomed, there was widespread feeling that the initiative should contribute towards job creation and skills development.

Community views on the social issues prevalent in Atlantis were corroborated by firms operating in the area. A large firm in the area noted that it has had to pursue disciplinary processes against employees abusing drugs on site while another mentioned drugs and drug-related crime as a concern. Issues around the quality of hospital care and insufficient housing were highlighted by another two firms.

Atlantis is however, not the only area in Cape Town characterised by entrenched, complex socio-economic challenges. In many respects, the socio-economic challenges of Atlantis mirror prevailing conditions in large parts of the city.

5.3.1.1. Assessment of workforce capabilities based on interviews

Of the interviewees that are currently operating in Atlantis, most noted that the majority of their labour force was from the Atlantis region. The adequacy of this labour often depended on the industry in which the interview operates. Hisense, for example, employs over 90% of its workforce from the Atlantis area and was able to hire people who already had gained significant relevant experience in the electronics industry when working at the Tedelex factory.[78] Tellumat has not experienced any problems with labour availability or with the skill-level of this labour.[79] Firms outside of the electronics sub-sector operating in Atlantis (e.g. Pioneer Foods, Promeal, Swartland and CA Components) noted that while the availability of semiskilled labour in Atlantis is adequate, semi-skilled and particularly skilled employees often commute from Cape Town.[80]

[78] Based on an Interview with Ebrahim Khan, Hisense, 11 June 2014

[79] Based on an Interview with Murison Kotze, Tellumat, 9 May 2014.

[80] Based on Interviews with Jan de Villiers, Pioneer Foods, 18 June 2014, Hempies Kriel, Promeal, 18 June 2014, James Hannekom, Swartland, 18 June 2014 and Tommy Lesner, CA Components, 12 May 2014.

The majority of firms in Atlantis prefer to provide training in-house and on-the-job.[81] In particular, Atlantis Foundries noted that significant on-the-job training was required for its semi-skilled labour, which accounts for approximately 70% of its labour force.[82] DCD, who chose Coega over Atlantis as the site for its wind tower factory, noted that the lack of semiskilled and skilled labour was a concern in Atlantis. This however was not a deciding factor in their decision since Coega does not necessarily have better skills availability and DCD send their employees for training in Vereeniging. This decision was predominantly based on Coega's proximity to an uncongested and underutilised port, good access roads to and from the site for abnormal loads and proximity to wind projects in the Eastern Cape, which is currently where most of the wind power installation is taking place.[83]

Skilled labour often resides in Cape Town and commutes and, for these employees, the distance from Cape Town and lack of appealing residential suburbs in Atlantis was raised as a disadvantage although the commute from outlying suburbs of Cape Town appears to be manageable and the MyCiti rapid bus transit service recently opened a route to Atlantis.[84]

5.3.1.2. Assessment of wages based on interviews

With respect to wages, few firms could comment specifically on the relative price of labour in Atlantis. The Cape Clothing and Textiles Cluster (CCTC) noted that clothing manufacturers often decide to locate in rural areas rather than urban areas in order to take advantage of the lower minimum wage.[85] Atlantis although somewhat dislocated from the City of Cape Town is nonetheless part of the metropolitan area and as such is classified as an urban area. This means rural areas such as Caledon and Saldanha, are more desirable to very labour intensive manufacturers than Atlantis as they are very sensitive to the price of unskilled and semi-skilled labour.[86]

5.3.2. Education and Training Institutions serving the Region

West Coast College is the only institution for further education and training in Atlantis. The Atlantis campus of West Coast College offers electrical, automotive, welding, fabrication and fitting and turning courses.[87] While these courses appear to be in line with the requirements of firms already in the region and those that could locate in the Atlantis SEZ, these courses are often only provided up until NQF level 4, whereas firms often require NQF level 6 training.[88] Also, it was found that graduates are often not able to pass NQF level 2 company entrance exams which points to concerns about the quality of training provided.[89]

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[81] Atlantis BR&E Survey Report, March 2012

[82] Based on an Interview with Pieter du Plessis and Cordell Rautenback, Atlantis Foundries, 15 May 2014

[83] Based on Interview with Henk Schoeman, DCD, 5 May 2014.

[84] Based on an Interview with Ebrahim Khan, Hisense, 11 June 2014

[85] Based on Interview with Stephen Wright, CTCC, 11 June 2014.

[86] Nattrass, N. and Seekings, J. 2012. Differentiation within the South African Clothing Industry: Implications for Wage Setting and Employment. CSSR Working Paper No. 307.

[87] SBIDZ Feasibility Study, Revision 1.

[88] SBIDZ Feasibility Study, Revision 1.

[89] SBIDZ Feasibility Study, Revision 1.

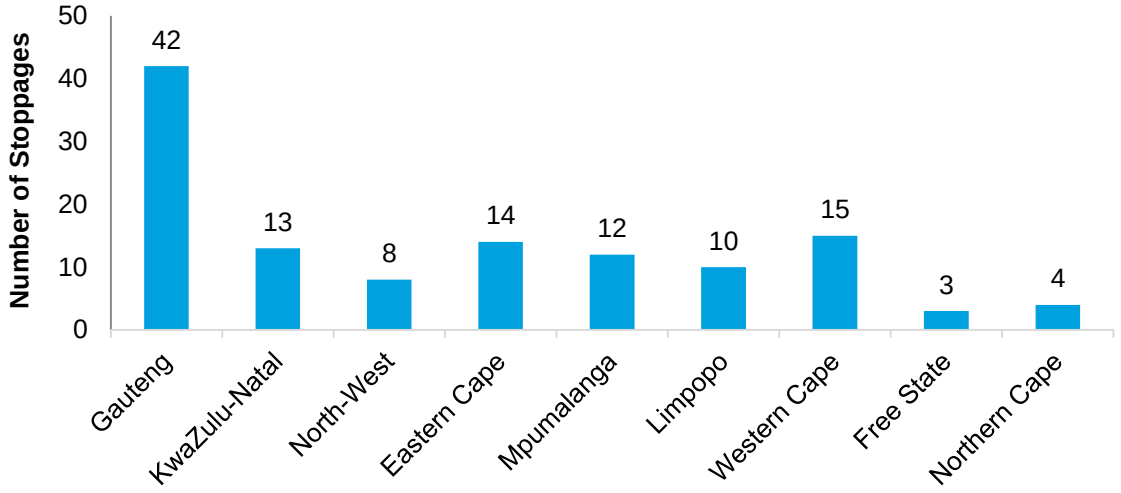
Several firms mentioned the inadequacy of West Coast College as one of the reasons for the reliance on in-house training. Atlantis Foundries and CA Components also noted that the skills acquired at this FET college are not relevant to their operations.[90] Some firms noted that they could hire artisans trained at the FET college and that they would be willing to work in partnership with the college to make sure the training meets their requirements. LM Wind noted that it prefers to provide in-house training and, would not rely on or support the local FET College directly.[91]

5.3.3. Labour disputes

Labour disputes are a significant factor affecting businesses in South Africa.[92] A comparison of the number of work stoppages across the provinces of South Africa in 2012 and wages lost during the stoppages is provided in Figure 18 and Figure 19.

While the larger provincial economies will tend to experience the highest number of stoppages the low relatively value of wages lost in the Western Cape suggests that labour disruptions are less severe than in the other large economies of KwaZulu-Natal and Gauteng.. While the Western Cape experienced the second largest number (15) work stoppages in 2012, they appear to have be resolved relatively quickly as the province lost R13milllion in wages compared to much larger losses experienced in other provinces (Gauteng R5bn and Kwazulu-Natal R500.

Figure 18: Number of work stoppages per province, 2012



Source: Industrial Action Report, Department of Labour, 2012

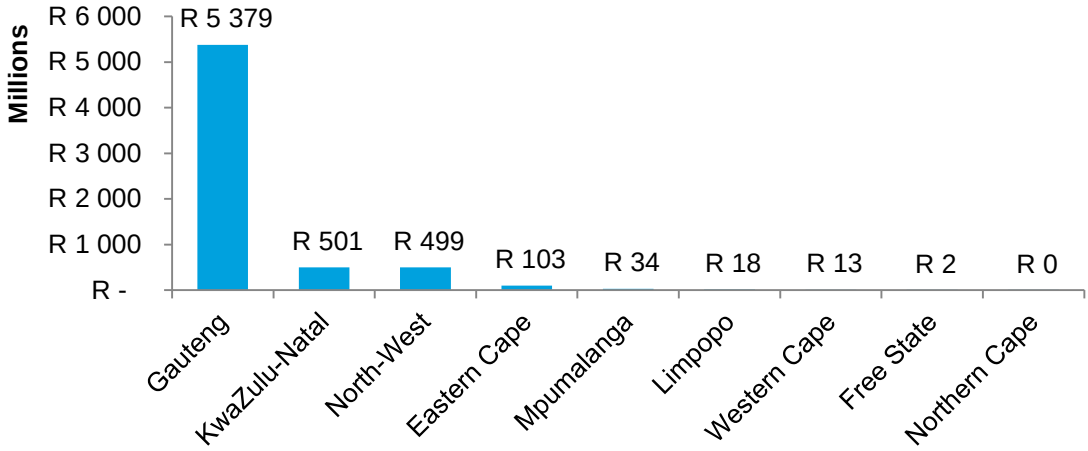
[90] Based on Interviews with Pieter du Plessis and Cordell Rautenbach, 15 May 2014, Atlantis Foundries and Tommy Tesner, CA Components. 12 May 2014. Based on Interview with Nirmal Gupta, LM Wind, 30 April 2014

[91] Based on Interview with Nirmal Gupta, LM Wind, 30 April 2014

[92] OECD (2013), OECD Economic Surveys: South Africa 2013, OECD Publishing.

Figure 19: Wages lost by province 2012

Source: Industrial Action Report, Department of Labour, 2012

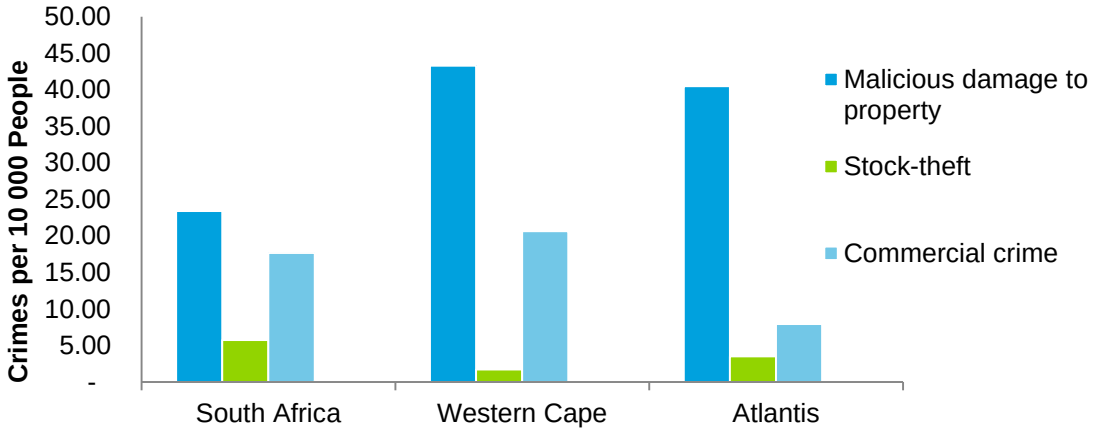


In addition of the firms interviewed in the City of Cape Town, only one noted that labour disputes were an issue citing a disagreement with a labour broker.[93] A potential investor in the green technology sector noted they were concerned about labour unrest in South Africa more generally.[94]

5.3.4. Crime

High levels of crime are often mentioned as a cost of doing business in South Africa.[95] The incidence of business-related crimes in Atlantis has been compared to the broader Western Cape and South Africa regions in Figure 20. Cases of malicious damage to property in Atlantis are high relative to the rest of the country, but Atlantis compares favourably with respect to other business-related crimes.

Figure 20: Incidence crimes affecting business in Atlantis, Western Cape and South Africa 2013



Source: South African Police Service

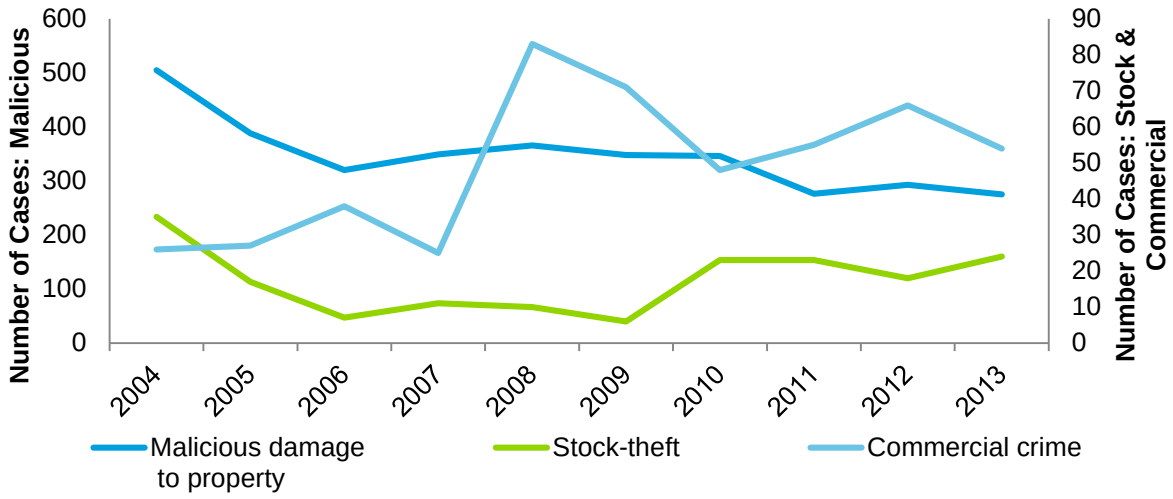
[93] Deloitte interviews

[94] Based on an nterview with Nirmal Gupta, LM Wind, 30 April 2014and Ryan Hammond, Solaire Direct, 15 May 2014.

[95] SBP (2008), The Impact of Crime on Small Businesses in South Africa, The South African Presidency

The incidence of most categories of crime in Atlantis has also remained relatively stable over time. Commercial crime (e.g. fraud) increased significantly in 2008, but has since stabilised, whereas malicious damage to property has steadily declined and stock theft has remained relatively stable. Business-related crime appears to be relatively stable and compares favourably to the rest of the country.

Figure 21: Incidence of crimes affecting business in Atlantis 2004-2013



Source: South African Police Service

Two of the existing firms in interviewed in Atlantis specifically mentioned business crime as a concern.[96]

5.3.5. Conclusions on Socio-economic profile

The key conclusions on the current socio-economic profile of Atlantis are as follows:

- There is an ample supply of unskilled and semi-skilled labour living in Atlantis. The residential area is in close proximity to the industrial area so many of the workers in fact walking distance from work which is particularly advantageous for shift work in manufacturing.
- There is access to an adequate supply of skilled labour within the broader Cape Town region, although skilled workers typically live close the urban centre of Cape Town as it provides better amenities and commute to Atlantis.
- There is a small local skills pool in electronics , steel work and other manufacturing because of the long legacy in the area
- There is no noticeable difference in wages in Atlantis as compared to the broader Cape Town region, but labour intensive manufacturers noted that they prefer to locate in areas where the rural minimum wage applies as Atlantis although somewhat dislocated from Cape Town's urban area is still classified as urban so the higher minimum wage applies.
- Average tertiary educational attainment in Atlantis is very low with only 3% of the population having obtained any form of tertiary education. The higher education facility in the area – West Coast College appears to provide some relevant training but complaints about both the extent and quality of training provided were registered by existing firms.

[96] Based on interviews with Tommy Lessner, CA Components, 12 May 2014 and Ebrahim Khan, Hisense, 11 June 2014.

- The low average level of educational attainment amongst the Atlantis community, high unemployment rates and low average household income are the context for a community that suffers from a number of social problems notably drug abuse. While the incidence of business related crime has remained relatively stable, crime and drug abuse were raised as issues faced by some firms operating in the area. These issues however are prevalent in many areas in the Cape and South Africa more broadly and are not specific to Atlantis.
- In terms of the need for social infrastructure, inadequate healthcare facilities were noted by both the community and one of the existing firms.

5.4. Land use, availability and spatial context

5.4.1. Spatial structure of Atlantis

In general terms, the spatial structure of Atlantis comprises a rectangular area, some 2.5km wide and 5-6km long stretching south-north some 10km from the coast and 40km north of Cape Town. The two halves of the rectangle are respectively reserved for residential areas in the north, and industrial use in the south (Figure 22). An undeveloped buffer zone divides the residential and industrial areas. A south-north route, Charel Uys Drive, connects the residential and industrial areas

Figure 22: The spatial structure of Atlantis

Source: AECOM analysis

The Atlantis CBD is located in the middle of the residential area, and is surrounded by “cellular”, internally focused communities with public facilities (e.g. schools, places of assembly) at the centre of these. In keeping with ‘modernist town planning’ practice, the neighbourhood/ local road network is curvilinear – with frequent cul-de-sacs – in an attempt to force most movement onto the main road network. Linear open space systems traverse the area, but remain largely undeveloped, “lost” (undeveloped) space. Most of the residential area is zoned for single dwelling use (albeit erf sizes are relatively small in line with the originally intended “worker” status of the community) with general residential use (intended for apartments) along busier routes or at major intersections. Parts of the residential area – specifically towards the north – remain undeveloped.

The industrial area to the south shows a gradation of erf sizes from the north to the south with larger erven to the south. Clearly the original intent of this layout was for larger industries – those with potentially the most adverse impact (e.g. in terms of industrial vehicular movement) – to locate in the south, furthest from residential areas. The northern part of the industrial area is most developed while large tracts of vacant land occur to the south. The inner industrial area is served by a continuous ring road – Neil Hare Road – which intersects with Charel Uys Drive. A major route, Dassenberg Road, serves the industrial area to the west. Dassenberg Road also intersects with Charel Uys Drive.

Figure 23: The structure of Atlantis Industria
Source: CoCT and AECOM

The overall “square” shape of the industrial area makes it clearly identifiable as a defined area of specific land use. Internally, the area provides a range of erf sizes, accommodating the needs of different manufacturing activities.

5.4.2. Land use and availability

Atlantis Industrial contains a very high extent of industrial floor space; some 4 074 461m² of "bulk" is provided for in the zoning scheme of which 632 195m² (16%) – on 137 land parcels – is developed. In terms of land, some 39.5% of available industrial land is developed with 1 567 175m² remaining vacant. The area accommodates almost 18 000 industrial work places. Gestamp will add an estimated 200 additional work spaces.

Almost 80% of the developed floor space consists of conventional industrial space with the remainder comprising predominantly warehousing and some light industrial and workshops. The average size of improved industrial property is large, more than 17 500m² in extent.

5.4.3. Industrial Property Market

The demand for industrial property in Atlantis is lower than demand for property in Cape Town's more central industrial nodes which include Airport Industria, Epping, Montague and Killarney Gardens, Paarden Eiland and South Bellville among others. This is evident in the significantly lower rental rates and land value.

Atlantis currently offers the lowest rental rates on industrial property and the some of the least expensive industrial land (vacant and developed) on the Cape Peninsula. Vacancy rates in Atlantis for developed property currently stand at about 5% which is somewhat higher than the Western Cape average of 1.5%[97] (Table 11). Rental rates for existing industrial floor space currently range between R15m^2 and R19m^2 as compared to the Western Cape average of R31.50 m^2 and up to 50m^2 in premier industrial parks such as Montague Gardens.

Rental rate growth over the past decade has been fairly muted. According to Atlantis Realtors, average rentals on developed industrial property were R10m^2 in 2005 and have since increased to between R15m^2 and R20m^2. Assuming current rental of R20m^2, average rental inflation over the period would have been 7.2% which is roughly in line with CPI inflation which average 6.3%. As such, in real terms, rentals on industrial land in Atlantis have not increased since 2005.

As mentioned above, a total of 632 195m² of industrial floor space is currently available in Atlantis which is high compared to other industrial nodes. Rates of new development in the area over the past decade have been low to average, from 2005 to 2013 16 373m² of new industrial space was developed in Atlantis. Gestamp's new wind turbine tower manufacturing facility which will be built in 2014, will add an additional 23 000 m² of industrial floor space.

In terms of land value, the cost of vacant undeveloped industrial land at R160m^2 on average is regarded as very cheap compared to the city average[98]. Between 2005 and 2013, 33 vacant industrial land parcels were sold for an overall value of more than R77 million. As noted above over 1.5 million m^2 of vacant land zoned for industrial use is still available.

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[97] SAPOA, Industrial Property Report, October 2013

[98] CoCT's Economic Areas Management Programme diagnostic tool, accessed in May 2014

According to Atlantis Realtors, the average purchase price for existing developed industrial property in Atlantis is in the region of R900m^2 for floor space in neglected factories and R1800m^2 to R2000m^2 for floor space in properties in good condition. The average purchase price per square meter of developed industrial property based on erf size rather than floor space is estimated to be in the region of R400m^2. While detailed information on comparable land values in competing industrial nodes in the CoCT and other metropolitan areas was not readily available. Floor space in prime industrial property for sale in Montague gardens is currently advertised at R5500m^2 suggesting developed land in Atlantis at less than half this price is inexpensive.

Table 11 Comparison of rental and vacancy rates on developed industrial property

	Vacancy Rate (%)	Monthly Rental R/m^2
Gauteng	3.3	R 32.20
Western Cape	1.5	R 31.50
KwaZulu-Natal	2.2	R 30.80
Atlantis*	5	R15 to R20

Source: SAPOA industrial property report Oct 2013, Atlantis estimates based on information from Atlantis Realtors.

5.4.4. Attributes of the sites currently earmarked for the greentech industrial park

In section 2.4.1 we discussed the sites already earmarked by CoCT and the GreenCape initiatives for the development of greentech industrial park. In Table 12 we describe and assess the implications for potential users of basic site attributes.

Table 12: Attributes of the two sites identified for the development of a greentech hub

ATTRIBUTE	DESCRIPTION	IMPLICATIONS
Size	Both sites are large, respectively measuring ±29.99 hectares and ±38.65 hectares in extent.	The large extent of both sites would enable a range of users with different and perhaps unique space requirements.
Shape/ configuration	Both sites have a relatively simple shape/ configuration (square or rectangular).	The simple shape/ configuration of sites would enable easy "parcelling" of land to accommodate different users and a very large range of building configurations.
Slope	Both sites are flat.	The flat nature of both sites would readily accommodate manufacturing space (requiring large flat surfaces).
Ownership	Both sites are owned by the City of Cape Town.	Single ownership facilitates easier configuration of land parcels to meet the specific and different needs of users.
Current use	Both sites are vacant.	Given that the sites are vacant, there are no previous structures to be removed or contaminants related to earlier activities requiring remedial removal/ clean-up. As both sites are vacant, users will be able to configure buildings and service requirements to meet their specific needs. Because the sites are currently undeveloped they are the sites are suited to large-scale manufacturers with very specific requirements or industrial property developers
Location within Atlantis	Both sites are part of an industrial area.	There are no non-industrial activities that would be negatively impacted upon by the proposed uses. Although removed from residential areas within Atlantis, both sites are readily accessible to labour settlement areas.
Location within industrial area	Both sites are located in the western and southern part of the industrial area which is less developed and comprise of larger erven.	The less developed nature and larger erven of the western and southern part of Atlantis enables more flexibility – if needed – in the configuration/ re-alignment of infrastructure and land units to accommodate the specific and different needs of users.

Source: AECOM analysis

5.4.5. Land use provisions on the sites currently earmarked for development of greentech park

Table 13 summarises the key land use provisions applicable to the sites already identified by CoCT for the development of a greentech park at Atlantis

Table 13: Land use provisions on sites currently earmarked for greentech park

GENERAL INDUSTRY SUBZONE GI 1		
Purpose	The GI zone accommodates all forms of industry, except noxious trade and risk activity, in order to promote the manufacturing sector of the economy. Some allowance is made for non-industrial activities, but these should not compromise the general use of the area zoned for industry. It is accepted that the intensive nature of the industrial activity or the scale of the operation could generate some negative impact on adjacent properties.	
Primary uses	Industry, restaurant, service station, motor repair garage, funeral parlour, scrap yard, authority use, utility service, crematorium, rooftop base telecommunication station, freestanding base telecommunication station, transport use, multiple parking garage, agricultural industry, private road, open space.	
Additional use rights		Specific conditions applicable to additional use rights
	Factory shop	The occupant of an industry may operate a factory shop provided that: The total floor space devoted to the sale of goods shall not exceed 10% of the total floor space of all the buildings on the land unit. Any goods that are offered for sale but have not been manufactured on the property must be directly connected with the goods that are manufactured on the property.
	Adult shop	An adult shop shall not be located within 100 m of an existing adult shop, adult entertainment or adult services premises. The street front and entrance shall be discreet and unobtrusive, and no pornographic, sexually explicit or erotic material shall be visible from outside the premises. Outdoor signage must comply with Council's Outdoor Advertising and Signage by-law. No form of public address or sound amplification shall be audible from outside the premises.
Consent use	Abattoir, place of worship, institution, clinic, place of assembly, adult entertainment business, adult services, aqua-culture, informal trading, shop, office, sale of alcoholic beverages, place of entertainment, helicopter landing pad, wind turbine infrastructure and container site.	
Floor factor	1.5	
Coverage	75%	
Height	18m measured from base level to the top of the roof	
Street building lines	5m	
Common boundary building lines	3m	
Parking	Subject to the activity and designation of Public Transport Areas but for "standard" Industry: 2 bays per 100m² GLA	

Source: AECOM analysis

In making the land available specifically for the SEZ, CoCT limited use rights on the land in that only applicants who comply in terms of one or more of the following categories will qualify for evaluation:

- Companies awarded power purchase agreements.
- Supplying components to utility-scale renewable energy installations.
- Manufacturing/supplying energy efficient equipment.
- Manufacturing/supplying greentech.
- Specialising in the construction and/or management and/or maintenance of renewable energy installations.
- Manufacturing and/or repair components for primarily green manufacturing industries.
- Companies involved in research and experiments in respect of renewable energy.

It is acknowledged that a specific 'greentech' activity may require further deviation from the applicable zoning regulations, for example in relation to building height, setbacks, floor area, or coverage. In these cases, departures from the provisions of the zoning scheme could be applied for. Given the City's specific support for the Atlantis SEZ, such applications would in all likelihood be supported.

In terms of the zoning scheme the Council can declare "overlay zones" for different purposes, promoting Council's planning principles, strategies and development goals, including heritage protection, environmental management, directing development, or promoting specific density targets for development.

The Incentive Overlay Zone (IOZ) specifically provides a mechanism for designating "development incentive measures" to land so as to promote development priorities and strategies identified in the IDP or approved spatial plans. Development incentive measures may include, but are not limited to, incentives or concessions relating to parking, building height, floor space, coverage and density. Such incentives could involve an increase in the floor space or density otherwise permitted in terms of this zoning scheme.

In addition to the development rules that apply to the base zone, the provisions of the relevant Incentive Overlay Zone, as adopted and recorded in terms of the zoning scheme, shall apply. Any development rules in terms of an approved IOZ that exceed or are more restrictive than the limitations of a base zone shall be deemed to be approved departures from the provisions of the base zone.

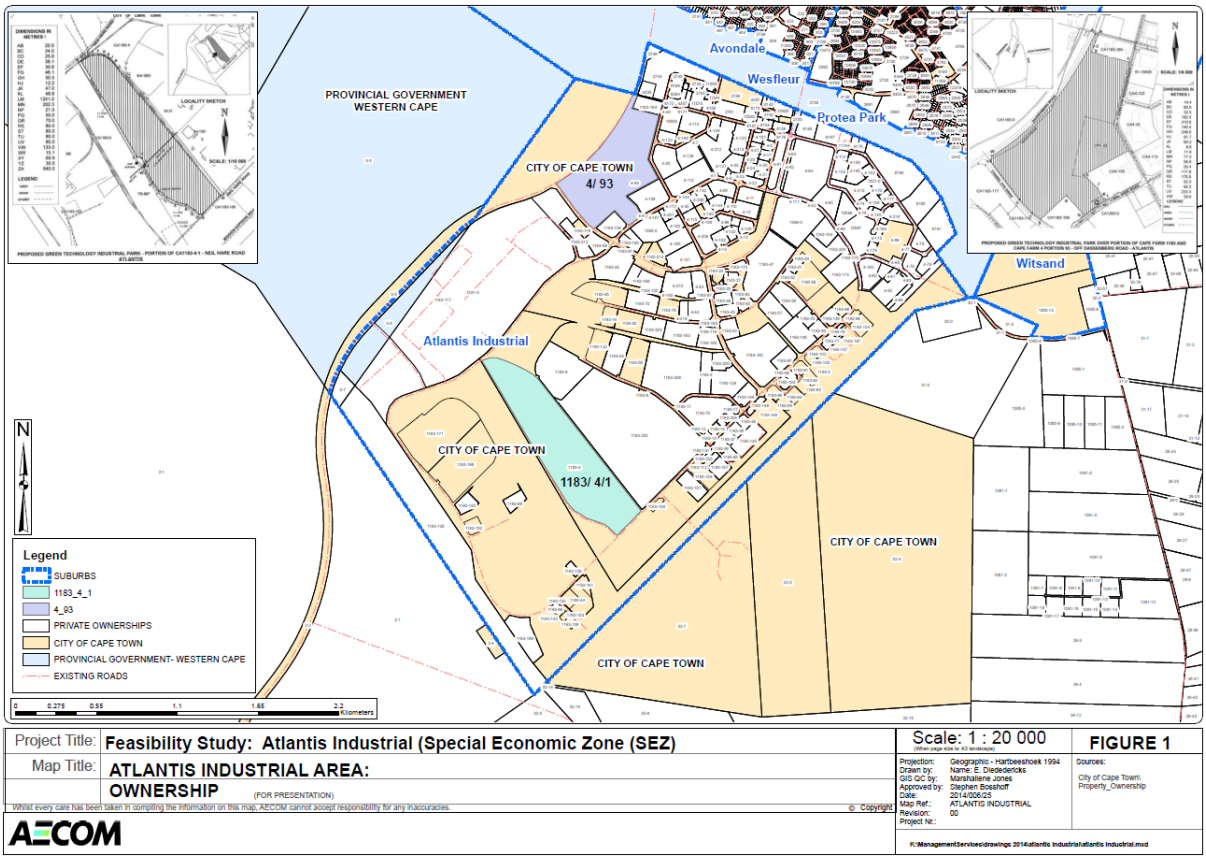
5.4.6. Broader land and property ownership in Atlantis

Although the CoCT has made two sites available to green manufacturing enterprises, and it is anticipated that the two sites are sufficient in size to accommodate demand from qualifying enterprises, the CoCT owns more vacant land in Atlantis Industrial (Figure 24). The CoCT also owns smaller land parcels in the central and northern parts of the industrial area, some of which appear to be developed properties.

This is significant in that there will be ample CoCT owned land available for growth in the SEZ should growth of the SEZ exceed currently anticipated demand. Alternatively, it could prove strategic to "reserve" of the two large sites identified now for a very large future land user as opposed to developing and subdividing it for users requiring smaller brownfield industrial park space.

Some of the CoCT's developed properties may also be suitable for refurbishment or upgrading as industrial park-type space, although further work is required to understand the exact nature and current use of these properties.

Figure 24: City owned land in Atlantis Industrial



Source: AECOM analysis

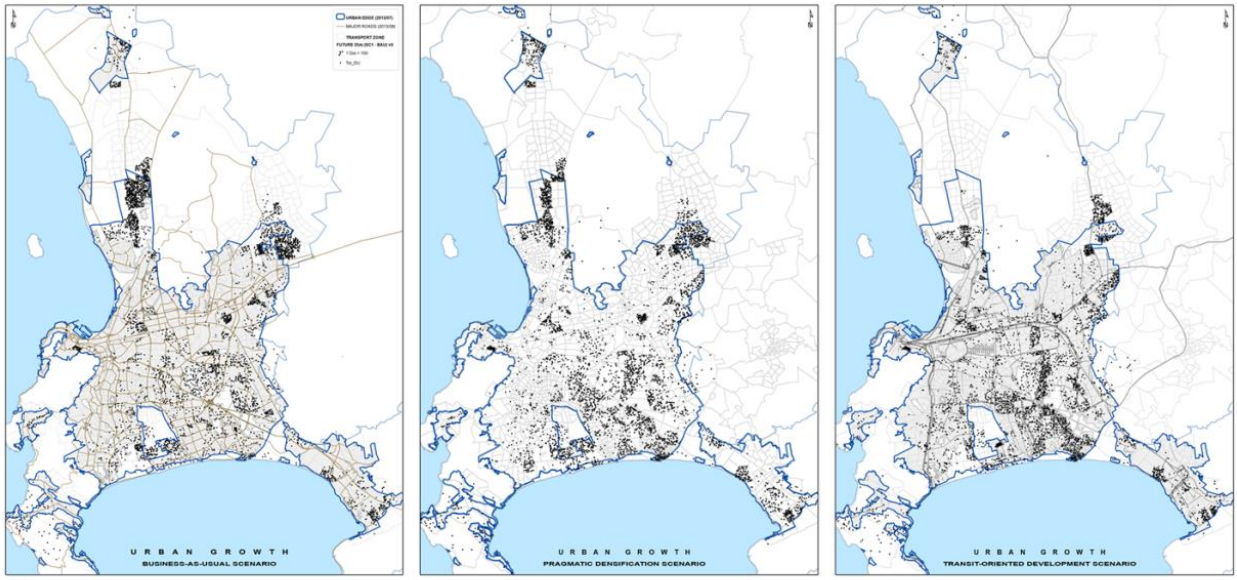
5.4.7. Atlantis and future city growth

The City has undertaken considerable work to model and plan accommodating expected future population growth spatially in a manner which best serve overarching objectives of spatial transformation, increased city efficiency, and resource sustainability.

The City's land use model allocates land demand to land supply (based on extensive local professional knowledge related to the suitability of different uses and the provisions of Council adopted District Spatial Plans) in terms of three scenarios:

- A business-as-usual scenario, where green field development outweigh infill.
- A pragmatic densification scenario, with less emphasis on green field development.
- A transit-oriented scenario with little green field development and most development allocated to transit corridors.

Figure 25: The three development scenarios for Atlantis



Business-as-usual Pragmatic densification Transit oriented

Source: CoCT

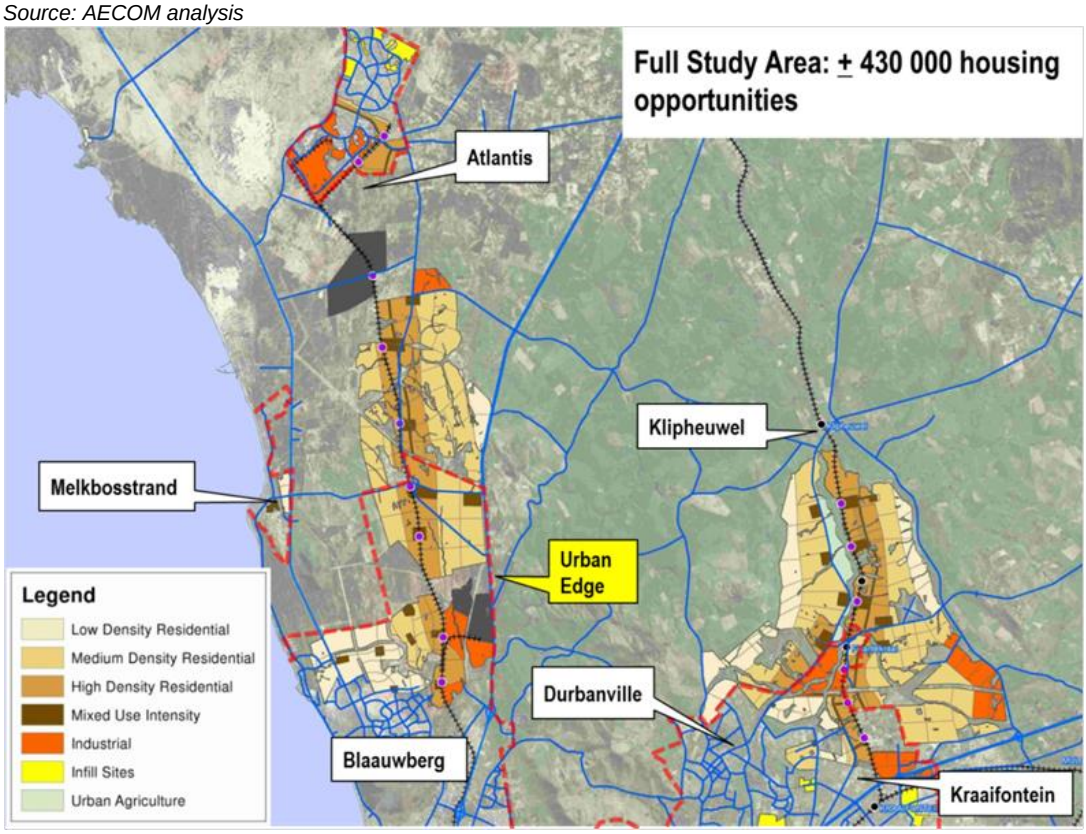
All three scenarios assume a significant proportion of future housing need being accommodated through private rental. The pragmatic densification scenario supports the current broad spatial focus of human settlement programmes, specifically:

- A current focus on infill and renewal development in the Philippi Central, Khayelitsha, Delft, DuNoon/Table View, and Helderberg areas.
- The call that the City should as a matter of priority acquire and land bank substantial tracks of privately owned land in the north-western, north-eastern and Helderberg growth corridors and areas of housing shortage.
- The call for detailed planning to commence on a number of major projects focused on the north-western, north-eastern and Helderberg growth corridors and possibly the Strandfontein/Vanguard Drive area.

An inter-disciplinary team has undertaken a detailed exploration of growth options (and the potential yield of opportunities) for the north-western and north-eastern development corridors, including in-depth understanding of “infrastructure triggers” enabling/ inhibiting human settlement. Together, these two corridors could accommodate some 430 000 housing opportunities (more than half the anticipated 30-year future need).

Figure 26: The north-western and north-eastern growth corridors

Source: AECOM analysis



Although currently dislocated from the rest of Cape Town, it is clear that Atlantis in future will increasingly be integrated with the rest of the city as new growth is accommodated on the growth corridor between Blaauwberg and Atlantis.

5.4.7.1. Housing

The following housing projects for Atlantis are included in the City's Integrated Development Plan (2013/14 Review).

Table 14: Housing projects

Status	Location	Area/ number of opportunities
Pipeline projects	Atlantis South	**329ha**
	Protea Park Community Residential Units (rental)	**3.5ha**
Planned projects	Kanonkop (Ext 12)	**1 500**
Projects under construction	Witsand Phase 2	**1 835**
	Kanonkop (Ext 12)	**455**
	Atlantis South Incremental Development Area	**-**

Source: CoCT Integrated Development Plan

The Witsand housing development, of which 452 units have been completed (ultimately to comprise some 2 400 opportunities), is designed to maximise the use of solar energy and natural ventilation. The development adheres to the City's Green Building and Smart Living guidelines and units are fitted with solar geysers, photovoltaic modules for lighting and cell phone charging, and roof-water and stormwater recovery systems. Additional funding has been provided for green spaces throughout the development and in partnership with an NGO (Green Communities), the City provided each household with a choice of indigenous trees, bushes, flowers, herbs and vegetables for their own gardens.

Students from the Raymond Ackerman Graduate School of Business also assisted to plant hundreds of trees and install three hydroponic vegetable tunnels in Phase 1 of the development. The tunnels will be managed as a commercial enterprise to raise funds for further greening initiatives.

5.4.8. Conclusions

From a spatial perspective, Atlantis has the following advantages over similar industrial nodes in the region and country more generally:

- **It is removed from city traffic and congestion** - Although traditionally dislocated from the rest of the city, Atlantis Industrial has locational advantages for manufacturing activities sensitive to "urban" transport movements (e.g. large vehicles not readily mixed with city traffic).
- **Atlantis contains large industrial erven and spaces** - For users requiring very large land or floor space, Atlantis has clear advantages compared to industrial areas within the city characterised by more completion for land, smaller spaces, and higher land prices.
- **There is ample existing industrial floor space** - Atlantis Industrial contains a very high extent of industrial floor space; some 4 074 461m² of "bulk" is provided for in the zoning scheme of which 632 195m² (16%) – on 137 land parcels – is developed
- **Undeveloped industrial land is plentiful and inexpensive**, In terms of land, some 39.5% of available industrial land is developed with 1 567 175m² remaining vacant. There is sufficient undeveloped land and vacant industrial space for considerable further growth of the SEZ and associated enterprises. In addition a substantial portion of this available vacant land is owned by the CoCT. The average purchase price for vacant land is low (R160m^2) and the CoCT owns vacant land in addition to the land already identified and made available for the green manufacturing sector.
- **Average industrial property rentals and values are the most affordable in the Cape Town metropolitan area.** Demand for property in Atlantis remains relatively low compared to other industrial nodes in greater Cape Town. This is evident in relatively low rentals and cheap land. Rentals over the past decade have remained unchanged in real terms (inflation adjusted). That said, the reasonably low vacancy rates on developed property in Atlantis at 5% currently, according to Atlantis realtors suggest that low prices and rentals are attracting enough interest to keep property occupied if somewhat underutilised.

The key advantages and disadvantages of the two undeveloped sites earmarked for development of a greentech industrial park can be summarised as follows

Advantages:

- The large extent of both sites identified, would enable a range of users with different and perhaps unique space requirements.
- The simple shape/ configuration of sites would enable easy "parcelling" of land to accommodate different users and a very large range of building configurations.
- The flat nature of both sites would readily accommodate manufacturing space (requiring large flat operational surfaces).
- Given that the sites are vacant, there are no previous structures to be removed or contaminants related to earlier activities requiring remedial removal/ clean-up.
- There are no non-industrial activities in the vicinity of the sites that would be negatively impacted upon by the proposed uses.
- Although removed from residential areas within Atlantis, both sites are readily accessible to labour settlement areas.

- The less developed nature and larger erven characteristic of the western and southern parts of Atlantis Industria – where the sites are located – enables more flexibility in the configuration/ re-alignment of infrastructure and land units to accommodate the specific and different needs of users.

Disadvantages:

- The sites are undeveloped and as such are only really geared to large scale manufacturing with unique space requirements and the capital available to invest in the development of a greenfield site.
- The sites at Atlantis are relatively remote from the urban centre, suppliers and customers.

5.5. Environment

5.5.1. Environmental planning context and attributes

Atlantis forms part of the transition zone of the Cape West Coast Biosphere Reserve. The area has a Mediterranean climate, with warm summers and cool winters. Rain occurs mainly in winter. Wind direction in summer is predominantly south-westerly and south-easterly, and in winter north-westerly. Situated on a coastal plain, the area comprises mainly unconsolidated quartz sand sediments deposited to an average of 25m deep on shale bedrock of the Malmesbury Group. The area is gently sloping and largely lacking in rivers and streams but productive springs are located at Silwerstroom and Mamre.

As part of the Cape Floristic Region the area contains a high percentage of endemic and threatened plant species. Previous studies (Ankerlig Power Station Conversion and Transmission Integration Project, Western Cape, Final Scoping, March 2008), indicated that it is doubtful that any Red Data invertebrate taxa occur in the area. Out of 67 mammal species in the broader area, eight are endemic. Two hundred and one bird species occur in the area, 15 of which are red-listed and 44 regional endemic or near endemic.

The Atlantic coastline presents an area of natural amenity with unique views of Table Mountain. Portions of the coastline and inland areas are susceptible to the effects of sea level rise which may impact on coastal development and infrastructure. Vast areas of rural land are located in the broader area including extensive farms and smallholding areas. Whilst portions are actively farmed, a large proportion is the subject of private sector land banking and development speculation.

The Blaauwberg District – with Atlantis at its north – is viewed as a major growth axis of the City. However, given its environmental value, it is imperative that high conservation worthy remnants is protected and that ecological corridors are provided to allow for the movement of fauna and flora. Atlantis itself has been identified as within the urban edge of the City of Cape Town – suitable for further urban development. The area as a whole is largely surrounded by designated core conservation and agriculturally significant land (Figure 27). The current urban edge of Cape Town "proper" is further to the south of Atlantis. However, over the long term it is expected that this edge will be adjusted to integrate Atlantis with development along the City's west coast (the proposed "Wescape" development is situated to the south of Atlantis).

Figure 27: Natural assets surrounding Atlantis

Source: CoCT

5.5.2. Details of the environmental authorisation obtained on two sites identified by CoCT for the greentech industrial park

The EIA process for the two sites identified for greentech manufacturers found that both erven contain natural vegetation in medium habitat condition. These erven do not, however, form part of the City of Cape Town's Biodiversity Network. The vegetation type is classified as Cape Flats Dune Strandveld (West Coast subtype) and is nationally endangered. It is also endemic to Cape Town and can only be conserved within the City's borders.

In order to mitigate the effect of the conservation requirements in respect of the endangered vegetation on the properties the City has recently resolved to acquire an alternative site, the Klein Dassenberg site, as an off-site biodiversity offset site which will enable the minimum conservation thresholds for the relevant vegetation types to be met and will compensate for the loss of endangered vegetation on the subject properties.

As a result the development of the subject properties will not be constrained by any requirements regarding conservation of any endangered vegetation and the vegetation may be removed

As mentioned in section 2.4.2.3 the two sites earmarked by CoCT for the development of a greentech industrial park have already received a favourable environmental authorisation. It is envisaged that these two sites would form or form part of the proposed greentech SEZ at Atlantis.

A favourable environmental authorisation was received from the Department of Environmental Affairs and Development Planning (DEA&DP) on 16 January 2013 by virtue of the powers conferred on it in terms of the National Environmental Act 1998 (Act No. 107 of 1998) and the Environmental Impact Assessment Amendment Regulations, 2010.

Annexure 1: contains the detailed findings of the desktop environmental review of the Environmental Authorisation (dated January 2013; EIA Reference Number: 16/3/1/1/A1/2/3037/12 for site 1 and 16/3/1/1/A1/2/3036/12 for site 2), Basic Assessment Report (dated October 2012) and Environmental Management Programme (dated July 2012) applicable to the two sites earmarked for the proposed SEZ.

5.5.2.1. Additional actions and possible approvals

Some additional actions and possible approvals that may be required on designation of the SEZ include:

- The draft Environmental Management Programme (EMPr) needs to be amended to ensure compliance with the conditions contained within the environmental authorisation or further applications. During this process, the EMPr is to be reviewed and made site specific, ensuring compliance with the requirements of NEMA Section 24N.
- Chapter 4 of the National Water Act (NWA) refers to the use of water and eleven uses are described in Section 21 of the Act. Two of these “uses” clearly fall within the realm of artificial recharge, namely “storing water”, and “the intentional recharging of an aquifer with any waste or water containing waste”. Other uses such as “altering the bed, banks, course or characteristics of a watercourse”, could be applicable in the case of a bank filtration artificial recharge scheme. Based on the definitions as contained in the NWA, artificial recharge can therefore be considered a water use. Therefore waste water emanating from the bio retention facility may require a water use license. Furthermore, the basic assessment indicates that a (man-made) retention pond has been identified on site. Should this pond perform the functions of a wetland, it may be classified as such. The NWA does not differentiate between natural and man-made wetlands, and as such any activity occurring within 500m of a wetland may require a water use license.
- The removal of endangered plants prior to the commencement of construction related activities requires a permit from *inter alia* CapeNature. This is not a long lead item and will not significantly impact upon the development. The small population of the endangered *Ruschia indecora* should, where possible, remain undisturbed (*in situ*) and be incorporated in the landscaping, thereby receiving protection; alternatively, these must be used as part of the greater site landscaping.
- Section 38 of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) requires developers to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. A Notice of Intent to Develop has been submitted to Heritage Western Cape as part of the basic assessment. The environmental authorisation requires that a qualified archaeologist be appointed should heritage artefacts be discovered on site during earth works/development.

5.6. Infrastructure

5.6.1. Water supply and waste water treatment

5.6.1.1. Water sources

The CoCT is the Water Services Authority for Atlantis, distributing potable water to the end user. Bulk water sources for Atlantis include the:

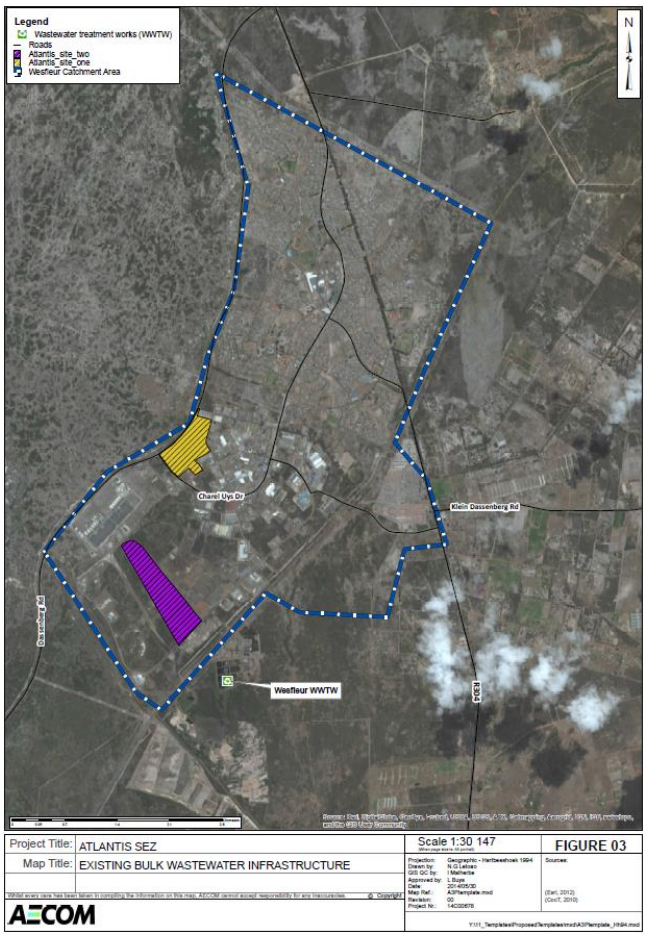
- Witzands well-field/ boreholes (potential capacity of15 Ml/d).
- Silwerstroom well-field/ boreholes (potential capacity of 6 Ml/d).
- CoCT Bulk supply system (potential capacity of 25 Ml/d).

The Average Annual Daily Demand (AADD) for Atlantis residential and industrial water use is respectively 4 168.1 Kl and 8 521.7 Kl. Thus, both the residential and industrial water needs of Atlantis could potentially be met through its groundwater supply, recharged through the Atlantis Water Resource Management Scheme (AWRMS) which replenishes 30% of groundwater through recycling stormwater and treated domestic effluent. During the recent rehabilitation programme of the well-fields, the whole of Atlantis's water needs was supplied through the CoCT bulk water supply system.

5.6.1.2. Existing bulk water infrastructure

Existing bulk water infrastructure serving Atlantis and Mamre are illustrated in Figure

Figure 28: Existing bulk water infrastructure



Source: AECOM analysis

This comprises:

- Two 20 Ml Melkbos reservoirs, supplied via the 700 mm diameter Melkbos supply pipeline, in turn supplied via its connection to the 1 500 mm diameter Voëlvlei pipeline.
- A 500 mm pipeline which supplies water from the Melkbos reservoirs to the Witzands well-field.
- A 400 mm and 450 mm diameter pipeline which supplies bulk water further northwards from the Witzands well-field.
- Two pumpstations located at the Witzands well-field (Witzands A and B pumpstations). Witzands A pumpstation pumps bulk water via a 400 mm diameter pipeline to the 10 Ml and 40 Ml Pella reservoirs, and Witzands B via a 450 mm diameter pipeline to the 10 Ml and 20 Ml Hospital reservoirs.
- Pumpstations pumping water from the Silwerstroom well-field to the 10 Ml and 40 Ml Pella reservoirs.

Aquifer extraction from the Witzands and Silverstroom well-fields is chlorinated prior to the point where it meets up with the bulk water supply.

For the purpose of developing the two sites identified for the greentech park and the proposed Atlantis SEZ, the overall bulk water availability should be adequate depending on the required water demand of the development that is currently unknown. Moreover, the capacity of the water reticulation network in the vicinity of the two sites has to be investigated further.

5.6.1.3. Existing bulk wastewater infrastructure

The Wesfleur Wastewater Treatment Works (WWTW), located south-east of Atlantis, serves waste water needs of Atlantis. All industrial wastewater is treated and employed with urban stormwater to recharge the groundwater supply. In Table 15 we present the existing residential and industrial return flow to the Wesfleur WWTW.

Table 15: Existing residential and industrial return flow to the Wesfleur WWTW

Description	Ml/day
Present residential Atlantis AADD (Kl/day)	4 .1
Return flow factor	0.7
Stormwater factor	1.2
Potential present residential return flow to Wesfleur WWTW (Kl/day)	3.5
Present industrial Atlantis AADD (Kl/day)	8.5
Return flow factor	0.7
Stormwater factor	1.2
Potential present industrial return flow (Kl/day)	7.2
Total existing return flow to Wesfleur WWTW (Kl/day)	10.7

Source: AECOM analysis

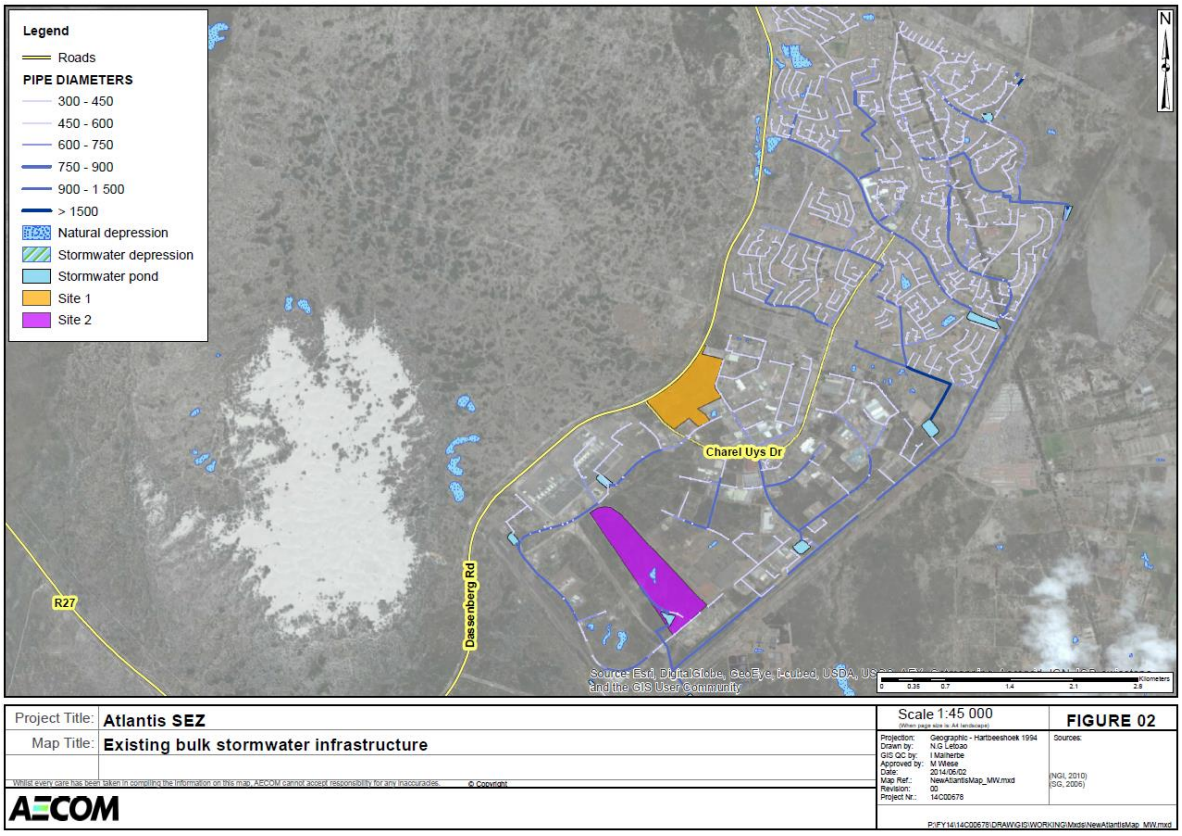
Wesfleur WWTW has a combined existing residential and industrial capacity of 14 Ml/d. As indicated in Table 15 the WWTW currently receives an inflow of approximately 10 Ml/d, and therefore has 4 Ml/d spare capacity. The Wesfleur WWTW can potentially be extended to have a combined treatment capacity of 25 Ml/d.

For the purpose of developing the two sites identified for the Atlantis SEZ, the Wesfleur WWTW currently has spare capacity. This, however, depends on the required return flow generated by the development that is currently unknown. Moreover, the capacity of the wastewater reticulation network in the vicinity of the two sites has to be investigated further.

5.6.1.4. Stormwater drainage

The existing bulk stormwater system of Atlantis consists of a comprehensive network of pipes, canals and stormwater detention ponds, which collect and convey stormwater runoff in a south-westerly direction (Figure 3). Stormwater is discharged towards natural low lying areas where it infiltrates the sandy soils. In this way, the bulk stormwater system can be considered as independent from the stormwater infrastructure of the greater city area.

Figure 29: Existing bulk stormwater infrastructure
Source: AECOM analysis



Atlantis Industrial is drained by two bulk stormwater systems located along the northern and southern edges of the area. The catchment for the northern stormwater system extends to the north eastern edge of the industrial area, near the location of the first site proposed as part of the SEZ. Stormwater runoff collected in this system drains in a south-westerly direction towards a pond located along the western outskirts of Atlantis, from where the stormwater is discharged to a natural depression located west of the pond.

The catchment for the drainage system along the southern edge of Atlantis extends to the residential area located in the eastern parts of Atlantis and also includes the southern parts of the Atlantis industrial area. This system conveys stormwater in a south-westerly direction towards a natural depression approximately 2 km south-west of Atlantis.

The natural drainage direction of both sites proposed for the SEZ is in a general south-westerly direction. Site 1 drains to the corner of Charel Uys Drive and Neil Hares Road, the latter which is drained by a 450 mm diameter pipe which forms part of the stormwater system along the northern boundary of Atlantis. Site 2 drains towards an existing municipal stormwater detention pond located at the south-western corner of the site, which forms part of the stormwater system along the southern edge of Atlantis.

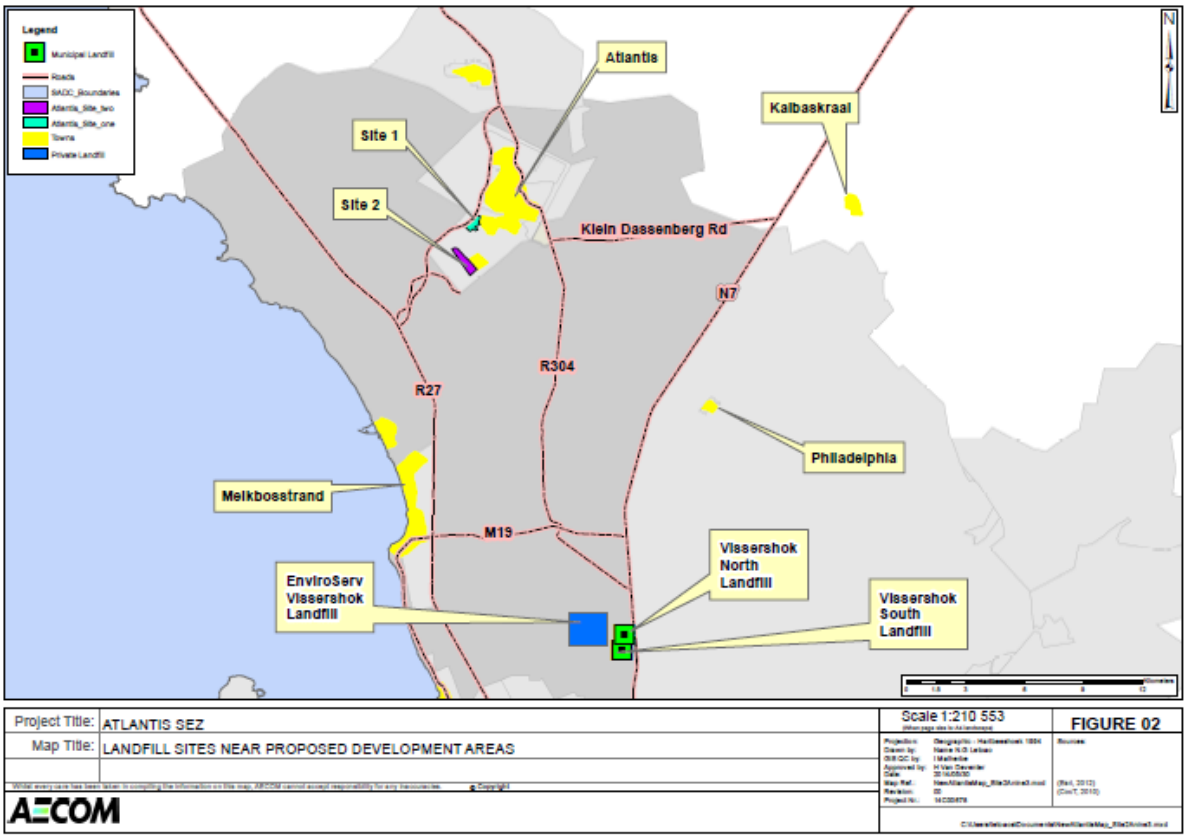
Even though the existing bulk stormwater infrastructure provides sufficient access to both of the sites, the available capacity of this stormwater system needs to be confirmed.

5.6.2. Solid waste management

5.6.2.1. Existing solid waste infrastructure

At present, if not reclaimed or recycled, all solid waste generated by Atlantis is either disposed of at the CoCT owned Vissershok South Landfill or the privately owned EnviroServ Vissershok Landfill. These are currently the only operational landfill sites within the vicinity of the proposed Atlantis SEZ development. In future, two new sites will be commissioned within close proximity to the proposed SEZ. The Vissershok North Landfill – an extension of Vissershok South – is scheduled to open in 2015. The exact location of the new Regional Landfill is still to be confirmed but is expected to be in the region of Kalbaskraal (some 15 km east of Atlantis) and be operational by 2018. The location of the different landfill facilities is illustrated in Figure 30:.

Figure 30: Location of different landfill facilities in relation to Atlantis



Source: AECOM analysis

The classification of the various landfill sites are as follows:

- The Visserhok South Landfill is licensed as a H:h site, a containment landfill which accepts hazardous waste with hazard ratings 3 and 4. The site had a life expectancy of three years left in 2013.
- The Vissershok North Landfill is licensed as a G:L:B$^+$ site, a general waste, large sized landfill with leachate generation. It is envisaged that the classification of this site be amended to H:h once the existing informal settlers on the site have been relocated. The site is expected to be commissioned in 2015 and have a service life of 10 years.
- The EnviroServ Vissershok Landfill is privately owned and licensed as a H:H site, a containment landfill which accepts all hazardous waste.
- The Regional Landfill is envisaged to be licensed as a Class A site in terms of the new National Environmental Management Waste Act, 2008 (Act No. 59 of 2008), a landfill which accepts Types 1,2,3 and 4 Waste.

Refuse Transfer Stations do not accept any industrial waste and drop-off sites are strictly for residential use.

5.6.2.2. Waste Service Delivery

The CoCT does not provide a waste collection service to industries. Industrial and health care entities must have a contract with a legitimate private sector service provider that is able to provide a service according to the nature of the waste that must be collected, treated, recycled, and/or disposed. The minimum service level requirement for collection by external entities is once per week.

The CoCT provides – through internal and external service arrangements – a range of cleaning services to public spaces, including:

- Provision and servicing of street litter bins.
- Litter picking.
- Street sweeping.
- Street cleansing by means of water tankers.
- Clearing of illegal dumping.

The CoCT offers no waste minimisation services to industries. Although in general terms removal of recyclable waste by the City from the source is part of the municipal service, the waste enters the "waste beneficiation stream" once removed from the waste stream and from that point forms no longer part of the municipal service. The City has elected to control and regulate, rather than provide these services. For example, the City developed and maintains a recycler's database to facilitate market exposure of those involved in providing the public and/or businesses with recycling or waste minimisation related services.

Various external service mechanisms are employed as part of integrated waste management and minimisation processes, requiring specialized infrastructure, equipment and minimisation processes. Any entity wishing to establish and/or operate a specialised waste management service or activity must follow procedures specified by the City, and all industrial entities requiring a service must register with the City, irrespective of who the service provider will be.

The City also ensures that specialised equipment, vehicles and infrastructure utilised for the treatment, disposal and minimisation mechanisms of waste, and the operation and maintenance thereof comply with legal requirements as defined by national and provincial legislation.

5.6.3. Electricity

Atlantis Industrial and the erven identified for the proposed SEZ fall within the municipal electrical supply area of the CoCT.

The whole Atlantis area is serviced by means of a single Eskom 80MVA firm supply step-down substation, which distributes to numerous CoCT substations located within the residential and industrial areas of Atlantis. This substation is currently running at capacity. However, it is understood that Eskom intends to construct a second 80MVA substation for and to the account of the CoCT to meet growing demand for electricity in Atlantis. The construction of the second step-down substation will take three to four years once the necessary plans and approvals have been agreed between Eskom and the CoCT.

Medium Voltage (MV) infrastructure can be located in John van Niekerk Street and Neil Hare Road located on the east and south-east boundaries of Site 1 and Gideon Basson Road and Neil Hare Road located on the south-west and south-east boundaries of Site 2. At present, given the location of the existing infrastructure, the following supply constraints are applicable to the identified sites, this based on the location of MV supply surrounding the erven:

Site 1:

- The boundary of John van Niekerk Street is no longer available as the land has been sold (to Gestamp).
- Electrical supply limited to 1.6MVA can be made available along the boundary of Neil Hare Road.
- The site bordered by Charel Uys and Dassenberg Roads has no nearby infrastructure readily available, so the MV infrastructure would have to be extended to the proposed location.

Site 2:

- Limited capacity could be made available at the end of Gideon Basson or along Neil Hare Roads.

A representative of the CoCT Distribution System Development service has confirmed that each of the sites identified for the proposed SEZ can be serviced up to a maximum of 2MVA. The Supply Authority has indicated that while 2 MVA is readily available for use, electrical demands in excess of 2MVA will trigger upgrades to the existing infrastructure and the construction of an indoor substation.

5.6.4. Transport

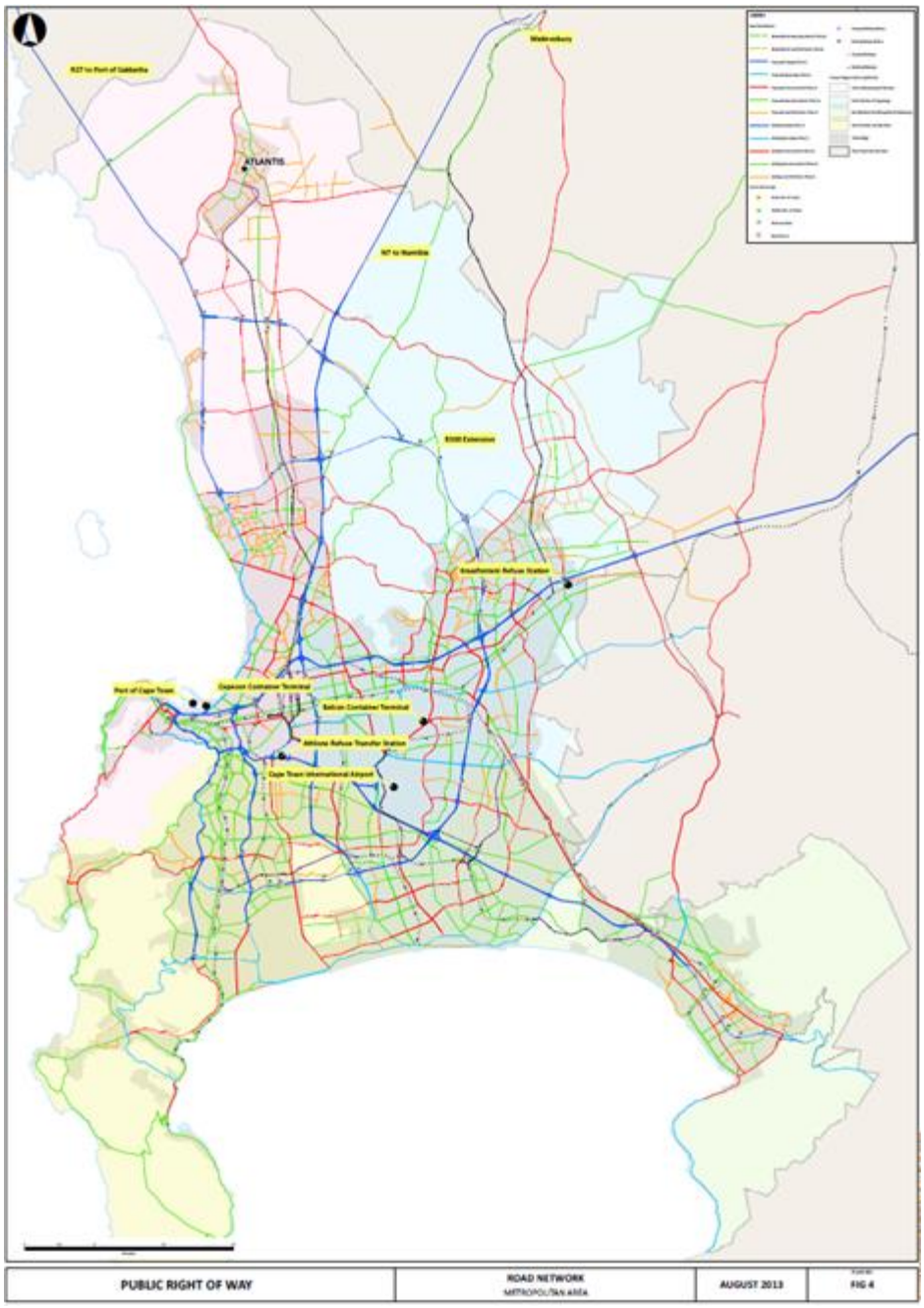
5.6.4.1. Road Network

A road classification system is used to prioritise the road network into a hierarchy, ranging from routes focusing on mobility (Class 1 freeways) to routes focusing on accessibility (Class 4 and 5). The metropolitan road network plan, included as Figure 31 shows the Class 1 to Class 4 roads in the Cape Town metropolitan area.

The following roads are relevant to the study area around Atlantis:

- Class 1 (Freeways and Expressways) include the R27 west of Atlantis linking Saldana to Cape Town. The R27 carries about 10% heavy vehicles per day. The N7 east of Atlantis links Cape Town with the northern regions and Namibia and carries about 15% heavy vehicles per day. The Class 1 roads are indicated in blue.
- Class 2 (Primary Arterials) provide access to Class 1 roads. From Atlantis, these roads provide access to the R27 and to the N7. The Class 2 roads are indicated in red.
- Class 3 (Secondary Arterials) feed into Class 2 and Class 1 roads. The Class 3 roads are indicated in green.
- Class 4 (Local Distributors) operates through residential/industrial areas and feed into primary and secondary arterials. The Class 4 roads are indicated in orange.

Figure 31: Road network in the metropolitan area



Source: AECOM analysis

5.6.4.2. Rail Network

High order freight rail lines in the Western Cape Region are owned and operated by Transnet Freight Rail (TFR). The main rail lines for the movement of freight in and out of Cape Town are as follows:

- The main line between Cape Town and Johannesburg, which terminates at the marshalling yards in Bellville.
- The line from Bellville to Table Bay via Kensington.
- The line from Bellville to Saldanha Bay via Fisantekraal and Hopefield.
- The line from Bellville to Bitterfontein via Malmesbury.
- The line from Port of Cape Town to Atlantis.

5.6.4.3. Airports

Cape Town International Airport is located about 60km from Atlantis and is the only major commercial airport in the region and therefore the focus of all air freight operations. The airport is well serviced with a complete range of support agents, clearing and forwarding and transport services.

An estimated 30 000 tons of cargo is lifted annually to various international destinations as well as to the Johannesburg International Airport for transhipment. About 80% of this cargo is transported by aircraft providing regular passenger services. The cargo comprises mostly of fish and shellfish, rock lobster, abalone and ostrich products, as well as certain chemical, pharmaceutical and photographic and computer components. The Airports Company of South Africa (ACSA) owns and operates the Cape Town International Airport.

There are two military airfields in the wider region, namely the Ysterplaat Air Force Base near Cape Town and the Langebaanweg Air Force Base, located in the Saldanha/Langebaan area.

5.6.4.4. Pipelines

Pipeline facilities are limited to the transport of oil and petroleum products between the Ports of Cape Town and Saldanha Bay and various refineries in the Cape Town area. From the Port of Saldanha, crude oil is transported by pipeline from the oil tankers to underground storage tanks located on the perimeter of the port. From the storage tanks, a pipeline carries the crude oil over approximately 126km to the refinery at Montague Gardens near Cape Town. This line carries an estimated 3.3 million tonnes of crude oil per annum.

From the Port of Cape Town, petroleum products are transported form the dedicated petroleum tanker wharf to bulk storage tanks located at the port. From the storage tanks, the products are transported directly via the pipeline to and from the refinery at Montague Gardens. From the refinery, short pipelines extend to several of the oil company depots, while others receive all their refined products by road.

5.6.4.5. Sea Ports

There are two well-maintained ports in the Western Cape significant to the Atlantis area; the Port of Cape Town and the Port of Saldanha Bay. Both ports are the property of Transnet and are controlled and managed by the Transnet National Ports Authority (TNPA).

Port of Cape Town

The Port of Cape Town is located 50 km from Atlantis and is the major seaport in the region for general cargo import and export. It is also the second busiest container port in South Africa and is fully equipped to handle all types of general break-bulk and containerised cargo via specialised terminals. Other than the freight handling facilities, the port also provides dry docking facilities as well as a dedicated ship repair quay. The Port of Cape Town is served by well-developed inland road and rail transport infrastructure.

The Port of Cape Town is the preferred port for the export of deciduous fruit and serves as one of the main bases for the deep sea fishing industry. The major break bulk commodities that are handled here are agricultural produce (fruit, wheat, maize, and barley), iron, steel, oil and petroleum products and chemicals (fertilisers). It remains open 24 hours a day 7 days a week while freight forwarding is done during office hours. The Port can be subject to strong winds during from April to September that can disrupt cargo handling at the port.

Port of Saldanha

The Port of Saldanha is a common user port and South Africa's largest natural anchorage and the port with the deepest water. It is located 60 nautical miles northwest of Cape Town or about 110 km from Atlantis. The Port of Saldanha handles predominately iron ore and crude oil. Port control operates 24 hours a day in all weathers although adverse weather can affect operations.

A summary of the weight in cargo handled by these two ports during the 2011/12 financial year is presented in Table 5.

Table 16: Summary of cargo handled at Ports of Cape Town and Saldanha (2011/12)

Cargo Type (Metric tonnes)	Port of Cape Town	Port of Saldanha	TOTAL	% of TOTAL
Total bulk	3 525 805	57 669 845	61 195 700	98,5
Total break-bulk	327 128	593 185	920 313	1,5
TOTAL	3 852 933	58 263 030	62 116 013	100
Export			54 894 992	88,4
Import			7 143 711	11,5
Transshipments			77 310	0,1

Source: Transnet Port Authority

From the total tonnage handled 98.5% was bulk cargo and 1.5% break-bulk. Of the total quantity of cargo shipped, 99% were exported and consisted mostly of iron-ore. The container tonnage handled at the Port of Cape Town during 2008/2009 is an estimated is 10 669 225 tonnes (calculated on the basis of an average 13.5t per TEU), giving the port an annual total tonnage handled of more than 14 million tonnes.

Multi-modal transport facilities

The International Multi-modal Transport Association defines multi-modal transport as “the chain that interconnects different links or modes of transport – air, sea, and land into one complete process that ensures an efficient and cost-effective door-to-door movement of goods under the responsibility of a single transport operator, known as a Multi-modal Transport Operator, on one transport document”.

Containerisation is a form of multi-modal transport where goods are moved in a single loading unit rather than more than one mode of transport. The transport of petroleum products are considered as an example of multi-modal transport, as the product is “handled” at the time of changing modes. The location of the facilities discussed below are shown on Figure ...

Bellville Container Terminal

Inter-modal freight transfer facilities are required to operate efficiently to ensure the competitiveness of rail freight haulage. At present the only such facility in Cape Town is situated at Bellville Container Terminal (Belcon). Belcon is located south of the Bellville CBD on the main line between Cape Town and Johannesburg. This location is at the centre of the main rail line transfer area for container and general cargo in the Western Cape.

Intermodal Containerised Waste Disposal

Within Cape Town, waste disposal is primarily performed by road vehicles but the Athlone Refuse Transfer Station, which is situated in Langa, provides the means to transport containerised waste by rail from the municipal collection system to the Vissershok disposal area. The Kraaifontein Refuse Transfer Station also makes provision for a similar rail service in the future. However, the ability to accommodate both passenger and goods trains on the Bellville line is hampered by inadequate signalling facilities.

5.6.4.6. Provincial and Regional Freight Transport Network

The Atlantis area is one of the key industrial freight centres within the Cape Town Metropolitan area. The regional freight movement networks consist mainly of the following corridors:

- Atlantis to Namibia (N7 - Road Network).
- Atlantis to Cape Town (R27 & N7 or Rail Network).
- Atlantis to Port of Saldanha (R27 & N7 - Road Network).
- Atlantis to Cape Town International Airport (R27, R300, N7 & N2 - Road Network).

According to the CoCT ITP (2013), Marine Drive (R27) and the N1 from Marine Drive to the N7, have been identified as some of the most congested corridors in the City of Cape Town. Abandonment of the rail system has resulted in increased loading of the road system, congestion and deteriorating road safety and environmental standards.

Abnormal loads

Abnormal loads are mostly transported via the N1 and N7, where infrastructure permits such movements. The remainder of the road system has limited capacity to carry abnormal vehicles. It is recognised that the major attractors and generators of abnormal loads are the Koeberg Nuclear.

Figure 32: Abnormal route network in the Cape Town area

Source: AECOM analysis

Power Station, Transformers to electricity sub-stations, the yacht building industry, freight movement between the Port and the West Coast and the wind turbine industry and wind farms. Figure 32: shows the abnormal route network in the Cape Town area.

It is required to obtain a permit from the WCPG to transport abnormal loads and vehicles. The requirements for a permit depend on the size and nature of the load or vehicle.

Hazardous material

The City of Cape Town manages the movement of Hazardous goods. At present there are no specific route maps for the distribution of Hazardous material; however the City of Cape Town is in the process of developing route maps. The nine classes of Hazardous material are as follows:

- Explosives.
- Gases.
- Flammable Liquids.
- Flammable Solids.
- Oxidisers and Organic Peroxides.
- Toxic Materials and Infectious Substances.
- Radioactive Materials.
- Corrosives.
- Miscellaneous Dangerous Goods.

The movement of the Classes 1 and 7 materials are well regulated and strictly enforced. The movement of other classes of hazardous is not inspected on a regular basis.

Overloading

Weigh bridges are controlled by the Provincial authority. There are two provincial overloading control stations located along the strategic freight route between Cape Town and Saldanha, which is the weighbridge along the N7 at Vissershok and the weighbridge at the intersection of TR85/1 and the R27 near Saldanha.

Planned transport infrastructure

The projects reflected in the following tables show various existing and future infrastructure interventions that could potentially influence mode specific freight in and around the Atlantis area.

Table 17: Future and existing road and rail projects affecting freight movement

Road	Description
N7 upgrade	The South African National Roads Agency Limited (SANRAL) is in the process of upgrading National Route 7 (N7). The section of the N7 between Melkbos and Malmesbury is currently being upgraded to a dual carriageway, phased as follows: • Phase 1: Melkbos intersection to Atlantis South intersection. • Phase 2: Atlantis South intersection to Leliefontein. • Phase 3: Leliefontein to Hopefield intersection.
Saldanha TR85/1 (R79)	Extension of the TR85/1 from the intersection with the R27 to the R45 at Langebaanweg air force base.
R300 extension	The R300 Ring Road is intended as a toll road between Muizenberg and Melkbosstrand. The ultimate intention is to provide an Outer Ring Road, which is accessible from as many areas as possible within the Cape Town urban area. This will result in the unloading of heavily congested arterial routes in the urban area together with related savings in time and cost for motorists. It is the developers' intention that the toll fees generated should be cost effective to all sectors of the population, while ensuring that the maintenance and service of the road are of a high standard.
Rail	**Description**
New railway lines	• The airport rail link is to be implemented in the short to medium term in line with the national directive to link all international airports to the CBD via rail, should it be deemed financially viable. • The Blue Downs rail link between Nolungile and the Kuilsriver Stations. • Conceptual design of the Langa-Atlantis link.
New commuter services	Rail studies for new commuter services on existing rail corridors: • Kraaifontein to Fisantekraal/Klipheuwel (planning for an improved service with doubling and electrification). • Cape Town to Du Noon/Atlantis (planning for a new commuter service on a freight line). • Eerste Rivier to Strand (doubling to address network deficiencies).
New rail stations	• North-east corridor stations (implementation priority to be determined). • Bloekombos Station (implementation priority to be determined). • Central line station upgrades (Langa, Heideveld, Athlone, Cape Town Station).
Worcester and De Aar	New crossing loops on the main line between Worcester and De Aar to accommodate longer trains and improve operating performance.
General	Transnet plans to invest R34.8 billion in the rail freight business as follows: • Coal line: R 4.9bn. • Ore Line: R 3.8bn. • General Freight: R15.3bn. • Maintenance capitalization: R10.8bn. • Doubling the single main line sections. • Improvement of the power supply for the main line. • Optimization of the Bellville shunting yard and re-signalling of the Bellville Complex.
Cape Town International Airport	The development of road and rail transport infrastructure as well as the integration of inter-modal transport, to be coordinated with CTIA expansion and the involvement of a range of public authorities.

Source: AECOM analysis

5.6.4.1. Public transport

Atlantis is currently the City's 7th most significant bus travel origination area in terms of AM peak passengers. The City is pursuing the increased responsibilities for the rail mode of public transport as provided for in the National Land Transport Act (NLTA). It includes the implications and development of a business case for the management of the passenger rail operations subsidy, as well as corridor-based SLA's for the network.

The City is implementing the MyCiTi bus rapid transit service in phases. The first elements of the system enabled the City to meet the public transport requirements for hosting the 2010 FIFA World Cup. This service consisted of an events service to the Cape Town Stadium, a service to the Airport and a temporary service around the inner city. In May 2011, the first network was launched. This consisted of a route between the Civic Centre station in central Cape Town and Table View, temporary services around the residential areas of Table View, Blaauwberg and Parklands – connecting to the main route – and a connecting temporary route around the central city. The next step was eight new routes covering areas including Woodstock, Salt River, Oranjezicht, Tamboerskloof, the Atlantic Seaboard suburbs including Camps Bay, and Hout Bay and Imizamo Yethu. The west coast route has now been extended to include Atlantis, the informal settlements of Du Noon and Jo Slovo Park, the industrial area of Montague Gardens. This route has considerably improved labour mobility in and out of Atlantis.

5.6.4.2. Koeberg Emergency Plan

Atlantis Industrial falls within the Urgent Protective Action Planning Zone of the Koeberg Nuclear Power Station (area within a 5 km-16km radius of the Koeberg nuclear reactors). New development within the UPZ, may only be approved subject to demonstration that the proposed development will not compromise the adequacy of disaster management infrastructure required to ensure the effective implementation of the Koeberg Nuclear Emergency Plan (version approved by the National Nuclear Regulator (NNR)). Specifically, within the UPZ area, an evacuation time of 16 hours of the projected population, within any 67,5° sector to designated mass care centres (as appropriate), must be demonstrated by means of a traffic (evacuation) model approved by Council and acceptable to the NNR.

The City of Cape Town, Koeberg Nuclear Emergency Plan: Traffic Evacuation Model (2006), which considers population forecasting, meets the requirements for evacuation in the UPZ.

5.6.4.3. Conclusions

From a transport perspective:

- Atlantis is integrated with the regional freight movement/ abnormal load network.
- Planned improvements to the regional freight movement/ abnormal load network are in progress.
- The existing and planned regional freight movement/ abnormal load network should meet the needs of full development of the two sites identified for green manufacturing enterprises.
- The extension of the West Coast MyCiti rapid bus transit route to include Atlantis should considerably improve labour mobility in and out of Atlantis.
- Atlantis is fairly strategically located in terms of the fact that it has access to both the ports in the province. It is located 110km from the port of Saldanha and 50km from the port of Cape Town.
- Atlantis is removed from city traffic and congestion

5.6.5. ICT Infrastructure

There is growing evidence that the diffusion of ICT is an accelerator of economic growth in a country (studies by the OECD, World Bank, Economic Commission for Africa, etc.). Broadband is being identified as a key contributor to economic growth and offering “opportunities for employment generation, creation of new sources of innovation and enhancement of industrial competitiveness”.

The Western Cape economy is moving from one based principally around the production and distribution of physical goods to one driven primarily by the production and application of knowledge. As such, the Western Cape is home to many initiatives in the ICT/ Knowledge economy space. For most of these initiatives, the presence of well-functioning, robust and accessible telecommunications infrastructure is a prerequisite.

In response, the WCPG has created a broadband framework and strategy which is based on international best practice frameworks and indicators.

Government’s role is to create a catalytic telecommunications environment and to use Government demand itself as a catalyst for the development of regional and local backbone networks to all areas.

The connecting of all WCPG corporate sites, schools, healthcare institutions (clinics, day hospitals, emergency medical services, forensic pathology services and hospitals), libraries (provincial as well as municipal libraries in rural areas) as well as satellite administrative offices and depots of the WCPG must be used as a key catalyst in developing the telecommunications infrastructure for a connected province. This will achieve the development of regional and local backbone networks, as well as some of the subscriber access infrastructure.

The current process followed where ad-hoc quotations are sought for each individual site is not cost effective, but also a very labour intensive and time consuming exercise, with some sites having waited more than a year for a service, and in some instances no cost effective solution could be found to connect distant rural sites as vendors were unwilling to invest a significant capital outlay for one or two single sites. By aggregating the WCPG requirements we believe that service providers will be provided with the necessary incentive to invest in the development of the telecommunications infrastructure and be more competitive with the pricing of their solutions.

It should be noted that the WCPG has adopted a 3 stream approach to the implementation of the Broadband initiative. The 3 streams are as follows:

- Stream 1: Connecting WCPG Buildings – which will focus on connecting WCPG buildings with high-speed broadband capability which will make provision for data, voice and video.
- Stream 2: Economic/ Value Add Stream – which will focus on realizing broader economic benefits in partnership with the private/ commercial sector. This should result in lowered costs for the private sector and ultimately households by leveraging off the investment being made through Stream 1.
- Stream 3: Application Development Stream – which will focus on transversal application development to ensure that the broadband capability will be optimally utilised. This should result in the improvement of the efficiency and effectiveness of the WCPG.

By September 2014, the learners of Delft and Atlantis will receive free Wi-Fi as part of the projects so that they can research their school projects on the web.

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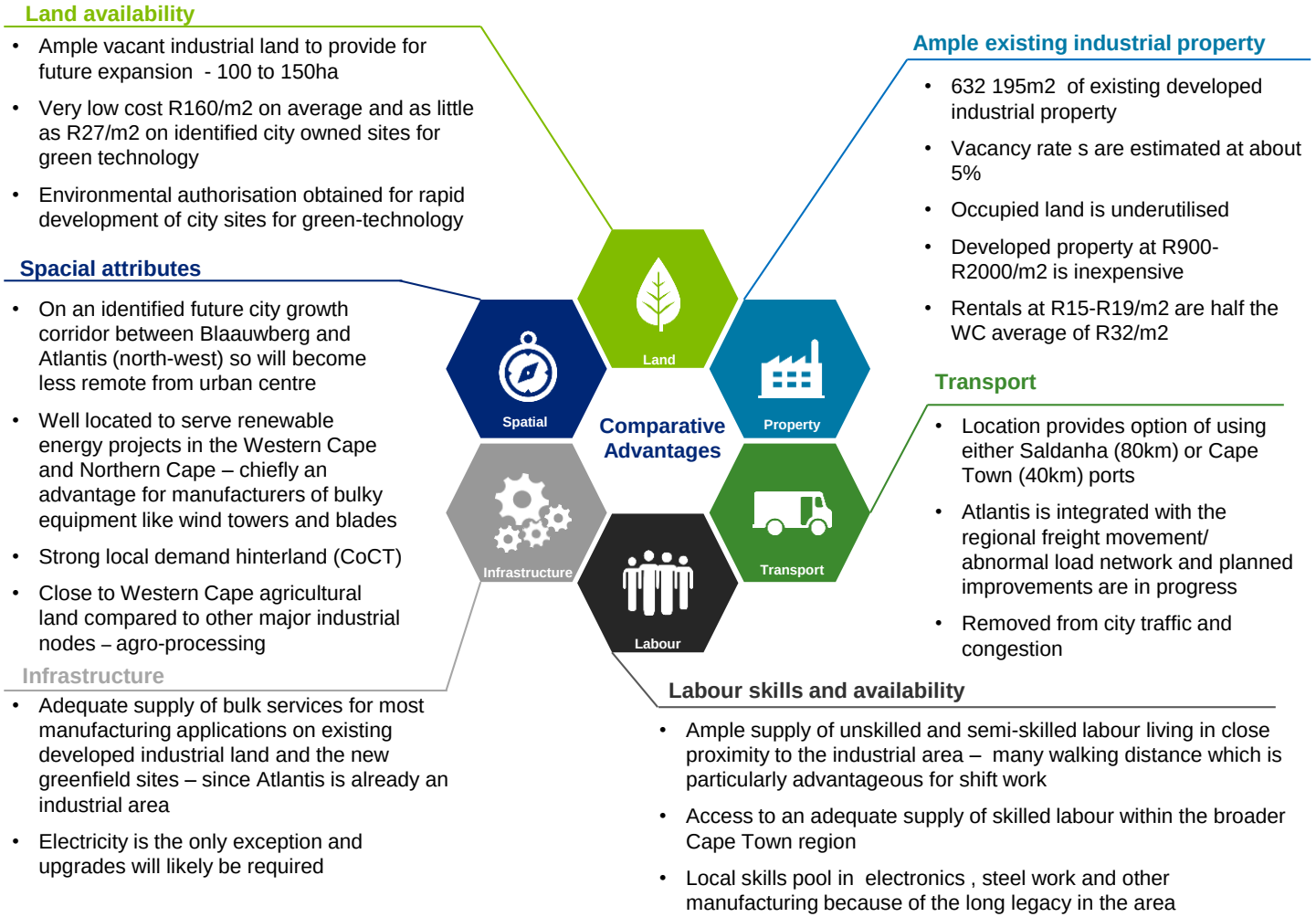
5.7. Summary of the key comparative advantages and challenges of operating in Atlantis

In Figure 33: we have attempted to summarise the key identified comparative advantages of Atlantis

Figure 33: Comparative advantages of Atlantis as business destination



Source: Deloitte analysis

Some of the key challenges associated with operating in Atlantis are summarised in Figure 34.

Figure 34 Key challenges associated with operating in Atlantis

Relatively far from Cape Town

- Atlantis is 40km from Cape Town and although it considerably more integrated with Cape Town than 40 years ago, it is still 50km from the port and is somewhat dislocated from the urban centre. Demand for property in Atlantis remains relatively low compared to other industrial nodes in greater Cape Town. This is evident in relatively low rentals and cheap land. Rentals over the past decade have remained unchanged in real terms (inflation adjusted)
- Existing firms noted that a disadvantage of Atlantis is that it is more remote from the urban centre, suppliers and customers than all the other industrial nodes in Cape Town
- While good road links provide access to Saldahna and Cape Town ports, it is far from ports relative to many of the other SEZs and particularly Coega which competes for a share of the utility-scale renewables market

Labour costs

- Although fairly remote from Cape Town city centre, the urban minimum wage still applies in Atlantis, making it less competitive than nearby 'rural areas' for low-skilled labour-intensive activities such as clothing manufacturing
- Wages are however in line with averages for the Western Cape and South Africa rather than lower

Inadequate training facilities

- While there is an FET college in the area (West Coast College), the training does not align with firm needs and is often not at a high enough level – NQF 2- 4 as opposed to the NQF 6 often required. The quality of training provided has also been questioned by some firms

Social problems

- High rates of unemployment and low educational attainment have resulted in a variety of social ills including crime, gangsterism and drug abuse – this does impact existing firms to some extent with complaints of business burglaries, drug abuse on premise and stock theft. These issues however are also prevalent in other areas of Cape Town and South Africa

Source: Deloitte analysis

6. Global drive for energy efficient technologies and renewable energy

6.1. The increasing importance of renewable energy

Energy sources such as coal, oil, natural gas and uranium are non-renewable and will eventually be depleted or become too expensive to extract economically. Population growth and the associated increase in demand for energy will eventually lead to the depletion of such resources if alternative energy sources are not utilised. This creates an immediate energy problem for future generations, however far into the future resource depletion might occur. Investing in renewable energy sources, such as solar, wind, hydro, geothermal, biomass or biogas will both prolong the usefulness of non-renewable energy sources as well as provide almost infinite amount of energy for future generations. By investing in renewable energy today future generations are saved from the burden of increasing energy costs and climate change impacts thus protecting their living standards by creating a more sustainable future.

Non-renewable energy sources are also more harmful to the environment during their extraction, production and consumption phases compared to renewable energy sources. The consumption of non-renewable energy sources leads to greenhouse gas emissions or radioactive waste. Greenhouse gases absorb energy, slowing or preventing the loss of heat into space creating a heat barrier and thus causing what is known as global warming.[99] Non-renewable energy sources are generally consumed for use in transportation, electricity generation and industrial processes (including agriculture) which leads to the emission of such greenhouse gasses. Carbon dioxide is the primary greenhouse gas emitted, mostly from electricity generation. In 2011, carbon dioxide accounted for about 84% of all U.S. greenhouse gas emissions from human activities.[99] "South Africa is the 12th largest emitter of CO2 emissions in the world. The country is responsible for nearly half the CO2 emissions for the entire continent of Africa, and about 1.6% of global emissions. Given the developing nature of the South African economy, it is expected that emissions will grow as development goals are pursued. The activities which generate the most carbon dioxide emissions are the production related activities, which use large quantities of coal or electricity, and the transportation sector.[100]

The emission of greenhouse gasses is linked to:

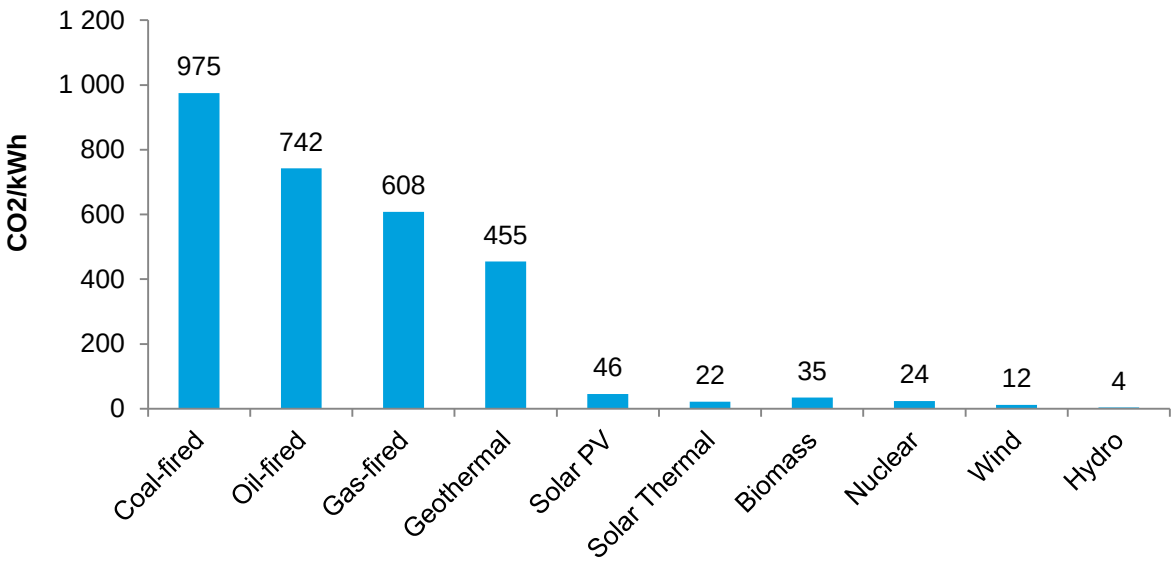
- An increase Earth's average temperature
- Influences on the patterns and amounts of precipitation
- A reduction in ice and snow cover, as well as permafrost
- A rise in the sea level
- An increase in the acidity of the oceans

[99] United States Environmental Protection Agency: www.epa.gov – Overview of Greenhouse gases

[100] National Treasury, 'The Carbon Tax Option', discussion paper for public comment, December 2010

This increase in emissions will impact food supply, water resources, infrastructure, ecosystems and health levels.[101] By reducing the consumption of non-renewable energy sources these negative externalities can be reduced via a reduction in associated greenhouse gas emissions. Renewable energy sources are far less carbon intensive (Figure 35) or at least carbon neutral, and provide a way of replacing sources of non-renewable energy thereby mitigating the negative environmental impacts.

Figure 35: Evaluation of life cycle CO2 emissions of power generation technologies



Source: Wang & Sun, 2012

The majority of governments have put in place plans and programmes to increase the share of renewable energy in the overall mix of energy consumption. This not only ensures a sustainable supply of energy but will also help achieve other strategic national goals. These goals include job creation targets, security of supply issues and targets set out by international emission agreements such as the Kyoto protocol or Copenhagen Accord where in 2009 South Africa pledged a 34% reduction in emissions by 2020. The South African government began setting renewable energy targets in 2003, with the publication of a Renewable Energy Policy White Paper that envisioned reaching 10 000 GWh of renewable energy generation by 2013.[102]

According to the international Renewable Energy Agency (IRENA), fuel-free renewable energy technologies create the greatest number of jobs during the installation, manufacturing, and administration phases, while fuel-based technologies create more job opportunities during the feedstock production and distribution phases. Even though labour productivity evolves through time, studies have shown that renewable energy technologies are currently more labour-intensive than fossil fuel technologies, with solar PV technology accounting for the highest number of job-years per GWh over the lifetime of the facility.[103]

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[101] United States Environmental Protection Agency: www.epa.gov – Future climate change

[102] South Africa's REIPPP programme: Success factors and lessons, World Bank Group, 2014

[103] International Renewable Energy Agency (IRENA) - Renewable Energies and Jobs

Producing energy locally, especially in the case of crude oil, reduces an economy's dependence on imported fuel and could lead to the stockpiling of reserves depending on the type of fuel or energy. In addition to stabilising disturbances in the supply of energy, reserves (in coal, oil or energy) can also be used for wealth generation purposes, where stockpiles are increased or reduced depending on future price expectations and storage capacity. Strategic reserves can also be used in the event of supply disruptions due to warfare or natural disasters. Reserves in these cases can either be used for the operation of emergency vehicles and other energy related purposes, though this is more appropriate in areas which experience such events more frequently. Some economies, especially in Africa, rely on diesel and petrol imports for energy generation, either for use in turbines which power larger areas or for use in private owned generators, powering businesses and households. In either case citizens or firms can be protected from a sudden spike in fuel prices which would occur if fuel (or energy) exporting countries agree to raise prices or if there is a sudden and significant drop in the supply of energy related commodities.

6.2. Global demand and outlook for greentech and renewable energy

Economic growth, a decrease in the price of technology and an increase in the amount of new technology choices available are increasing the demand for all forms of energy. Energy market players and those institutions responsible for providing energy have to continuously increase their supply in order meet this increasing market demand. The growth in the consumption of renewable energy is mostly driven by a fall in the relative price of such energy technologies as well as an increase in the maturity of these technologies.

Renewable energy technologies such as solar or wind require relatively low levels of on-site labour hours during the operations and maintenance phase as opposed to coal, mostly as a result of their non-existent fuel input requirements.[104,105] This results in a real fall in the price of such technologies relative to other non-renewable technologies like coal, gas or oil. The overall job creation however depends on a number of factors and in some cases the use of conventional energy sources does not always lead to greater employment outcomes. The upstream manufacturing processes involved in green technologies as well as the installation of these create on average more jobs than coal or gas power plants (Table 18). As always though, job estimates must be treated with caution given the numerous ways in which employment number are reported and the differences in permanent versus once-off jobs.

[104] NREL - Preliminary Analysis of the Jobs and Economic Impacts of Renewable Energy Projects Supported by the §1603 Treasury Grant Program

[105] Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?, Max Wei, Shana Patadia, Daniel M. Kammena: Energy Policy 2010

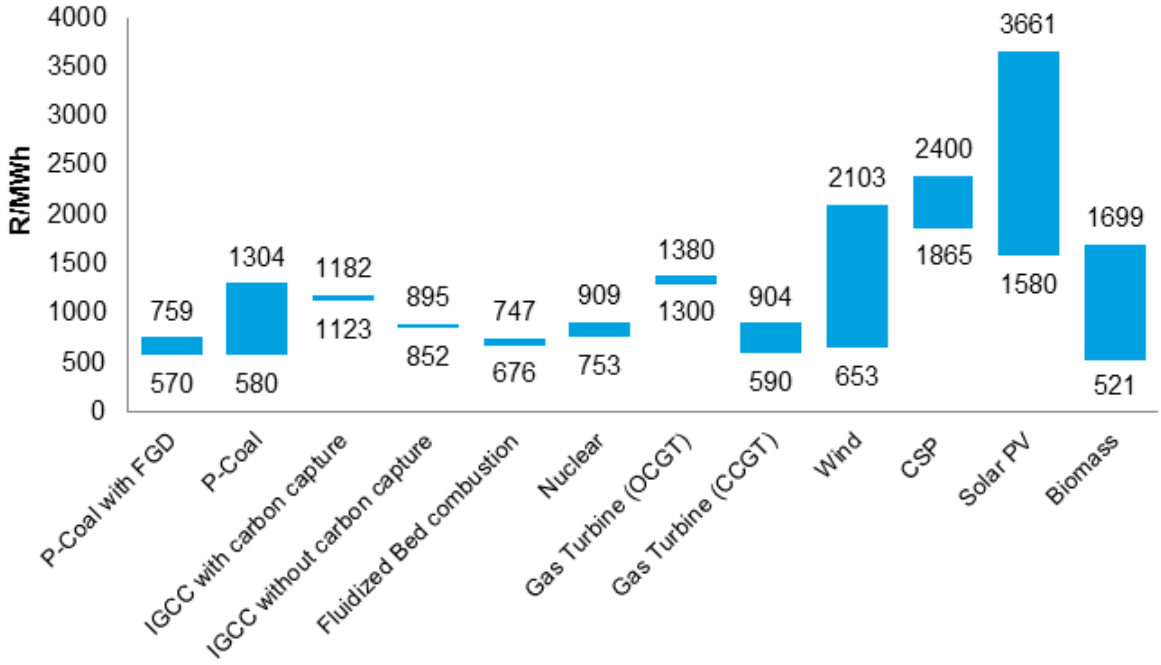
Table 18: Comparison of jobs per installed MW across technologies

Energy Technology	Capacity factor	Equipment Lifetime	Jobs/MW	
			Construction, manufacturing and installation	Operations and maintenance, including fuel
PV 1	21%	25	1.29	0.25
PV 2	21%	25	1.20	1.00
Wind 1	35%	25	0.15	0.10
Wind 2	35%	25	0.88	0.10
Biomass 1	35%	25	0.34	2.08
Biomass 2	85%	25	0.34	0.32
Coal	80%	40	0.21	0.59
Gas	85%	40	0.21	0.60

Source: Report of the renewable appropriate energy laboratory, Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?

The levelised cost of electricity (LCOE) [106] for a number of renewable technologies is already price competitive with conventional energy sources, especially clean coal or gas turbines. This is mostly due to falling component costs and the right environmental conditions (Figure 36). According to research by EPRI[107] wind and biomass technologies are in some instances cheaper as 'new build' options compared to coal or gas.

Figure 36: LCOE ranges by technology for South Africa in 2012



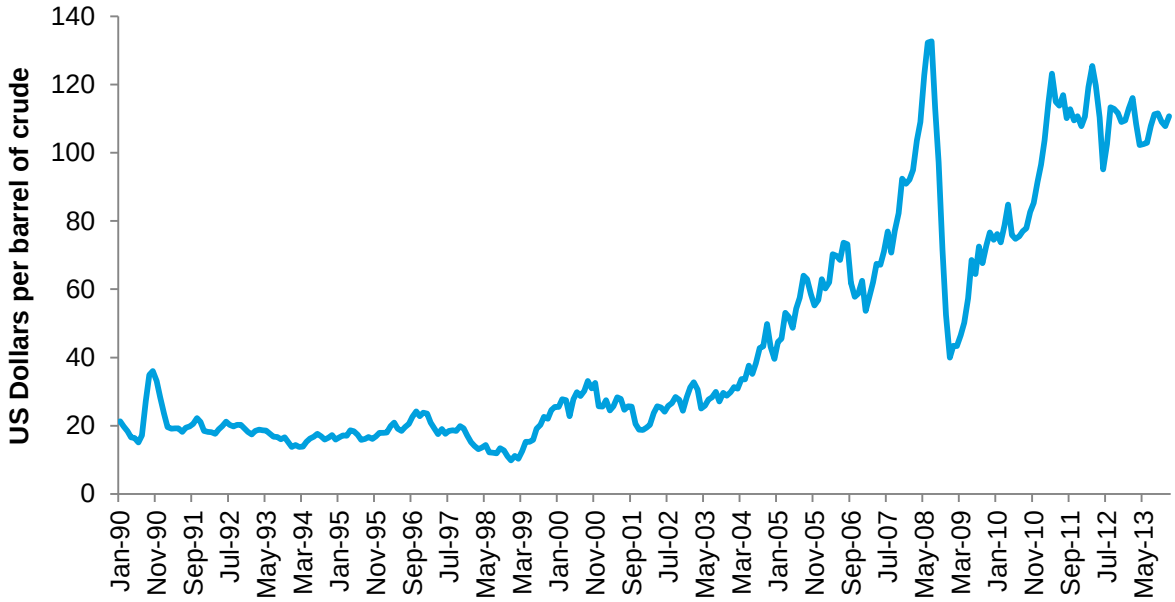
Source: EPRI, 2012

[106] The price at which electricity must be generated from a specific source to break even over the lifetime of the project

[107] EPRI - Power Generation Technology Data for Integrated Resource Plan of South Africa, 2012

The price of crude oil, and the industry specific dynamics of global oil production and supply, is making renewable energy an increasingly more attractive alternative solution. Although weather patterns can cause instability in the generating capacity of certain renewable energy sources, global price fluctuations in the price and supply of crude oil also cause instability in economic impacts, especially on factors such as inflation, security of supply and national debt costs. Figure 37 shows how the price of crude oil has fluctuated over time, impacting the economies of oil importers and exporters positively or negatively depending on the size and direction of fluctuations. The uncertainty of supply and political issues associated with oil is a key driver of renewable energy solutions in addition to the significant environmental benefits.

Figure 37: Price of a barrel of Brent crude 1990 – 2013



Source: Thomson Reuters

While transport and production processes have become more energy efficient over the years, the demand (consumption) of energy in the form of fuel, electricity and industrial inputs has increased in line with economic growth. At a global level this increase in supply will lead to an increase in both negative environmental impacts and a quicker depletion of non-renewable resources as discussed above. Table 19 shows the percentage change in the carbon intensity of selected regions and countries. While all regions and countries listed have managed to reduce their carbon intensities, through the use of more renewable energy sources and energy efficient investments, only Europe and North America have managed to reduce their overall carbon emissions in 2010 compared to 2000.

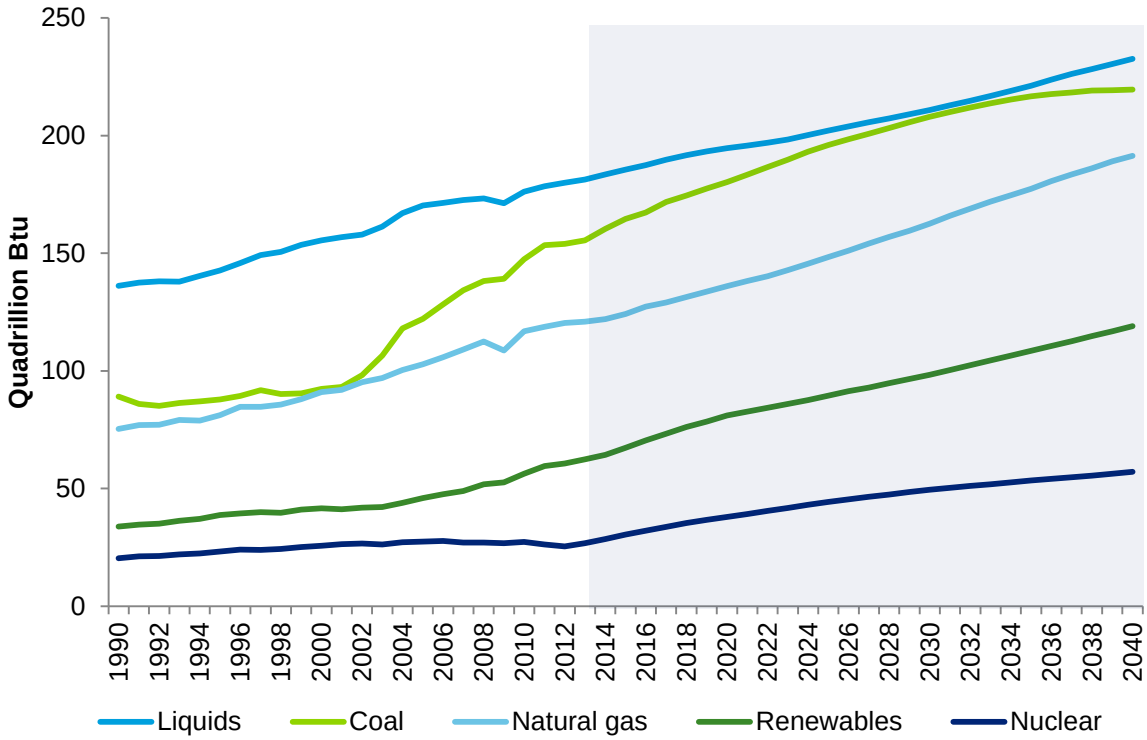
Table 19: Country and region emissions and intensities 2000 – 2010

	Carbon Intensity (2010)	Carbon Intensity (% change)	CO_2 emissions (% change)	Primary Energy consumption (% change)
Europe	0.33	-15%	-2%	3%
North America	0.52	-17%	-3%	5%
Central & South America	0.58	-9%	30%	29%
South Africa	1.89	-13%	23%	22%
China	2.31	-10%	144%	146%
Russia	2.64	-31%	10%	12%

Source: EIA International Data

According to the EIA world energy consumption will grow by over 50% between 2010 and 2040 (Figure 37).[108] The majority of this growth is related to the increase in energy consumption in less developed economies outside of the Organization for Economic Cooperation and Development (OECD) where energy demand is being driven by strong long-term economic growth. Renewable energy and nuclear power are forecast by the EIA to be the fastest-growing energy sources globally, each experiencing growth in demand of over 2.5% per year over the 2010-2040 periods.

Figure 38: World energy consumption by fuel type 1990-2040



Source: EIA – IEO 2013

[108] U.S. Energy Information Administration, International Energy Outlook 2013

Although growth in the consumption of renewable energy is expected to dominate growth in the consumption of other energy sources, the use of fossil fuels is still expected to dominate global energy supply, contributing over 80% of the world's energy requirements in 2040.[108] Growth in the global consumption of natural gas is expected to grow faster than that of coal and oil (1.7% pa) over the forecast period (2014 to 2040).

7. Support for green growth and technology in South African policy and regulations

7.1. Overview of policies, programmes and plans in support of the green economy

In line with the global trends, there has been increasing interest in South Africa, particularly within the last decade, in promoting 'greener' economic growth and renewable sources of energy. National government's support for greener economic growth and renewable energy is demonstrated in a number of the overarching economic policy frameworks and energy plans, such as the National Development Plan (2011), Industrial Policy Action Plan (2014), and the Integrated Resource Plan (IRP2010) 2013 update as well as in a range of more targeted policy statements and documents on energy, renewable energy and energy efficiency (Figure 39)

Figure 39: Policies, plans and programmes in South Africa in support of green growth

Key overarching economic and energy policy frameworks and priorities	• National Development Plan • IPAP2	• Integrated Resource Plan 2 • New Growth Path,
National 'green economy' or 'green energy' policies and strategies	• Vision, Strategic Direction and Framework for Climate Policy • Integrated Energy Plan • The National Climate Change Response White Paper • SANS 204 and SANS XA10400 • Carbon Tax Policy Paper	• National Energy Efficiency Strategy • A National Climate Change Response Strategy for SA • Biofuels Industrial Strategy • National Liquid Petroleum Gas (LPG) Strategy • Carbon Offsets Paper
Western Cape and City of Cape Town specific green energy polices and strategies	• WC Climate Change Response Strategy • Green is Smart, • OneCape2040 • The WC Strategic Plan • CT State of Energy and Energy Futures Report 2011 • Energy Scenarios for CT up to 2050 • Integrated Metropolitan Environmental Policy	• WC Infrastructure Provincial Spatial Development • CT Integrated Development Plan • CT Economic Growth Strategy • CT Spatial Development Framework • Moving Mountains: CT's Action Plan for Energy and Climate Change • Energy and Climate Change Action Plan • CoCT Environmental Agenda • Energy and Climate Change Strategy
Programmes	• REIPPPP • Free Alternative Energy Policy, • Energy Efficient Motors Programme,	• DoE Solar Water Heater Programme • The SAWE Programme • Working for Energy Programme, • Eskom IDM programme
Specific initiatives and Funds	• Subsidised CFLs exchange • SARi, • REEEP	• RECORD • GVP
Projects	• Green RDP houses in Atlantis • Sere Wind Farm	• WASA Project • Ingula Pumped Storage Scheme
	• Energy Efficiency Accord • India-Brazil-South Africa Declaration on Clean Energy • Green Economy Accord	• Copenhagen Accord Pledge of South Africa • Local Procurement Accord

Source: Deloitte analysis

The three overarching policy frameworks that perhaps best highlight the South African government's commitment to the development of renewable sources of energy and the 'green economy' are:

- The National Development Plan (NDP), 2011 – this document produced by the National Planning Commission in the Presidency was adopted by government as the overarching policy framework to promote economic development in South Africa over a long-term planning horizon. The NDP sets an explicit target of enabling 20 000MW of renewable energy generation in South Africa by 2030.

- The Integrated Resource Plan (IRP2010) 2013 (update) - the IRP first promulgated in 2011 is in the process of being updated. The IRP is the outcome of a consultative process led by the Department of Energy's to develop a long-term plan and outlook for South Africa's national electricity supply. It provides for significant quantities of renewable energy to be produced mainly by IPPs, a total of 2 625MW between 2011 and 2016. In addition, for the period 2020 to 2030, more than 9 500 MW of renewable energy will be added to the electricity mix. In terms of the IRP 2010-2030, the objective is for renewable energy technologies to represent 42% of new electricity generation capacity to be built by 2030.
- The Industrial Policy Action Plan (IPAP) 2014/2015-2016/2017 (update) - the Department of Trade and Industry's policy framework outlining policies and initiatives to promote industrial development. The IPAP outlines specific objectives for the development of renewable energy and green technologies and the use of a potential special economic zone for the manufacturing of renewable energy technologies at Atlantis.

In March 2011 the Department of Energy launched the Renewable Energy Independent Power Producer Programme (REIPPP), a public procurement programme guided by targets set in the IRP which replaced the Feed-in Tariff system to promote renewable energy generation. The qualifying technologies include onshore wind, solar PV, solar thermal, biomass solid, biogas, landfill gas and small hydro plants. According to the Department of Energy, the IPP Procurement Programme has been designed so as to contribute a target of 6 925MW of renewable energy by 2015 in support of national policy plans and objectives.

The national strategy around electricity has placed a strong focus on renewable energy providing support to the coal and nuclear dominated supply. Capacity targets to 2030 underline the decreasing share of coal in total installed capacity from 93% in 2011 to 46% in 2030 and a substantial share of nuclear of 12.7% by 2030 from 3% in 2014.

In the Carbon Tax Policy Paper (2013) and Carbon Offsets Paper (2014), National Treasury also outlines plans to introduce a carbon tax from 2016. National treasury believes that a carbon tax, as a market-based instrument will encourage a shift in production and consumption patterns towards low carbon and more energy efficient technologies by altering the relative prices of goods and services based on their emissions intensity and encouraging the uptake of cost effective, low carbon alternatives.

The carbon offset scheme that will enable businesses to lower their carbon tax liability and make investments that will reduce greenhouse gas (GHG) emissions.

There are numerous policies and programmes that have been implemented by the SA government over the last 10 years. Although targeting different goals and dates they all share a common objective, which is to increase the proportion of renewable energy consumption within total energy consumption as well as to promote clean technology and energy efficiency.

A summary of all the identified policies, plans, programmes, incentives and partnerships in support of growth in the green economy and green tech industry in particular is provided in Annexure 4:. The tables in this Annexure include the specific objective or target set by the policy with respect to green growth or technologies.

8. Market Analysis - sizing the potential greentech opportunity for the ASEZ

8.1. Introduction

The Atlantis SEZ has been envisaged by the City of Cape Town and Western Cape Provincial Government as a hub for the delivery of a range of greentech products and services. Most of the effort in sizing the market for the proposed ASEZ has therefore been spent on developing a granular understanding of the specific opportunity for Atlantis in the greentech sector. This is the focus of this section.

In section 8 we explore whether there is potential to further increase the economic impact of the SEZ. This includes a discussion or whether the extending the boundaries of the SEZ or incorporating additional clusters of economic activity would enhance the economic benefits and strengthen the business case.

8.2. Overall approach to market sizing and scenario development

Our overall approach to sizing the market potential for the Atlantis SEZ is illustrated in Figure 40. The first step was to develop an understanding of the current landscape at Atlantis in order to identify the comparative advantages that the site has to offer to potential investors in the proposed special economic zone. The findings of this analysis were presented in section 5.7.

Given that green technology had already been identified as the proposed focus of the SEZ, we focused on developing a sound understanding of the greentech industry and the types of economic activities that a typical definition would encompass and produced the high-level 'taxonomy' for green technology illustrated in section 2.3. We also researched the industry value-chains for each of the major categories of green technology and developed detailed value-chains.

We began a process of extensive stakeholder consultation and engagement to derive insights into the following areas:

- The market analysis and sizing of green technologies
- Policy and regulation issues faced by potential and existing greentech firms
- Market outlook and sentiment of renewable energy manufacturers
- Incentives proposed for SEZ investors
- Business services desired to support potential SEZ SMMEs
- Attractiveness of Atlantis as a site for investment or expansion of existing operations

Interviewees included representatives of the following groups:

- Government Departments
- State-owned entities
- State-funded business incubators
- Development finance institutions
- Firms Operating in Atlantis
- Green Technology Firms

A detailed list of stakeholders interviewed can be found in Annexure 4:

Figure 40: Market sizing approach

	Comparative advantages of Atlantis	Green taxonomy and value-chains	Consultation	Market analysis and sizing	Scenario development
Description	• Identify and summarise the existing attributes and comparative advantages of Atlantis • Identify existing industry clusters	• Green technology taxonomy and value chains • Unpacking the value-chains	• Conducted over 50 interviews with stakeholders including: Industry participants, potential investors, technology experts, DFIs, trade promotion agencies, education institutions etc.	• Initial prioritisation of green technologies and activities appropriate for the Atlantis SEZ • Further market analysis on high and medium potential technologies	• Defined two demand scenarios (conservative and moderate) based on assumptions on key demand drivers.
Detailed outcomes or activities	• Initial view of any disadvantages and advantages of the Atlantis industrial area including location, industrial activity, skills, socio-economic challenges, rent, wages, utility costs and logistical considerations • Understanding of the existing industry presence and clusters at Atlantis.	• Developed an understanding of the scope and definition of the green technology industry • Listed activities and components within the 'greentech' taxonomy which provide examples of core or anchor activities • Unpacked green technology value chains.	Interviewees gave input into: • the market analysis and sizing of green technologies • Policy and regulation issues faced by potential and existing green-tech firms • Market outlook and sentiment of RE manufacturers • Commented on incentives proposed and required to attract SEZ investors • Identified business services to support potential SEZ SMMEs • Attractiveness of Atlantis as a site for investment or expansion	Based on market research and interviews: • Ranked green technologies in terms of their market potential in South Africa and suitability for Atlantis. • Conducted further market analysis on high and medium potential technologies for utility-scale renewables and residential, commercial and industrial markets.	Developed two scenarios based on: • Defined assumptions on key demand drivers for each scenario. • Based on market analysis and sizing develop detailed scenarios describing the number type and size of firms that could potentially locate to Atlantis • Commented on the additional 'unquantifiable' opportunities in 'greentech' sector.

Source: Deloitte analysis

Based on interviews and initial market research we developed a view of the high-and medium-potential green technologies. We conducted further market research on only these technologies for the proposed Atlantis SEZ. In general the high-potential activities were found to be the manufacturing or partial manufacturing of technologies supported directly by government through initiatives such as solar water heaters and renewable energy technologies under the renewable energy independent power producer procurement (REIPPP) programme.

Using the insights gained from the market sizing process we developed two Atlantis SEZ uptake scenarios – conservative and moderate. The first scenario reflects a conservative view which assumes uptake from only those investors who already demonstrate and interest in the Atlantis and who are involved in producing high-potential technologies. The second scenario, the moderate scenario, assumes that some market opportunities are targeted sooner than expected due to improved market conditions and the approval of supporting policies currently under discussion and with a high probability of being enforced within the next two to four years.

8.3. Sizing the opportunity for greentech activities at Atlantis

8.3.1. Identifying the focus areas for the greentech market sizing

To understand the breadth and scope of the 'greentech' industry we researched definitions of greentech activities that are used internationally. There is no unique or universally accepted definition of greentech but it is widely understood to include activities that produce products or services that minimise harm to the environment or protect the environment relative to conventional alternatives. As discussed in earlier in section 2.3 we chose to adopt the following broad definition of greentech which was provided in the China greentech report 2012:

> "Greentech refer to technologies, products and services that deliver benefits to users of equal or greater value than those of conventional alternatives, while limiting the impact on the natural environment as well as maximizing the efficient and sustainable use of energy, water and other resources."
> China Greentech Initiative, 2012

The taxonomy of greentech activities provided in section2.3, Figure 4 while not exhaustive provided examples of technologies and services in the following broad categories of greentech activity:

- Renewable energy generation
- Energy efficiency
- Transport
- Materials and chemicals
- Environmental and waste services

To overcome the impractical task of trying to size the market for every category of greentech and every product and service within it, we conducted interviews with industry experts and completed additional market research to identify the largest sub-sectors of the greentech economy which are applicable to the South African economy and the Western Cape and Atlantis in particular.

These we group broadly into two categories:

- **Utility-scale renewable technologies** including the manufacture of components for wind and solar plant (PV and CSP).
- Residential, commercial and industrial greentech market including:
- Energy-efficient technologies like smart-meters, energy-efficient lighting, solar water heaters, heatpumps, appliances etc.
- Energy-efficient building materials
- Self-generation - Rooftop PV and related components and waste-to-energy (e.g.bio-mass), micro-wind power
- Waste management and recycling services
- Residential gas solutions

8.3.2. Identifying the key drivers of demand for green technology

Drawing insights from industry and green technology experts and stakeholders, as well as previously completed research, we outlined the main drivers of demand for and investment in green technologies illustrated in Figure 41. The green blocks represent the key factors that influence the demand for green technology in South Africa. Based on research and a series of interviews with industry stakeholders we determined that these include:

- Energy demand
- Energy price effects
- Cost effects
- Technological progress
- Government policies and standards
- Change in consumer preferences

The white blocks are the sub-drivers within each of these broad categories and these are described in terms of the direction they are likely to follow. For example, we expect overall energy costs to continue to rise based on forecasts of rising domestic electricity prices amongst other factors. The green upward arrow in turn, indicates that rising energy costs will increase the demand for investment in green technology.

Figure 41: Demand drivers of green technology products and services in South Africa

Source: Deloitte analysis

During the course of our research it became clear that the most significant drivers of demand for green technology in the short-term (next 3 years) are the direct support for uptake provided through a few key government programmes, standards and incentives (supported in turn by overarching policies and plans) and the impact of recent sharp increases in real electricity prices.

Key government programmes, standards and incentives include:

- The REIPPP programme
- The Eskom IDM programme which encompasses the standard product, standard offer and Esco programmes and its predecessor
- The DoE solar water heater programme, where Eskom is the implementing agency
- The new building standards which promote energy efficiency – SANS 10400XA and SANS204
- The DOE and SABS electronics labelling initiative SANS941 to a lesser extent
- 12L Tax Allowance

From a utility renewable energy generation perspective we find that the market is heavily dependent on the allocations set out within the REIPPP programme. Local manufacturing is promoted further through local content requirements for projects under the programme. This means that identifying the high priority utility-scale technologies is relatively straight forward. The renewable energy technologies with the highest allocations are naturally the most significant.

For the residential, commercial and industrial sectors we find that government policy and standards are also currently the key driver for greentech related products. Rising energy prices, while not as significant in terms of generating demand for greentech products as government policy or standards, is becoming ever more significant especially within the commercial and industrial sector.

The main reason why government support is the most significant driver for greentech related products within the non-utility market is because of up-front costs. Up-front costs associated with a number of greentech solutions are generally prohibitive for most South Africans, regardless of energy savings or shortening pay-back periods. Examples of such technologies include solar water heaters, rooftop PV or heat pumps. In many cases it is more affordable (or seems more affordable) for households to invest in diesel or petrol back-up generators even though in the long-run, the costs may be higher. For commercial or industrial users, payback periods are generally feasible for new builds but not for retrofits, depending on a number of technical considerations.

Upfront costs and a lack of knowledge regarding the green technology market are key barriers to further demand, particularly within the residential market segment. For this reason national and regional government will have to continue to support the greentech market until such a time that the combination of rising electricity prices and falling green technology costs provide enough of an incentive in of itself.

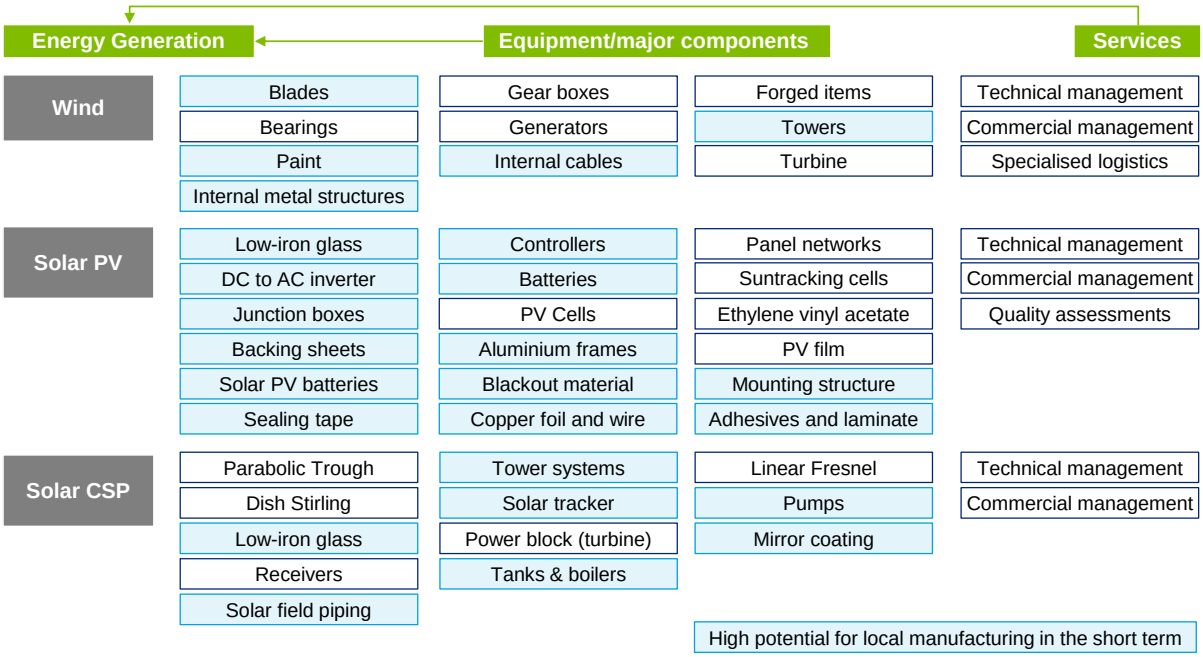
8.3.3. Unpacking the value-chains for green technology manufacturing

The purpose of unpacking the detailed value chains for various green technologies was to:

- Identify common inputs and therefore the potential common supplier industries
- To understand components which could feasibly be produced or were currently being produced locally
- To provide a more granular view of the industry

The value chains for wind, PV and CSP technologies are illustrated in Figure 42. This process of unpacking value chains was completed for a number of the other categories within the greentech taxonomy. These are presented in Annexure 7:.

Figure 42: Value chain analysis of Wind, PV and CSP technologies



It was only in subsequent interviews with key industry experts and stakeholders that we were able to identify the value-chain components that are potentially suitable for local manufacturing in terms of available skills and technologies (this assessment did not take into account other important factors in the case for localisation such as whether the local market size was supportive and whether the technologies can be produced cost-competitively in South Africa). The components suitable for local manufacturing on this rather narrow basis are highlighted in light blue in Figure 42.

By unpacking the various components within each value chain we could begin to prioritise activities related to products or services which are likely to experience increasing demand in the South African economy.

8.3.4. Identification of high priority green technologies for the Atlantis SEZ

In order to assess the feasibility of the proposed Atlantis greentech SEZ, we had to determine which of the greentech suite of activities Atlantis could viably attract in the short term given:

- The demand for the activity in South Africa and potential export markets
- Whether local industry can competitively produce the good or service for the local and\or export market
- The proposed DTI incentives and existing City of Cape Town incentives
- The advantages and limitations of the Atlantis business environment

To evaluate the greentech activities in terms of the considerations above, we developed a simple two-axis framework for activity prioritisation (Figure 43).

Figure 43: Description of prioritisation approach

Source: Deloitte analysis

On the vertical axis we ranked each activity in terms of its viability in the SA context – this encompasses an assessment of the demand for the activity in South Africa and its potential export markets and the extent to which South African producers can competitively produce it given the proposed DTI and City of Cape Town incentives. On the horizontal axis we assessed the extent to which Atlantis could feasibility attract the activity given its location, business environment and other attributes.

With respect to the viability of the activity in South Africa, the first major component is the demand for greentech products and services. For example, in South Africa national policies that mandate and incentivise the use of green technologies is one of the main drivers influencing demand.

The second major factor affecting the viability of producing the product or service in South Africa is the effect of global competition. This depends on differences in productivity (i.e. the costs of production) between South African producers and their global counterparts. In general, products which are relatively simple to produce, expensive to transport (when considering imports into South Africa) and require readily accessible local inputs will face less global competition. In considering this factor, we also take into account the proposed DTI and City of Cape Town incentives, which in some instances, may be sufficient to overcome differences in productivity.

With respect to the advantages and limitations of the Atlantis business environment (the horizontal axis), we consider attributes of the local labour supply, adequacy of infrastructure and relative cost of doing business in Atlantis and compare these to the needs of each business activity.

8.4. Sizing the market for utility-scale green technology activities in Atlantis

8.4.1. Background and context

8.4.1.1. Electricity consumption in South Africa

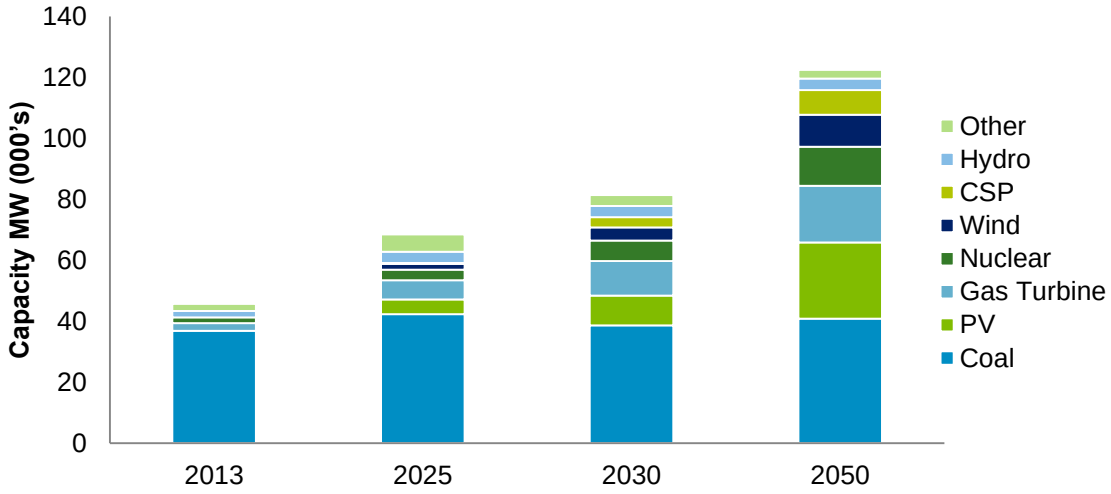
In South Africa, Eskom, the publically owned power utility, is responsible for generating 95% of South Africa's electricity.[109] Electricity is generated mainly by the conventional method of coal-burning power stations due to the country's abundant coal reserves. As the electricity is generated, it is transmitted on the national grid to municipalities and to large industries that pay a wholesale price. The municipality is a re-distributor for end-users in the residential, commercial and industrial sectors.

8.4.1.2. Electricity generation in South Africa and the long-term supply planning process

During the Apartheid era Eskom was solely responsible for future power planning in the country. This however changed in 1990 and the formal planning system now mandates the Department of Energy (DoE) to produce the national energy plan. Growth in electricity consumption in South Africa is expected remain positive over the next two decades supported by continued economic growth and an emphasis by government on achieving growth in industries such as metals, manufacturing, and mining. With this in mind, the Integrated Resource Plan for Electricity (IRP) 2010-2030 introduced in March 2011 outlines plans for increasing power generation to meet future demand based on the assumption of average annual GDP growth of 4.5% over the next 20 years (IRP2010-2030).

According to the draft IRP2010 update (Draft IRP2013) coal in South Africa will remain the main source of energy for electricity generation given the country's extractable coal reserves and investments into coal power plants (Figure 44). By 2030 coal is still expected to remain the key source of fuel for electricity generation in the country, contributing 50% of total installed capacity, down from 80% in 2013. By 2050 coal is expected to contribute 33% of all energy sources used to generate electricity.

Figure 44: South African IRP Planned Electricity Production per source



Source: Base Case Scenario (following step 5, Draft IRP2013)

[109] www.eskom.co.za

Table 20 illustrates the base case scenario from the draft IRP update which is currently out for public comment. In this draft 'base case' the allocation for wind has been reduced from 9 200 MW to 4 360 MW by 2030 compared to the IRP2010 plan. The allocation for solar renewables, however, has been raised, with the allocation for concentrated solar power (CSP) increasing to 3 300 MW from 1 200 MW, and solar photovoltaic (PV) to 9 770 MW from 8 400 MW. The draft base case is however inconsistent with the recommended policy adjusted summary where wind power targets remain at 9 200 MW by 2030. According to Johan van den Berg (SAWEA CEO), the wind allocations in the final IRP 2013 revision should be increased back towards those included in the initial IRP2010 for two main reasons:[110]

- Falling price of wind energy throughout the REIPPP programme bidding windows
- Green Accord localisation targets for fostering further industrialisation and employment creation

If the final 2013 IRP update does increase the base case allocations for wind power back to those originally included in the initial IRP document then confidence in the local wind manufacturing industry will indeed be restored. Given the uncertainties around the final IRP energy allocation updates, we will use the recommended policy adjusted summaries and the REIPPP programme allocations to understand the market size and potential for additional manufacturing activities in Atlantis.

Table 20: Technology options arising from IRP 2010 and the Update Base Case in 2030

Technology option	IRP 2010 (MW)	Base Case (MW)	Change
Existing Coal	34 746	36 230	1 484
New Coal	6 250	2 450	-3 800
CCGT	2 370	3 550	1 180
OCGT / Gas Engines	7 330	7 680	350
Hydro Imports	4 109	3 000	-1 109
Hydro Domestic	700	690	-10
PS (including imports)	2 912	2 900	-12
Nuclear	11 400	6 660	-4 740
PV	8 400	9 770	1 370
CSP	1 200	3 300	2 100
Wind	9 200	4 360	-4 840
Other	915	640	-275
TOTAL	89 532	81 350	-8 182

Source: IRP 2010 and Updated Based Case

[110] Allocation downgrade a threat to wind energy localisation goal, www.engineeringnews.co.za

8.4.2. Implications of the REIPPP programme for utility-scale renewables

Large coal power projects such as Medupi and Kusile require international sources of funds, which are also becoming harder to procure due to the negative environmental impacts associated with the burning of coal. In a bid to meet carbon emission targets set by international funders, such as the World Bank, and to foster 'greener' economic growth, the IRP also includes plans to lower the share of electricity generated by coal. To achieve these non-coal capacity targets the department of energy introduced the renewable energy independent power producer procurement (REIPPP) programme in 2011. The need, therefore, to procure renewable energy is both a function of South Africa's international commitment to reduce greenhouse gas emissions and a condition to the World Bank's funding of South Africa's coal fired station build programme.

While the IRP looks ahead at the energy needs of the country, South Africa's electricity generation capacity has not been able to meet existing energy needs. In 2008 Eskom introduced load shedding and again in 2013 due to a shortage in electricity supply and issues with weather. To increase the capacity on the national grid Eskom has embarked on a large capital expansion programme. At a utility-scale the Medupi and Kusile coal fired power stations are the two largest projects currently underway by Eskom. These two power stations aim to provide an additional 9 600 MW of capacity to the grid by 2020.[111] Medupi was expected to deliver its first power to South African grid by the end of 2013, but delays in construction have postponed this expected date to the end 2014, possibly further.

Until new capacity is brought online South Africa's power system will continue to constrain the growth of South Africa's economy and growth outlook. As part of government's overall strategy to remove energy constraints, Trade and Industry minister Rob Davies announced in 2013 that Cabinet has approved the building of a third coal-fired power station by Eskom.[112]

The other sources of energy that have been identified in the IRP include wind, solar, imported hydroelectricity, nuclear and liquefied natural gas. Significant growth in the installed capacity of solar PV, wind and CSP technologies is expected up to 2050 and possibly beyond. These capacity allocation targets set out by the IRP will help stimulate the market for renewables at a utility scale with most projects being completed and managed by IPPs through the REIPPP programme. The REIPPP programme invites prospective Independent Power Producers (IPPs) to submit renewable energy projects under a number of bidding windows within the Programme. The intention is that the IPP will build, own and operate the proposed renewable energy facility. The IPP will then sell electricity to Eskom.

In terms of renewable energy outside of the REIPPP programme the Ingula and Sere projects are the only two utility-scale projects currently underway by Eskom and are both expected to be completed within the next couple of years. The Ingula project is a 1 300 WM pumped-storage scheme situated within the Drakensburg mountain range between the KwaZulu-Natal and Free State provinces. The Sere wind farm project situated in the Western Cape is a 100 MW wind farm comprising of 46 wind turbines and is Eskom's first large scale renewable energy project. The REIPPP programme, however, will still remain the key driver for uptake in renewable energy at a utility scale.

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[111] Eskom new build progress, 2013

[112] Who Owns Whom Report, 2013

In 2003, Cabinet approved private-sector participation in the electricity industry and decided that future power generation capacity will be divided between Eskom (70 percent) and independent power producers, or IPPs (30 percent). The Department of Energy was mandated with the responsibility of ensuring private-sector participation in power generation through a competitive bidding process and that diversified primary energy resources be developed within the electricity sector without hindrance. During 2003, Eskom implemented a revised business model to prepare for capacity requirements and the impending restructuring by splitting its business into regulated and non-regulated divisions.

In November 2012 government and IPPs signed the first contracts for Window 1 project, which is expected to bring R47 billion worth of investment into the energy sector and help achieve government's target of 3 725 MW of renewable energy generation by 2016. In December 2012, the DoE announced a further allocation of 3 200 MW of renewable energy power to be online by 2020 bringing the total allocation for renewable energy through the REIPPP programme to 6 925 MW. The progress of the REIPPP programme is shown in Table 21.

The bids submitted through the REIPPP programme are evaluated against a set of criteria as determined by the DoE and then ranked on the basis of price (70%) and economic development (30%). The top projects are awarded the status of preferred bidder and then work towards financial close on the projects. In addition to the REIPPP programme, there is also a Small Scale IPP Procurement Programme where the Department of Energy has allocated 100 MW to the procurement of small projects which individually have a maximum contracted capacity of 5 MW. The technologies included in the small scale REIPPP programme include onshore wind, solar photovoltaic, biomass, biogas and landfill gas.

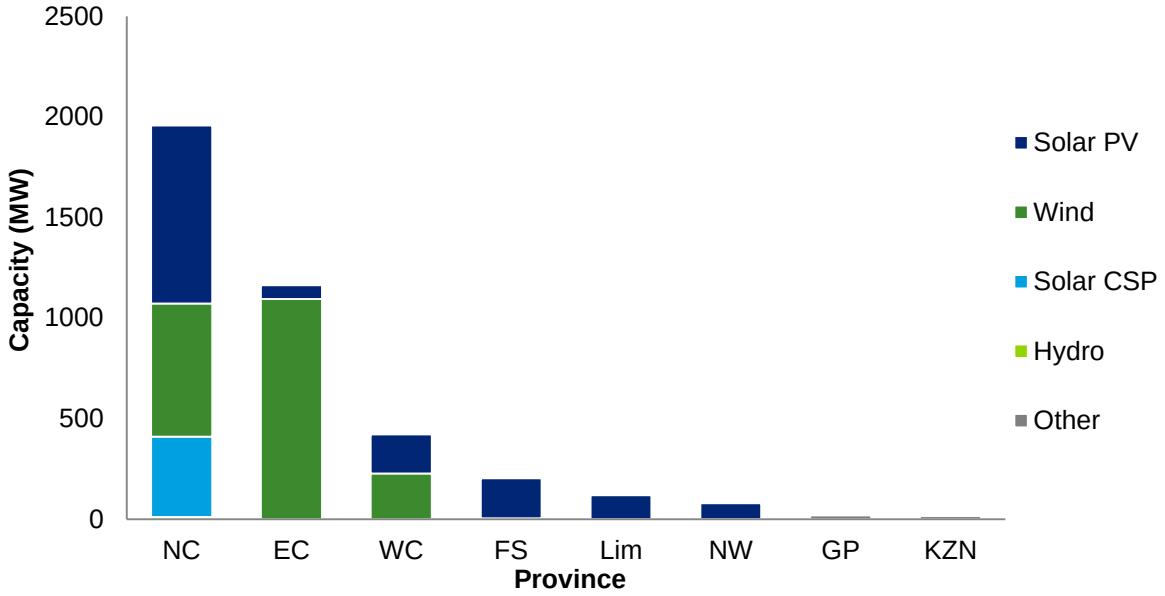
Table 21: REIPPP programme megawatt allocations to date

	MW in window 1 November 2012	MW in window 2 May 2013	MW in window 3 November 2013	MW remaining
Solar PV	632	417	435	1 041
Wind	634	563	787	1 336
Concentrated Solar Power	150	50	200	200
Small Hydro (less than 40MW)	-	14	-	121
Landfill Gas	-	-	18	7
Biomass	-	-	16	43
Biogas	-	-	-	60
TOTALS	1 416	1 044	1 456	2 808

Source: DoE, 2012

Figure 45 illustrates the cumulative renewable energy capacity by province which has been allocated throughout the first three phases of the REIPPP programme. Solar CSP and solar PV are more predominant in the Northern Cape and the Eastern Cape due to the high levels of Direct Normal Irradiation. For the Western Cape, 227 MW of wind power and just less than 200 MW of solar PV have been allocated over the last three bids of the REIPPP programme.

Figure 45: Total capacity awarded through the REIPPP programme by province and technology



Source: DoE, 2014

Subsequent to the window three allocations the DoE has finalised the date for window four submissions. Bidders are required to submit their proposals before the 18th of August 2014. Notification of successful bidders is scheduled for the end of October 2014. It is anticipated that the approvals for bid windows four and five will improve the market outlook for South Africa and potentially provide the demand required for more foreign investors to locate in the country and for existing suppliers and manufacturers to expand their facilities output. Given the small allocations to utility-scale biogas, biomass, landfill gas and small hydro these technologies will not be considered further in this section.

8.4.2.1. The falling absolute and relative cost of renewable energy will support demand

Through the successive REIPPP programme rounds, the cost of generating energy from renewable technologies has fallen considerably as evidenced in Table 22. While it is useful to compare the cost of energy generated from different sources in absolute terms, these costs do not reflect the full techno-economic, fit-for-purpose and opportunity cost considerations. For example power generated from wind technology is intermittent and not necessarily available at peak times so there are some significant disadvantages over other energy generation technologies such as coal which provide more predictable and consistent flows of energy.

Competition between bidders increased during rounds two and three, in terms of the number of bids submitted and those that exceeded the qualification hurdles. As result of this increased competition for REIPPP allocations, in addition to falling international prices for renewable energy equipment, the prices in bid windows two and three fell considerably.[113] Technological improvement in green technology and the falling relative cost of energy generated from renewable sources are supportive of demand for and therefore allocations are likely to these technologies in future editions of the IEP and IRP.

Table 22: Fully indexed prices (Ave Rand per MW/h)

	PV	Wind	CSP
Window 3	R 990	R 737	R 1 640
Window 2	R 1 848	R 1 008	R 2 822
Window 1	R 3 098	R 1 284	R 3 017

Source: DoE, 2014

8.4.3. Localisation requirements

8.4.3.1. Background

Large-scale public procurement has become a key enabler for implementing South Africa's localisation strategies. The REIPPP programme presented an opportunity to develop a local renewable energy market through the manufacturing of components by stipulating certain thresholds and targets which bidders need to meet.

8.4.3.2. REIPPP Local Content requirements

The RFP defines local content (LC) as 'the portion of the Total Project Value that represents South African Products' with South African Products being defined as 'the Total Project Value' excluding: (a) the cost of components, parts or materials which have been or are still to be imported (whether by the seller or the EPC contractor or any of their contractors) and which costs are inclusive of costs abroad, plus freight and other direct importation costs, such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African port of entry; and (b) the costs of or payments made in respect of services or service providers that are not South African tax paying persons or entities'.

The majority of the Total Project Value comprises of 'Key Equipment or Components' costs. In order to achieve its localisation strategies the government has defined priority components per technology to be manufactured in South Africa with the understanding that a gradual roll-out may be required in order to build the necessary local manufacturing capacity.

Minimum LC thresholds for each technology have been set which bidders need to meet. Bidders are incentivised to commit to LC figures that meet or exceed the targets for LC per technology by way of a points scoring methodology:

- Bidders who meet the thresholds for LC do not score any points.
- Full points are awarded to bidders who achieve or exceed the targets.

[113] South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons, 2014

- The system is based on the principle that the highest score submitted by a bidder is allocated the most points and other bidders are then allocated point's pro-rata to their position in terms of the highest score submitted. This system incentivises bidders to aim as high as possible.
- It is particularly important to note that the LC score represents 25% of the overall Economic Development Score. The competitive evaluation portion of the bid includes Price at 70 points and Economic Development at 30 points.

As part of their response, bidders need to articulate their LC breakdowns in tables which clearly distinguish between Key Equipment and Components and the Balance of Plant. The tables require bidders to show the total rand value of the cost per item as well as the rand value cost of the LC portion per item and its associated % value as well as identify the suppliers and service providers who are anticipated to supply the goods and services. Table 23 below outlines the thresholds, targets and key components earmarked for localisation:

Table 23: Thresholds, targets and Key components identified for localisation

Onshore Wind		Solar Photovoltaic		CSP without Storage		CSP with Storage (min 3 hours per day)	
Threshold	Target	Threshold	Target	Threshold	Target	Threshold	Target
40%	65%	45%	65%	45%	65%	40%	65%
The REIPPP defines the following items as Key Components or Equipment for this technology: • Meteorological Mast • Turbine Tower • Turbine nacelle (including interior fittings, exterior fittings and drive train) • Blade		The REIPPP defines the following items as Key Components or Equipment for this technology: • Solar Modules • Mounting Frames • Inverters • Transformers • Control and Tracking control for tracker frames		The REIPPP defines the following items as Key Components or Equipment for this technology: • Heat transfer fluid and handling system • Electrical generation system (including generator steam turbine and ancillary equipment) • Condenser and cooling system • Thermal storage system • Distributed control system • Pump, motors and auxiliary steam cycle equipment • Water treatment plant			
Wind Turbine blades and towers have been earmarked for localisation by the Government		PV modules, PV inverters and the metal structures used in PV plants have been earmarked for localisation by the Government		No specific mention of priority key equipment for localisation			

Source: Adapted from the REIPPP Volume 5 Economic Development Requirements, DoE.

The commitments made by bidders in their submissions will form part of a binding contract with the DoE and their performance in relation to achieving these commitments will be monitored on a quarterly basis. Significant financial penalties are incurred by bidders who fail to meet their commitments. Therefore significant effort is undertaken by bidders to plan and verify their LC strategies in prior to submission of the bid.

8.4.3.3. Other key considerations

- The earmarking of certain key equipment and components for localisation has provided a clear trigger for the local manufacturing market. However, with some of the delays in the REIPPP process and allocations there is still a lack of market confidence required to ensure that sufficient demand will be available to justify local manufacturing long-term. In the short term, however, within the last two to four years, four PV manufacturers, four inverter manufacturers, two wind tower manufacturers and various other manufacturers and assemblers have invested in the country, signalling a successful outcome of these local content requirements.

- Local manufacturers need to understand the certifications and standards process in order to ensure that the relevant warranties and guarantees for the components that they manufacture are in place as this is a key technical requirement of the RFP as well as a requirement by institutional and private lenders. The requirements for bankability in the REIPPP programme has made it difficult for non-tier 1 suppliers to participate. Similarly, in manufacturing a strong track record has been required.
- There are often significant risks borne by local manufacturers in terms of developing the necessary track records for the components they produce – options to share these risks with larger OEMs, developers and Government should be explored.
- Calculating LC at a 2nd and 3rd tier subcomponent level is often complex and can be unattractive to OEMs if not incorporated into their own production plans. Coupled with Broad-based black economic empowerment (B-BBEE) requirements, the bid complexity in the REIPPP programme and high transaction cost in SA makes it expensive to set up in South Africa
- The REIPPP has strict technical efficiency and reliability standards which the local manufacturers need to ensure they meet.
- Local manufacturers are often impacted by various input costs which can put even further pressure on the cost-effectiveness of the products. Within the REIPPP provision has been made whereby raw or unworked steel and aluminium products, which are used for local manufacturing of components, such as wind turbine towers, solar PV mounting structures or solar PV module frames, will be recognised in the REIPPP Programme as 100% local. The rationale behind this is to encourage local fabricators of components (such as wind turbine towers, solar PV mounting structures and solar PV module frames) to seek the best globally competitive prices for primary steel and aluminium.
- It is important to note that the demand for renewable energy equipment and components at a utility scale will be directly linked to the pace at which the REIPPP programme is rolled out and the allocations allowed in each bid window.

While the REIPPP programme allocations drive the development of renewable energy plants in South Africa, it can be argued that it is the local content requirements set out by the DTI that is driving local manufacturing. While not all local manufacturing can be attributed to local content requirements (illustrated by manufacturers operating in SA before the introduction of the REIPPP), during our interview process it was evident that many developers and OEM's would have preferred importing components mainly as a result of cheaper import prices. Local content requirements thus play a major role in generating tangible future demand for locally manufactured components from utility-scale RE power plant developers.

Almost all of the component manufacturers who we interviewed indicated that they were considering future markets for exports, especially within sub-Saharan Africa. SolaireDirect already export most of their output to Europe, where it would have been too expensive to locate. Cape Town was chosen due to the then CEO's knowledge and interest in the area. There is a large opportunity for multinational manufacturers, such as SolaireDirect, to establish themselves in South Africa to supply the Southern Africa region in the future. During our interviews manufacturers indicated that for the time being, local demand would still need to sustain business first, until such a time where opportunities in neighbouring countries become more tangible. The proposed Atlantis SEZ will no doubt be a location that manufacturers will consider.

Other drivers of demand from outside of South Africa include commitments by governments to invest in Africa's energy crisis, usually to the benefit of their own manufacturers though, but which can still positively impact demand for South African exports in services.[114] The state of electricity supply and capacity in Africa is poor resulting in a gradual but disruptive trend towards self-generation, especially outside of South Africa where electricity infrastructure and supply is considered good.[115] Renewable energy technologies are able to provide energy to households and firms in a more decentralised manner, if conditions are right, and are quick to deploy without the need of access to large transmission and distribution networks. Government policy and regulation, technology awareness and access to finance however will need to improve before this opportunity fully develops for South African manufacturers who will need to compete with global players.

In the short to medium term local demand, stimulated via the REIPPP programme and other government plans and regulations as well as rising electricity prices, will create enough demand for additional local manufacturing activities to take place sustainably in the country.

8.4.4. Results – rating and prioritisation of utility-scale technologies for Atlantis

In order to prioritise the various utility-scale renewable energy technologies for the Atlantis SEZ, we evaluated the potential of each technology on the basis of the following four criteria:

- Current size of the market and tangible future demand
- Level of government support
- Ability to produce or produce components or service competitively in South Africa
- Suitability for production or service delivery at Atlantis

The ratings (very low, low, medium and high/large) for each of the criteria were determined on the basis of desktop market research and additional insights from interviews with industry players, academics with specialisation in green technology, Deloitte and AECOM industry experts and a variety of other stakeholders. The results are illustrated in Table 24. The detailed assessment of these technologies against the four criteria and rationale for each rating can be found in Annexure 8:.

[114] With Power Africa plan Obama to grease billions in deals for GE, www.forbes.com

[115] Wall Street firms keep warning of distributed energy threat to utilities, www.greentechmedia.com

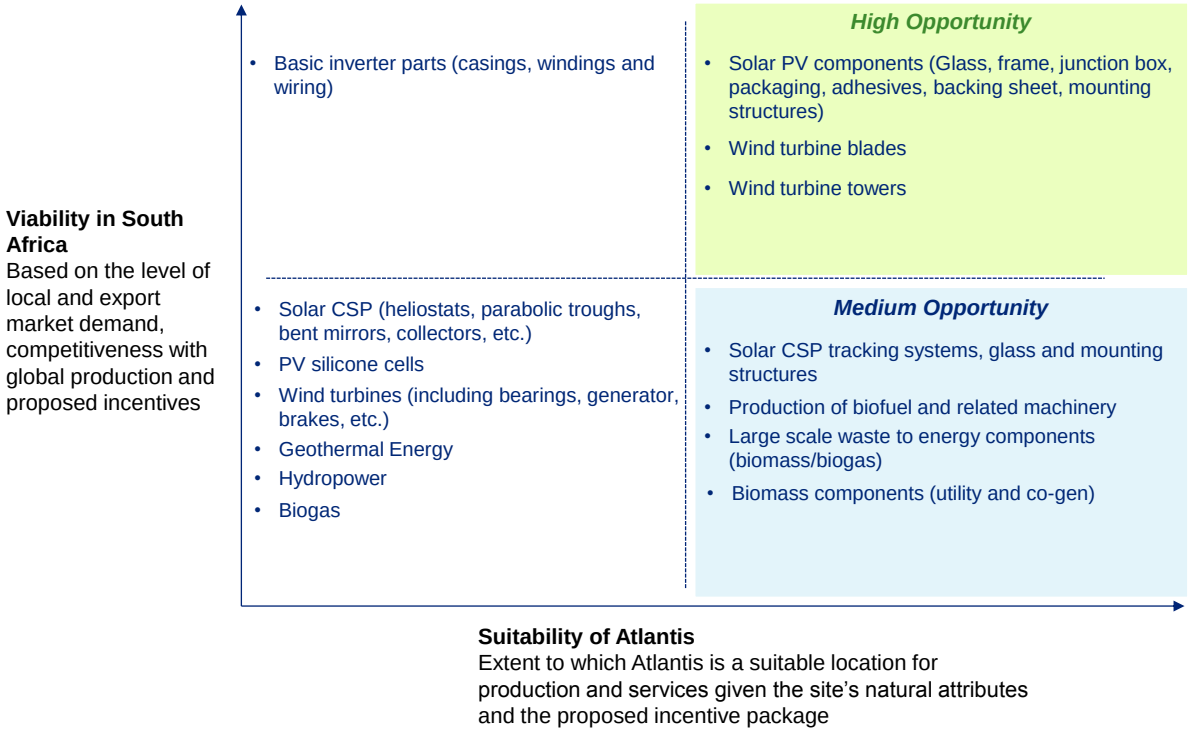
Table 24: Assessment of utility-scale greentech opportunities

	Current size of the market and tangible future demand	Level of government support	Ability to produce in South Africa	Suitability of Atlantis and potential for new investor
Solar PV components (Glass, frame, junction box, packaging, adhesives, backing sheet)	Large	High	High	High
Wind turbine blades	Large	High	Medium	High
Wind turbine towers	Large	High	Medium	High
Basic inverter parts (casings, windings and wiring)	Large	High	Medium	Low
Production of biofuel and related machinery	Medium	High	Medium	Medium
Biomass components (utility and co-gen)	Medium	Low	High	Medium
Solar CSP tracking systems, glass and mounting structures	Medium	Medium	Low	Medium
Wind turbines (including bearings, generator, brakes, etc.)	Medium	High	Low	Low
Large scale waste to energy components (biomass/biogas)	Medium	Low	Medium	Medium
PV silicone cells	Medium	High	Very Low	Low
Solar CSP (heliostats, parabolic troughs, bent mirrors, collectors, etc.)	Medium	Medium	Low	Low
Hydropower	Medium	Medium	Low	Low
Bio-gas energy	Low	Low	Medium	Low
Geothermal Energy	Very low	Very Low	Low	Low

Source: Deloitte analysis

Due to government support through the REIPPP programme and the allocations within the IRP2010 and IRP2013 update summary tables, the manufacturing and assembly of solar PV modules, wind turbine blades and towers and selected CSP components are the activities with the largest utility-scale greentech market opportunities. The technologies and products categorised as having a 'medium' market opportunity are technologies which potentially have attractive market opportunities in the near future (post 2017) but which lack the required government support needed for growth in the short term. As market conditions improve for these activities so will demand, eventually reaching a point where annual demand is sufficient enough to sustain more local manufacturing, potentially in Atlantis. The prioritisation results are illustrated in Figure 46.

Figure 46: Prioritisation of utility-scale green technology market opportunities



Source: Deloitte analysis

8.4.5. The utility-scale wind power opportunity in South Africa and Atlantis

The most noticeable investment currently underway is the Gestamp wind tower manufacturing plant under construction in Atlantis. Also of importance is LM Wind Power's interest in establishing a wind blade manufacturing plant in either Atlantis (Western Cape) or Coega (Eastern Cape). LM Wind Power's decision will be based on further research, SEZ announcements and the outcome of the fourth bid window of the REIPPP programme due to be released towards the end of 2014.[116]

Currently DCD is the only local wind tower manufacturer in South Africa. DCD manufactures wind towers out of their Coega plant in Port Elizabeth. They also have the capability of manufacturing wind blades (through a small subsidiary, I-WEC) and possibly nacelles and hubs in the future. The DCD facility can produce around 110 towers per annum. DCD has also signed a technology agreement with Vestas, a multinational OEM and local project developer of wind power projects. By manufacturing towers locally, DCD is able to raise the local content level to beyond 40%, which is sufficient to satisfy the current requirement.[117]

[116] Interview with LM Wind Power (India)

[117] Home grown supply chain: how is South Africa meeting its challenges? www.windenergyupdate.com

At an average capacity of 2.5 MW[118] per tower DCD can produce enough towers to supply 275 MW per year for the local wind market. Based on current wind power allocations in the REIPPP programme and the IRP2010 update, the market potential for the next six to ten years is between 300 and 400 MW per year or 120 to 160 towers per year. This in our view provides enough market opportunity for at least two wind tower manufacturers to sustainably operate in the country over the next decade. Only after 2025 does the current IRP2010 plan indicate a wind power market potential for another two or three wind tower manufactures, with an annual installation requirement of around 600 MW per year. With the introduction of Gestamp into Atlantis we consider the market to be fully captured for the next decade unless interim updates to the IRP are improved significantly for utility-scale wind power.

In terms of wind blade manufacturing we can in a similar fashion estimate the local manufacturing potential by looking at the allocations for wind power within the IRP2010. If we assume three blades per wind turbine we can estimate that the South African market will need between 360 to 480 blades per year over the next 6 to 10 years. Thereafter, the market potential for local wind blade manufacturing improves in line with the DoE's current allocation within the IRP2010.

Assuming a plant output capacity of 250 – 400 blades per year[119] the South African wind blade manufacturing market can sustain one local manufacturer over the 2014 - 2030 period. Industry experts and wind blade manufacturers agree that the local wind blade and tower manufacturing market is driven by local content requirements set out by the DTI in order to be awarded projects under the REIPPP programme.[120] The market outlook therefore depends on how stringent local content requirements are monitored (or increased) and how much future energy plans (REIPPPP and IRP) allocate to this technology.

The draft IRP update (2013), which was out for public comment, includes a 'base case' that reduces the allocation for wind from the 9 200 MW by 2030 outlined in the current IRP, to 4 360 MW. The final IRP 2014 which will take into account the public's comments is waiting for approval from the Cabinet. The allocation used in our scenario planning is based on the IRP 2013 update with an allocation of 4 360 MW. This can be seen to be a conservative view, as it is possible that the wind allocation will be increased, back closer to the IRP2010 allocation.

Johan van den Berg the CEO of SAWEA believes that as wind power has become cheaper since the last IRP, the association is confident that the final IRP 2014 will recognise this and there will be an increase in the allocation.[121] Such an increase would be a positive outcome for the local industry and Atlantis, as this increase will give scope for additional manufacturing (output or presence of firms). To date, however, there has been no press release with regards to any new allocations or when the new IRP 2014 will be released.

Suppliers and supporting services

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[118] Nordex2.5 MW N90 turbines, Kouga wind farm overview.

[119] LM Wind Power, 5 moulds and a 3 day requirement for one mould.

[120] Deloitte interview with Professor Alan Brent and LM Wind Power.

[121] Johan van den Berg CEO of Sawea, Engineering News, Allocation downgrade a threat to wind-energy localisation goal, January 2014.

Through interviews with both Gestamp and LM Wind Power additional SMME opportunities were identified. Services and suppliers of electrical cables, manufacturing of ladders and steel frames, lights and light kits as well as dedicated painting services will be imported at first. Both firms however hope to use local SMMEs at a later stage and have already had discussions with SEDA Atlantis Renewable Energy Business Incubator (SAREBI) to potentially fast track this process. Specialised transport services will also be required for both the wind turbine blades and towers which may present another opportunity for Atlantis to attract more activity.

8.4.6. The utility-scale PV opportunity in South Africa and Atlantis

Close to 900 MW of solar PV capacity have already been allocated in the Northern Cape and close to 200 MW in the Western Cape. These allocations are expected to increase during the fourth and fifth REIPPP bidding windows.

Overall the DoE has targeted just less than 5000 MW of solar PV by 2025. This implies an average installed capacity requirement of 400 MW per year. Currently there are five manufacturers of PV modules in South Africa with capacities to manufacture between 75 and 120 MW each per year (SolaireDirect, Sunpower (previously called Tenesol), JA Solar, JinkoSolar and ARTsolar). Most of these manufacturers have indicated through interviews that they can expand their existing plant outputs within a minimal amount of time if required.

Within the next decade we do not expect to see a significant increase in the number of foreign firms establishing new manufacturing facilities unless it is based on an export market opportunity or guaranteed uptake from any of the REIPPP projects. We can, however, expect new PV module manufacturers to be interested in the Atlantis area given its close proximity to Cape Town and its relatively close proximity to the majority of REIPPP solar projects in the Western Cape and Northern Cape. While the market can comfortably support 4 or 5 PV manufacturers some competition may drive prices down encouraging exports and thus additional output.

Given the IRP2010 allocation of PV power we can expect at least one additional module manufacturer to enter the market within the next three to five years, potentially within Atlantis. Industry stakeholders have indicated that a number of international PV module manufacturers are interested in moving into the South African market, as seen with the recent opening of the Jinko factory in Epping, Cape Town. Other sources of demand for PV modules which support the industry include household PV and industrial off-grid small scale projects. The DoE has also launched the Small REIPPP programme. At this stage bidding for both the first and second window periods for the small-scale REIPPP programme will be finalised by mid-2015. At current levels of planned allocations, only after 2025 would the PV market outlook improve enough to anticipate any further manufacturers entering the local market.

Additional manufacturing opportunities that were identified through interviews with local manufacturers and localisation studies are illustrated and discussed in Table 25. These are opportunities related to the assembling of PV modules, excluding packaging and transport.

Table 25: Localisation potential for PV module component inputs, 2014 - 2025

Description	Localisation potential	Rationale
Silicone Cell	Medium	Opportunity exists if DoE allocations increase and residential PV market expands significantly Requires significant local demand Global over-supply

		500 MW of stable annual demand for a period of five to ten years is required to justify investment in the PV cell manufacturing facility in the country Thin-film manufacturer PTiP has indicated interest in manufacturing in South Africa in the future[122]
Aluminium frame	High	Local suppliers exist but not competitive with imports at the moment. May require greater demand for product to increase capacity
Glass	High	Local capabilities exist but market demand has historically not been sufficient to justify investment into a new production lines Glass can be used for PV modules, flat plate solar water heaters, flat plate glass CSP plants and building installations Large opportunity exists where raw low-iron glass sheets are imported and locally beneficiated to a final product which is a high value-adding step in the production process High transport costs also justify manufacturing locally and close to PV module manufacturers/assemblers.
EVA (Ethylene vinyl acetate) and backing sheet	Low	Currently imported Supply chain is highly concentrated; thus potential for its localisation is limited but still exists if future demand would unlock economies of scale benefits
Wiring (copper ribbon)	Medium	Difficult to compete with imported copper wire unless scale is significantly increased. Maybe justifiable post 2025. Local copper is available but quality can be low
Junction boxes	High	Small scale manufacturing is taking place by small electrical goods manufacturers, however, greater investment is required to increase outputs New manufacturing could be established but may require additional demand. Existing manufacturers can meet current market requirements

Source: Deloitte interviews, 'Localisation Potential of Solar Photovoltaics in South Africa', SAPVIA, WWF and DTI

Inverters

Inverters are a key component in all utility-scale PV plants. The inverter market in South Africa is still considered to be in its infancy stage compared to other countries. Most local suppliers of inverters are importers of inverters manufactured by companies like SMA or Siemens. Locally manufactured inverters tend also to be more expensive (between 35-75%) than imported inverters. Some recent developments locally include:

- Starting in the second quarter of 2014, SMA Solar Technology AG will begin producing solar inverters in Cape Town. Together with the expansion of the South African sales and service structures, SMA will fulfil all of the requirements for local added value.[123]
- TUV has also recently established a manufacturing plant in South Africa.
- A 200 MW capacity facility owned by AEG was established in 2012 and has begun operations to produce utility-scale solar inverters. In mid-2012 the AEG facility was the only facility manufacturing utility-scale solar inverters in South Africa.

[122] Hopes for a CIGS boom in South Africa, www.pv-magazine.com

[123] *Press release, SMA Solar Technology AG*

- Earlier this year Powerway PV SA and Sungrow announced that the two companies would be opening a solar inverter manufacturing facility in Coega.[124] The joint-venture between these two firms is expected to reach full capacity by the end of 2014. Sungrow and Powerway PV SA are also interested in a solar PV module factory plus a mounting system production facility based on the country's high levels of solar irradiation, their third party financing solution and the possibilities of net-metering in the future.
- In 2012 Gefran S.p.A. and Enertronia S.p.A. established a joint venture in South Africa with the aim of producing inverters and PV modules as well as proving EPC services. [125] In 2013 the two firms however decided to continue operating in South Africa, but as separate firms. Gefran S.p.A is an international leader in industrial automation and the production and sale of photovoltaic inverters. Enertronica S.p.A. is a company operating in the field of renewable energies as EPC and manufacturer of components and systems used in photovoltaic installations. The two firms decided to continue their activities with separate companies in order to increase the number of initiatives under the BEE compliance programme, thereby improving the company's future BEE level.

There is also the possibility that larger multinational firms could set up assembly plants in South Africa where basic components, such as the container box or cables, are sourced locally and the remaining parts (inverter, transformer and switchgear) imported.[126]

Mounting structures

Components of mounting structures are generally pre-engineered systems using aluminium and/or steel depending on the application of PV modules. Some mounting structures use tracking systems which can increase the output of a PV module by up to 32%.[127] Tracking systems would typically be the only moving parts on a PV mounting structure if included. Both the mounting structures market and the tracking systems market have existing manufacturing capabilities in South Africa. Tracking systems were identified as one of the high potential local manufacturing opportunities in South Africa in a recent study completed by the IDC.[128]

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[124], Solar Inverter Manufacturing Plant For South Africa, March 2014

[125] *Gefran and Enertronica partners in photovoltaics in South Africa, www.energymatters.com.au*

[126] Solar PV localisation report, DTI, WWF and SAPVIA, 2013

[127] Solar PV localisation report, DTI, WWF and SAPVIA, 2013

[128] feasibility study to determine the viability of the establishment of a local manufacturing facility of (CSP) modules and components in South Africa, IDC, 2012

The opportunity though in the Western Cape is limited, with most mounting structures already being manufactured in other industrial areas around the country, such as Vanderbijlpark, by existing steel and steel structures firms. The South Africa business arm of Schletter, a German PV mounting systems specialist, is considering investing in its own domestic manufacturing capacity in an effort to service growing local and regional demand, as well as to further raise the localisation levels of its products. Schletter established operations in Johannesburg in 2011 and currently produces its systems locally in partnership with domestic manufacturers and is supplying products for four of the REIPPP programme projects from the first two bidding rounds.[129]

8.4.7. The utility-scale CSP opportunity in South Africa and Atlantis

The CSP market opportunity is significantly smaller than the utility PV or wind power markets. To date only 400 MW have been allocated in the first three bid windows in the REIPPP programme with an additional 200 MW still to be allocated in the next two bidding rounds. This implies a market opportunity of 600 MW over the next ten years which equates to an average annual installation requirement of 60 MW between 2015 and 2025 based only of the current REIPPP programme targets. A report conducted by the IDC indicates that there is a market opportunity of over 6 000 MW for CSP in South Africa when including water and power line restrictions, suggesting that allocations for CSP may improve in future IRP updates.

The IRP2010 indicates a target of 1200 MW of installed capacity for CSP by 2030, and 3 300 MW in the draft IRP2013 base case. Depending on the magnitude of changes to the final IRP2013, the market outlook for CSP beyond the REIPPP programme seems attractive for investors. Given the allocations thus far for CSP technologies we anticipate an annual capacity demand of between 150 MW and 250 MW in CSP technologies.

One of the key advantages of CSP technologies, over that of PV or wind power, is that CSP provides opportunities for better storage solutions. Developers within the local CSP market indicated that current allocations for CSP do not take into account this storage potential.[130] Also, because CSP is a thermal process, the power block component can be removed to provide steam and other thermal energy without having to create electricity.[131] This however is more suitable to the non-utility-scale market and referred to as concentrated solar thermal (CST). Some disadvantages include water availability and the need to import a significant amount of technology and components such as the parabolic troughs, storage components, receivers and other pipes, pumps and boilers.[132]

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[129] German solar mounting specialist weighing SA investment options, www.engineeringnews.co.za

[130] Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) CSP study, June 2013

[131] Based on an interview with Professor Alan Brent from the Centre for Renewable and Sustainable Energy Studies

[132] CSP market report, June 2013, the **dti**, giz and SASTELA

According to one study investigating the localisation potential of CSP in South Africa, the local manufacturing industry can only compete in the basic CSP components market. The most promising components for local manufacturing are the mirrors, steel support structures and the support systems for the thermal storage and power block.[133] This view was repeated in a localisation study by the IDC which identified the manufacturing of CSP/CPV tracking systems, mirror coating services and mounting structures as the most feasible components for local manufacturing. The report suggests that local manufacturing would however only really take off if average annual allocations increased to above 100 MW per year.[134] This value then confirms our view that more local manufacturing can take place for these "basic" components within CSP power plants. It was established that curved mirror and solar receiver manufacturers require a 400-500 MW per annum market to justify investment into manufacturing operations.[135] Unfortunately due to a lack of low iron sand available in South Africa and low levels of demand for low-iron glass, the incentives and know-how are lacking for the competitive production of curved and flat glass mirrors.[136] According to an interview with a high potential investor in the local production of flat low-iron glass, the greatest value added is in the further beneficiation of these glass plates which South Africa could most certainly do at competitive rates once the right technology and basic inputs are imported. PFG Building Glass is currently the only manufacturer with the ability to produce low-iron glass and silver flat mirrors for the power tower and linear Fresnel applications on a commercial scale.

Given the opportunities mentioned above we do not anticipate any CSP collector or parabolic trough mirror manufactures to enter the market within the next decade unless the CSP utility market outlook improves or if thermal energy solutions become more financially feasible. We do however anticipate CSP developers to seek local suppliers of associated components to enhance the local content share of the overall plant costs. This would unlock the opportunity then for an additional tracking system manufacturer who will also be able to service other markets such as the SKA project and other communication technology related projects.

The manufacturing of mounting structures and flat plate low-iron glass were also identified as opportunities for improving localisation within the CSP market. With support from the DTI and local government we can expect potential glass and tracker manufacturing firms to show interest in the Atlantis area for additional/new manufacturing activities. These products are also inputs into the PV module and solar water heater manufacturing/assembling industries, further building on the case for additional local activity.

8.4.8. Renewable projects in the SADC region

[133] Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) CSP study, June 2013

[134] Feasibility study to determine the viability of the establishment of a local manufacturing facility of CSP modules and components in South Africa, December 2012, IDC

[135] Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) CSP study, June 2013

[136] Deutsche Gesellschaft Für Internationale Zusammenarbeit (GIZ) CSP study, June 2013

The majority of countries within the Southern African Development Community (SADC) region, excluding South Africa, depend on hydropower for the bulk of their electricity supply. According to power industry reports by Business Monitor International (BMI) hydropower's share of the power mix is expected to decrease over the next decade. This decrease in hydropower is to be supplemented with an increase in new coal, oil and gas power stations.[137] There is limited existing capacity of solar PV, CSP or wind within the utility and non-utility market in the SADC region.

BMI reports indicate a growing emphasis on exploiting renewable energy resources by utilities in the SADC region. This could provide a foothold for new entrants into the SADC power sector. The increase in government support of non-hydropower renewables is evident by the new policies that are being drafted, however these are in very early stages compared to the REIPPP programme in South Africa. Off-grid projects, however, are growing increasingly popular and may provide a better opportunity for project developers and OEMs. The off-grid market in most SADC countries outside of South Africa is driven by a lack of generating capacity and reliable energy.

In terms of national plans;

- The Namibian government is conducting negotiations with renewable energy IPPs to develop projects in rural areas. While the country does not have a renewable energy policy yet, it is aiming to source 10% of electricity from renewable sources by 2025.[138]
- Zimbabwe is set to introduce feed-in tariffs (FITs) in 2014, in an effort to boost greater private sector power generation from renewable energy sources.[139]
- The Tanzanian government is implementing a National Solar Programme under the World Solar Programme (WSP) in an open-ended attempt through broad partnerships and cooperation of governments and NGO organisations to promote the wider utilization of renewable energy resources. In Tanzania, PV development is supported by the government, which is looking to increase the share of renewable energy in the country's electricity mix from 4.9% to 14% by 2015.[140]

According to the BMI power infrastructure database, there are various renewable energy projects that are expected to be undertaken in the next 10 years (Table 26). Approximately 1 089 MW is expected to be constructed by 2023. The total planned capacity of all the projects reported in Table 26 is roughly 16% of the allocated megawatts in the REIPPP programme. Majority of the projects that are planned are being constructed by international firms (mostly from Europe and China).

Although there is a potential for local South African manufacturers to benefit from these renewable energy projects, there is little incentive for project developers to use the services or products of South African firms. This is especially true for instances where imported products are significantly cheaper than those made in South Africa due to government subsidies or other comparative disadvantages. Therefore, for both the SADC utility and non-utility markets, SA firms will need to compete on a global market. If South African assemblers and manufacturers were able to trade duty free across borders, this may aid in the competiveness of South African products.

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[137] Business Monitor International Power Report for Angola, Namibia, Mozambique, Tanzania and Zambia Q2 2014

[138] BMI Namibia Q2 2014 Power Report

[139] Zimbabwe to introduce renewable energy FITs, Edgar Meza, Oct 2013

[140] Tobias Cossen in Special Report Africa: Tanzania and Mozambique, PV-magazine, Nov 2013

Table 26: Renewable Energy Projects in the SADC Region

Country	Project Name	Size, MW	Renewables Sector
Angola	Biofuel power plant, Lunda	217	Biomass
Lesotho	Letseng-La-Terai Wind farm, Mokhotlong	30	Wind
Mauritius	Suzlon Plaine Sophie Wind Farm	30	Wind
Mauritius	Aerowatt Plaine des Roches Wind Farm	18	Wind
Namibia	Thermal-solar power hybrid station, Arandis	120	Solar
Namibia	UAG Diaz Wind Farm	44	Wind
Namibia	InnoVent Walvis Bay Wind Farm	30	Wind
Tanzania	Makambako Wind Farm	100	Wind
Tanzania	Singida Wind Farm	100	Wind
Zimbabwe	Zvishavane solar power plant	100	Solar
Zimbabwe	Power Plant, Near Harare	100	Solar
Zimbabwe	Solar Power Plant Project, Gwanda	100	Solar
Zimbabwe	Zhenfa Solar Photovoltaic Project	100	Solar
Total		1 089	

Source: BMI Renewable Energy database and World Bank Private Participation in Renewable Energy Database

8.4.9. Summary of the utility-scale greentech market assessment

The market for utility-scale renewable energy in South Africa is driven by government policy and regulation. The REIPPP programme sets out the allocations for selected renewable energy technologies and provides the mechanism for private (local and international) and public institutions to invest in the South African renewable energy market. The local content thresholds and targets within the REIPPP bidding process is driving up demand for locally manufactured components and related services.

The IRP sets out the energy plan for the country and includes future allocations of renewable energy beyond the REIPPP programme. The IRP provides investors with a longer term view of potential demand for their respective energy technologies or services and indicates the potential magnitude of allocations in future renewable energy procurement programmes. In the current REIPPP programme, however, wind, PV and CSP are the three renewable energy technologies which make up the majority (>95%) of the allocations.

According to awarded and remaining allocations in the REIPPP programme and the IRP2010-2050 plan, we estimate the following annual capacity instalment requirements over the next decade:

- 300 – 400 MW of Wind power,
- 300 – 500 MW of PV power, and
- 150 – 250 MW of CSP power.

To date there have been a number of investments into the local greentech manufacturing market. In the wind energy market DCD (R300 million, Coega) and Gestamp (R300 million, Atlantis) have both set up tower manufacturing facilities and LM Wind Power has shown a keen interest in moving to either Atlantis or Coega to set up a wind blade factory. According to our annual demand estimates the short term market potential for local manufacturing has been reached for those technologies which have a high potential of being manufactured locally in Atlantis. Depending on the final wind allocations set out in the final IRP update, to be released soon, the market could potentially include an additional wind blade manufacturer post 2025.

The local PV market consists of five PV module manufacturers and a number of component suppliers not solely servicing the PV market. The PV market opportunity differs from that of the wind or CSP market opportunities because PV modules can also be used by households or commercial and industrial firms. The PV market therefore does not exclusively rely on government support, though local manufacturing activities mostly exist due to local content requirements or dedicated contracts with international firms. The greatest opportunities which we identified for the Atlantis area were activities related to the manufacturing of PV modules (one to two additional market players) and flat plate low-iron glass. Other opportunities include manufacturing of aluminium frames, mounting structures, junction boxes and copper wiring, all of which could be manufactured in Atlantis for all PV customers.

Within the CSP market the manufacturing of low-iron glass, solar trackers and mounting structures was identified as opportunities for the Atlantis area. The local manufacturing of curved glass, parabolic troughs, solar receivers, molten salts and other advanced components was considered not feasible due to the relatively small annual demand expected compared to the required annual demand required to justify investing in new plant. The CSP market is also the less mature technology compared to wind and PV, with only a few international manufacturers able to produce some of the components. The CSP market opportunity also includes industrial users who may be able to use the thermal capabilities of concentrated solar thermal (CST) which may help in providing the additional demand required for further investment into the South African, and Atlantis, CSP related manufacturing industry.

8.5. Sizing the residential, commercial and industrial green technology market for Atlantis

8.5.1. Key drivers of demand in the residential, commercial and industrial market

There are various factors which drive the demand for green technology in the residential, commercial and industrial market. There is also a wide range of technologies in this segment of the market including, energy efficiency equipment, green technologies for self- generation and distributed power generation, biofuels, energy efficient building materials amongst others.

The main drivers of demand for green technologies in this market segment are summarised in the demand driver tree in Figure 47. The green blocks represent the key factors that influence the demand for green technology in South Africa. Based on research and a series of interviews with industry stakeholders we determined that these include: government policies and plans, price effects, income effects, change in consumer preferences and power disruptions. The white blocks are the sub-drivers within each of these broad categories and these are described in terms of the direction they are likely to follow. For example, we expect overall energy costs to continue to rise based on forecasts of rising domestic electricity prices amongst other factors. The green upward arrow in turn, indicates that rising energy costs will increase the demand for investment in green technology.

Figure 47: Key energy demand drivers for the residential, commercial and industrial markets

Source: Deloitte analysis

During the course of our research it became clear that the most significant driver of demand for green technology in the residential, commercial and industrial markets over the past few years has been direct support for uptake provided through a few key government programmes. These include:

- The Eskom IDM programme which encompasses the standard product, standard offer and ESCO programmes and its predecessor.
- The DoE solar water heater programme, where Eskom is the implementing agency
- The new building standards which promote energy efficiency – SANS 10400XA and SANS204
- The DOE and SABS electronics labelling initiative SANS941 to a lesser extent.
- The 12L Tax Allowance

Beyond specific government programmes to promote the accelerated uptake of green technology, another key driver has been the sharply rising cost of energy and electricity prices specifically. A rise in average living standards would also support the demand for energy efficient consumer electronics and will continue to support demand so long as this trend persists.

Although 'environmental consciousness' in South Africa is still considered low by interviewees, relative to more developed countries, this was still noted as a significant secondary driver of demand for some residential energy efficiency and renewable energy solutions, including solar water heaters, recycling and waste reduction.

Episodes of load shedding experienced in 2008 and more recently in 2014 have also supported the demand for green self-generation technologies such as rooftop PV, and at an industrial level biogas[141] and co-generation[142]. Disruptions to South Africa's energy supply however are not expected to continue beyond 2015 when Eskom's new coal-fired power station Medupi is expected to come on line.[143]

8.5.2. Detailed analysis of key drivers for the demand for green technology

8.5.2.1. Legislation and government programmes

Through the course of our primary research and interviews with a variety of green technology stakeholders it became clear that the largest driver of uptake of green technologies in the residential, commercial and industrial markets are the government programmes mentioned above (section 7.1). We provide more detail on the key programmes in the sub-sections below.

Eskom Integrated Demand Management (IDM) Programme

The demand for a number of green technologies for the residential, commercial and industrial markets has enjoyed considerable support from the Eskom IDM programme (previously energy efficiency and demand side management (EEDSM)). The IDM programme was introduced in 2011 partly in response to a need to address critical supply shortages experienced by the utility since the advent of country-wide load shedding in 2008.

[141] Bronkhorstspruit biogas to power project contract, www.esi-africa.com; MTN unveils R22m tri-generation power plant, www.engineringnews.co.za

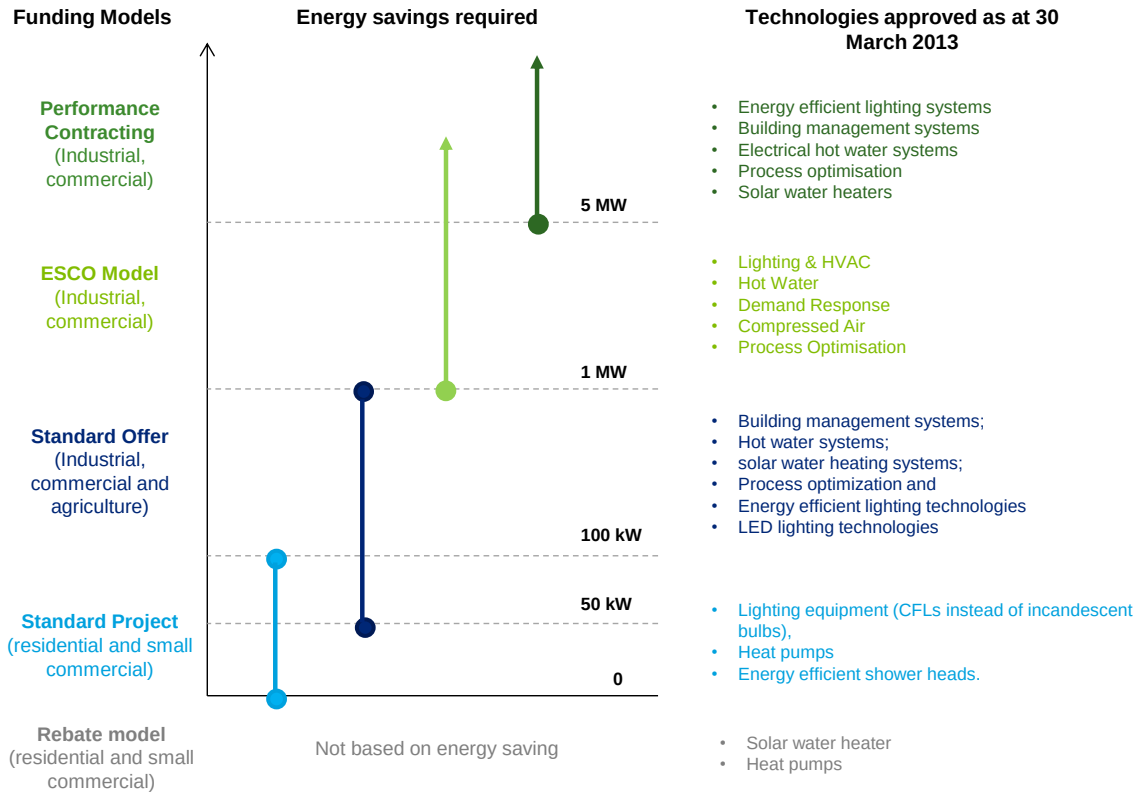
[142] South African parliament hears calls to promote co-generation, www.cospp.com

[143] Business Day Live: Medupi expected to come on line in 2015, 4 June 2014, www.bdlive.co.za

The introduction of the IDM programme saw a fundamental shift in thinking away from support for specific green technologies towards broader support for any technology that could deliver proven energy savings at reasonable cost. This was in recognition that customers and industry specialists were often in a position to best identify opportunities for energy savings and the technologies that could deliver these at least cost. It also avoided the problem of continuing to support technologies that were soon superseded by new technologies, equipment and processes due to rapid progress and innovation.

Eskom's IDM programme makes funds available to customers in support of a proven reduction in energy demand or consumption. In an effort to enable industrial customers to reduce their energy consumption Eskom introduced five funding models for various target markets. These range from rebates for relatively small energy savings at an individual household level to performance contracting initiatives designed to purchase bulk verified energy savings across multiple sites and technologies by contracting with a single project developer (Figure 48).[144]

Figure 48: Eskom IDM funding models



Source: Based on Eskom IDM Programme overview, 2013

[144] Integrated Demand Management Programme Overview Document Rev 1, Eskom 13 March 2013

Unfortunately the standard offer, standard product and ESCO programme were all put on hold in October 2013 due to funding constraints. NERSA the national energy regulator in a bid to keep electricity tariff increases to a minimum, did not award Eskom an electricity tariff increase for MYPD3 period (2014 to 2018) that was sufficient to generate revenue to support the continuation of the IDM programmes. A regulatory expert at Eskom indicated to us that Eskom was currently in the process of applying to NERSA for an additional tariff increase to cover the cost of IDM programmes (amongst other costs incurred) through a mechanism called the regulatory clearing account, but this process could take some months and the provision of additional funding to cover these costs through a tariff increase will still be subject to decision by the regulator. A GM at Eskom however mentioned that it is likely that Eskom will get some additional IDM funding in the short-term (2015/2016) to assist them in meeting current supply capacity constraints before Medupi and Kusile are online.

The demand for all the energy efficiency technologies listed in Figure 2 is partly contingent on support provided by Eskom through the IDM programme and therefore the outlook depends to a large degree on whether further funding will be made available. It appears from our discussion with National Treasury on 5 June 2014 alternative funding for the Eskom IDM programme, while considered, has not been made available.

Department of Energy (DoE) Solar Water Heating Programme

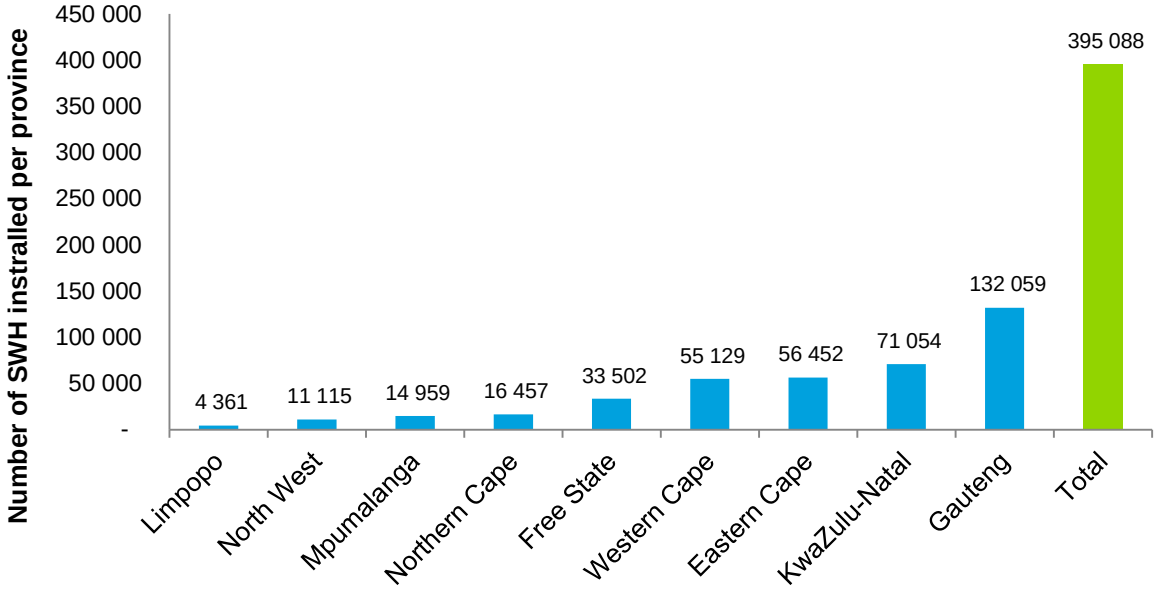
The solar water heater (SWH) programme was announced in 2006 and is led by the DoE. In 2012 the DoE announced that it had set a target of installing one million SWHs by March 2015 and that it had secured R4.7 billion from National Treasury over the Medium Term Expenditure Framework period (three fiscal years) in order to fund it. Eskom is the implementing agent for the DoE's SWH programme. By the 30th of May 2014, some 386 000 geysers had been installed so the funding has been rolled over the next three year MTEF and will support the continued rollout of SWHs until fiscal year 2016/17. In terms of National Treasury's strategic framework, it appears the target will be extended to 1.7 million SWHs beyond the current MTEF. The NDP envisaged that a total of five million SWHs would be installed by 2030 although this is not a firm commitment as the programme is subject to review.

The programme has evolved continuously since 2006. In its most recent form the programme comprises three distinct sub-programmes:

- **The Eskom rebate high pressure (HP) SWH programme**
  DoE provides partial rebate for the installation of HP SWH systems through Eskom. SABS approved product is delivered by private sector suppliers and installers.
- **The Eskom rebate low pressure (LP) SWH programme**
  provides 100% subsidy on the installation of LP SWH systems through Eskom. SABS approved product is delivered by private sector suppliers and installers and installations approved and audited by Eskom.
- **The DOE mass-roll out direct procurement programme**
  DoE in consultation with municipalities issues to tenders to procure

The DoE put the Eskom LP rebate programme on hold in December 2012 in favour of the mass-roll out contract system where DoE works directly with municipalities to identify suitable projects. DoE subsequently put both LP SWH programmes on hold in order to incentivise local manufacturing as the majority of installations on the LP SWH programme were imported systems. The DTI is in the process of introducing a stricter localisation requirement on LP SWH geysers and collectors (70% local content minimum) under SABS SATS 1286:2011. This did not affect the HP SWH programme as it was never intended that the localisation requirements were to apply to HP SWHs. Approximately 400 000 SWHs have been installed between 2009 and 2014 (Figure 49). From our discussions with various SWH manufacturers and industry stakeholders the DoE SWH roll-out plan has created awareness for SWH systems and is the key driver of demand for the technology.

Figure 49: Number of Solar Water Heaters installed from 2009-2014 per province



Source: National solar water heater programme status update, DoE Feb 2014

Energy Efficiency in Buildings

The South African National Standard (SANS) 10400-XA and the SANS 204 Regulations are an attempt made by government to regulate energy use and encourage energy efficiency in buildings. The building code (SANS 10400 XA) was published and promulgated as a national building code effective as of September 2012.

The new standard has far reaching effects on building design insofar as energy efficiency and maximum energy consumption per square metre are concerned. Part XA2 specifies that at least 50% by volume of the annual average hot water heating requirement should be provided by means other than electrical resistance heating including but not limited to solar heating, heat pumps, and geothermal heat, heat recovery from other systems or processes and renewable combustible fuel. All new buildings must comply with regulations, as must any additions and extensions to existing buildings. This will in future help stimulate the market for solar water heaters and heat pumps as the building industry recovers and the number of new house plans submitted for approval increase.[145]

SANS 204 regulation deals with energy efficiency in buildings and provides the necessary design principle details to achieve SANS 10400 X1 compliance. The first part of SANS 204 sets out the general requirements for achieving energy efficiency in all types of buildings as performance parameters, and will eventually form part of the National Building Regulations. Whilst SANS 204 is voluntary at this stage, the DoE and DTI will make it mandatory when the market is ready.

SABS labelling regulation

SANS 941: Energy Efficiency for Electrical and Electronic Apparatus aims to assist households in becoming more energy efficient. In a combined effort by the Department of Trade and Industry (DTI) and the DoE the standard aims to empower consumers to make informed choices when buying electronic appliances.[146] The appliance labelling campaign motivates for energy specification labels on all new household appliances to inform consumers of the energy efficiency of the appliances. The idea of the labelling initiative is to provide consumers with more information on the relative energy consumption of different products, enabling them to make more energy saving choices and to aid in conserving energy on the national grid.

12L Income Tax Allowance

The promulgation of the regulations on the allowance for energy efficiency savings in terms of section 12L of the Income Tax Act as amended came into operation on November 1 2013.[147] The 12L regulation sets out the process for calculating the amount of energy efficiency savings as well as the requirements for claiming any tax deductions through the act. Section 12L incentives include all energy efficiency projects that reduce energy use and is claimable until 2020. Energy efficiency savings under the act include all energy sources, not just electricity.

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[145] GreenCape Energy Efficiency Market Intelligence report, 2014

[146] Keep your eye on the label, www.25degrees.net

[147] 12L Income Tax Allowance, www.sanedi.org.za

The allowance for tax deductions are calculated at R0.45 per kW/h or equivalent of energy efficiency savings.[148] The 12L income tax allowance is an incentive for using existing energy sources more efficiently and therefore does not include renewable energy generation or co-generation (excluding waste-heat recovery) projects or investments. The 12L income tax allowance also provides the incentive for firms to invest in energy efficient initiatives as soon as possible due to current rising costs of electricity and the potential future introduction of the carbon tax. While we are certain the 12L tax allowance will drive up the demand for energy efficient solutions and services, it is difficult to say which technologies will benefit the most given that the allowance is not limited to any predefined technologies or energy sources. This is probably the most significant difference between the 12L tax allowance and the Eskom standard offer programme, which has been put on hold.

8.5.2.2. Price of electricity

Electricity prices in South Africa have risen substantially since 2006 in order to finance a new build programme to address critical shortages. Real electricity prices (inflation adjusted) have more than doubled since 2008 and further increases will be required if Eskom is to achieve cost-reflective tariffs (i.e. tariffs that fully reflect the cost of supply without relying on provision of implicit government subsidies (Figure 50). The electricity price is set to continue to rise, albeit at a slower rate based on a decision by NERSA to grant Eskom an average annual tariff increase of 8% over the five year period 2013 to 2017. While electricity remains relatively cheap in South Africa, there is no doubt that continued price increases will play an increasingly important role in driving increased awareness of energy costs and will motivate consumers to invest in green technologies to lower their overall energy costs. In a study on the price elasticity of demand for electricity (2009), Deloitte noted that while it was difficult to estimate reliable estimates of price elasticity for the residential sector in South Africa, a survey of over 44 international studies suggest that the price elasticity of electricity demand is typically between -0.2 and -0.4 meaning that for every 10% increase in electricity prices consumers decrease demand by between 2 and 4%.[149] Another study by Blignaut and Inglesi-Lotz suggests that consumers are more responsive to sharply rising electricity prices as evidenced in late 1980s when the elasticity of demand was estimated at between -0.2 and -1 meaning that for a 10% price increase consumers were reducing demand by almost 10%.[150] The reduction in electricity demand can be achieved in two ways – reducing overall consumption or purchasing of energy saving and more energy efficient technologies and self-generating technologies.

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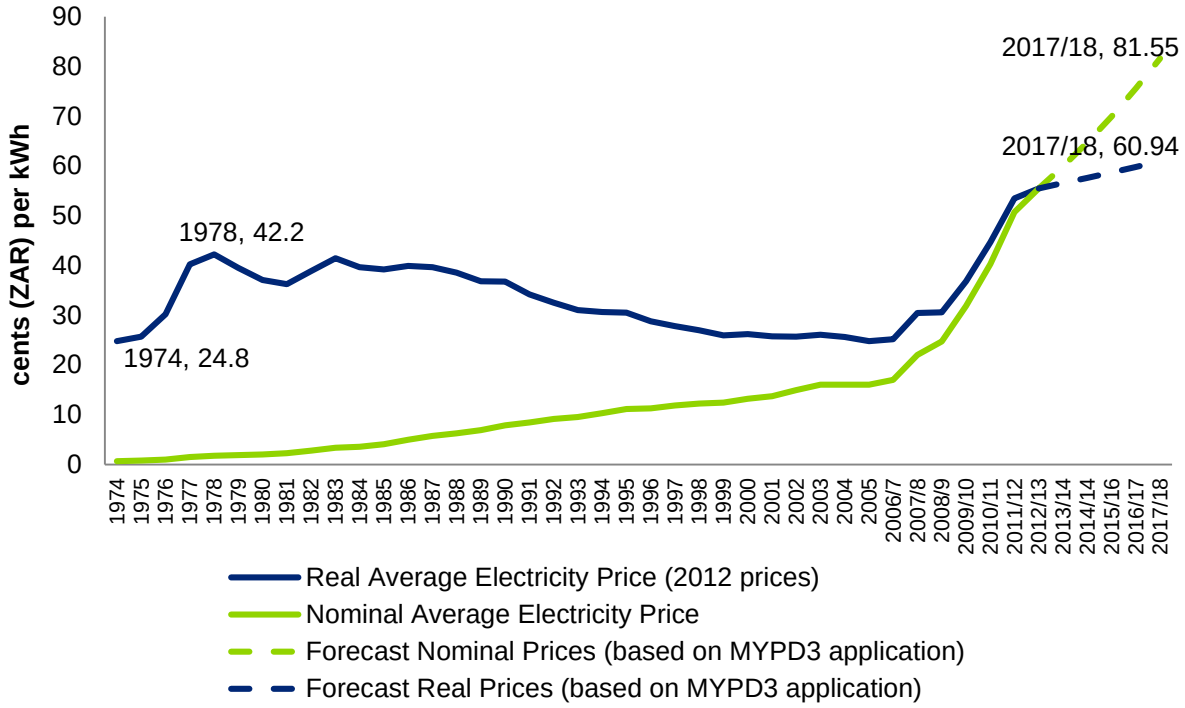
[148] *The full value of the 12L Tax Allowance, www.greenbusinessguide.co.za*

[149] Deloitte . (2009). Estimating the Elasticity of Electricity Prices in South Africa. Johannesburg.

[150] Blignaut, J. N., & Inglesi-Lotz, R. (2011). Estimating the Price Elasticity of Demand for Electricity by Sector in South Africa. South African Journal of Economics and Management Sciences.

Figure 50: General electricity price 1974 – 2012, forecast 2012/13 – 2016/17



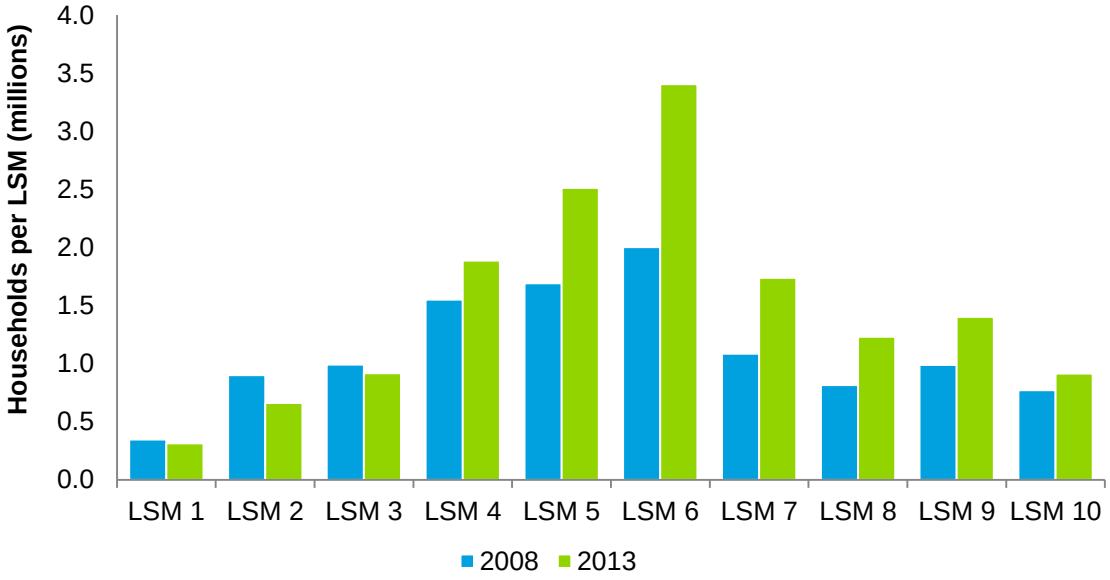
Source: Deloitte analysis

8.5.2.3. Rise in the average living standards

Numerous studies have demonstrated that household energy consumption is positively correlated to income.[151] Throughout the 2008 to 2013 period a significant amount of households moved to higher Living Standard Measure (LSM) categories, especially across the lower LSM categories (Figure 51). According to SAARF statistics, an additional 4.1 million households were classified within the LSM 4 to LSM 10 categories between 2008 and 2013. Close to 350 000 of the 4.1 million increase was from households moving out of the lower LSM 1 to LSM 3 categories to higher categories, indicating an overall improvement in living standards and not just an increase in population. This upward shift in LSM categories not only indicates a general increase in living standards, but also an increase in the amount of households who have access to electrical appliances and other electricity related products such as motorised gates, garages, stoves, etc. Households who own such electrical goods, however, will be affected by a real increase in electricity tariffs or increases in the occurrences of power outages. This incentivises households to turn to alternate sources of energy such as diesel generators, rooftop PV or gas solutions to ensure security of supply as well as to implement energy efficiency measures to manage rising costs. Wealthier households are more likely to be able to afford more energy efficient products and renewable energy solutions. The growth in the number of households in higher LSMs is therefore expected to result in higher overall energy demand. We would expect an associated increase in demand for energy efficient/ renewable energy products. These products would include solar water heaters, gas powered heating and cooking appliances, residential rooftop PV, LED lighting and other energy efficient solutions.

[151] Druckman, 2000 and Utley, 2008

Figure 51: Number of Households per LSM 2008-2013 (AMPS 2008 and 2013)



Source: AMPS 2008, AMPS 2013

8.5.2.4. Power disruptions

Approximately 74.3% of households rely on electricity for their main source of energy for cooking, heating water and lighting.[152] Households though will not be able to complete 'basic' tasks such as cooking if back up power is not immediately available during planned or unplanned power outages. The inconvenience of power outages will lead to an increase in demand by households for alternative sources of energy, including renewable energy solutions, in order to ensure a stable supply of electricity or energy. Possible impacts of outages include food spoilage, damage to appliances and compromised security. As noted before, the increase in demand for renewable energy or energy efficiency solutions due to black-outs is considered to be temporary due to the Medupi and Kusile coal power plant projects underway.

8.5.2.5. Environmental Awareness

Globally there is a trend to become more environmentally conscious due to an increase in awareness of the negative impacts of human activity on global warming, biodiversity and the natural environmental in general. It has already been mentioned that the primary driver of an increase in energy consumption, and hence energy efficiency, is growth in income. However, households' increasing awareness of the individual's impact on the environment is also driving the uptake for environmentally friendly solutions or products. An indicator of an increase in the environmental awareness of households is the proportion, and growth in, the number of households that engage in recycling activities. Recycling in South Africa is still not a common activity as seen in Figure 52, though activity is increasing, whereby the proportion of the population recycling has increase by 2% over the last 2 years. Close to 40%[153] of people in the UK recycle and over 60%[154] in the United States.

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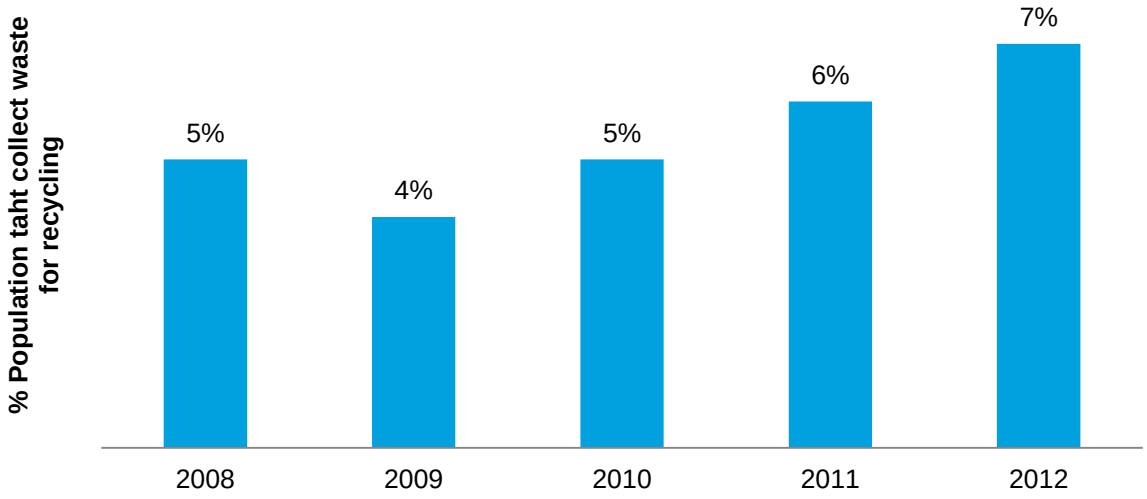
[152] StatsSA Household survey, 2012

[153] Household waste recycling by area, www.theguardian.com

[154] Recycling surveys offer some surprising result, www.call2recycle.org

Figure 52: Percentage of the households that engage in recycling activities



Source: Stats SA Household Survey 2008-2012

8.5.3. Results – rating and prioritisation of greentech activities in the residential, commercial and industrial market

In order to prioritise the greentech activities and technologies within the residential, commercial and industrial market for the proposed ASEZ, we evaluated each technology\activity on the basis of the same four criteria:

- Current size of the market and tangible future demand
- Level of government support
- Ability to produce or produce components or service competitively in South Africa
- Suitability for production or service delivery at Atlantis

The ratings (very low, low, medium and high/large) for each of the criteria were determined on the basis of desktop market research and additional insights from interviews with industry players, academics with specialisation in green technology, Deloitte and AECOM industry experts and a variety of other stakeholders. The results are illustrated in Figure 53. The detailed assessment of these technologies against the four criteria and rationale for each rating can be found in Annexure 8:.

Figure 53: Residential, commercial and industrial greentech prioritisation scores per criteria

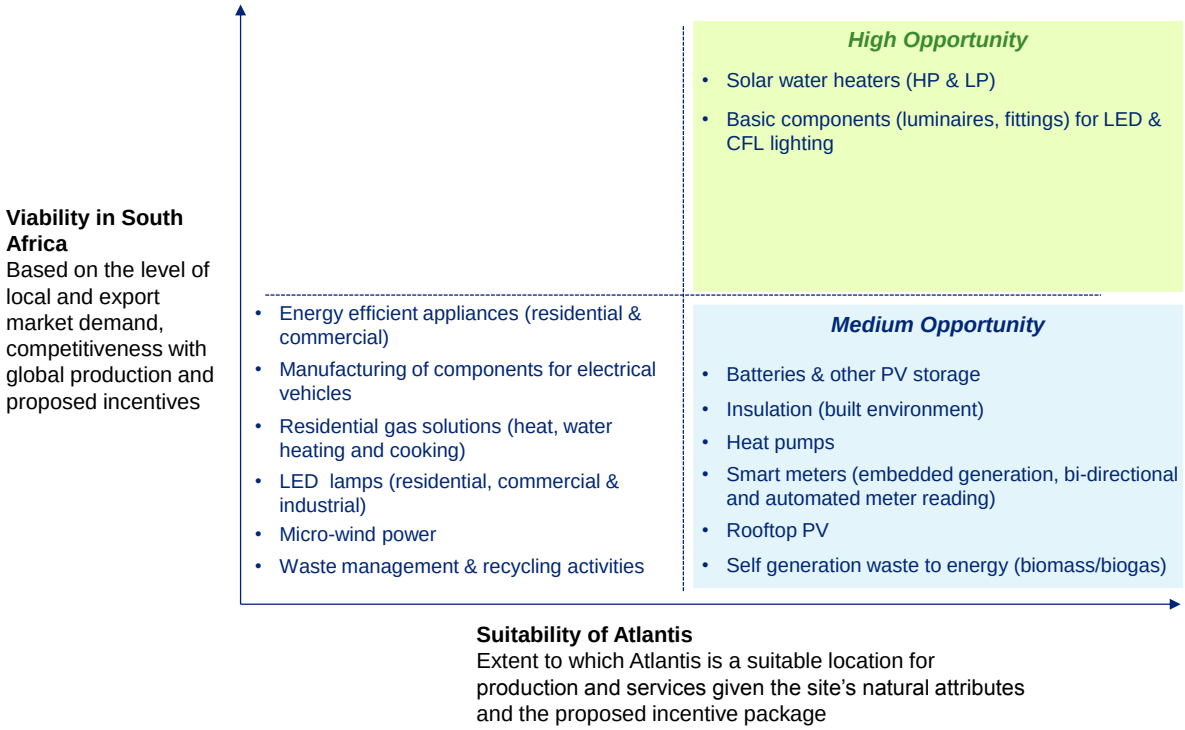
	Current size of the market and tangible future demand	Level of government support	Ability to produce in South Africa	Suitability of Atlantis and potential for new investor
Solar water heaters (HP & LP)	Large	High	High	High
Basic components (luminaires, fittings) for LED & CFL lighting	Large	Medium	Medium	Medium
Smart meters (embedded generation, bi-directional and automated meter reading)	Medium	Low	Medium	High
Insulation (built environment)	Medium	Medium	Medium	Medium
Self generation waste to energy (biomass/biogas)	Medium	Medium	Medium	Medium
Heat pumps	Medium	Low	Medium	Medium
Energy efficient appliances (residential & commercial)	Large	Low	Medium	Low
Rooftop PV	Medium	Low	Medium	Medium
Batteries & other PV storage	Medium	Very Low	High	Medium
LED lamps (residential, commercial & industrial)	Large	Low	Low	Low
Manufacturing of components for electrical vehicles	Low	Medium	Medium	Low
Waste management & recycling activities	Low	Low	Medium	Low
Residential gas solutions (heat, water heating and cooking)	Large	Very Low	Low	Very Low
Micro-wind power	Low	Very Low	Medium	Low

Source: Deloitte analysis

On the basis of our assessment, we plotted the technologies on the prioritisation matrix highlighting specifically the components that are viable to produce locally (e.g. LED luminaires rather than lamps). The technologies that fall in the top quadrant represent the current high-potential opportunities for Altantis and are the ones we have then focused on to size the market for the ASEZ. We also analysed in further detail any activity or technology that fell in the medium-opportunity quadrant as these represent potential future opportunities for the ASEZ(beyond 2018).

Due to government support and a large market, the manufacturing and assembly of solar water heaters and basic components for LED/CFL lights are considered to be the largest greentech market opportunities for the residential, commercial and industrial sectors. The technologies and products categorised as having a medium market opportunity are technologies which we feel have attractive market opportunities in the near future (post 2017) but which lack the required government support needed for growth in the short term. As market conditions improve for these “medium opportunities” so will demand, eventually reaching a point where annual demand is sufficient enough to sustain more local manufacturing. The result of the green technology assessment is presented below in Figure 54.

Figure 54: Prioritisation of greentech for the residential, commercial and industrial market



Source: Deloitte analysis

8.5.4. Analysis of high-opportunity greentech activities

8.5.4.1. The solar water heater market in South Africa

In 2012 the DoE announced that it had set a target of installing 1 million SWH by March 2015 and that it had secured R4.7 billion from National Treasury (NT) to fund the programme over the Medium Term Expenditure Framework period (three fiscal years). The budget provided by NT is split 80% for LP SWHs and 20% for HP SWHs. Eskom is the implementing agent for the rebate programme and originally provided two different rebates; one for low pressure (LP) SWHs, and one for high pressure (HP) SWHs.

The LP SWH rebate was however put on hold to be restructured and then reintroduced as a 'contractor programme' lead by the DoE, while the HP SWH rebate programme continued as before. This interruption in the LP SWH rebate and roll-out plan has caused the domestic solar water heating industry to go into consolidation, with a number of companies deciding to either exit the market or to move to more profitable ventures. At the peak of the rollout programme in 2011, Deloitte was processing approximately 1 200 claims per day (or 30 000 per month). However, once the LP SWH program was put on hold with much confusion and uncertainty, especially regarding the local content requirements, the amount of claims processed decreased to around 2 200 per month or less than 80 per day.[155]

[155] Interview with National Treasury and Deloitte

8.5.4.2. Low pressure solar water heater (LP SWH) market

Initially the LP rebate program worked on the premise that the location where the LP SWH would be installed was decided by a private installer who approached the provincial or municipal government. Once the SWH has been installed the installer claimed the rebate. This process, however, was cancelled in favour of a tender/ contract approach, whereby the municipality or provincial government decides on the location and sends out a tender to installers. The LP SWH tender was subject to products meeting certain local content requirements set out by the DTI and according to definitions of local content in SATS 1286. The 70% local production requirement (for collectors and geysers) was introduced in 2011 and many manufacturers/installers were unable to meet this requirement. The DoE has put the LP SWH programme on hold until late 2014, which is when they expect the SANS standards and local requirements to be finalised. According to SWH manufactures and industry stakeholders, the LP SWH market will be revitalised once the rebate programme is re-implemented, and is the largest market opportunity for the local SWH market.

8.5.4.3. High pressure solar water heater (HP SWH) market

The rebate program for the high pressure SWHs began in 2008; however uptake by consumers was slow until 2010, when the values of subsidies were close to doubled. Through the Eskom HP SWH rebate approximately 81 000 units have been installed as of early 2014. Rising electricity prices are assumed to be one of the key drivers for this increase in uptake of HP SWHs as the rebates do not fully compensate the purchaser, unlike in the majority of LP SWH purchases. The competitive landscape of the HP SWH industry has gone through notable changes since the inception of the rebate. When the rebate was introduced the number of suppliers went from 45 in 2006 to over 700 in 2010. Once the market became saturated and local requirements were introduced for LP SWHs[156], the number of suppliers decreased from over 700 to 300 by 2013.

Consultation with the DoE indicates that there is secured funding available for an additional 550 000 LP SWHs and 200 000 HP SWHs. The LP SWH programme is expected to be reintroduced in late-2014 as soon as local content and quality standards have been finalised.

8.5.4.4. Sizing the opportunity for manufacturers in Atlantis

Green retrofitting of public and residential buildings

According to the household Survey 2012 (StatsSA) there are 14.6 million households in South Africa. Approximately one million households use a SWH as a means to reduce energy consumption. This translates to a market penetration of around 7%. This low penetration rate indicates a potential but latent opportunity depending on government support and relative energy prices.

The Western Cape is reported to have 1.6 million households of which 90 000 are reported to use SWHs.[157] With respect to the retrofitting market, the penetration rate for both SA and WC, is 7% and 6% respectively. This low penetration rate, while promising for manufacturers, overstates the market opportunity for retrofitting. Uptake rates in private installations based on retrofitting are likely to remain constrained for the following reasons:

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[156] The HP SWH is not subject to the 70% local content requirement due to World Trade Organisation agreements

[157] Household survey 2012 (Stats SA)

- High upfront cost of installing the technology even with a HP SWH rebate
- Low interest from consumers even when they can access the rebate as some inconveniences can occur (especially if the household only has access to one geyser)
- Difficulty in proving energy cost savings which vary from month to month and year to year

At this stage the size of the retrofitting market is small and challenging to calculate. Since the programme's inception in 2006 only 81 000 HP geysers have been installed. This amounts to roughly 10 000 HP geysers per year where the majority of these are likely to be related to new builds rather than retrofitting.

Through interviews with manufacturers and industry stakeholders it has been noted that transport costs are considered a significant cost with regards to the overall supply of SWHs in the market. Therefore, manufacturers will generally supply the region within which their plant is located, rather than the entire country. This promotes an environment for SMMEs to manufacture competitively within their respective regions, thus improving the case for additional manufacturing activities in Atlantis, servicing the Cape Town region.

Replacement of burst/broken electric geysers with solar water heaters

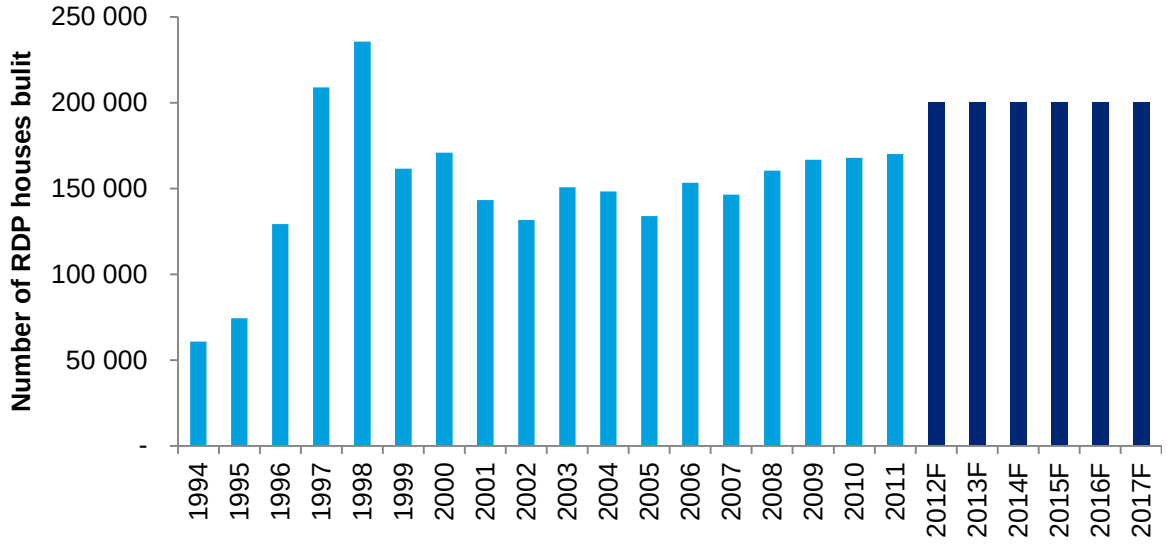
Approximately 300 000 burst geysers are replaced each year.[158] Applying the provincial breakdown of households in South Africa, we can assume that approximately 33 000 geysers burst in the WC each year. Many insurers already offer the opportunity to replace damaged geysers with a solar equivalent; however, take-up by consumers has been low. This is because the homeowner has to pay a nominal difference of between R1 000 and R4 500 depending on the size of the geyser. If this balance can be recouped through the Eskom rebate programme it would encourage the consumer to replace the electric geyser with an SWH. However, due to unsuccessful attempts by insurers to secure funding for this type of initiative, consumers and insurers have not been able to benefit from this opportunity. Insurers requested that funds be ring-fenced by National Treasury to facilitate the insurance industry in providing SWH at affordable rates on the back of the HP SWH rebate programme. This is necessary because insurers do not hold enough cash reserves to fund such an initiative. The insurer has to import or buy the geyser and wait for approximately three months before it is paid back through the rebate programme. National Treasury and SAIA (South Africa Insurance Association) are currently in discussion with regards to guaranteeing upfront funds. If an agreement is met, this can provide significant drive in the uptake of HP SWH.

Low cost houses and other government procured projects

Tokyo Sexwale, the minister of the Department of Human Settlements, announced a 200 000 per year target for new low cost houses to be built until the year 2030 (Figure 55). The target was introduced due to a 2.1 million backlog in housing. If construction targets are reached and maintained then the low cost housing initiative by the state will play a key role in meeting the SWH targets set by the DoE. At this stage it is not possible to gauge how many low cost houses out of the 200 000 every year will be eligible for LP SWH.

[158] ESI-Africa ,Has-the-demand-for-solar-water-heaters-in-south-africa-gone-cold, April 2013

Figure 55: Number of RDP houses built each year, 1994 - 2017



Source: StatsSA 2014

New building market

The number of new housing units for which building plans were approved by local government institutions increased by 7%, to a total of 50 484 units in 2013 from 47 079 units in 2010.[159] The SANS 10400XA stipulates that at least 50% of the energy required to heat water must be from a non-electricity source i.e. Solar, heat pump, gas or biomass. Building Statistics from Stats SA report that approximately 50 484 residential units are planned for completion in 2014 in South Africa, of which approximately 13 000 in the Western Cape. At this stage it is difficult to assume a split with respect to the technology preference. However, given the support of SWHs by the government (DoE) and other private institutions, we can expect SWH to be the preferred technology choice in the short-term.

According to an interview with Tasol, one of their factories is able to produce 4 000 geysers a month or approximately 48 000 a year. Based only on the residential market opportunity it seems that the market can sustain potentially one or two large manufacturers per province on top of a number of smaller manufacturers.

Existing manufacturer Tasol expressed an interest in using Atlantis as a hub to locally manufacture SWH and service the Western Cape Market. At least one other medium sized manufacturer looking at Atlantis via SAREBI incubator programme has been identified. When DoE Low pressure programme recommences, we believe that there will be room for more than one Atlantis based manufacturer.

8.5.4.5. Basic components of LED/CFL lighting

LED lamps are manufactured to replace existing CFL light bulbs within existing sockets. LED luminaires on the other hand do not fit into existing sockets and require some additional retrofitting to be used (electrical cables are attached directly to the new luminaire rather than replacing bulbs).

[159] South Africa's residential building statistics, 21 February 2013, Bizcommunity

When discussing the “light engine” we mean the heat sink, LED module (LEDs on circuit board) and LED driver. LED lighting systems don’t radiate heat in the same way as incandescent or halogen light bulbs. The heat produced from the power going into the product must be drawn away from the LED module. This is usually done with a heat sink, which is a passive, usually aluminium or copper, device that absorbs the heat produced and dissipates it into the surrounding environment. This keeps LEDs from overheating and burning out.[160] LED luminaires and lamps require drivers to rectify the AC power and convert the voltage to an appropriate value.[161] In addition to the LED “light engine” you also need some optics, such as a lens or reflector to increase light quality coming out of your luminaire.

Placing LED luminaires into existing casings usually does not provide the best lighting solution because incandescent bulbs emit radiant light while LEDs emit light in a single direction. Therefore, many LED luminaires are housed within casings that are uniquely designed to that of traditional incandescent lights.

Residential, industrial and commercial buildings represent 60% of global lighting electricity usage because of typically longer burning hours and use of outdated technologies. According to South African industry experts and existing small-scale manufacturers, this segment represents a large potential market for energy efficient lighting installations in South Africa.[162]

The Eskom IDM programme, together with sharp increases in the price of electricity, has been the key driver of demand for energy efficient lighting in South Africa. The Eskom funded CFL light exchange programme, and more recently the residential mass roll-out of CFL and LED lighting, under the standard product programme started in 2011 supported demand for energy efficient lighting in the residential segment. The residential mass roll-out of energy efficient lighting and other technologies delivered the most significant savings of any Eskom IDM programme in 2013.[163]

Uptake in the commercial and industrial segment was supported by rebates provided for LED lighting under the Standard Product programme, including the Standard Offer and ESCO model programme. These programmes were placed on hold in October 2013 due to funding constraints placed on Eskom after NERSA awarded Eskom an annual tariff increase of 8% instead of the 16% requested by Eskom for MYPD3.[164]

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[160] What are LEDs, www.energystar.gov

[161] How to construct an LED luminaire, www.light.fi

[162] Interviews with Megan Louw, Sustainable Solutions (former GM of Phillips lighting solutions) and LED-Z lighting

[163] Eskom places temporary hold on energy efficiency rebate programmes, www.engineeringnews.co.za

[164] Integrated demand management programme overview document Rev 1, Eskom 13 March 2013.

According to a former GM of Phillips Lighting Solutions, it is not viable to manufacture LED modules (or chips) and CFL lamps in South Africa due to the large economies of scale required. In order for manufacturers to justify local manufacturing of LED/CFL lamps, the local market needs to provide enough demand to produce at output levels which provide the economies of scale necessary to produce at globally competitive prices. South African manufacturers cannot compete on price when it comes to imported lamps and light fitting components.[165] According to the former GM of Phillips Lighting, manufacturing LED/CFL lamps in South Africa is still not financially feasible even if you include the sub-Sahara Africa market. LED/CFL lamps are volumetrically inefficient in transport and South Africa is not geographically well placed to serve large export markets.

The local industry is dominated by international lighting companies such as Phillips, Osram and Eurolux and it is very difficult for local manufacturers to compete with the R&D abilities of their international counterparts. Depending on the manufacturer's range of lighting products, completed products are only imported where:[166]

- Equivalent products are made in large volumes abroad such that it is impossible for manufacturers to compete on cost. Most significant in the residential LED/CFL market
- A product exists abroad which local manufacturers cannot produce due to technical reasons
- There are significant upfront costs involved in bringing a product to market, e.g., casting moulds and initial stock purchasing

The luminaires (fittings, casings of fixtures) however can be produced locally. Phillips for instance sources its steel fittings from Green Planet Lighting.[167] High-end industrial and residential LED lamps are integrated with the fittings for optimal results and therefore cannot be locally manufactured. The customised and lower end markets for LED/CFL fittings can and are currently supplied by local manufacturers. It appears the largest unexploited opportunity is in industrial and commercial lighting market as there are already many suppliers of residential LED fittings in South Africa. Local manufacturers are confident that there are excellent prospects for LED lights in the market, but it would be at an increased risk to invest at the moment.[168]Although introduced to protect the local market, import duties (20%) prohibit further manufacturing, where imported components are part of the final product, resulting in purchasers choosing cheaper imported products.

As a result of electricity price increases, the LED lighting market is expected to grow by a compound rate of 20% annually until 2016[169], benefitting the local LED manufacturing sector. However, without effective regulatory mechanisms in place cheaper imported products will continue to saturate the market.

According to a local manufacturer, Atlantis would only be suitable for large scale manufacturing and not for "small beginnings" because of the area's distance from other major cities such as Johannesburg. We therefore anticipate at least one LED/CFL assembler to set up in the SEZ, who will serve the Western Cape region. Since there are already over five firms already assembling LED lights in Cape Town mostly for the residential market, we understand there to be an opportunity to assemble and possibly manufacture components (heat sinks or fittings) for the industrial LED market.

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[165] Who Owns Whom, Lighting Industry Report, 2013
[166] F&S EE technology report, market interviews
[167] F&S EE technology report, market interviews
[168] F&S EE technology report, market interviews
[169] Who Owns Whom, Lighting Industry Report, 2013

8.5.5. Analysis of medium-opportunity activities

8.5.5.1. Heat pumps

Heat pump technology has the potential to create large energy savings. The technology is best utilised when incorporated in new buildings as opposed to the retrofitting of existing buildings. Market demand is supported by new building regulations, SANS 10400 XA, which mandate the use of energy-saving technologies for water heating. In the context of this regulation, solar water heaters are considered the preferred technology given that they are currently subsidised by the DoE. Heat pump technology previously attracted government support through a rebate in the Eskom IDM programme in 2011. This programme was however discontinued in June 2013 due to a lack of funding. Over the duration of the programme roughly 11 016 heat pumps were rebated. The national energy regulator decided to reduce the funding for the programme in the MYPD3 tariff application. Despite the withdrawal of government support, the Sustainable energy Society of South Africa (SESSA) believes that heat pump technology will continue play an important role in the move towards sustainable energy use. Heat pump technology is expected to be adopted by both domestic and commercial consumers.

Financially feasible manufacturing of completed heat pumps requires the attainment of significant economies of scale. The compressor component in particular requires production on a substantial scale for feasibility. Currently, South Africa's market demand is not sufficient to justify the local manufacturing of a complete heat pump given the required scale. The majority of the technology in the individual components however stems from Japan and is used for a variety of other consumer products. Based on interview responses with existing heat pump suppliers it was noted that subcomponents, casings and heat rails, could be manufactured in SA at the required scale given their alternative uses. The manufacturing of these components however is not financially viable due to subsidies being offered only on completed products versus individual components. [170] The landed cost of completed heat pump imports is between 30-40 per cent cheaper as a finished product, than what suppliers are able to locally assemble.[171] It is therefore not surprising that the majority of heat pump suppliers primarily import finished products. Currently 16 of 18 primary suppliers registered on the Eskom heat pump rebate program import completed products.

Assembly of imported components within the commercial and industrial heat pump market is however viable given that large industrial heat pumps require complex and custom installations. The installation revenue forms a significant portion of the total revenue generated by these suppliers. The majority of local suppliers have a presence in this submarket. This submarket is however not believed to be sufficiently large to support a new market entrant.

Furthermore interview respondents noted that a complete heat pump manufacturing plant would have to sell up to 10 000 units per month for the business to be sustainable. This is a substantial number when compared to current local demand considering that only 11 000 units were rebated in three years. Given these market dynamics we believe that there is limited scope for new manufacturing or assembling activities in Atlantis within the short to medium term. As energy prices continue to increase the market outlook for heat pumps will continue to improve, especially within the commercial and industrial market.

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[170] Interview with ITS Solar

[171] F&S report, EE Technology report for South Africa

8.5.5.2. Rooftop PV

According to research by SAPVIA, the DTI and the Centre for Renewable and Sustainable Energy Studies, the key drivers for the development of the residential, commercial and industrial PV system applications in the country include:[172]

- Rising electricity tariffs that help justify investment in alternative energy solutions
- Increased reliability and security of supply associated with on-site generation applications
- An increase in the awareness of one's carbon footprint, especially in light of the potential promulgation of a carbon tax
- Marketing tool for businesses

The drivers mentioned above, and discussed in more detail in section Figure 56 are following trends which suggest that the demand for PV rooftop installations should increase. Grid connectivity is relatively good in SA, 74% of the SA population have access to grid power[173], but a market for self-generation in the country still exists. According to our interviews, public buildings in rural locations, farms, cellular towers and rural businesses, such as hotels and resorts, all require off-grid solutions or use expensive diesel generators sets.

Despite the fact that the rooftop PV market demonstrates a large potential, uptake to date has been small. During our interviews with market players, high initial installation costs and long pay-back periods were indicated as the main barriers for uptake in rooftop installations. The payback period can only be effectively reduced if households are given the capability to sell excess power back into the grid (embedded or net generation) or once levelised costs (for PV with storage) reach grid parity (Figure 56). According to estimates in Figure 56, rooftop PV (without storage) will only reach grid parity with coal after 2030, and rooftop PV (with storage) thereafter. If these estimates are correct, then the rooftop PV market will require government support for growth in the short to medium term.

Currently households and most businesses are only able to use PV to off-set their own energy consumption and thus tend to undersize their self-generation systems. Feed-in tariffs and net metering are already available in the Western Cape. The tariffs however are not yet attractive enough to drive uptake, but signal a step towards a better understanding of the technology and administrative effort required.

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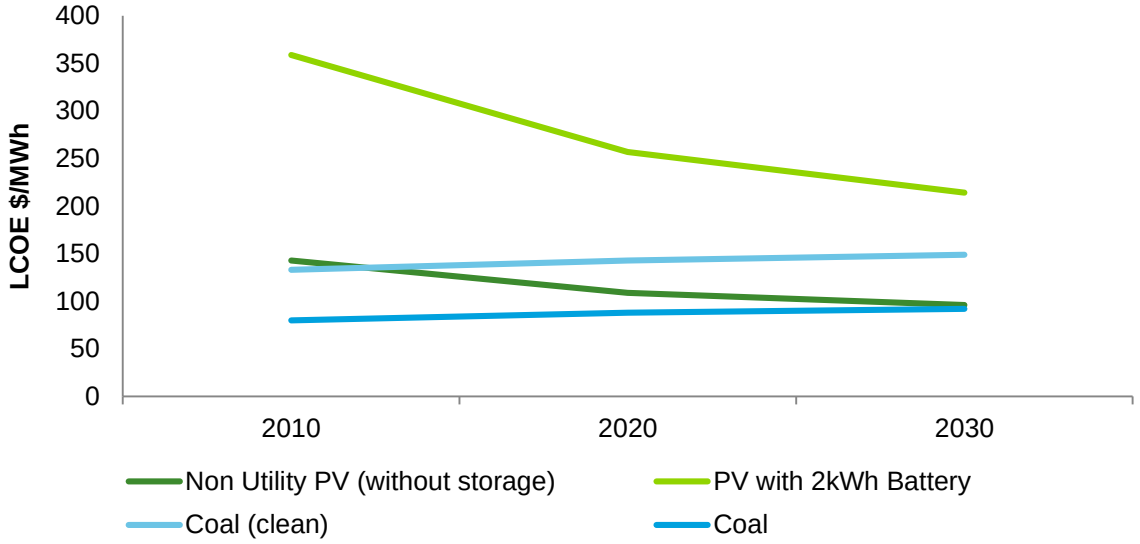
[172] Unlocking the rooftop PV market in South Africa, Centre for Renewable and Sustainable Energy Studies, 2013; The localisation potential of PV and strategy to support large scale roll-out in South Africa, SAPVIA, DTI, WWF, 2013

[173] StatsSA, Household survey 2012

Figure 56: Levelised costs of electricity in South Africa, 2010 – 2030



Source: Prospects for Renewable Power in the South African Power Pool, IRENA 2012

To this end, in 2011 NERSA produced guidelines for small-scale (household) embedded generation. Many municipalities, including the City of Cape Town, are currently investigating the requirements to successfully enable and promote embedded generation. Successful implementation of embedded generation is contingent on the installation of smart meters and the introduction of two or three part electricity pricing tariffs including time of use tariffs to promote load shifting.[174]

Currently there are five manufacturers of PV modules in South Africa with capacities to manufacture between 75 and 120 MW each per year (SolaireDirect, Sunpower (previously called Tenesol), JA Solar, JinkoSolar and ARTsolar). Three of these are already operating from within Cape Town. Without the introduction of additional support for rooftop PV (net metering, rebates or feed-in tariffs) the potential for new market players is very small. We expect existing manufacturers to be able to meet demand in the short term. In addition to the barriers already mentioned, there are no local content requirements for this market, further inhibiting the local manufacturing for the rooftop PV market.

8.5.5.3. Smart meters

The demand for smart meters is dependent on the ability of households and other small generators of electricity to sell excess power back into the grid (embedded or net generation) via net-metering. The CoCT, Swartland and Witzenberg municipalities have progressed further than most other municipalities in the country in the implementation of net metering but none have yet reached full implementation. Implementation of net metering is currently hindered by the lack of enabling administrative and legislative infrastructure. Specifically, bi-directional tariffs have not been finalised on a national level nor have the necessary supporting structures been put in place.

[174] The Challenges to get RE going in Municipalities, City of Cape Town, 2013

The government has however made inroads in providing the necessary legislative support through NERSA. Currently, NERSA requires that smart meters are to be provided by municipalities and distributors to all residential consumers using more than 1000 kWh per month. In addition to this, many municipalities are investigating or already rolling out some smart meters.[175] This is due to the many benefits that smart meters provide such as elimination of manual meter reading which improves accuracy as well as enable better management of distribution generation.[176]

According to a survey done by Green-Cape the current barriers faced by local smart meter manufacturers include:[177]

- Smart meter sales volumes not high enough to get sufficient economies of scale to be cost-competitive against imported smart meter products
- The lack of clear and South Africa-specific smart meter standards
- The presence of large global companies in the South African smart meter market, leading to monopolistic conditions
- The lack of clear incentives and policies to promote local manufacture and local purchase of smart meter systems and products
- The tendency of municipalities to favour one-stop-shop solutions for smart meter projects rather than having to deal with many projects spread across many suppliers
- Corruption and unfair business practices

Smart meters coupled with net metering and bi-directional tariffs will drive the demand for rooftop PV as well as rooftop PV with storage. Until such a time that bi-direction tariffs are finalised and set so that households are encouraged to send power back into the grid at peak times, the potential of this market remains low. Additionally, global competition in low-end meters is fierce. For this reason, most internal electrical components are imported.[178] Notwithstanding this, Green Cape identified 13 firms who currently have the capability to manufacture smart meters in SA in their 2013/14 market report. Itron, a subsidiary of the global firm, manufactures smart meters out of the Atlantis area.

Based on the survey conducted by Green-Cape, it appears as though there is sufficient local capacity to meet current demand. Given that municipalities are looking to replace old meters with new smart meters as well as the meters of all households with consumption greater than 1 000 kWh per month and growing demand by rooftop users, we anticipate additional manufacturers to enter the market.

8.5.5.4. Batteries & other PV storage

The PV storage market is inextricably linked to the roof-top PV market which as noted earlier demonstrates large market potential. Currently the PV storage market is small. Similar to the rooftop PV market, unlocking the PV storage market potential relies on the successful implementation of embedded generation.

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[175] Itron Awarded Largest Smart Meter Contract in South Africa with City of Johannesburg, www.itron.com

[176] GreenCape Smart Meters - Technology Review and Role in the Western Cape 2013-2014

[177] GreenCape Smart Meters & Smart-enabled Prepaid Meters Project 2013-2014

[178] GreenCape smart meter survey

According to StatsSA, household PV systems have a higher market penetration within rural areas due to a general lack of electricity infrastructure (transmission and distribution).The absence of a cheaper alternative renders household PV and PV storage products financially viable in these areas. Unsurprisingly, the rural market currently represents the most significant market opportunity for both the rooftop PV and PV storage markets. According to the PV localisation study, local manufacturers have the capabilities to produce PV storage products. In particular, First National Battery currently manufactures PV batteries. The report also suggests that most local car/truck battery manufacturers have the capability to produce PV batteries should market prospects improve. The local capacity however is currently unable to produce solar deep-cycle batteries. Investment by local manufacturers into production facilities of this specialised nature would require increased market demand. Market demand is currently based on the uptake of the rooftop PV market.

8.5.5.5. Building Insulation

A combination of policies, incentives and trends, which include an increase in awareness of green building practices and rising energy costs, will increase the demand for energy efficient solutions, designs and products within the built environment. With the promulgation of the National Building Regulations and Building Standards Act in November 2011 (SANS 10400 XA), thermal insulation has become compulsory for all new buildings.

Currently, building standards require a minimum level of energy efficient design however no rebate or subsidy is provided. Future growth in the building insulation market will be driven by building regulations and standards. Insulation products include, ceiling insulation, water heating insulation (SWH, gas, heat pump), insulation for hot water pipes, wall insulation, floor insulation, glass glazing and shading, design.

Insulation products are generally used in bulk in a single application and therefore require bulk manufacturing capabilities. This facilitates local manufacturing given the high transport costs and low unit value associated with bulk freight.

The Thermal Insulation Association of Southern Africa (TIASA) currently has a membership consisting of 29 manufacturers, 25 suppliers, 11 consultancies and14 contractors. Manufacturers are mostly found in the Gauteng (14), KwaZulu-Natal (8) and Western Cape (6) provinces.[179]

Table 27: Building Insulation Market participants in South Africa

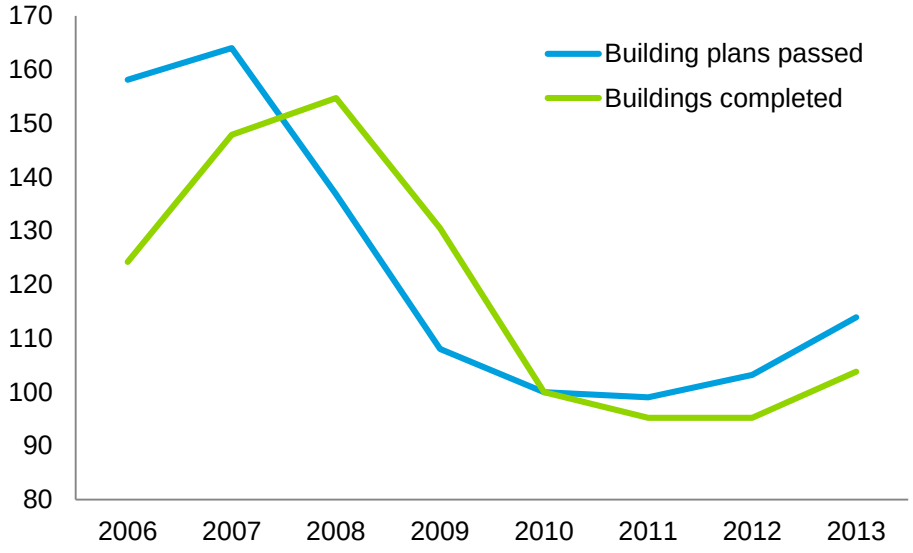
	Consultants	Contractors	Manufacturers	Suppliers
Gauteng	6	10	14	7
KwaZulu-Natal	2	1	8	4
Eastern Cape	0	1	2	4
Western Cape	1	1	6	6
Free State	1	1	0	2
Mpumalunga	1	0	0	2
Total	11	14	30	25

Source: TIASA, 2012

[179] TIASA (Thermal Insulation Association of South Africa)

Isoboard started operating their insulation manufacturing plant in Atlantis in 1994.[180] Significant economies of scale are not required for the production of insulation materials therefore the sector provides opportunities for SMMEs and proximity is important. This therefore provides the Atlantis SEZ an opportunity to attract firms manufacturing insulation products within the built environment. Current market players though are expected to be able to meet market demand in the short to medium term as the South African building market recovers (Figure 57). We therefore only anticipate additional manufacturing activities in this promising market to materialise in the medium to long-term.

Figure 57: Indices of building plans passed and completed, 2010=100



Source: SARB Quarterly Bulletin, June 2014

The Green Building Council of South Africa (GBCSA) has stated that businesses are beginning to experience the economic benefits of buying greener building materials (such as low VOC paint, energy efficient windows and other materials) as this means they would incur lower electricity costs in the long term, especially those resulting from heating, ventilation and air conditioning (HVAC). The other noted benefits as highlighted by the GBCSA include overall lower operating costs; higher asset returns; increased property values and improved marketability. While building insulation makes up a large part of the built environment overview in this report, other materials lowering energy consumption exist. These products include windows, walling solutions and paints. These products can all be manufactured using low carbon materials and inputs or contribute towards energy efficiency, and therefore should be included as part of the greentech opportunity in the built environment.

With regards to walling bricks are typically used in South Africa during the construction of most buildings because they can be easily made on-site at a low cost and provide good strength and insulation. Modular solutions, including those made from recycled products, are only used in areas where bricks cannot be made or where it is too expensive to transport them or where housing needs to be deployed within minimal lead times.

[180] www.isoboard.co.za, About us

8.5.5.6. Waste-to-energy

Waste-to-energy (WtE) can be broadly defined as a process whereby waste (or biomass) is processed to produce gas, diesel, refused derived fuels (RFDs) and/or heat. These products can then be utilised to generate electricity through a generator and/or combined heat and power (CHP) engine. Combustion, pyrolysis and gasification are the primary methods in which biomass feedstocks can be used to generate power. Biogas (a methane rich gas) is generated when organic waste (e.g. food residues and waste sludges) are subjected to the process of anaerobic digestion (biological decomposition without oxygen). The various forms of feedstock that can be used for WtE processes can be classified into three main categories based on their source. These are source separated waste (SSW) obtained directly from the generation point such as commercial operations (e.g. restaurants), mixed municipal waste (MMW) which is usually the residual waste from a municipal material recovery facility and organic waste already disposed of in landfills. Biogas can be generated from these three different waste types, although biogas generated from landfills is generally referred to as 'landfill gas.'

The costs required to access sufficient feedstock can differ significantly based on the technology used (e.g. boiler, gasification, digester, landfill gas and anaerobic digestion), as well as type of feedstock (i.e. SSW or MMW) as well as location since transport costs usually account for a large proportion of the total project cost even if the waste materials can be sourced at no cost.

Biomass has historically been used by the paper and pulp industry and the sugar industry, both industries using this technology for both process steam and electricity generation (for own usage), although WtE need not necessarily use biomass (e.g. pyrolysis can make use of plastics). More recently, there are several WtE projects underway such as a landfill gas project undertaken by the municipality, and some private biogas projects (e.g. a 3 MW project in Bronkhorstspruit that will use abattoir waste and the Saldanha Biogas Project that will use private waste). The electricity generated for both the projects above will be sold to an industrial user in the area. A biomass (17 MW) and landfill gas (18 MW) project have also been selected successfully as part of round III of the REIPPPP.[181] The WtE market is likely to be supported further by the promulgation of a carbon tax in the near future.

However, South Africa is still far behind Europe and North America in terms of the proportion of waste used to generate energy. South Africa uses less than 1% of its waste for this purpose, whereas countries in Europe and North America use about 20%, with Germany using over 45% of its waste to produce energy.[182] This demonstrates the potential for the expansion of this market.

[181] Presentation to Africa Utility Week, Gracia Munganga, GreenCape, May 2014

[182] Presentation to Africa Utility Week, Gracia Munganga, GreenCape, May 2014

Small-scale anaerobic digestion systems for biogas digesters can in many cases be 100% localised (e.g. BiogasPro, a local digester invented by the Western Cape-based firm, Agama). Plastic or brick domes/digesters are low tech and easy to install.[183] For larger scale projects, turbines and gas engines often need to be imported, but South Africa is competitive in the manufacturing of selected WtE components and equipment. This is predominantly due to the fact that the equipment (e.g. boilers) is large and difficult to transport, which makes imports expensive. This inherent local advantage is supported by the DTI's Manufacturing Competitive Enhancement Program (MCEP) and the IDC's Green Energy Efficiency Fund (GEEF). Evidence of this is the existence of several local manufacturers of WtE equipment including Cape Advanced Engineering (CAE), who produces biomass electricity generating systems, CA Components, who produces diesel and natural gas engines (although currently for the export market, the firm is keen to play a significant role in the biogas sector and adapt their engine accordingly) and John Thomson Boilers, who produce conventional and biomass boilers.[184]

As described above, WtE can be used for self-generation of electricity gas and heat as well as for electricity generation to be fed into the grid. This essentially divides the market into self-generation (or non-utility scale) and utility scale. The market can be further broken down into projects that use a firm's own waste and projects that use landfill waste. Hence, there are essentially three market segments, each with its own set of constraints.[185]

8.5.5.6.1. The non-utility scale, own waste products WtE segment

As mentioned above, up until now WtE has predominantly been associated with firms using their own waste products to generate electricity to offset their need to purchase electricity from Eskom. There is likely to be further stimulus for this market segment due to the imminent introduction of a carbon tax and the existing 12L income tax incentive, which rewards energy efficiency and includes cogeneration. Firms such as Agama are also using WtE technology in the non-industrial sector. For example, kitchen and sewage waste has been used in Goodwood prison to produce and use biogas.

While the this segment may grow, it is likely to remain relatively constrained due to the low price of electricity, which disincentives using technologies that reduce electricity purchases from Eskom. Hence, it appears that existing local manufacturing capacity is sufficient to meet any growth in demand from this market segment.

8.5.5.6.2. The utility scale, own waste products WtE segment

There is also scope for firms to generate electricity beyond their own needs to be fed into the national electricity grid. Based on a public hearing on cogeneration, this latent opportunity appears to be large with 712 MW of capacity from the sugar industry in the pipeline between 2014 and 2024 and 158 MW from the paper industry over the next two years.

There are four issues that are constraining this latent opportunity:

- Biomass and biogas have relatively small REIPPPP allocations (59 MW and 60 MW, respectively), meaning that there is little induced demand.

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[183] Development of a Customised Sector Programme for Small Sclae Renewable Energy in South Africa prepared by Frost & Sullivan, Emergent Energy, 3E, Neil Townsend and Chris Ahlfeldt, October 2013.

[184] Overview of Biogas Market in South Africa, Gracia Munganga, GreenCape, October 2013.

[185] Fuel produced from waste for the transport sector may become a forth segment in the future, but the opportunity is still in its infancy and, hence, we do not assess the opportunity here.

- Although generated electricity can also be fed into the grid outside of the REIPPPP, this is often hampered by difficulties associated with obtaining power purchasing agreements (PPA)
- Even if a PPA can be obtained, feed-in tariffs are still too low (due to a price cap on bulk sales to municipalities) to make this profitable
- Electricity prices are still relatively low compared to the cost of WtE generation

8.5.5.6.3. The utility scale, landfill waste WtE segment

There is also the opportunity to use WtE to produce electricity for the grid using landfill waste. The same issues identified above apply, but over and above these, there are an additional five constraints[186].

- It is difficult to access waste stock due to competition for the waste stream. There is demand for waste from the likes of buy-back and material recovery facilities, which make use of elements of the waste material. This makes waste stock difficult and costly to find.
- Available waste stock is not sorted, making it hard to control the quality of waste. 83% of waste is disposed of at landfill sites, with limited sorting at the source. There is also limited incentive to recycle with recycling costing R1900/ton and landfilling costing only R390/ton (in Stellenbosch). However, National Environmental Management Waste Act (NEMWA) has set waste diversion targets for municipalities, as well as job creation targets. It is anticipated these targets will drive demand for WtE technology from a waste management compliance angle rather than electricity prices.
- Securing long term contracts for waste feedstock with municipalities is a lengthy process as required by municipal procurement processes such as the MFMA and the MSA. Any contract is issued on a competitive basis, and some municipalities such as the City of Cape Town are reluctant when approached with unsolicited bids. Alternative technologies might take longer to implement in municipalities compared to the private sector for this reason.
- The storage and use of waste is highly regulated. NEMWA requires a waste license depending on the thresholds required and type of waste handled (i.e. general versus hazardous). The National Environmental Management Act (NEMA) requires a full scope EIR and/or basis assessment depending on thresholds and site location (National DEA is the mandated authority to issue waste licenses for projects using waste classified as hazardous). NEMAQ, an air quality license is required depending on the technology (most WtE with a flare and flue gas emission would require this license).
- Current zoning legislation makes it difficult to obtain land for WtE projects. For environmental reasons only certain areas are made available for the processing of landfill waste, thereby restricting where WtE projects can be established.
- There does not appear to be sufficient grant funding available for WtE projects.

8.5.5.6.4. Unlocking the WtE latent opportunity in Atlantis

Given that these barriers appear to be impeding the latent WtE opportunity, we have identified several factors that would serve to unlock the WtE opportunity and improve local manufacturing possibilities:

- An increase in the amount of better quality waste available for WtE projects. This requires improved incentives for recycling (including higher landfilling prices and the prohibition of the disposal of certain types of waste at landfill sites). The quality of waste has already begun to improve through the increased landfill classification requirements.

[186] Presentation to Africa Utility Week, Gracia Munganga, GreenCape, May 2014.

- A reduction in regulatory barriers. Essentially the CoCT would need to work with national government to reduce the existing regulatory barriers. In particular:
  - Changes in zoning legislation are required to make more land available
  - Changes in municipal procurement processes to make contracting with private firms easier. While GreenCape has already begun to work on facilitating this process, significantly more work needs to be done at municipal level to improve the process.
  - Changes in the definition of activities that require a waste licence in order to make it easier for firms to store and process waste for WtE projects. This has begun to change through an increase in thresholds meaning that projects that previously required a waste license and EIR might now only require a BA and no license.
- Extension of the ASEZ boundaries over time to include landfill sites south of Atlantis, including land adjacent to the landfill site, which could be used for recycling and sorting for WtE products.
- Further targeted incentives. Given relatively low profits and financial IRR for firms operating in the WtE space, the incentives offered as part of the SEZ are unlikely to provide sufficient impetus to the market. It is however expected that the recent changes in the legislation will stimulate the drive towards alternative waste management. Hence, additional incentives might be required to support project developers such minimizing the compliance requirements especially for small scale/residential installations.
- The provision of local waste-testing facilities. This is due to the fact that potential project developers have to ship waste overseas to be tested increasing the cost and decreasing the viability of establishing a project in South Africa.

While there is an opportunity for the local production of WtE machinery and associated activities (such as recycling bins transporters and construction), there are several factors that impede the growth of this market. In our view the requirements mentioned above need to be addressed before this potential can be realised. If so, then the WtE opportunity is more likely to become a high opportunity. It should be borne in mind that this would be a South Africa-wide opportunity and, while Atlantis does have the capability to manufacture WtE components, there are also likely to be other regions capable of doing so.

8.5.6. Conclusions - residential, commercial and industrial greentech opportunity for Atlantis

1. Atlantis is suited to manufacturing activities

- Atlantis is better suited to manufacturing of green technologies and materials than provision of related services (e.g. Research and development, installations, waste services etc.). This is a function mainly of its location – its relative isolation from the CoCT urban centre and ample existing industrial infrastructure.

2. Government support and rising electricity prices drive demand

The demand for local manufacturing of green technologies this segment is contingent largely on:

- Direct government support for uptake of the end-product policy, programmes and standards, coupled in some cases with additional localisation requirements. Key programmes being the Eskom IDM programme, the DoE solar water heater roll-out plan, the SANS building standards and the 12L income tax allowance.
- The rising cost of electricity
- Falling cost of green technologies.

3. While demand has increased the outlook is uncertain

- Two of the most successful government-support uptake programmes are on hold - the Eskom IDM programme is on hold due to funding constraints and the DoE solar water heater programme will soon be re-launched in a new format
- This has negatively affected suppliers and manufacturers in CFL, LED, heat pump, SWH and other energy efficient and renewable energy industries who were servicing the commercial and industrial sectors.
- Andrew Etzinger, current head of IDM at Eskom noted in an interview, that while some alternative funding may become available in the short-term it is likely the programme will be discontinued when Eskom's coal-fired plants come online. The rising cost of electricity and falling relative cost of green technologies will continue to play a role in driving uptake independent of government support.

4. Local manufacturers primarily serve the domestic and regional market

- The majority of existing local manufacturers supply the domestic and regional (SADC) market. Opportunities for expansion are therefore limited by growth in this market.
- Difficult to compete in the international export market because of a combination of one or more of the following factors - geographic remoteness of SA from key international markets, the relative cost and productivity of labour, the domestic\regional market is small and doesn't provide sufficient economies of scale in production.
- Exceptions in niche areas – CA components in Atlantis for example supplies natural gas\biogas engines to Europe on contract.

5. Commercial & Industrial market is the larger opportunity

- While the household market has a higher number of potential users, the commercial and industrial market represents the larger opportunity for manufactures of green technology in South Africa.
- Demand is being driven by the rising cost of grid electricity prices and falling cost of green technologies.
- The business case for self-generation or energy efficiency initiatives is much clearer in these segments due to much higher overall energy consumption and longer operating hours within this segment and high opportunity costs of power outages or rising electricity costs.

6. Result – the high-opportunity and medium-opportunities greentech activities for Atlantis

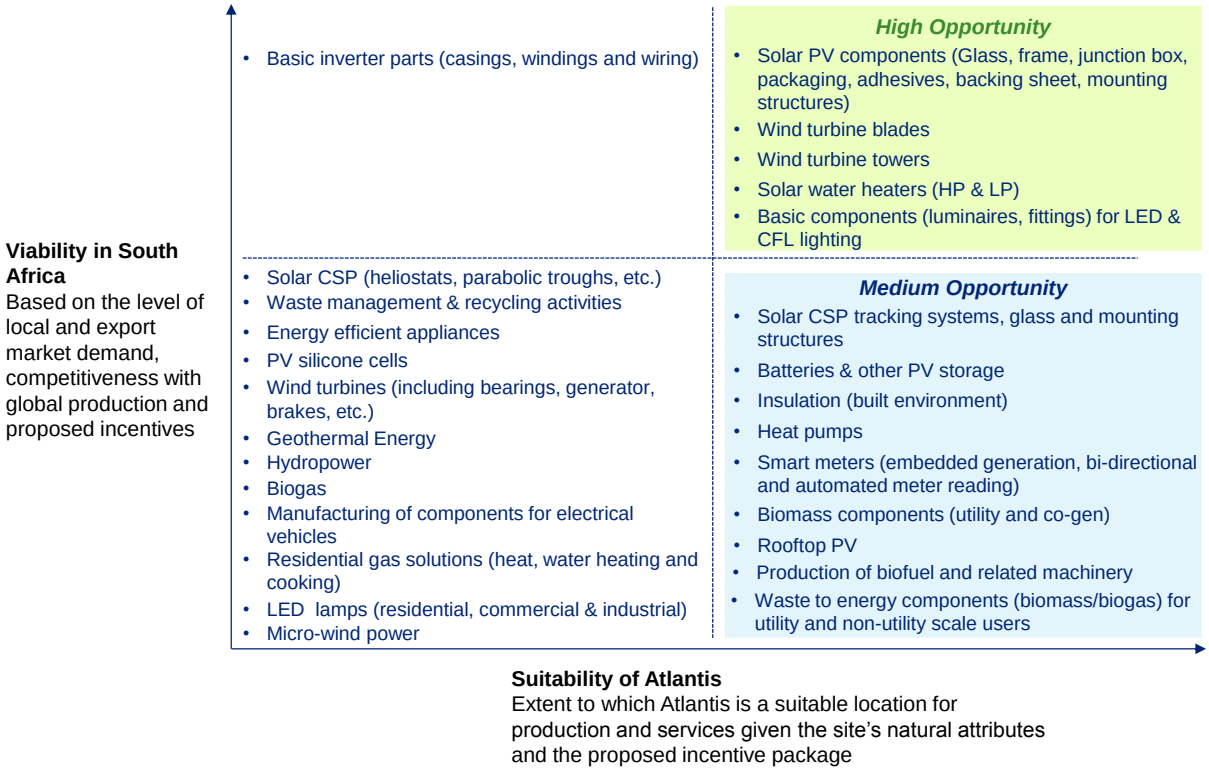
- The high-potential opportunities identified were the manufacturing of SWHs and basic LED components, including assembly of LED lights. We expect both of these markets to receive continued government support (through rebates and standards) and note that growth in these markets will potentially support the establishment of new entrants or expansion of existing firms to Atlantis.
- The other market opportunities which we identified for the Atlantis region include the manufacturing or assembling of heat pumps, building insulation, solar batteries, smart meters and roof top PV. Again, due to shipping costs and size requirements, assembling and manufacturing for the commercial and industrial market provides the greatest opportunity for additional manufacturing activities in Atlantis.
- The medium-potential technologies are future opportunities because they are typically contingent on some additional government support in terms of enabling regulation, standards or funding or growth in the regional market. These include Rooftop PV (which depends on progress in embedded generation) an, or larger local markets to breach the tipping points for local investments into additional manufacturing activities in the country.

8.6. Summary of greentech market sizing findings and conclusions

A summary of our overall ranking and prioritisation of greentech activities for the proposed ASEZ is provided in Figure 3. The high-opportunity activities (and in some cases specific components) are highlighted in the top-right quadrant while medium-opportunity activities are in the bottom-right quadrant.

The immediate (next 3 years) high-potential opportunities for Atlantis include the manufacturing of selected PV module components, wind turbine blades and towers, solar water heaters and basic components of CFL and LED lights. These activities, with the exception of lighting components are all directly supported through targeted government initiatives and would likely have setup without SEZ incentives. The purpose of the SEZ therefore would be to attract these activities to a relatively under-utilised industrial node and to promote the 'clustering' of these activities to foster greater collaboration and development of greentech activities in future.

Figure 58: Overall greentech opportunity prioritisation



Source: Deloitte analysis

The medium-opportunity activities represent future opportunities for the ASEZ to attract because growth in these markets is still contingent on additional government interventions (in terms of regulation, standards or direct support) or movement in other key demand drivers (e.g. falling cost of the technology or higher energy prices).

The IRP allocations and REIPPP programme together with local content requirements is the key driver of demand within the utility-scale market, especially within the wind, solar PV, CSP, biomass and biogas technologies. These technologies are capable of providing power to the national grid while also providing opportunities for additional local manufacturing in the proposed ASEZ.

The local manufacturing opportunities differ for each technology in terms of both timing and complexity. For instance within the wind energy market the fabrication of the wind blades and towers is already taking place in South Africa and Gestamp, a wind tower manufacturer, has already started building their plant in Atlantis. For the local CSP technology market it may take several more years before firms in South Africa start producing more advanced components such as curved mirrors or energy storage solutions. For now though the current opportunities in CSP occur within the manufacturing of solar trackers, steel and aluminium frames, flat plate glass and mirrors and other BOP components.

There are a wide range of greentech products and services in the residential, commercial and industrial market. These greentech solutions span across all the categories within the greentech 'taxonomy'. The technologies which we assessed as providing the greatest short-to-medium term opportunities for manufacturing in Atlantis are solar water heaters, heat pumps, rooftop PV, components of inverters, LED and CFL luminaires, building insulation and components of waste to energy technologies.

As electricity prices increase and technologies improve over time, local demand could sustain additional manufacturing in other technologies such as PV silicone cells, advanced components of inverters and heat pumps, electrical cars and their components, bio-fuels, batteries and other storage solutions, small scale waste heat recovery and other industrial solutions to reduce resource usage.

A number of existing greentech manufacturers and service providers have already indicated that a greentech SEZ in Atlantis would be an attractive location to operate from. In addition to the short term tangible opportunities already identified, the proposed greentech Atlantis SEZ would also provide future local and international greentech firms with a location that consists of fiscal incentives and an easier and more productive environment to do business from depending on individual needs.

Local and international demand for greentech products and components will continue to grow thus increasing the likelihood of demand from firms wishing to gain access to the ASEZ property and incentives. We foresee demand for ASEZ eligibility growing on the back of increasing electricity prices, growing consumer awareness, increasing support for embedded generation, rising income levels, improving environmental awareness and falling technology prices.

8.7. Greentech demand scenarios

8.7.1. Our approach – from market sizing to scenario development

Having identified high-potential and medium-potential greentech opportunities for Atlantis in both the utility-scale and broader residential, commercial and industrial market we estimated the size, number and nature of the firms that would likely setup in the ASEZ to take advantage of each of the identified opportunities. These estimates provide the basis for two demand scenarios –'conservative' and 'moderate'.

The assessment of the type, nature and number of firms representing each high and medium greentech opportunity was based on primarily on information obtained during interviews with potential investors, existing greentech firms and other industry experts at institutions including the IDC, SAREBI at Stellenbosch Centre for Renewable Energy Studies. For some of the identified technologies we were able to estimate the number of firms that would be required to support tangible future demand. Gestamp, the Spanish wind tower manufacturer that recently invested in Atlantis was included in all scenarios.

We split each scenario into two periods with the high-potential greentech opportunities translating into investment in the first period (2014 – 2017) and the medium-potential opportunities likely to translate into investments in the second period (2018 – 2030). The 2030 end-date was chosen to coincide with the end of the long-term planning horizon set by government in the Integrated Resource Plan (which provides guidance on future allocations to utility-scale renewables) and the National Development Plan.

8.7.2. Description of demand scenarios and assumptions

8.7.2.1. Conservative scenario – description and assumptions

This is the low-road scenario. Government support for greentech is a key driver of demand and we assume no further support beyond what is currently committed to the development of renewable energy and energy efficiency technologies over the period 2014 to 2030. We have also assumed that only investors that expressed a keen interest in locating in the ASEZ during this period will do so.

Key Assumptions:

- There will be no significant increase in the allocations for renewable energy in any subsequent updates to the integrated resource plan from 2015 to 2030 and no further increases in the REIPPPP
- For the medium-potential opportunities where the future market potential is still uncertain and government funding is not readily available, we have assumed it will take interested firms 3 to 4 years to setup.
- The DoE meets its target date of re-introducing the low pressure SWH mass roll-out programme and runs it for the remainder of the MTEF period (3 years) only. The high pressure SWH rebate programme continues as it is currently. We assume that no additional funding is provided by Treasury for SWH rebates beyond the current MTEF. The strict localisation requirements (70% on collectors and geysers) are implemented in 2014 for low pressure SWH. In the absence of innovative financing or insurance incentives uptake of private installations of heat pumps, SWH, etc. remains slow.
- Small and medium enterprises (both suppliers and greentech firms) will be able to setup within the SEZ within available brownfield sites and will have access to support services such as those supplied by SAREBI
- We assume that beyond the specific greentech investors already identified there will be an additional 15% that setup in the ASEZ to take advantage of opportunities that we have not explicitly identified.

8.7.2.2. Moderate demand scenario – description and assumptions

In the moderate scenario we assume that the demand for greentech improves primarily due to increased support by government and stronger enforcement of energy efficiency standards but also due to an increase in the cost of electricity which drives independent uptake of energy-efficient technologies. We have assumed that greentech investors beyond those directly identified for Atlantis and some investment by those in adjacent clusters. We assume that an additional 30% of firms will setup to take advantage of greentech opportunities that we have not been able to specifically identify.

Key Assumptions:

- The DoE releases renewable energy allocations for subsequent bid windows on time and increases the overall allocations marginally

- The DoE SWH roll-out plan is funded beyond the current MTEF period. An improved SWH subsidy is introduced via Eskom or another party (e.g. City of Cape Town) with the enforcement of the localisation requirements (70% on collectors and geysers) for low pressure SWHs. This is backed by additional market offerings for HP SWHs either through innovative insurance products or through new financing products
- The rising cost of grid electricity prices and falling cost of green technologies drives increased demand for energy efficient products such as heat pumps, LED lighting and HVAC from non-residential users, with an increase in those applying for rebates or the 12L tax incentive
- Improved market outlook sustains more SMMEs in the region than in the conservative case
- In some cases we assume entry into the market where IRP allocations became significantly larger in later periods (post 2030)
- We assume that beyond the specific greentech investors already identified there will be an additional 30% that setup in the ASEZ to take advantage of opportunities that we have not explicitly identified.

8.7.3. Assessment of likely uptake under the conservative and moderate demand scenarios

An overview of the type, nature and size of firms that the ASEZ could feasibly attract under 'conservative' assumptions is provided in Table 28 and under 'moderate' assumptions in Table 29.

Under the conservative scenario we estimate that the ASEZ could attract 12 firms in the first 3 years and an additional eight firms in the following period. The moderate scenario (Table 29) assumes a marginally higher and earlier interest by firms wishing to invest in the Atlantis SEZ compared to the conservative scenario (Table 28). For instance in the moderate scenario we anticipate that a PV module manufacturer will show interest in the SEZ within the next two years and begins operating before the end of 2017. Also, due to a slightly higher than anticipated uptake in the demand for SWHs we foresee the market being able to support an additional SWH manufacturer and assembler in the short term.

Table 28: Conservative scenario

	Description.	2014 – 2017	2018 – 2030
		Green Tech and directly related	
Green Technology	Wind	Gestamp (wind tower manufacturer) 1 x Wind blade manufacturer	
	Solar PV		1 x Low-ion glass manufacturer 2 x PV module manufacturer
	CSP		1 x CSP trackers
	Solar Water Heaters	1 x Manufacturer 2 x SMME SWH assembly & installation	
	Energy Efficiency	1 x Energy efficient lighting	
Suppliers to Green Tech	Larger Suppliers		2 x Steel structures 1 x Inverter parts and assembly
	SMMES	1 x Cabling and cabling services 1 x Basic steel structure (e.g. ladders and small platforms) 1 x Specialised painting services (Gestamp) 1 x Specialised painting services (wind blades) 1 x Small electrical components and kits, incl. lights 1 x Specialised logistics	1 x Aluminium frames & structures

Source: Deloitte analysis

Table 29: Moderate scenario

	Description	2014 – 2017	2018 – 2030
		Green Tech and directly related	
Green Technology	Wind	Gestamp (wind tower manufacturer) 1 x Wind blade manufacturer	
	Solar PV	1 x PV module manufacturer	1 x Low-ion glass manufacturer 2 x module manufacturer
	CSP		1 x CSP trackers
	Solar Water Heaters	2 X Manufacturer 3 x SMME SWH assembly & installation	2 x SMME SWH assembly & installation
	Biomass		1 x Biomass components
	Energy Efficiency	1 x Energy efficient lighting	1 x Batteries for storage 1 x Building insulation 1 x Heat pump
Suppliers to Green Tech	Larger suppliers		2 x Steel structures 1 x Inverter parts and assembly
	SMMES	1 x Cabling and cabling services 1 x Basic steel structure (e.g. ladders and small platforms) 1 x Specialised painting services (Gestamp) 1 x Specialised painting services (wind blades) 1 x Small electrical components and kits, incl. lights 1 x Specialised logistics	1 x Aluminium frames & structures 1 x Packaging

Source: Deloitte analysis

Differences in the scale and impact the greentech SEZ could have under conservative and moderate scenarios in terms of number of greentech firms and suppliers, direct permanent jobs created per year and the required industrial floor space are outlined in Table 30.

In the conservative scenario the wind blade manufacturer and Gestamp represent the two large manufacturers employing 550 workers and requiring 41 000m^2 of industrial floor space. In the moderate scenario we assume an additional ten greentech firms will set up over the 17 year period (2014 to 2030) increasing our overall estimate of total direct and permanent jobs created by 380 and increasing required floor space 32 000m^2. These ten firms represent six medium greentech firms, three small greentech firms and one additional small greentech supplier. No additional large manufacturers were assumed to set up in the moderate scenario above those already identified in the conservative scenario. In both of our demand scenarios presented here the proposed Atlantis SEZ would be considered a small scale greentech SEZ.

The majority of foreign direct investment will likely be attracted by the two large anchor tenants, Gestamp and the wind turbine blade manufacturer. According to our market research and interviews with manufacturers this investment could be in the range of R500 million for each scenario. If international PV module manufacturing firms make investments of R50 million each then an additional R100 million and R150 million in FDI could be attracted in the conservative and moderate scenarios respectively.

Table 30: Size of likely uptake, conservative and moderate scenarios

	Conservative				Moderate			
Firm Size	Large	Medium	Small	Total	Large	Medium	Small	Total
No. greentech firms	2	5	3	9	2	11	6	18
No. of greentech suppliers	-	3	7	10	-	3	8	11
Direct permanent jobs created per year	550	370	140	1 060	550	690	200	1 440
Industrial floor space required, m^2	41 000	30 500	9 100	80 600	41 000	60 500	11 100	112 600
FDI, million	R500	R100	-	R600	R500	R150	-	R650

Source: Deloitte analysis

8.7.4. Conclusions

Our analysis of the greentech market in South Africa and the potential of Atlantis to attract a share of the firms that will serve that market suggest that demand will be sufficient, even under the more conservative scenario, to support the development of a small-scale greentech SEZ.

In the short-term (2014 to 2017) the ASEZ would focus on trying to attract manufacturers of SWHs and components for wind and solar PV as well as basic LED/CFL lighting components and/or assembly. The SEZ would also focus on supporting a number of SMME greentech suppliers focusing on servicing the larger anchor tenants such as Gestamp or a wind blade manufacturer. We acknowledge that these activities, with the exception of lighting components are all directly supported through targeted government initiatives and would likely have setup without the provision of SEZ incentives.

However, the SEZ would play a role in regional development in that it would likely attract these activities to a relatively under-utilised industrial node and to promote the 'clustering' of these activities to foster greater collaboration and development of greentech activities in future.

The opportunity for the ASEZ is also likely to improve over the medium-to-long term (beyond 2018) because of increased IRP allocations and movements in demand drivers, such as rising electricity prices or falling technology costs. In the medium term the ASEZ could potentially attract two large greentech firms and 14 medium and small firms with a host of smaller suppliers creating 1 440 direct and permanent jobs once fully realised. The majority of these jobs are likely to be filled Atlantis residents thereby contributing to the revitalisation of the area.

There are a number of factors that could further unlock the ASEZ greentech opportunity increasing industrialisation, job creation and revitalisation. These opportunities have not yet been fully considered in our greentech demand scenarios but are discussed in section 9 and are incorporated to an extent in the final business case options. .

Overall we feel that current market demand is capable of sustaining a small scale greentech SEZ in Atlantis, particularly if the SEZ entity adopts and incremental approach to investment based on realised demand. If additional demand from neighbouring countries or other international markets for South African made products increases or new local markets such as co-generation and embedded generation are unlocked, then this would only further increase the viability and potential of the proposed Atlantis greentech SEZ.

In section 12 we discuss the business case options and illustrate how the Atlantis SEZ could develop in terms of different assumption on land use and sector definitions and provide initial estimates of investment costs associated with each option.

9. Exploring the broader opportunity for the ASEZ

9.1.1. Introduction

As discussed in section 8.7 our analysis of the greentech market in South Africa and the potential of Atlantis to attract a share of the firms that will serve that market suggest that demand will be sufficient, even under the more conservative scenario, to support the development of a small-scale greentech SEZ.

In this section we explore whether value could be added to this concept – how the SEZ framework and incentives could be used to unlock additional opportunities for industrial and\or economic development in the area and to maximise the benefits in terms of attracting investment and job creation.

The opportunities identified include:

- **Extended sector focus to support existing or emerging clusters**– the SEZ could be used to support the further development of the existing manufacturing cluster in Atlantis while maintaining a focus on greentech and commitment to the 'green economy' more broadly.
- **West Coast SEZ corridor** - Designating the SEZ as a wider-scale "West-Coast economic growth corridor" to unlock greentech opportunities that are tied to particular locations outside Atlantis and to use the SEZ as a catalyst for a broader West Coast regional development initiative.
- **Emergence of a natural gas supply** – Understanding the positive spill over effects from the likely emergence of a natural gas supply in Atlantis through either local production or imports could have on the proposed ASEZ and understanding how it can support the business case.

9.1.2. Extended sector focus to support existing or emerging clusters

International experience suggests that SEZs are often most successful in unlocking the economic potential of an area where they are used to support clusters of activity that are already organically emerging in the targeted geography and where they seek to exploit the location's comparative advantages[187].

A World Bank study that explores how SEZs and industrial clusters have contributed to China's rapid development notes that, "in China, while market forces are usually responsible for initially producing industrial clusters ["bottom-up"], the government supports or facilitates them in various ways, including setting up an industrial park on the basis of an existing cluster." While SEZs are often employ a 'top-down' approach to cluster development, the study notes that inevitably it is easier to devise policies to support a functioning cluster than it is to call a new cluster into existence. China in a sense appears to successfully employ a mixture of the "bottom-up" and "top-down" approach to cluster development.[188]

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[187] World Bank, "Special Economic Zones in Africa, Comparing Performance and Learning from Global Experience", Thomas Farole. 2012.

[188] World Bank, "How Do Special Economic Zones and Industrial Clusters Drive China's Rapid Development?", Douglas Zhihua Zeng. 2011.

Our analysis of economic activity in Atlantis (section 5.2) suggests that manufacturing is still the heart of the local economy. Of the 81 firms identified in the main commercial and industrial area, 'Atlantis Industria', 49 were involved in manufacturing. Atlantis Foundries, which was one of the firms established with the area in the 1970s, remains an anchor tenant and there is a cluster of automotive and steel product manufacturing and related services around it. There are a variety of other manufacturers in small clusters including consumer electronics, textiles, wood products, food-processing and building materials; these are usually centred around one or two large firms.

While some of long-standing manufacturing firms in the Atlantis, such as the Foundries are there because of a 'top-down' process to establish the area in the 1970s, interviews with existing firms revealed that others have chosen to locate there because of the comparative advantages the area offers. These as discussed in greater detail in section 5.7 include:

- **Ample supply of both developed and vacant industrial land** (632 000m^2 and 1 500 000m^2 respectively) and the area was purpose built for manufacturing.
- **Low rentals and cheap land** compared to other industrial nodes in the CoCT and Western Cape
- Atlantis is removed from urban congestion and traffic
- **Proximity to an agriculturally significant area** of the Western Cape which provides some raw materials (e.g. wheat)

To understand whether an SEZ at Atlantis could potentially support further growth and development of the existing manufacturing clusters we interviewed a number of the existing firms in the area[189]. There were a few firms that felt that the SEZ incentives could be sufficiently attractive to support the incremental expansion of their own operations (under separately registered subsidiaries) or to support a new entrant. Most of the existing manufacturers in Atlantis however noted that while the SEZ incentives were attractive, there was limited opportunity to expand operations into new product lines or attract new entrants into their industry given sluggish growth in the market they serve (predominantly SA and neighbouring countries).

Hisense, the Chinese consumer electronics manufacturer felt that growth in regional demand was not sufficient to support growth in the electronics cluster, noting that Gauteng remained it is major market and by comparison the feasible market outside South Africa was small. It did however identify an opportunity for firms to manufacture electronic components (e.g. compressors for refrigerators) locally to replace imports, but acknowledged that the market is highly competitive and manufacturers require scale to be competitive. Hisense has already established a factory in Nigeria and as such would not export from South Africa to West Africa.

[189] Interviews conducted with Hisense, Atlantis Foundries, Rotex Fabrics, Promeal, Pioneer and Swartland (wood products).

Rotex indicated that there is unlikely to be an opportunity for expansion in the knitted fabrics market in which it operates but said the same was not necessarily true for other textiles and clothing.[190] Promeal, a pet food manufacturer, and Pioneer Food, which produces cereal products in Atlantis noted little potential for expansion due to limited growth in local demand.[191] Pioneer food felt that any expansion in the cereal market would likely be in Gauteng because it is the largest local market and because wheat is traded inclusive of the transport costs to Gauteng regardless of whether it is actually sent to Gauteng.

Swartland, a manufacturer of doors, window frames and other wood products noted that they were considering expansion into other product lines (potentially under a separate subsidiary) and that the eligibility for SEZ incentives may be a determining factor in their decision on whether it was feasible to embark on this expansion.[192] Swartland interestingly is one of the firms which serve a much broader export market and are therefore less constrained by domestic growth – they currently export about 50% of their output to countries in Sub-Saharan and North Africa (Algeria).

We also tried to survey a number of labour-intensive manufacturing firms in the broader Cape Town area to assess whether the SEZ incentives could be potentially be sufficient to attract new entrants or incremental expansion of these employment generating operations to Atlantis. Unfortunately responses to a survey distributed by Westgro and the Cape Town Clothing Cluster were very low. Cotton Traders, a business involved in feather and down bedding products, noted that while the SEZ incentives particularly the employment tax incentive was attractive, it if it was to expand its operations it would do so at its existing facilities in Brackenfell due to the fact that synergies would exist between new and current operations (e.g. supervisory or managerial staff).[193]

9.1.2.1. Conclusions and observations on extending sector focus

Overall the interviews with firms in Atlantis suggest that this is an opportunity to support the further growth and development of the existing small manufacturing clusters Atlantis under the SEZ. Many of the firms felt that opportunities for expansion would be constrained by growth in the domestic consumer market regardless of the incentives provided. But for those firms such as Swartland who are able to serve a broader and growing export market in Africa, SEZ incentives may indeed tip the business case in favour of incremental expansion into new product lines and markets. There may also be an opportunity to attract new low-skill labour intensive manufacturers to Atlantis where growth in the domestic and broader regional market is also supportive.

When we engaged various government stakeholders on the possibility of using the SEZ to support the development of the existing manufacturing cluster some additional perspectives were provided:

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[190] Based on an interview with Sam Schaffer, Rotex, 18 June 2014.

[191] Based on interviews with Hempies Kriel, Promeal, 18 June 2014 and Jan de Villiers, Pioneer Foods, 18 June 2014.

[192] Based on an interview with James Hannekom, Swartland, 18 June 2014.

[193] Based on an interview with Mike Stewart, Cotton Traders, 2 July 2014.

A manufacturing plus greentech SEZ should still have a 'green economy' focus

A WCPG stakeholder noted that if extending the SEZ sector focus to include manufacturers would attract more investment and employment than the greentech-only alternative it should be encouraged. That said, the SEZ should not lose its 'green' focus because one of the envisaged goals of the Atlantis SEZ was to create a focus area for 'green investment' in the province. As such, any manufacturer that applies for SEZ incentives should have to demonstrate a minimum commitment to 'low-carbon resource-efficient industrial production'. The minimum requirements for 'low-carbon resource-efficient' could be stipulated and an assessed by a committee similar to the existing Greentech Manufacturing Evaluation Committee and should not be so onerous that they offset SEZ incentives provided.

Does the SEZ Act provide for the designation of a greentech and manufacturing SEZ

A DTI stakeholder noted that in terms of the SEZ Act and Policy all sector development zones should have a clearly defined sector or industry focus and it was not clear whether an SEZ with a 'greentech' and manufacturing focus would meet these criteria.

There is nothing, in our view, in the provision of the Act. No. 16 of 2014: Special Economic Zones Act, 2014 (SEZ Act) to suggest that it would not be possible to designate an SEZ with a focus on 'greentech and manufacturing firms' within the guidelines provided. The SEZ Act, clause 4(2a) suggests that the purpose of SEZs is to support targeted investment in the manufacturing and tradable services while clause 24 suggests that sector development zones be focus on a specific sector or industry.

The purpose of SEZs as outlined in SEZ Act 2014, Clause 4(2a) is described as follows:

"The purpose of establishing Special Economic Zones includes – facilitating the creation of an industrial complex, having strategic national economic advantaged for targeted investment and industries in the manufacturing sector and tradable services;"

In terms of the SEZ Act, section 24(4):

"the Minister of Trade and Industry may… prescribe the type of service and business that may be located in a Special Economic Zone in order to achieve the purpose of the Special Economic zone set out in section 4."

A sector development zone as the proposed ASEZ would likely be classified was defined in the SEZ Act 2014, Section 24(5d) as follows:

""Sector Development Zone" means a zone focused on the development of a specific sector or industry through the facilitation of general or specific industrial infrastructure, incentives, technical and business services primarily for the export market."

9.1.3. 'West Coast SEZ corridor'

During our engagement a variety of potential investors and existing firms in Atlantis and it became apparent there may be an opportunity to use a wider-scale version of the Atlantis SEZ as a catalyst for regional growth and development and to support growth specifically along the emerging West-Coast economic corridor.

The rationale for the 'Atlantis' SEZ to be designated over a wide geographic area include:

- It could unlock a broader range of activities (greentech and\or 'low-carbon and resource efficient') that are suited or tied to particular locations outside Atlantis but still within the broader Blaauwberg-Atlantis-Saldanha corridor – for example biomass linked to agricultural waste or alien vegetation removal, waste-to-energy and recycling activities around landfill sites south of Atlantis and potential development of 'low-carbon resource efficient' aquaculture on the west coast.
- It could attract investors who cannot feasibly locate in Atlantis because of their sensitivity to time\distance parameters from ports and the urban centre by providing them with alternative location options that are within or at least closer to the current urban edge.
- A wide-area SEZ could act as catalyst to support commercial and industrial development along a corridor that has already been identified by the CoCT as an area of mixed-use development where the City will need to proactively accommodate housing opportunities for the rapidly growing urban population.
- A wide-area SEZ could be instrumental in integrating a number of different 'hard' and 'soft' infrastructure investments along the corridor with the core industrial parks at Atlantis and Saldanha.

A global trend in economic zones has seen a shift away from traditional 'gated' export-processing zones toward larger-scale, more flexible SEZs. These SEZs are typically designed over a wide geographic area that includes residential development. This model allow for a broader range of activities and investment and provides investors with more flexibility in terms of markets where outputs can be sold (domestic and export). A World Bank report on SEZs in Africa notes that "Wider-scale SEZs can be integrated around key trade infrastructure (ports, roads, power projects), with domestic industry clusters, and local labour markets. This may begin to unlock the potential of zones as catalysts rather than enclaves."[194]

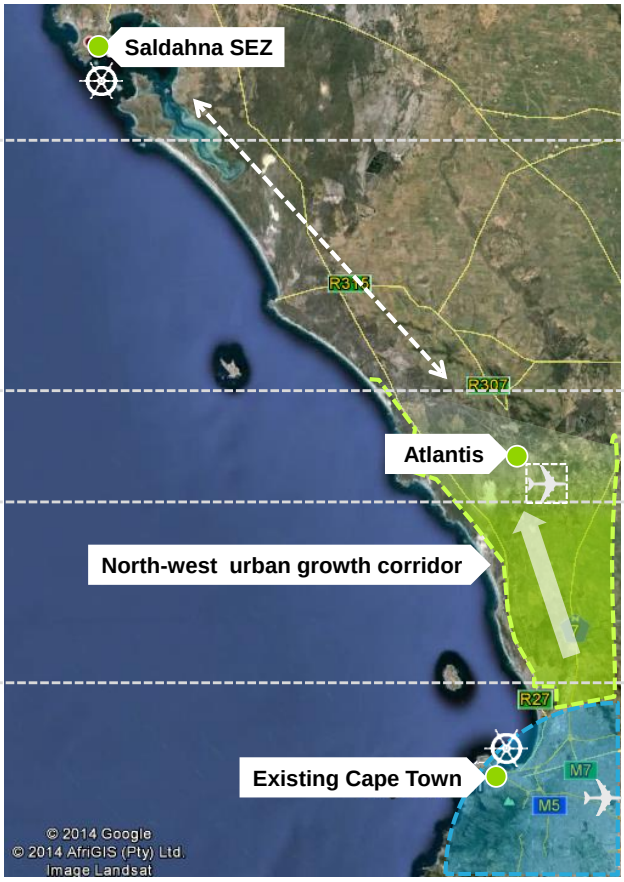
A conceptual illustration of Atlantis in the context of the broader regional development plans and initiatives along the corridor north-west of Cape Town is provided in Figure 59. The north-west corridor between Blaauwberg and Atlantis is one of the CoCT's identified 'future urban growth corridors'. Together with the north-eastern development corridor, the Blaauwberg-Atlantis corridor could accommodate some 430 000 housing opportunities which is just over half the anticipated 30-year future need.

Some of the other potential initiatives that could act as catalysts for growth along the corridor include LNG facilities at Atlantis and\or Saldanha, the oil and gas SEZ at Saldanha, a proposed future airport at Atlantis, a proposed future landfill site near Atlantis.

[194] Special economic zones in Africa, World Bank, 2011

A wider SEZ corridor from Blaauwberg to Atlantis and possibly even including the geography north of Atlantis to Saldanha could potentially support a range greentech and 'low-carbon resource-efficient activities' along this corridor. Some of the specific opportunities that an SEZ corridor in this area could unlock include waste-processing and waste-to-energy at the existing and proposed landfill sites some 15km to 20km from Atlantis, biomass linked to agricultural waste or alien vegetation removal waste-to-energy and recycling activities around landfill sites south of Atlantis and potential development of 'low-carbon resource efficient' aquaculture on the west coast.

Figure 59: Atlantis in the context of other developments in the north-west corridor



Saldanha oil and gas SEZ, Saldahna Port, aquaculture

Strengthened logistical linkages between Cape Town, Atlantis, Saldanha, and functional region hinterland

Proposed Atlantis SEZ, proposed future additional airport, potential LNG projects

Urban growth corridor - residential, commercial and industrial development supporting the public transport system. Existing and proposed landfill sites

Existing Cape Town - with a contained urban edge and subject to on-going urban renewal

Source: Deloitte and AECOM analysis

Another argument in support of a corridor rather than 'industrial park' approach to the Atlantis ASEZ is that it would provide investors with some alternative location options that are still within the corridor but somewhat closer to Cape Town.

In general economic activity tends to occur, within fairly predictable and inelastic time\distance parameters, along good roads (usually also associated with the provision of other bulk infrastructure services such as power, water and communications infrastructure) and near major population centers that host a variety of business services and are close to key transport nodes.

While Atlantis is considerably more integrated with the broader Cape Town metropolitan area than it was 40 years ago, interviews with existing firms in the greentech industry suggest the distance from the urban centre of Cape Town and port of Cape Town still represents a barrier to a fair proportion of would-be investors. It would take approximately 50 minutes to drive the 50km from the Cape Town city centre to Atlantis in light traffic.

A potential West Coast Corridor would likely accommodate a range of residential commercial activities and not all companies in the SEZ would be given 'licensed SEZ enterprise' status and the associated fiscal and other benefits. The sector focus of the SEZ could be limited to the greentech firms but could also be extended to include a range of low-carbon resource-efficient activities that are in keeping with the broad values of the 'green economy'.

9.1.4. Natural gas as a clean energy opportunity for Atlantis

Natural gas is a major fuel for multiple end-uses including electricity, industry, residential cooking and heating and increasingly is discussed as means to reduce dependence on oil in transportation[195]. Because gas is a less carbon-intensive and therefore a 'cleaner' form of energy than coal or oil, it is often referred to as a 'bridge to a low-carbon future. The discussion about gas as means of reducing carbon emission has intensified since the discovery of a large unconventional natural gas resource in the form of shale gas, particularly in the United States.

The Western Cape Provincial Cabinet identified natural gas as a strategic priority in May 2013 (The Cape West Coast Gas Development).[196] The business case appears to be anchored on an identified opportunity to convert the Ankerlig power station at Atlantis from a diesel to natural gas feedstock. Ankerlig is a 1 350 MW open cycle gas turbine power station located in Atlantis, which could be converted to a 2 070 MW closed cycle gas turbine. It currently runs on diesel to meet peak power demands, however, there are plans to convert the power station to run on cheaper natural gas. There are also gas-fired power stations planned for Milnerton (800-1 000MW) and Saldanha (350-450MW).[197]

Moreover, the transport and industrial hubs throughout the Western Cape and heavy industrial users in Saldanha Bay (ArcelorMittal, rare metals industries, BHP Biliton, Steel Authority of India and Frotnier Rare Earths) have been identified as potential consumers of natural gas.[198]

The Cape West Coast Gas Development has considered two main options for the supply of gas: indigenous gas reserves and imported liquefied natural gas (LNG).

9.1.4.1. Indigenous gas reserves – Ibhubesi Gas Project

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[195] The Future of Natural Gas, an interdisciplinary MIT study, 2011

[196] LNG Importation Initiative: Saldanha – Cape Town Corridor, Western Cape Government Economic Development and Tourism

[197] Pre-feasibility study for the importation of natural gas into the Western Cape with specific focus on the *Saldanha Bay-Cape Town corridor, Cape Town Chamber of Commerce*

[198] LNG Importation Initiative: Saldanha – Cape Town Corridor, Western Cape Government Economic Development and Tourism

The most advanced indigenous gas reserves project is the Ibhubesi Gas Project (IGP). The Ibhubesi gas field (380km north of Cape Town and 70km offshore) may provide a source of natural gas to be used at Ankerlig. These reserves are owned by a joint venture between Sunbird Energy (76%) and PetroSA (24%). As part of IGP there are plans to develop a 400 km offshore pipeline from Ibhubesi to Ankerlig with gas production starting in 2018 including onshore receiving stations in Atlantis and Saldanha.[199] However, the Front End Engineering Design (FEED) has not yet begun, meaning that this start date is likely to be a best-case scenario.

Sunbird Energy has entered into a memorandum of understanding with Eskom whereby it would supply 35 Bcf per annum. This appears to be based on total production volume of 540 Bcf and depends on both proved and probable reserves (Table 31).[200]

Table 31: Ibhubesi Gas Project Reserves

Sub-sector	Recorded Gace: MHs Volume (Bcf)	Recorded Conditional Volume (MMbbls)
Proved (1P)	210	1.7
Proved + Probable (2P)	540	4.3
Proved + Probable + Possible (3P)	915	7.3

Source: MHA

9.1.4.2. LNG import terminal

There are two options for the location of an LNG import terminal:

- An onshore receiving terminal in the port of Saldanha Bay and
- An offshore receiving terminal with distribution infrastructure supplying Atlantis, Cape Metrolpolis, Paarl and Wellington (phase 1) and Saldanha Bay (phase 2).

The prefeasibility study found that the latter option would require less capital investment and would result in the shortest lead time. In this case, first commercial gas (for phase 1) would be available in 2018 (as is the case for the IGP).[201]

A prefeasibility study has been performed and shows that this project could be profitable but the likelihood of the project going ahead is difficult to assess at this point.

The potential for the supply of natural gas into Atlantis provides two opportunities

- Gas receiving facilities

For the IGP, an onshore gas receiving facility would be required to reduce gas pressure in the production pipeline and measure the gas flow rate before it is fed through to the end user. While employment would be required to construct the facility as well as maintain, test and inspect the onshore pipeline, there does not appear to be a significant business opportunity associated with the onshore gas receiving facility.

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[199] Proposed Ibhubesi Gas Project, CCA Environmental

[200] Sunbird Energy Corporate Presentation, May 2014.

[201] Pre-feasibility study for the importation of natural gas into the Western Cape with specific focus on the Saldanha Bay-Cape Town corridor, Cape Town Chamber of Commerce

- Investment in Atlantis from manufacturers seeking lower priced, cleaner energy

This opportunity is only likely to be possible once gas supply from IGP and the LNG import terminal exceeds Ankerlig's demand. Should only the IGP go ahead, this may be as a result of Ankerlig requiring less than 35Bcf per annum and as a result of the exploitation of possible reserves (i.e. exploitation over and above the proved and probable reserves). This implies that the likelihood of manufacturers having access to gas is low and is at this point a future opportunity (beyond 2020).

Post 2020 there is the possibility of excess gas being available for a range of end-users at prices lower than other forms of power, including electricity and diesel. At this stage, however, it is difficult to predict what the relative price of natural gas will be. Nevertheless, should the gas be competitively priced relative to grid electricity it could attract a range of energy consumer and intensive users to locate/re-locate to Atlantis and firms already established in Atlantis would benefit from a cleaner, potentially cheaper source of energy.

Regardless of the price, gas is still a cleaner energy source than coal-generated electricity, which means that firms looking to gain carbon credits may still be incentivised to locate in an area where it is feasible to use gas. Moreover, the clean aspect of gas is compounded by the fact that firms may be able to use cogeneration (or tri-generation), where the steam from the burning of gas is also used as an energy source, thereby reducing energy usage.

Hence, it is possible that energy-intensive users with the need to prove clean energy credentials would locate in Atlantis, but opportunity is only likely to be realised post-2020.

10. Key requirements to unlock the SEZ potential

This section provides recommendations on the key requirements to unlock the potential of the Atlantis SEZ ranging from recommendations on the package of fiscal and other incentives,

10.1. Overview and critique of proposed fiscal incentives

The typical package of fiscal incentives offered by SEZs is increasingly similar and almost universally includes:

- Corporate income tax reductions or exemption (tax holidays)
- Duty free imports of raw materials, capital goods and intermediate inputs
- No restrictions on profit repatriation
- Exemption from foreign exchange controls
- Zero charge on exports
- Exemption from local and indirect taxes (registration & licensing fees, property tax, title deed recordation tax, stamp duties, consumption taxes, etc.)

As SEZs have become a widely used policy tool so the typical package of fiscal incentives that form part of them have become less of a differentiating factor.[202] A comparison of incentives offered across a range of African countries and a few comparator zones in developing regions is provided in (predominately African) , provided in a World Bank study is recreated in Table 32.

All countries listed provide some form of corporate tax exemption, in some cases permanent and in some cases just a tax holiday or alternatively offer permanently low corporate income taxes.

Tax holidays – exemptions that are available for only a fixed period - are increasingly regarded as ineffective for the following reasons:

- They provide little benefit to company that is not making profits (usually the case in the first years of operation and particularly so in capital intensive firms)
- They favour short-term investments since longer-term projects that generate profits beyond the tax holiday period do not benefit
- They encourage income shifting through transfer pricing from exempt and non-tax exempt operations
- They reduce the appeal of debt-funding
- Often see short-to-medium term investors leave at the end of the 'holiday period"

[202] "Special Economic Zones: Performances, Lessons Learned and Implications for Zone Development", FIAS, 2008

Table 32: Fiscal Incentives for selected comparable countries,

Country	Fiscal incentives
Bangladesh	• 10 years corporate tax exempt + 5 years at 50% of normal corporate tax rate (35% national rate) • No dividends tax • Accelerated depreciation; • Expats pay no income tax for 3 years
Dominican Republic	• Unlimited corporate tax exemption (25% national rate) • No VAT • No Municipal taxes
Honduras	• Unlimited corporate tax exemption (25% national rate) • No local sales tax • No excise tax • No tax on net assets • No municipal taxes
Vietnam	• 4 years corporate tax exempt + 50% reduction for next 9 years, + 25% reduction thereafter (28% national rate)
Ghana	• 10 years corporate tax exempt + 8% corporate tax rate thereafter (25% national rate) • Permanent exemption from withholding taxes on dividends
Kenya	• 10 years corporate tax exempt + 10 years at 25% corporate tax (30% national rate) • No VAT or stamp duty (perpetual) • 10-year holiday on dividend tax • Investment in new equipment 100% deductible
Lesotho	• Corporate tax exempt for all sales outside Southern African Customs Union (SACU) • 15% corporate tax rate for sales inside SACU • No withholding tax on dividends • training deductible at 125%
Nigeria	• Unlimited corporate tax exemption (30% national rate) • No municipal taxes • No VAT • Rent-free land during construction phase
Senegal	• Corporate tax rate reduced to 15% (25% national rate) • No withholding tax on dividends • No employers taxes on staff • No property taxes • No licensing fees • No stamp duties
Tanzania	• 10 year corporate tax exempt ion (national rate 30%) • 10-year exemption on municipal taxes • 10-year exemption on dividend tax • 10-year exemption on interest tax • Rent free land for 10 years • No VAT on utilities or wharfage

Source: World Bank 2011

10.1.1.1. Good practice on corporate income tax and other incentives

Tax holidays, by definition finite in period, often do not benefit long-term investors (who are capital-intensive and only generate profits after some years) and can see the short and medium term investors leave for other jurisdictions at the end of the period. An increasing number of SEZs are taking the approach of setting permanently low corporate income tax rates. A Low, flat corporate income tax (in the 5-15% range), as has been put in place in Aqaba SEZ in Jordan, in the Philippines' PEZA SEZs, and in China's SEZs (Table 33).

Table 33 Corporate income tax incentive in selected SEZs

Country	Corporate Income Tax Rate in the domestic fiscal territory	Tax Rate in SEZ
China	25%	15%
Jordan	14%	5% (Aqaba SEZ)
Philippines	30%	5% (PEZA Zones)
Turkey	20%	0% (YOIKK, Manufacturing)
Rwanda	30%	0% (Kigali FTZ)
Namibia	33%	0% (EPZs)
Mauritius	15%	0% (Freeport Cos., BoI)

Source: Based on work compiled by Jean-Paul Gauthier of Locusa Economica

China made extensive use of tax exemptions and holidays prior to 2008 but in 2008 corporate income tax reform process saw the introduction of lower corporate income tax and limited exemptions. Within major SEZs, such as Shenzen, Foreign investors qualify for a beneficial tax rate of 15%. A non-location beneficial corporate income tax rate of 15% applies for all companies qualifying for high or new technology status. Within SEZs (including Shenzhen, Zhuhai, Shantou, Xiamen and Hainan) and Pudong, high or new technology status firms also qualify for the so-called "2+3 tax exemption".[203] . This means that they will pay tax at the following rates from their first year of profit:

Year 1	**0.0%**
Year 2	0.0%
Year 3	12.5%
Year 4	12.5%
Year 5	12.5%
Year 6	15.0%

The conditions on the "2+3" tax holiday that it begin in the first year of profit is important in that firms that only make a profit some years into investment and operation do indeed benefit.

Best practice would suggest that on corporate income tax – a permanently lower CIT rate of between 5 and 15% is preferable to temporary tax holidays that often prove ineffective and provide little benefit for long-term investors.

The 'good practice' SEZ fiscal incentives the SEZ programme may consider are describe in Table 1:

Table 34 Additional good practice incentives

Category of tax or other incentive	Recommendation	Example where implemented
Corporate Income Tax	A Low, flat corporate income tax (in the 5-15% range)	Aqaba SEZ Jordan, Philippines' PEZA SEZs, China's SEZs
VAT	Zero-rating of Vat on SEZ enterprises domestic and internal purchases	Philippines, Panama, Mauritius, Malaysia
Tax on dividends and profit distribution	Exemption from taxes on dividends and profit distributions	Jordan, Philippines, Kenya
Registration and licensing fees and stamp duties	Exemption from registration and licensing fees, as well as Stamp Duties	Panama, Kenya
Land, building, and property registration and transfer taxes	Exemption from land, building, and property registration and transfer taxes	Jordan, Panama, Kenya
Local government taxes	Exemption from local government taxes	Philippines, Kenya, Tanzania

[203] Deloitte PRC Tax, China Enterprise Tax Reform Series Tax Incentive Developments, Issue M11/2008 – 12 March 2008

Category of tax or other incentive	Recommendation	Example where implemented
Customs duties	Zero customs duties on imports used in the production of exports	Most EPZs
Specific smart incentives	Smart incentives geared to producing specific results/outcomes (e.g. skills upgrading, R&D in technology, development of undeveloped land), including through co-financing, loan interest subsidies etc.	R&D incentives in China

Source: Deloitte analysis based on input from Jean-Paul Gauthier.

10.1.1.2. Overview and critique of South Africa's proposed SEZ fiscal incentives

A brief summary of the fiscal incentives currently proposed or confirmed for South Africa's SEZs and the specific bills and acts in which they are outlined is provided in Table 35.

Table 35: Summary of confirmed and proposed SEZ fiscal incentives

Incentive	Description	Level of interest
Corporate Tax incentive	Corporate tax rate of 15% instead of 28% for a fixed period of ten years (2014 to 2024).	Section 12Q, Draft Taxation Laws Amendment Bill 2013
Additional depreciation Allowance	Additional depreciation allowance on manufacturing assets within SEZs of 75% or 100% versus the usual 35% or 55% for industrial projects outside the SEZs (i.e. 175% or 200% of manufacturing assets can be depreciated within the SEZs as opposed to only 135% or 155% for industrial projects outside the SEZs)	Section 12I, Draft Taxation Laws Amendment Bill 2013
Zero-rated VAT and customs duties	Customs duties and VAT will be zero-rated for imports for the production of exports or 'temporary imports'. Problems with administration of the incentive during the IDZ era have been identified and will be improved upon.	Customs and Excise Act, 1964 Amendment DAR/82, 2011 Customs and Excise Act, 1964 Amendment DAR/82, 2011, Section 21A
Employment tax incentive	Pay-As-You-Earn (PAYE) tax deduction of up to R1 000 per month (in the first year) for each employee earning less than R6 001 per month and up to R500 per month in the second year. Valid until January 2017 after which it may be rolled over. The incentive outside of SEZs is only applicable for employees aged 18 to 29 but within SEZs the age restrictions do not apply	Employment Tax Incentive Act No. 26 of 2013

Source: Deloitte analysis

We asked a small sample of firms including potential investors and those currently operating in Atlantis to rank the proposed incentives in order of importance and provide any specific feedback on reasons for the rankings. Comments from existing firms are summarised in Table 36. The reduction in the corporate income tax was noted as the most significant of the proposed fiscal incentives.

Table 36: Feedback from sample of firms on proposed SEZ incentives

Incentive	Comments from firms interviewed	Level of interest
Corporate Tax incentive	• Five of seven firms interviewed ranked CIT as the **most significant of the fiscal incentives.** • Included Gestamp, Energimart, LEDzshine, Rotex and Swartland. Existing firms in Atlantis are concerned that they will not be eligible and will be put of our business by new entrants that are eligible.	
Additional depreciation Allowance	• Two of the firms noted that given the low value of land in Atlantis, the accelerated depreciation allowance is **importan**t because it allows them to minimise sunk cost in infrastructure investments on the site.	
Zero-rated VAT and customs duties	• Three of seven firms interviewed noted this was a **significant incentive** - East Coast Safety Glass, LEDzShine and Earth Power. • Tend to be those where imported component costs are a high proportion of total costs. • Local manufacturers of solar PV panels, noted that additional import duty reform was required - they have to pay customs on the imported components required to manufacture panels, but there is no duty on fully assembled panels making it difficult to compete with imports.	
Employment tax incentive	**Mixed views** • Three firms, Gestamp, Energimart and Promeal considered the employee subsidy to be a significant. • Others including Rotex and Pioneer Foods indicated that the employment incentive is not significant due to the fact that they do not pay a significant amount of their employees below the R6 000 threshold.	

Source: Deloitte analysis

10.1.2. Critique of proposed incentives and recommendations

Under the IDZ regime South Africa failed to introduce many of the universally implemented SEZ incentives. The proposed incentives are still quite limited in comparison to what is offered by competing SEZs (see Table 32 and Table 33) and this suggests that we are still lagging the rest of the world in introducing comparatively compelling fiscal incentives.

With respect to the **corporate income tax incentive**, the proposed fixed term of the incentive (valid only from 2014 to 2024) is our main concern. Tax holidays, particularly over fixed dates are likely to be ineffective for the following reasons:

- Much investment in greentech will be quite capital intensive and firms will take some time to recoup their investment.
- By the time firms setting up in the post 2018 period turn a profit (which is when the majority of investment in the ASEZ is expected to tax place) the holiday period will have come to an end.
- The incentive does not compare favourably with other countries SEZ that increasingly offer permanently lower CIT rates of between (0% and 15%) and in the case of China additional tax holidays for firms in focus sector on top of the beneficial flat rate.

Since it is unlikely to be very effective in its current form our recommendations are as follows:

- National Treasury should follow 'good practice' examples in recommended an unlimited term lower corporate tax rate – 15% would be in line with widely adopted rates of between 5% and 15%. The extent of tax erosion can be managed through eligibility requirements and tax on likely higher dividends and profit.
- A second-best solution would be to limit the duration of the incentive but the length of the tax holiday offered must be the same for all qualifying firms and should begin in their first year of declared profit or it will provide little benefit to firms who are capital intensive or long-term investors.

With respect to the **employment tax incentive**, while we support the incentive in principle, it is currently quite limited in both scope and duration. If it is to be a significant draw for labour-intensive manufacturers we would recommend that National Treasury commit to having this in incentive place for at least 5 years (currently no certainty beyond 2016) and that the duration of the incentive be extended by a year or two beyond the current two year period within SEZs.

- The additional depreciation allowance and VAT and customs incentives are adequate and require no change. The additional incentives that could be considered for the SEZ against those recommend by 'good practice' with comments in Table 37.

Table 37: Recommendations on additional incentives

Category of tax or other incentive	Recommendation	Provided?	Comment
Corporate Income Tax	A Low, flat corporate income tax (in the 5-15% range)	✗	While 15%, currently only temporary tax holiday.
VAT	Zero-rating of Vat on SEZ enterprises domestic and internal purchases	✗	Could be considered if deemed to be significant from a cash-flow perspective
Tax on dividends and profit distribution	Exemption from taxes on dividends and profit distributions	✗	Unlikely to be considered in the South African context
Registration and licensing fees and stamp duties	Exemption from registration and licensing fees, as well as Stamp Duties	O	
Land, building, and property registration and transfer taxes	Exemption from land, building, and property registration and transfer taxes	✓	Fee exemption from land use and building plan application fees Development contribution deferral/debt write off which applies in respect of both civil and electrical DCs where enhanced development rights granted.
Local government taxes	Exemption from local government taxes	✗	Unlikely to be considered
Customs duties	Zero customs duties on imports used in the production of exports	✓	
Specific smart incentives	Smart incentives geared to producing specific results/outcomes (e.g. skills upgrading, R&D in technology, development of undeveloped land), including through co-financing, loan interest subsidies etc.	O	City offers competitively priced undeveloped land Other Smart SEZ-specific incentives should be investigated and considered.

Source: Deloitte analysis

10.2. Eligibility requirements and qualifying criteria for SEZ fiscal incentives

Eligibility requirements are put in place to ensure that the SEZ attracts companies aligned with its strategic objectives. They also ensure that firms do not simply relocate to take advantage of lower tax rates but that the SEZ attracts only new investment.

The current qualifying criteria for SEZ benefits as stipulated in the SEZ Act of 2014 are:

- Qualifying companies are those that are incorporated or effectively managed in South Africa and carry out selected activities in an SEZ designated by the trade & industry minister.
- The company should also generate 90% of its income from business in these zones.
- A company cannot relocate to the SEZ from within South Africa.

Principles that we recommend be adopted in determining the eligibility requirements in terms of sector definitions include:

- **Early investors should be eligible -** While existing firms do not qualify, investors who have made and early commitment to a zone while the legislation was being passed should be treated with some flexibility.
- **Eligibility for SEZ benefits should be flexible -** Avoid too narrowly stipulating which type of enterprise can qualify for incentives at the proposed ASEZ. Promote a flexible regime which supports the development of already emerging clusters and allows for range activities that support the overall objectives of the SEZ to qualify.
- **Co-location** - While existing firms will not qualify for fiscal incentives they allow SEZ qualifying and non-qualifying enterprise to co-locate within the same area. This way existing firms will still reap some of the benefits of the SEZ and the SEZ in turn has a greater impact.

10.3. One-stop shop investment facilitation services

A key aspect of SEZs globally is establishment of one-stop shops to consolidate and expedite government approvals. One-stop shop type services were also ranked as the most significant of the non-fiscal incentives we listed by all 7 firms we interviewed on the subject of incentives.

A one-stop shop should provide the licencing company of the SEZ with a single-point authority over other government agencies in core areas, facilitated by appropriate legislation.

As noted in section 1.3.2 the CoCT and GreenCape initiative already provide a basket of one-stop shop type services to potential investors in the green technology industrial hub. These include pre-obtained environmental authorisation for development, fast-tracked building plan approvals, quick disposal process for city-owned land and one point of contact for liaison between various government departments currently involved in the provision of incentives to greentech investors.

Gestamp noted that the one-stop shop services offered by GreenCape and the CoCT played a significant role in their decision to invest in Atlantis. Fast-tracked approval was estimated to have expedited the development process from 3 years to 1 year.[204] These services mentioned included:

- Environmental Impact Assessment (EIA) was already approved, which can take up to 18 months to obtain;
- Building plan approval; and
- A single facilitator between the business, City of Cape Town, Western Cape government and the DTI and, in particular, the prioritisation of requests to these bodies.

[204] Based on an interview with Christiaan Botha, Gestamp, 21 May 2014.

Some of the firms be interviewed mentioned that assistance with B-BBEE compliance would be particularly helpful, especially for foreign investors. This was especially the case for larger firms (Gestamp, Jinko Solar, DCD and Vestas).[205] This would entail facilitating agreements with B-BBEE partners once the three-year grace period is over. The enterprise development aspect of this could involve SAREBI, but there would need to be additional facilitation in terms of B-BBEE ownership requirements.

Interview respondents also raised the need for assistance with:

- Customs clearance (specifically, a dedicated SEZ resource at ports);
- Logistics support (e.g. transportation permits – noted by DCD for transportation of wind towers);
- Expedited SABS certification;
- Expedited immigration services for foreign workers;
- R&D testing facilities; and
- Marketing and investment promotion.

Of these, expedited SABS certification, R&D testing facilities and Marketing and investment promotion were noted as particularly significant for SMMEs (LEDzShine and Energimart).[206]

Small business incubation and support – as there is already an established and operational small business incubator in Atlantis our recommendation would be to formally incorporate the activities of SAREBI into the SEZ so that it becomes the 'one-stop-shop' business and support provider to greentech SMMEs in the area. SAREBI has indicated that they would be able to provide support services to these firms including[207]:

- SABS and other quality assessments;
- Payroll;
- HR;
- Accounting services;
- R&D testing facilities;
- Access ICT infrastructure;
- Business administration services;
- Business plan assistance;
- Business acumen training; and
- Relocation assistance.

[205] Based on interviews with Christiaan Botha, Gestamp, 21 May 2014, Wido Schnabel, Jinko Solar, 15 May 2014, Henk Schoeman, DCD, 5 May 2014 and Flemming Schlier, Vestas, 2 May 2014.

[206] Based on emailed responses from Richard Lomax, LEDzShine, 13 June 2014 and Neill Human, Energimart, 10 June 2014

[207] Based on an interview with Gerschwin Williams, SAREBI, 16 May 2014.

10.4. Skills and Human Capital Requirements

10.4.1. Background

Adequate access to human capital plays a critical role in the success of all businesses. The impact of this on the success of the SEZ depends on the identified need and the ability to react to that need. If a skills gap is identified there is generally a strong argument for government to be involved in the provision of training. This stems from the possibility that firms may not be able to realise a return on the training investment if employees leave prematurely.[208] International experience has shown that a government supported skills development program is able to significantly increase the likelihood of success of an SEZ.

In Malaysia the Penang Skills Development Centre (PSDC) was formed as part of a PPP after a skills shortage was identified as a major impediment to the success of Malaysian SEZs. The PSDC was initiated by government, but led by the private sector. The government provided the land and limited funding whilst the private sector provided the equipment, trainers and curriculum to suit their needs. Today the PSDC is considered a significant contributing factor to the success of Malaysia's SEZs[209]. A similar skills development centre was successfully developed in Honduras, the Instituto Politécnico Centroamericano (IPC) as a result of an identified skills shortage.[210]

10.4.2. Recommendations

- Facilitate the upgrading and redesign of course currently offered at West Coast College in Altantis to meet the needs and standards required by firms in the area. Some firms noted that they would be willing to partner with the FET college to ensure that students acquire more relevant skills.
- Based on discussions with Northlink College, it appears that SETAs have funding available for practical training, which could be used towards training required by greentech firms in the Atlantis SEZ.[211]
- Where possible, partnerships between greentech firms, FET colleges, SETAs and SEZ administration should be fostered in order to provide efficient skills development;
- It has become increasingly difficult for highly-skilled and skilled foreigner worker to obtain permits to work in South Africa. In this regard, Gestamp noted that having the work permit process facilitated and expedited as part of the SEZ would be beneficial.

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[208] "Special Economic Zones in Africa", World Bank, 2011

[209] "Special Economic Zones in Africa", World Bank, 2011

[210] "Special Economic Zones in Africa", World Bank, 2011

[211] Based on an interview with Henri Mafumba, Northlink College, 9 May 2014.

- The SEZ administration should seek to facilitate relationships between greentech firms and labour representatives in order to avoid the costs and uncertainty caused by labour disputes. Labour unrest was not identified as an issue for existing firms but was a factor that a potential investors expressed some concern about. The ASEZ could consider negotiating a zone labour agreement as was the case in Coega. This involved an agreement between employer organisations and trade unions on several issues, but most importantly, dispute resolution. An incentive of this nature was ranked second most significant non-fiscal incentive proposed by all incentive interview respondents (Gestamp, Energimart, East Coast Glass and LEDzShine).[212]

10.5. Future Infrastructure requirements

A summary of the future infrastructure requirements for the SEZ based on the demand scenarios provided in section 8.6 and based on assumptions in section 10.8 is provided below:

10.5.1. Land and industrial property requirements

Most of the greentech firms interviewed noted that they would not be willing to make an investment in developing greenfield land and would prefer to lease a facility or floor space in an established industrial park.

Sufficient vacant and zoned land has been identified and made available by the City to accommodate:

- The anticipated moderate development scenario for 2014-2017 take-up of a wind blade manufacturer of 18 000m² floor space on 9ha and a new industrial park of ±21 500m² on 12.6ha (if needed, all of the anticipated 2014-2017 needs could be accommodated on the remaining 22ha of Site 1 following disposal of 7.8ha to Gestamp).
- The anticipated moderate development scenario for 2018-2030 take-up of a new industrial park of ±50 500m² on 21.3ha (both identified sites by the City are required to accommodate the anticipated 2014-2030 take-up).
- Apart from the land currently made available by the CoCT there is almost 100ha of vacant industrial land available in Atlantis and a number of these parcels are also city-owned. There is ample land available in both CoCT and private hands to accommodate expansion beyond what we have assumed would be required under the conservative and moderate scenarios.

Should the SEZ authority elect to make use of existing developed industrial property, there appears to be adequate vacant developed industrial space to accommodate

- the anticipated conservative development scenario for 2014-2017 take-up of 12 100m² for an industrial park should smaller users be accommodated in existing space (purchased or leased).
- There may be inadequate vacant developed industrial space to accommodate the moderate development scenario for 2014-2017 take-up of 21 500m²

10.5.2. Bulk water, waste water treatment and storm water

[212] Based on emailed responses from Christiaan Botha, Gestamp, 10 June 2014, Neill Human, Energimart, 10 June 2014, Rob Henderson, East Coast Safety Glass, 11 June 2014 and Richard Lomax, LEDzShine, 13 June 2014.

Overall bulk water availability should be adequate to provide for both conservative and moderate development scenarios. Wesfleur WWTW currently has spare capacity of 4 Ml/d which should accommodate both conservative and “moderate” demand scenarios.Existing bulk stormwater infrastructure should be adequate to provide for both conservative and moderate development scenarios.

10.5.3. Solid waste

Regional landfill facilities catering for different waste classifications are situated in the vicinity of the Atlantis and should have sufficient capacity to accommodate both conservative and moderate development scenarios. The CoCT does not provide a waste collection service to industries. Accredited private sector service providers able to provide a service according to the nature of the waste that must be collected, treated, recycled, and/ or disposed are available.

10.5.4. Regional transport

Atlantis is integrated with the regional freight movement/ abnormal load network and planned improvements to the regional freight movement/ abnormal load network are in progress. The existing and planned regional freight movement/ abnormal load network should meet the needs of both conservative and moderate demand scenarios.

10.5.5. Public transport

With respect to public transport, the CoCT has recently introduced MyCiti bus route to Atlantis, linking Atlantis with the centre of Cape Town. Firms in the area noted that the response by their employees had been slow and that the service should market the service better and consult commuters to determine barriers to using the services.

10.5.6. Local road network

The local road network of Atlantis Industrial should be adequate to meet the movement needs of anticipated users with the exclusion of some local intersections given possible abnormal loads (i.e. wind blades). Intersections to be upgraded and the nature of upgrades can only be determined once the location of users and their associated movement needs are known.

10.5.7. Electricity

- 2 MVA is available for each of the two sites identified. Gestamp has required 1.6 MVA of the 2MVA available on the one site.
- A ±21 500m² industrial park could use 860 KVA (.86 MVA), based on an estimated load of 40VA/m^2 of GLA.
- The wind blade manufacturer is assumed to have a demand similar to Gestamp.
- The 4 MVA should therefore be sufficient to accommodate Gestamp, a wind blade manufacturer and ±21 500m² industrial park on the two sites identified over the 2014-2017 period.
- A 50 500m² industrial park (the moderate expected take-up for the period 2018-2030) will require ±2 MVA, based on an estimated load of 40VA/m2 of GLA.
- The expected 2018-2030 up-take on the two sites will require an additional ± 2 MVA.
- The cost of electricity provision entail a R1 300 per KVA Development Contribution, R700 000 connection cost for firm supply and R1.5 million for indoor substation upgrades for new development on the two sites identified, as at 2013/ 2014 tariffs.

On-site (“internal”) infrastructure services

- Internal services (water, waste, stormwater, road infrastructure, excluding electricity and Development Contributions) for a new industrial park of ±21 500m² on 12.6ha will cost ±R30 million.
- Internal services (water, waste, stormwater, road infrastructure, excluding electricity and Development Contributions) for a new industrial park of ±50 500m² on 21.3ha will cost ±R73 million.

10.6. Unlocking the demand for greentech

As noted previously, Governments play a critical role in supporting demand for green technology. While market forces such as the rising cost of energy and falling cost of renewable technologies do play an important part in driving uptake of green technology, large-scale uptake is typically supported by government through regulation, policy and law.

Other greentech case studies suggest that strong co-ordination between different levels and spheres of government is required to support sustained green technology investment. Because the decision to invest in green technology seldom makes pure financial sense as the business case often rests on the inclusion of non-financial benefits including environmental and social benefits, intervention by government to address the 'market failure' is required. Interventions include market-mechanisms such as the proposed carbon tax, incentives such as section12L energy efficiency tax incentive, subsidies, building standards and direct procurement. Strong coordination between different levels and spheres of government to provide required support in terms of regulation, legislation and policy interventions is required.

Many of the greentech firms interviewed noted that the considerable uncertainty around key government programmes to promote uptake and local manufacturing of green technology has had a negative impact on investment decisions. With both the Eskom IDM programme and DoE Solar Water Heater currently on hold and little certainty provided beyond a two to three year horizon it is not possible to commit to investment in the industry.

During the course of the study we identified a few green technologies where represented a large latent opportunity for Atlantis but which were currently unviable due to a range of regulatory and other constraints. Examples included the unlocking the Waste-to-energy and recycling market by making changes to regulation around the use and storage of different waste streams and unlocking the self or distributed electricity generation market (co-generation and rooftop PV) by enabling embedded generation through the provision of attractive time-of-use tariffs and other enabling regulation. Some of the specific opportunities are discussed in the detailed greentech market sizing in sections 8.4 and 8.5.

10.7. A green identity– demonstrating the using of greentech to achieve resource-efficient low-carbon production

As noted previously, greentech SEZs focused on activities that produce products and services used to limit or reduce harm to the natural environment (such as renewable energy plant components or energy-efficient equipment) often also aim to serve as examples of how these technologies are used to promote resource-efficient low-carbon industrial production.

The 'demonstration effects' typically include clearly visible examples such as the use of renewable technologies in public infrastructure such as street lighting and billboards. Typically these initiatives are supported through government grants, incentives and other sources of funding.

Globally there has also been a notable trend towards the 'greening' of SEZs and industrial zones in general. Official guidelines such as the Institute for Sustainable Communities' (ISC) 'Guide for Low Carbon Industrial Development Zones in China' and the World Bank groups recently issued 'Low-carbon Zones: A Practitioner's Handbook, 2014' provide practical guidelines on how to promote more resource-efficient low-carbon industrial parks. The ISC guide suggests the main focus should be on energy-use with the category 'energy use greenhouse gas management' receiving a 60% weighting. Other measures include recycling economy and environmental protection (15%), zone management and protection mechanisms (15%) and planning and land use (10%). These are further broken-down into 23 sub-indices.

Examples of initiatives undertaken in other green SEZs were discussed in section 4.2. In the case of Boading, a city-wide greentech SEZ that is also a heavily polluted city for historical reasons, much larger scale interventions such as the installation of utility-scale renewable energy plants have also been undertaken as part of a national 'low carbon city pilot' in an attempt to reduce the city's reliance on coal-based power.

The Investment Climate Department of the World Bank has also proposed a framework to transform an economic zone into a low-carbon zone[213]:

- Secure commitment
- Technical diagnostic
- Set targets
- Planning and implementation
- Monitoring and reporting

Since the proposed ASEZ would be a relatively small-scale greentech SEZ our recommendation is that the SEZ provide a practical example or 'demonstration' of the use of greentech in the context of South African industrial park without imposing overly ambitious requirement on firms to meet resource-efficient low-carbon targets. Moreover, the initiatives should not be seen as a means of generating demand for the greentech products (since the initiative is not on a city-wide scale), but assist in the development of its green identity. Potential initiatives could include examples such as:

- Encourage the adoption of clean manufacturing processes
- Energy efficient or solar powered street lighting
- Promotion of self-generation (e.g. installation of PV panels on factory rooftops)

[213] Low-carbon Zones: A Practitioner's Handbook, Investment Climate, World Bank Group

- Green public transport
- Recycling and waste minimisation services.

10.7.1. SEZ as a platform for greentech collaboration

International experience has shown that collaboration between businesses in a focused science or technology park type SEZ can assist in driving growth and innovation. While these types of parks are typically close to or within existing research and development centres like universities the proposed greentech SEZ could still make use of some similar initiatives to provide a space for collaboration to unlock opportunities in the sector, to engage collectively with stakeholders in government and thereby facilitate its success. Initiatives that have proven to be valuable internationally can be relatively simple and include the likes of:

- High-end coffee-shops, sport facilities, parks, green spaces and water-features, making the SEZ a “community of choice” or “space to think” for young talent
- Free or subsidised work and collaboration space for SME start-ups
- The presence, on-site, of academic and applied research, learning and training institutes as well as programs linking universities to the SEZ
- Scalable broadband, and structural cabling supporting gigabit applications and networking
- An exhibition centre
- Office planning and coordinating including events, forums, innovation competitions, awards programs, networking, site-visits by visiting trade delegations and chambers of commerce and industry. This could even include regular subsidised “pizza nights” and ”wine and cheese” events
- Value-added common assets (e.g. metrology labs, clean rooms, “Intelligent” Buildings, 3-D printers, etc.)
- As soon as feasible, dedicated/specialized SEZ electronic content, intellectual property, publication, and standards legislation
- As soon as feasible, employment regulations allowing for the import of required management, training and technical talent by FDI companies

Given that Atlantis is somewhat remote from the key institutions for research and development in the he province, not all of these activities would necessarily be appropriate to host ‘on-site’ but might be encouraged at more appropriate off-site by locations that are clearly associated with the SEZ. Coordinating events, forums and competitions and subsidised ‘pizza nights’ could be hosted on-site to foster informal collaboration between firms in the area.

10.8. Comparative advantages of Upington, Coega and Atlantis as SEZs focus on green technologies

The DTI in its policy on the development of SEZs noted that one of the lessons learnt from IDZ experience was the SEZs need to develop in a coordinated way and cooperate with eachother so that they do not compete among themselves but jointly compete against IDZs in other parts of the world.[214]

Since Upington, Coega and Atlantis are all seeking to attract a share of the 'greentech' market it is important to understand whether they are likely to compete for a share of the greentech market or whether in fact because of their very different natural and locational attributes they could in fact be complementary in the provision greentech products and services in South Africa.

In Figure 60 we have summarised the comparative advantages of each location with respect to location, infrastructure and proximity to markets and skills base. The key comparative advantages for Upington include its natural solar irradiation resources which are among the highest in the world, relatively low wage rates and relative proximity to wind resources. The key comparative advantages for Atlantis include its relative proximity to one of the largest metropolitan areas in South Africa, ample existing industrial infrastructure and a good skills base. The key comparative advantages of Coega include its close proximity to the port of Ngqura, ample new and underutilised infrastructure and it's the best placed to serve utility-scale projects in the Eastern Cape as well as the local eastern cape market for bulky technologies that are expensive to transport such as solar water heaters.

Figure 60: Comparative advantages of selected SEZs

	Atlantis	Coega	Upington
Locational advantages	• On a future urban growth corridor • Relatively close to two ports (Saldanha 110km and Cape Town 50Km)	• At a major underutilised port (Ngqura) and close to PE port (25kms) • Additional support services currently available	• One of the highest solar irradiation resources in the world • Reasonable proximity to wind resources
Existing Infrastructure	• Ample existing industrial property, but some in need of refurbishment • Greenfields sites already zoned and permitted for development	• Ample recently constructed infrastructure that is currently underutilised	
Proximity to Markets	• 40km from Cape Town, 2nd largest urban centre by GVA in the country • Best placed (of 3 sites) to serve utility-scale projects in WC and NC • Close enough to port infrastructure to feasibly service projects elsewhere in SA as well as Africa and Middle East export markets	• 25km from Port Elizabeth, 6th largest urban centre by GVA in the country • Best placed (of 3 sites) to serve utility-scale projects in EC • Close enough to port infrastructure to feasibly service projects elsewhere in SA as well as Africa and Middle East export markets	• 50% of REIPP projects thus far awarded to Northern Cape, therefore best placed to supply these projects • Strong government support for solar energy • Plans in place for creation of solar corridor with potential 5GW capacity
Skills base	• Adjacent to Atlantis residential area with a semiskilled labour pool with manufacturing skillset • Close proximity to Cape Town which has an excellent skills base	• Close proximity to Port Elizabeth which has a good skills base	• Lower wage rates for rural based semi-skilled labour

Source: Deloitte analysis

[214] Policy on the Development of Special Economic Zones in South Africa, 2012, No.34968 Government Gazette, 23 January 2012

For renewable energy generation and related services such as maintenance (Figure 61), the opportunity for Atlantis is limited to a potential biofuels project, whereas there are concrete opportunities for Coega and Upington. For Coega and Upington these opportunities relate to different technologies, with Upington likely to focus on solar PV and CSP, while Coega would likely focus on wind.

Figure 61: Utility scale generation opportunities per SEZ

Technology	Suitability of Location			Key rationale for ratings
	Atlantis	Upington	Coega	
Generation of utility-scale renewable energy and related services (e.g. maintenance)				
Wind	🔴	🔴	🟢	Atlantis is not a suitable site for utility-scale wind generation. Confirmed REIPPP wind projects in the Northern Cape are more than 500km away from proposed Upington SEZ. A wind farm was proposed for Coega, the site is large and close to other identified wind farm sites.
Solar PV	🔴	🟢	🔴	Atlantis is not suitable for a utility-scale solar PV or CSP plant in terms of resources, zoning and space. Coega also has little advantage in solar resources. Upington site is ideally suited for Solar (PV and CSP) generation and related services in terms of its solar resources. The area around Upington is earmarked for a number of confirmed and proposed PV and CSP projects
Solar CSP	🔴	🟢	🔴	
Waste to Energy	🟡	🔴	🔴	Atlantis is relatively close to the major landfill sites for the City of Cape Town (some 15km to 20km away). This creates an opportunity for waste-to-energy and recycling services, particularly if the SEZ boundaries are extended to include these sites and regulatory issues are addressed. Potential for Coega not known but Upington likely too small to create e a significant opportunity.
Biofuels	🟡	🔴	🔴	Atlantis could be a good location for a potential biofuels plant based on triticale feedstock which is still in concept phase. It is close to the proposed agricultural lands .The EC biofuels project is proposed for Cradock which is too distant from Coega (240km) and NC has no biofuel feedstock that we are aware of.

Source: Deloitte analysis

For utility scale component manufacturing (Figure 62), Upington is disadvantaged because it is distant from ports and the good skills base manufacturers typically require, particular since they need to serve a market beyond the local demand in the area to achieve scale. Wind presents a good opportunity for both Coega and Atlantis and they will likely continue to compete for a share of this market. The decision by investors to-date between the two locations appears to hinge on the importance of proximity to projects, and whether the manufacturer would service Eastern Cape projects or Northern Cape and Western Cape projects initially. Both Coega and Atlantis are capable of producing solar components, but the opportunity is clearer for Atlantis due to relative proximity to projects in the Northern Cape.

For the delivery of other greentech products and services for the household, commercial and residential market (Figure 63) the opportunity in Upington is limited due to the lack of a manufacturing base and distance from major urban centres and ports. There could however be some small-scale agricultural waste-related biomass opportunity for Upington. There are good opportunities for both Atlantis and Coega. In many instances such as waste-services, recycling and solar water heater manufacturing, there are site-specific opportunities in each major metropolitan area and decentralised production is the norm so there are specific location-based opportunities that each SEZs could take advantage of without competing for the same investment.

Figure 62: Utility scale component manufacturing opportunities per SEZ

Technology	Suitability for activity			Key rationale for ratings
	Atlantis	Upington	Coega	
Component Manufacturing - Renewable energy utility scale				
Wind	🟢	🔴	🟢	Both Atlantis and Coega are well suited being close to large wind projects predominantly in NC and EC, close to ports and having good manufacturing infrastructure and skills. Upington is disadvantaged because it is far from ports and currently is disadvantaged in terms of access to skills and transport infrastructure.
Solar PV and CSP	🟢	🟡	🟡	Atlantis and Coega are well suited given proximity to ports, good manufacturing infrastructure and skills base and access to brownfield land. Atlantis is however better suited in terms of its relative proximity to the Northern Cape solar plants. While Upington will host solar plant, it is disadvantaged as a location for manufacutirng because it is far from ports and currently lacks the necessary infrastructure and skills base.
Waste to Energy	🟡	🔴	🟡	The utility scale market is driven by municipalities generating electricity on landfill sites and agro-processors with excess waste, which are more prominent in the WC and EC than in the NC. High transport costs for waste to energy components means proximity to these customers is an advantage. Atlantis and Coega also have suitable existing infrastructure and skills
Biofuels	🔴	🔴	🔴	The biofuels market lacks sufficient scale to justify the manufacture of specialised components for biofuels plant. General components are likely to be sourced from existing component manufacturers (e.g. steel products etc.)

Source: Deloitte analysis

Figure 63: Non-utility scale component manufacturing per SEZ

Technology	Suitability for activity			Key rationale for ratings
	Atlantis	Upington	Coega	
Component Manufacturing - Renewable energy non utility scale				
Solar water heaters and heat pumps	🟢	🔴	🟢	Atlantis and Coega are well suited given proximity to ports, a good manufacturing infrastructure and skills base, and local demand for installations. Upington is far removed from a large urban population and is not suitable. SWH are more feasible than heat pumps given government support.
Rooftop PV	🟢	🔴	🟡	The rooftop PV customer base is generally high income households, commercial and industrial buildings. Tariffs for embedded generation must be favourable and in place. The City of Cape Town has progressed most with approved tariffs for embedded generation. The market in Upington is likely to be small. Large urban areas generate sufficient demand.
Energy efficient appliances and lighting	🟢	🔴	🟢	Energy efficient products require access to either a large urban population or a sufficient industrial base. Atlantis and Coega have access to large urban centres which should generate sufficient demand to support manufacturing of basic components
Waste services and recycling	🟢	🟡	🟢	Non-utility scale waste-to-energy requires a strong base of local demand, Upington is far removed from a large urban population, limiting landfill gas to energy opportunities. Crop and livestock farming activities within the NC region may generate some demand for small scale biogas or biomass products

Source: Deloitte analysis

11. Economic impact assessment

11.1. Introduction

The potential extent of any economic impact assessment is limited by the information available. At this stage in the investigation of the Atlantis greentech SEZ, some firm level information, such as profits or revenue, are not yet available. The requisite information is however expected to be available during the feasibility assessment where a more comprehensive EIA will be performed. The scope of the prefeasibility economic impact assessment is to highlight the potential economic impacts which are known at this stage and which already provide a good benchmark in terms of a return on investment in the SEZ.

It is also important to note that at this stage of the impact assessment no induced employment impacts have been considered. In addition to this, the temporary, but generally significant, impact on jobs throughout the construction phase of the SEZ is also not included within this chapter. These impacts, including others, will be further addressed in the feasibility and strategy phases.

11.2. Methodology

The number and nature of firms expected to be included in the SEZ were estimated in the conservative and moderate scenarios outlined in section 8.7. These scenarios were considered over the two time periods 2014 – 2017 and 2018 – 2030. The potential number of jobs created during each time period in each scenario was completed across the following categories:

- number of employees;
- employees per skill level;
- earnings per skill level; and
- expected personal income tax revenues

The expected number of direct employees, and floor space required per firm was estimated mainly through interviews with existing firms and prospective investors. Where sufficient figures were not made available, the primary research was supplemented with secondary desktop research. The secondary research entailed obtaining the relevant figures for proxies of the firms expected to be included in the SEZ, in accordance with our conservative and moderate scenarios. Proxies were characterised by firms of similar size utilising similar production methods in the given technology.

Employees per skill level were estimated by utilising a skill level breakdown per industry sourced from a recent social accounting matrix for the South African economy, which is based on labour force surveys, household surveys and other reputable national surveys and databases. Firms were placed into appropriate industry categories and the average skill breakdown per industry was applied to the total jobs per firm included in the scenario. This resulted in a decomposition of total jobs per firm into highly skilled, skilled and semi- to unskilled employment categories.

For indirect jobs we applied a multiplier of 1.25. This multiplier was calculated using a 2012 South African social accounting matrix with over 170 industries. The value is based on the average value added multiplier for all manufacturing activities.

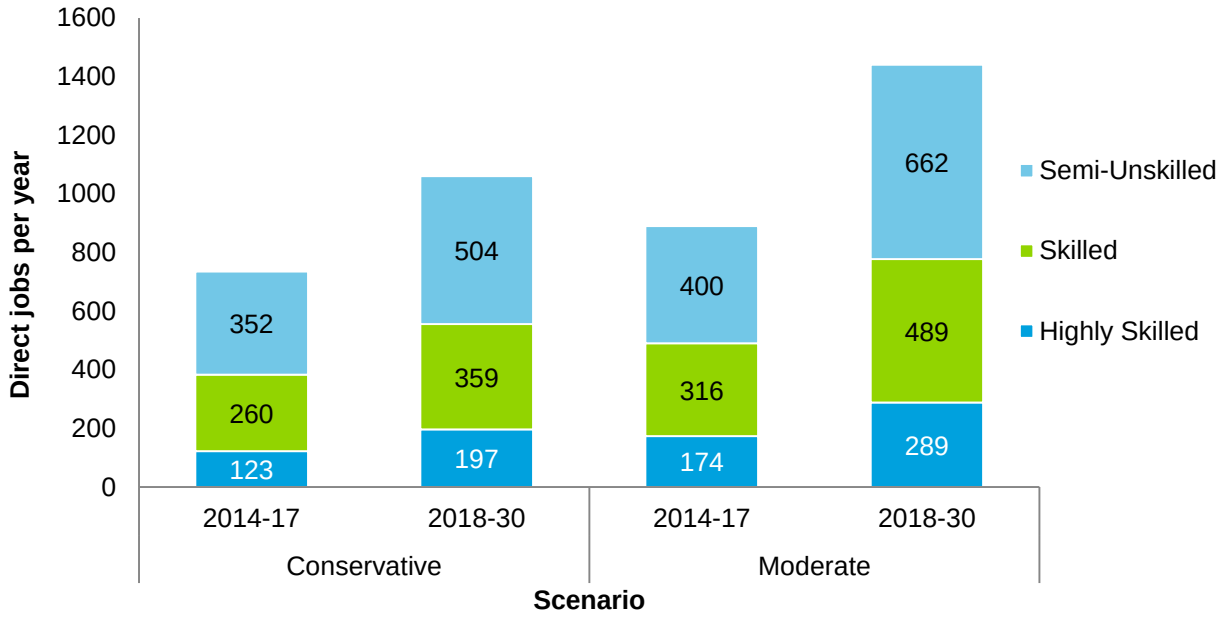
Earnings per skill level were estimated utilising data from StatsSA's 2011 Income and Expenditure (IES) survey. Annual income from work per highest level of education attained was extracted from the IES dataset. The categories which represented no schooling to "did not finish matric" were used as a proxy for semi-skilled and unskilled labour. Similarly, the matric through to post-matric qualifications (excluding university degrees) categories were used as a proxy for skilled labour. The final skilled category was created by including all individuals who hold graduate or post graduate degrees. A weighted average of these earnings per skill level was calculated and applied to the employees per skill level breakdown previously estimated. The 2011 figure calculated was then inflated to 2014 utilising the CPI rates as published by the South African Reserve bank. This resulted in a metric indicating the expected income per skill level per firm in 2014 terms.

Expected income tax from employment was estimated on an annual basis utilising the 2014 SARS personal income tax tables. The tax tables were applied to the estimated earnings per skill level metric. One of the main assumptions employed was that none of the workers were over the age of 65 and therefore eligible for the secondary or tertiary rebates. This resulted in an expected income tax from employment metric, effectively a recalculated P.A.Y.E. figure.

11.3. Economic impact results

The expected direct and permanent employment impact of the Atlantis SEZ can be considered significant when compared to the current labour force of 5 500 people (Figure 64). Under the conservative scenario approximately 735 jobs are expected to be created per year over the period 2014 – 2017 period and 1 060 jobs per year over the 2018 – 2030 period. The moderate scenario is expected to generate 890 jobs per year during the 2014 – 2017 period and 1 440over the 2018 – 230 period. It is important to note that the jobs estimates illustrated here are considered to be direct and permanent per year. The bulk of these jobs can be attributed to the "anchor tenants" Gestamp and a wind blade manufacturer with 200 and 350 associated jobs respectively. The majority of these jobs are expected to be of a semi-unskilled nature.

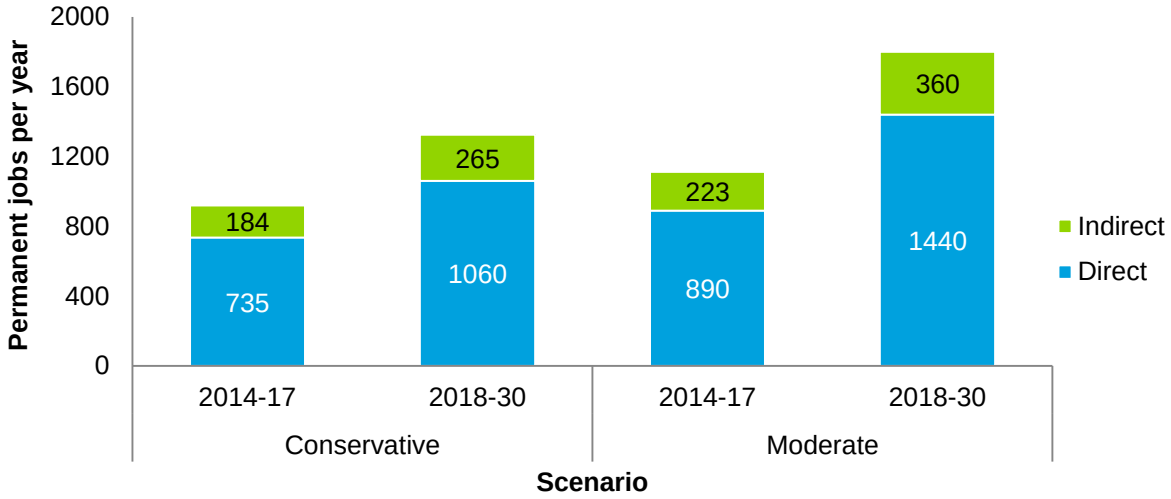
Figure 64: Direct permanent jobs per year by skill level per scenario



Source: Deloitte analysis

Using direct employment estimates from Figure 64 we can calculate indirect jobs (per year) by applying a multiplier. The multiplier used here illustrates the indirect impact due to downstream and upstream activities within the economy and represents the additional value added generated through these indirect activities per R1 of value created. Similarly then, we can estimate the indirect employment created or sustained through the interactions of the new businesses illustrated in out conservative and moderate scenarios. If we assume that employment is positively correlated with value added then we can simply multiply direct jobs by the multiplier to calculate indirect employment creation. Figure 65 illustrates the direct and indirect employment creation potential per year over both scenarios and time periods.

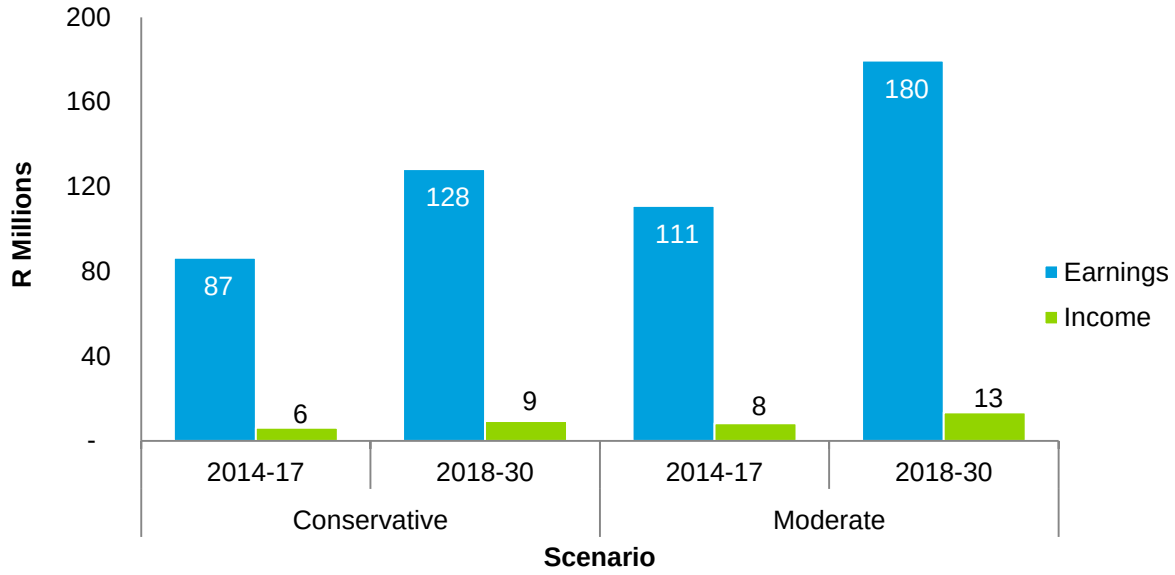
Figure 65: Permanent direct and indirect jobs per year per scenario



Source: Deloitte analysis

In addition to employment creation, wealth creation can also be considered a positive economic impact generated by the establishment of the Atlantis SEZ (Figure 66). Under the conservative scenario a total of R128 million per annum of personal income is expected to be generated by 2018 with an additional R9 million in tax revenue expected. In the moderate scenario R180 million in personal income is expected to be generated with R13 million in associated income tax revenue. It is important to note that the expected tax revenue will be partially offset by the allowance under the employee incentive scheme which will relate to semi-unskilled workers.

Figure 66: Expected earnings and personal income tax from direct employment per year



Source: Deloitte analysis

12. Business Case

We considered the business case for the proposed SEZ on the basis of four different options. In the first three options we considered the impact that different approaches to land-use may have on the business case and in the fourth we considered the impact of extending the proposed sector focus.

The following 'baseline assumptions' remain the same across all four options:

- The 'conservative' and 'moderate' greentech demand scenarios outlined in section 8.7 are the basis for estimated uptake/investment across all the options (but are further augmented in option 3 and 4)
- We assume that the whole of Atlantis Industria, including the vacant land that is currently zoned for industrial use would be designated as an SEZ (augmented in option 3). As such, not all companies within the SEZ boundaries would be given 'licensed SEZ enterprise' status and qualify for the associated fiscal and other benefits.

The rationale for the extended demarcation is to provide the SEZ with a broader reach and enable it to act as a catalyst for the upliftment of the entire Atlantis industrial area. This would be achieved through improvements in public services and infrastructure available to all businesses within the demarcated area. This is in line with international best practice notions that SEZs should serve as catalysts for broader economic and industrial development and not as isolated enclaves. Furthermore, stakeholder interviews indicated that existing businesses expressed some dissatisfaction that they would not be eligibility to receive the SEZ incentives as some of them are struggling enterprises. The extension of the zone demarcation would grant these businesses with access to some of the SEZ benefits and likely improve their overall disposition towards the SEZ. Additionally, the extended demarcation provides further land options to potential investors and makes it easier for the SEZ entity to make use of brownfields sites.

12.1. Description of the business case options

The four business case options have been described as follows:

- Option 1: Greentech SEZ, develop greenfield sites
- Option 2: Greentech SEZ, existing industrial property and greenfield sites
- Option 3: West Coast SEZ corridor
- Option 4: Greentech and low-carbon manufacturing SEZ

A brief description of each option is provided in Figure 67 where we have also compared the land-use and sector focus.

Figure 67: Business case options for the proposed Atlantis SEZ

	Option 1: Greentech SEZ, develop greenfield sites	Option 2: Greentech SEZ, existing industrial property and greenfield sites	Option 3: West Coast SEZ corridor	Option 4: Greentech and low-carbon manufacturing SEZ
Description	Remains close to the existing concept of the 'green technology industrial park'. A new industrial park however would be developed on a portion(s) of the earmarked sites in order to attract investors who prefer to lease developed property.	The SEZ entity would make portion(s) of existing developed industrial property in Atlantis available to potential greentech investors. Greenfield sites are reserved for development by the few firms with specific requirements for large vacant portions of land.	Designate a 'West Coast Corridor' SEZ rather than 'Atlantis SEZ'. A wide-area SEZ could unlock additional location sensitive opportunities and act as a catalyst for development in the identified future urban growth corridor.	Extend sector focus to include resource-efficient low-carbon manufacturers in addition to greentech. This option could support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus.
Sector focus	Greentech	Greentech	The sector focus could be limited to greentech but it might be desirable to extend it include a range of resource-efficient low-carbon activities that are in keeping with the broad values of the 'green economy'.	Extend sector focus to include resource-efficient low-carbon manufacturers to support the growth and development of the existing and emerging
Land use	A new industrial park would be developed on a portion(s) of the two sites currently earmarked by the CoCT for the 'green technology industrial park'. Most investors indicated that they will only lease developed industrial sites. Portions of the sites would be left vacant for the one or two large firms who specifically require large pieces of vacant land for development.	Vacant or underutilised industrial property in Atlantis Industria would be refurbished and made available to potential SEZ investors. This is to make better use of existing property at lower cost and would allow the SEZ entity to respond incrementally to demand. The greenfield sites would not be developed but would be available to investors who have specific or large-scale land needs	The SEZ corridor could extend from Blaauwberg to Atlantis and possibly even including the geography north of Atlantis to Saldahna. It could unlock a range of greentech and 'low-carbon resource-efficient activities' along this corridor. Could provide marginal investors sensitive to time\distance parameters with alternative location options closer to the current urban centre or ports.	Same land-use as option 2.

Source: Deloitte analysis

Option 1: Greentech SEZ, develop greenfield sites

Option 1 remains close to the concept of the existing CoCT 'green technology industrial park'. In this option we have assumed that the SEZ entity would focus on attracting greentech investors to the two sites already earmarked by the CoCT for the development of a 'green technology industrial park'. While the SEZ would be designated over whole of Atlantis (as per the baseline assumption), prospective SEZ enterprises would need to locate within one of the two identified sites.

GreenCape has already secured the investment of Gestamp on ones of these sites. But interviews with a range of existing greentech firms revealed that all firms, with the exception of a wind blade manufacturer, prefer to lease sites within an already developed and serviced industrial park. This finding was supported by GreenCape who noted that while a number of other greentech firms considered the vacant site at Atlantis over the past few years they had chosen to locate within already developed industrial parks in the broader Cape Town metropolitan area.

As a result we have assumed in option 1 that to successfully attract a broader range of greentech firms to these sites, the SEZ entity would need to facilitate the development of a new 'industrial park' on a portion or portion of the earmarked greenfield site. Firms who want to lease existing industrial space range from large glass and PV manufacturers to smaller assemblers and suppliers.

In keeping with the existing concept of a green technology park only firms in the greentech industry (as defined in section 2.3) and direct suppliers to these firms would be eligible for SEZ benefits.

Option 2: Greentech SEZ, existing industrial property and greenfield sites

In Option 2 is similar to option 1 in that the aim of the SEZ entity would be to facilitate the development of a greentech industrial park in Atlantis and only firms in the greentech industry and direct suppliers to these firms would qualify for SEZ benefits.

During the course of the study however, it became apparent that there is already ample developed industrial property in Atlantis (some 635 000m^2). While vacancy rates are at an estimated 5% are not particularly high, there is little doubt that the existing industrial property and factory space in Atlantis is currently underutilised. This in our view presents a significant opportunity to use and refurbish existing buildings and industrial property in the area at much lower cost and risk then the development of new industrial park (that may in a worst-case scenario fail to attract the anticipated demand).

In this option the SEZ entity would lease or purchase existing developed industrial properties in Atlantis and them available to potential greentech investors and possibly assist with the refurbishment. Ideally prospective investors would also able to identify the available properties in Atlantis that would meet their specific requirements (this however may be impractical).

The greenfield sites already earmarked by the CoCT for the development of the 'green technology industrial park' would still be made available but would then be reserved for development by the few firms who expressed a preference for a large tract of undeveloped land.

Option 3: West Coast SEZ corridor

Option 3 is to designate a 'West Coast Corridor' SEZ rather than an SEZ limited to Atlantis. The main rationale for a wide-area SEZ unlock a broader range of greentech activities that are suited or tied to particular locations outside Atlantis but still within the broader Blaauwberg-Atlantis corridor. These could include greentech activities like biomass linked to agricultural waste or alien vegetation removal, waste-to-energy and recycling activities around landfill sites south of Atlantis. It may in fact make sense to extend the sector focus include a range of resource-efficient low-carbon activities that are in keeping with the broad values of the 'green economy' but for the purpose of the business case cost estimates we have assumed greentech only.

The other rationale for a West Coast corridor is that Atlantis, while considerably more integrated with the broader Cape Town metropolitan area than it was 40 years ago, is still some 50km and a 50 minute drive from the port of Cape Town and its CBD. Based on interviews we established that its distance from urban customers and the ports is still likely to represent a barrier to a fair number of firms. A broader Blaauwberg-Atlantis SEZ corridor (possibly even extended to Saldanha) may attract firms who might be more sensitive to time\distance parameters from ports and the urban centre by providing them with alternative location options within the growth corridor but somewhat closer.

Option 4: Greentech and low-carbon manufacturing SEZ

In option 4 we extend the SEZ's sector focus to include resource-efficient low-carbon manufacturers in addition to greentech. We restrict the boundaries to Atlantis as is the case for Option 2 and suggests the SEZ entity makes use of existing industrial property rather than new build. This we feel could support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus.

Interviews held with firms in Atlantis suggest that for those firms who are able to serve a broader and growing export market in Africa, SEZ incentives may indeed tip the business case in favour of incremental expansion into new product lines and markets. Many of the firms noted that opportunities for expansion with or without the SEZ incentives were constrained by growth in the domestic market. It appeared however that the SEZ employment tax incentive could provide an opportunity to attract new low-skill labour intensive manufacturers to Atlantis where growth in the domestic and broader regional market is also supportive. For option 4 we have assumed that the SEZ entity would make use of existing industrial property as in option 2.

12.2. Key Business Case Assumptions

In Figure 68 we have summarised the key business case assumptions with regard to demand or uptake, the availability of and use of land and the firms that would qualify for SEZ benefits in terms of the sector focus. These assumptions underpinning our initial estimates of the costs and benefits associated with each business case option which we discuss in the sections that follow.

Figure 68 Key Business Case Assumptions

Key Business Case Assumptions	Option 1: Greentech SEZ, develop greenfield sites	Option 2: Greentech SEZ, existing industrial property and greenfield sites	Option 3: West Coast SEZ corridor	Option 4: Greentech and low-carbon manufacturing SEZ
Demand	Based on moderate and conservative greentech demand scenarios	Same as option 1	Same as option 1 but also assume a 30% increase in demand under conservative and 50% under moderate to account for the additional location specific or sensitive greentech opportunities that a wide-area SEZ could unlock.	Same as option 1 but also assume a 30% increase in demand under conservative and 50% under moderate to account new entrants or incremental expansion of existing firms under expanded sector focus (greentech + resource-efficient low-carbon manufacturing).
Availability and use of land and property	• Two greenfield sites of roughly 75ha are sufficient accommodate all demand anticipated under both conservative (33ha) and moderate (51ha) scenarios. • Would need to build a new industrial park of 39 600m^2 under the conservative scenario and 71 600m^2 under moderate scenario to accommodate the firms want to lease developed floor space.	• Assume there is 45 000m^2 of underutilised or vacant factory floor space in Atlantis. • This would be sufficient to accommodate demand under the conservative demand scenario. • In the moderate scenario another 26 000m^2 of new factory floor space would need to be built in Atlantis to cater for demand beyond 2018.	• Same as option 2 within Atlantis. • But in addition we have assumed the SEZ entity would need to lease or purchase an additional 33000 m^2 of already developed factory floor space under conservative assumptions and 40 000m^2 under moderate assumptions (at unspecified locations in the broader corridor).	• Assumed there is 45 000m^2 of underutilised or vacant factory floor space in Atlantis. • This would not be sufficient so we assume an additional 6600m^2 of 'new build' factory floor space in the conservative scenario and 59 600m^2 in the moderate scenario.
Firms eligible in terms of sector focus	• Greentech firms • Direct suppliers to greentech firms	• Greentech firms • Direct suppliers to greentech firms	• Greentech firms • Direct suppliers to greentech firms	• Greentech firms • Direct suppliers to greentech firms • Resource-efficient low-carbon manufacturers

12.2.1. Demand assumptions

In terms of estimating the number and size of firms the SEZ would likely attract, demand assumed for options 1 and 2 is based on the conservative and moderate greentech demand scenarios discussed in detail in section 8.7.

In option 3 we have assumed a 30% increase in demand under conservative and 50% under moderate to account for the additional location specific or sensitive greentech opportunities that a wide-area SEZ could unlock. The additional 30% uptake in the conservative scenario is equivalent to roughly two medium-sized firms and three small firms[215]. Similarly, in the moderate scenario the additional 50% uptake could be composed of one large firm, two medium sized firms and 4 small firms.

[215] Based on our sizing of the greentech opportunity for Atlantis, we found that different sized firms' typical requirements are:

Small firms require 1000m2 of floor space and employ 15 people

Medium firms require 4500m2 of floor space and employ 50 people

Large firms require 20 000m2 of floor space and employ 200 people

The types of firms or activities that we believe can offer greentech opportunities outside of the Atlantis industrial area include, but not limited to, landfill sites, small-scale biogas or biomass, co-generation opportunities, biomass pellets production, biofuel production, greentech installers and maintenance, energy audits and any other greentech firms who supply the medium firms on the corridor or who need to be close to a commercial/residential hub.

In option 4 a 30% increase in demand under conservative and 50% under moderate is assumed to account new entrants or incremental expansion of existing firms under expanded sector focus (greentech + resource-efficient low-carbon manufacturing). This could include wood and wood products and apparel manufacturers among others.

12.2.2. Assumptions on land-use and availability

In terms of assumptions on land-use we assume in option 1 that the two identified greenfield sites of roughly 75ha are sufficient accommodate all demand anticipated under both conservative (33ha) and moderate (51ha) scenarios. The SEZ entity would need to build a new industrial park of 39 600m^2 under the conservative scenario and 71 600m^2 under moderate scenario to accommodate the firms who want to lease developed floor space.

For option 2 we assume there is 45 000m^2 of underutilised or vacant factory floor space in Atlantis. This would be sufficient to accommodate demand under the conservative demand scenario but in the moderate demand scenario it is eventually necessary to develop vacant land.

In option 3 the assumption is the same as under option 2 but we assume the SEZ entity will need to lease between 30 000m^2 and 40 000m^2 of industrial property in the broader SEZ corridor to accommodate additional activities.

In option 4 we assume there is 45 000m^2 of underutilised or vacant factory floor space in Atlantis but this is not would not be sufficient to accommodate all activities under the more optimistic demand assumptions so we assume an additional 6600m^2 of 'new build' factory floor space in the conservative scenario and 59 600m^2 in the moderate scenario.

12.2.3. Sector focus assumptions

For options 1, 2 and 3 we have assumed that all greentech firms (as defined in section 2.3) and their direct suppliers would qualify for SEZ incentives. In Option 4 we assumed that resource-efficient low-carbon manufacturers would also qualify. The minimum requirements for ‘low-carbon resource-efficient’ could be stipulated and an assessed by a committee similar to the existing Greentech Manufacturing Evaluation Committee and should not be too onerous as the objective of the SEZ is to attract rather than discourage investment.

12.3. Initial estimates of the infrastructure costs for each option

In Table 38 and Table 39 we have summarised our initial estimates of the infrastructure costs associated with each option under the conservative and moderate demand scenarios respectively. For each of the cost line items we have made a number of additional assumptions and these are summarised in Annexure 9:.

The purpose of the initial cost estimates is to gauge the impact of different land-use alternatives on the overall cost of developing the SEZ rather than to determine the funds the SEZ entity will need to raise or recover (the financial modelling takes place at feasibility stage). So for simplicity sake, we have assumed that all the land and property required under each option will be purchased rather than leased and that all other infrastructure costs with demand anticipated over the 16 year period are borne upfront rather than staggered.

It is also important to note that not all of these costs will be borne by the SEZ entity. The CoCT is likely to bear some of the bulk infrastructure costs, some of the land and property costs will be recovered from the SEZ enterprises, the DTI will potentially fund some of the public infrastructure costs and some of the items could be financed by DFIs and commercial lenders. It would however be premature at this point to suggest who will be responsible for each item.

It is interesting to note that in both conservative and moderate scenarios option 1 would cost almost twice as much as option 2 even though both options are assumed to accommodate exactly the same number and type of firms. This suggests that it would be significantly less expensive for the SEZ entity to purchase and refurbish existing industrial property in Atlantis at current property prices and refurbishment costs (as assumed in Annexure 9:9) than it would be to develop a new industrial park.

It is also interesting to note that options 3 and 4 cost significantly less than option 1 in the conservative scenario despite the fact that we have assumed an additional 30% uptake by firms because of the difference in the cost of using existing vacant and underutilised developed property in option 3 and 4 vs a much higher proportion of new build in option 1. Option 2 (R143 156) and Option 3 (R154 043) cost less than half as much per direct and sustained job created than Option 1 (R328 032).

Initiatives to demonstrate the use of green technologies in the form of rooftop PV and solar powered streetlights are assumed to cost in the region of R30 million to R50 million based on the assumption that rooftop PV would account for approximately 5% of SEZ licensees electricity costs at R272/m^2 installed while solar powered street lights at R45 000 per light with lights distributed 30m apart on both sides of the road for 10km would cost about R30 million.

Although more direct jobs are created for all options in the moderate scenario, it is interesting to note that the cost per job is almost twice as high as for the conservative scenario for each option. This is due to the relatively expensive investment required for the development of new industrial property on greenfield land once brownfield land is no longer available.

Overall it appears that the overall costs to be incurred in the development of the proposed ASEZ under different options are not prohibitive particularly if one considers that the infrastructure can be scaled up to meet demonstrated demand as it is required.

Under the most conservative scenario a greentech SEZ that leverages existing developed industrial property in Atlantis (option 2) and could attract 9 greentech firms and 10 suppliers between 2014 and 2017 would cost only R40m to establish if one excludes the R33m of ‘green infrastructure’ that would likely be introduced over a longer period. Investment could be scaled up as appropriate to meet demand.

Table 38: Estimated infrastructure costs per option under the conservative scenario

R million	Option 1: Greentech SEZ, Develop greenfield sites		Option 2: Greentech SEZ, Existing industrial property and greenfield		Option 3: West Coast SEZ corridor		Option 4: Greentech and low-carbon manufacturing SEZ	
	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30
Greenfield land	R 17	R 20	R 10		R 10		R 10	R 4
Build new industrial park on greenfield land	R 61	R 138						R 33
Refurbishment costs			R 6	R 14	R 9	R 17	R 9	R 13
Cost of on-site bulk infrastructure excl. electricity	R 17	R 40						R 9
Electricity connection fee	R 8	R 6						R 1
Existing industrial property			R 24	R 55	R 36	R 67	R 36	R 54
Green infrastructure (street lights)	R 30		R 30		R 30		R 30	
Green infrastructure (rooftop PV)	R 3	R 7	R 3	R 7	R 5	R 9	R 5	R 9
Electricity substation development cost	R 1	R 1	R 1	R 1	R 1	R 2	R 1	R 2
TOTAL per period	**R 136**	**R 212**	**R 74**	**R 78**	**R 91**	**R 95**	**R 91**	**R 126**
TOTAL per option		**R 348**		**R 152**		**R 186**		**R 217**
Direct jobs		1 060		1 060		1 205		1 205
Cost per jobs created (R/job)		**R 328 032**		**R 143 156**		**R 154 053**		**R 180 252**

Source: Deloitte analysis

Table 39: Estimated infrastructure costs per option under the moderate

R million	Option 1: Greentech SEZ, Develop greenfield sites		Option 2: Greentech SEZ, Existing industrial property and greenfield		Option 3: West Coast SEZ corridor		Option 4: Greentech and low-carbon manufacturing SEZ	
	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30
Greenfield land	R 24	R 32	R 10	R 17	R 10		R 10	R 38
Build new industrial park on greenfield land	R 106	R 253		R 133		R 133		R 298
Refurbishment costs			R 11	R 12	R 19	R 20	R 19	R 4
Cost of on-site bulk infrastructure excl. electricity	R 30	R 73		R 38		R 38		R 86
Electricity connection fee	R 8	R 10		R 4		R 4		R 9
Existing industrial property			R 42	R 48	R 75	R 81	R 75	R 15
Green infrastructure (street lights)	R 30		R 30		R 30		R 30	
Green infrastructure (rooftop PV)	R 6	R 14	R 6	R 14	R 10	R 18	R 10	R 18
Electricity substation development cost	R 1	R 3	R 1	R 3	R 2	R 3	R 2	R 3
TOTAL per period	**R 204**	**R 383**	**R 100**	**R 268**	**R 146**	**R 298**	**R 146**	**R 471**
TOTAL per option		**R 587**		**R 368**		**R 444**		**R 671**
Direct jobs		1 440		1 440		1 800		1 800

Cost per jobs created (R/job)	**R 407 984**	**R 255 491**	**R 246 786**	**R 342 693**

Source: Deloitte analysis

12.4. Quantifiable benefits including job creation and FDI

In Table 40 we have summarised the benefit s of each option in terms of direct and indirect jobs created, wealth created, personal income tax generated and foreign direct investment attracted.

Across all the options considered and demand scenarios assumed, over 1 000 direct jobs can be created per year if these assumptions are realised. If we include the indirect job estimates then the lowest estimate of job creation is 1 325 jobs per year and the highest estimate is 2 250 jobs per year. This equates to between R128 million and R269 million per year in personal income or wealth creation excluding indirect job estimates.

Atlantis could receive between R600 million and R650 million in foreign direct investment in the period 2014 to 2017, including the investment already committed by Gestamp and the expected investment by a large wind turbine blade manufacturer. We have also assumed some FDI will be received from international PV module manufacturers setting up facilities in Atlantis.

Table 40: Summary of estimated quantifiable benefits per option and scenario

	Option 1: Greentech SEZ, develop greenfield sites		Option 2: Greentech SEZ, existing industrial property and greenfield sites		Option 3: West Coast SEZ corridor		Option 4: Greentech and low-carbon manufacturing SEZ	
	Conservative	Moderate	Conservative	Moderate	Conservative	Moderate	Conservative	Moderate
Direct employment, jobs per year	1 060	1440	1 060	1 440	1 205	1 800	1 205	1 800
Indirect employment, jobs per year	265	360	265	360	300	450	300	450
Wealth creation per year, Rm	R 128	R 180	R 128	R 180	R 167	R 269	R 167	R 269
Foreign Direct Investment, Rm	R 600	R 650	R 600	R 650	R 600	R 650	R 600	R 650
Personal income tax per year, Rm	R 9.4	R 13.4	R 9.4	R 13.4	R 12.3	R 20.2	R 12.3	R 20.2
Investment cost/job, R '000s	R 328	R 407	R 143	R 255	R 154	R 246	R 180	R 321

12.5. Key benefits and drawbacks of each option

Each of the options is associated with some benefits and drawbacks and which we have attempted to summarise in Figure 69.

Option 1: Greentech SEZ, develop greenfield sites

Option 1 appears to be the easiest option to implement since the two existing sites owned by the CoCT and already earmarked for the development of a greentech industrial park can accommodate all demand anticipated under both conservative and moderate scenarios. In addition a modern, 'fit-for-purpose' and spatially contiguous industrial park could be established.

Figure 69 Benefits and drawbacks of each option

	Option 1: Greentech SEZ, develop greenfield sites	Option 2: Greentech SEZ, existing industrial property and greenfield	Option 3: West Coast SEZ corridor	Option 4: Greentech and low-carbon manufacturing SEZ
Benefits	• Easiest option to implement since two existing sites owned by the CoCT can accommodate all demand anticipated under both conservative and moderate scenarios • All of the anticipated 2014-2017 needs could be accommodated on the remaining 22ha of Site 1 (the remaining portion excluding Gestamp) • A modern, 'fit-for-purpose' and spatially contiguous industrial park could be established	• Could cost 50% less than option 1 whilst accommodating the same number of firms (assuming sufficient vacant and underutilised property is available at current market prices) • Avoid speculative development of industrial property and factory shells for rent to SEZ licensees • Integration of SEZ licensees within existing Atlantis should contribute to the areas upliftment • A substantial publicly owned land holding (site 2) could be retained to attract future large space users • Adapting existing developed industrial space would be consistent with the principles of a "green" focus (implying re-use) • The existing differentiation between smaller enterprises in the northern parts of Atlantis Industria and large space users (possibly associated with abnormal loads) in the south would be maintained	• Same benefits as Option 2 with regards to the use of existing property • A broader range of opportunities not suitable for Atlantis, but appropriate other locations in the West Coast SEZ corridor could be unlocked (e.g. WtE from agricultural waste and the landfill site as well as 'low-carbon resource efficient aquaculture) • Attract investors for which time/distance from Atlantis to ports and urban centres is a constraint • Catalyst to support commercial and industrial development in an area already defined by the CoCT to accommodate rapid future urban growth • Integrate 'hard' and 'soft' infrastructure investments along the corridor with Atlantis and Saldanha as the core industrial parks	• Same benefits as Option 2 with regards to the use of existing property • Support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus • Contribute to success of the SEZ - Atlantis has an existing manufacturing base and international SEZ experience shows that successful SEZs support clusters that have emerged organically • Allows for a broader range of opportunities to be unlocked, thereby increasing the SEZ's potential impact on revitalising Atlantis through employment and wealth creation
Drawbacks	• A substantial publicly owned land holding will be subdivided for smaller users, potentially losing the opportunity to attract future (and as yet unknown) large space users • We have estimated that the cost of building a new industrial park could be almost twice as much as refurbishing existing underutilised property in Atlantis Industria to accommodate the same number of firms • Risk speculative development of industrial property and factory shells for demand that may never be realised • Building a new industrial park while already developed, adaptable space is available appears contrary to the principles of a "green" focus (implying re-use)	• Existing internal infrastructure services related to developed industrial space may require adaptation to meet the needs of users • Implementation may be complicated significantly by need to lease or purchase existing properties from various government or private land-owners • Less control over the quality and nature of accomodation provided • The SEZ industrial park would probably be non-contiguous with licensees distributed with existing firms	• Same drawbacks as Option 2 • Significantly more complex to implement and administer than other options • The issues of quality and control of infrastructure and services in a non-contiguous SEZ would be compounded by expanding the SEZ boundaries • Greentech firms less likely to cluster in one location • May reduce the opportunity for Atlantis is firms prefer alternative location options in the corridor.	• Same drawbacks as Option 2 • Increased administration in assessing on what grounds a firm may qualify as a resource-efficient low-carbon manufacturer • Alternatively, if less effort is attributed to this verification process, the SEZ runs the risk of including firms that are not necessarily low-carbon resource efficient

Source: Deloitte analysis

However our initial estimates of the infrastructure costs associated with option suggest that the cost of building a new industrial park (option 1) could be almost twice as much as refurbishing existing underutilised property in Atlantis Industria to accommodate the same number of firms (option 2).

In addition the SEZ entity in option 1 risks speculative development of industrial property and factory shells for demand that may never be realised. Building a new industrial park while already developed, adaptable space is available appears also contrary to the principles of a "green" focus.

Option 2: Greentech SEZ, existing industrial property and greenfield sites

Option 2 by the same token could cost 50% less than option 1 to accommodate the same number of firms (assuming sufficient vacant and underutilised property is available at current market prices).. Upgrades to public infrastructure around the SEZ licences sites would also benefit firms already in Atlantis, meaning that the SEZ would better contribute the upliftment of the area as a whole.

In practice however, the implementation of this option could be complicated by the need to lease or purchase existing properties from various government or private land-owners. The SEZ would also have less control over the quality and nature of accommodation and infrastructure provided than in a 'new build' gated park like option1.

Option 3: West Coast SEZ corridor

In addition to the land-use and therefore cost benefits of Option 2, this option could unlock a broader range of activities (greentech and\or 'low-carbon and resource efficient') that are suited or tied to particular locations outside Atlantis, but still within the broader West Coast urban growth corridor.

These could include but are not limited to, landfill sites, small-scale biogas or biomass, co-generation opportunities, biomass pellets production, biofuel production, greentech installers and maintenance, energy audits and any other greentech firms who supply the medium firms on the corridor or who need to be close to a commercial/residential hub.

The SEZ corridor could act as a catalyst to support commercial and industrial development in an area already defined by the CoCT to accommodate rapid future urban growth. This option would also overcome the fact that Atlantis' location may be prohibitive for investors with sensitivity to time\distance from ports and the urban centre by providing them with alternative location options that are within or at least closer to the current urban edge.

This option is however ssignificantly more complex to implement and administer than other options and the issues of quality and control of infrastructure and services in a non-contiguous SEZ would be compounded by expanding the SEZ boundaries. Greentech firms would be less likely to cluster in one location so it would be more difficult to facilitate collaboration and synergies among them. More location options may also reduce the opportunity for Atlantis if firms prefer alternative location options in the corridor.

Option 4: Greentech and low-carbon manufacturing SEZ

In this option the SEZ still benefits from the cost savings of using existing industrial land and property similar to options 2 and 3. By expanding the sector focus to allow green or low carbon manufacturers to apply for SEZ eligibility a number of additional industrial opportunities may be unlocked while still maintaining some degree of 'green' focus. This creates a greater set of potential activities that could be established in the area and benefit Atlantis. Similar to Option 3 we expect this option to facilitate a greater number of SEZ tenants and thus have a greater impact on the revitalisation of the area by increasing employment opportunities and wealth creation.

The disadvantages over option 2 include potential increase in administration in assessing on what grounds a firm may qualify as a resource-efficient low-carbon manufacturer. Alternatively, if less effort is attributed to this verification process, the SEZ runs the risk of including firms that are not necessarily low-carbon resource efficient diluting the 'green economy' focus of the SEZ.

12.6. Conclusions and recommendations

12.6.1. Preferred options and implementation strategy

In terms of our analysis of four alternative options for the design and implementation of the proposed SEZ we have made the following observations.

Option 2 certainly appears to have clear advantages over option 1 and so in terms of the choice between two focused greentech SEZ in Atlantis, Option 2 would be the recommended for the following reasons:

- Initial estimates of the cost of developing a focused greentech SEZ as suggest that it far less expensive to make use of and refurbish some of the existing vacant and underutilised industrial property in Atlantis than to build a new industrial park. This may lower the overall costs associated with accommodating 19 firms in the first 3 year period by as much as R50%.
- In addition the SEZ entity would be less exposed in option 2 to the risk of speculative development of industrial property and factory shells for demand that may never be realised.
- The only significant drawback of option 2 over option 1 is that it appears that it may be more complex to implement as it is contingent on the assumption that there is sufficient underutilised and vacant industrial land available and that existing owners would be willing to lease or sell this property to the SEZ entity at fair and market-related rates.

The choice between option 2 and option 4 is essentially the choice between an extended as compared to a more narrowly defined 'green' sector focus. The pros and cons would need to be considered by the relevant stakeholders but can be briefly summarised as follows:

- Extending the greentech sector focus to include resource-efficient low-carbon manufacturers could support the growth and development of the existing manufacturing clusters in Atlantis while retaining the SEZ's 'green' identity and focus.
- Interviews held with firms in Atlantis suggest that for those firms who are able to serve a broader and growing export market in Africa, SEZ incentives may indeed tip the business case in favour of incremental expansion into new product lines and markets.
- The SEZ employment tax incentive could provide an opportunity to attract new low-skill labour intensive manufacturers to Atlantis where growth in the domestic and broader regional market is also supportive.
- The concept of 'resource-efficient low-carbon' manufacturing is not as clearly defined as greentech and while there are several international guidelines emerging, there may be Increased administration in assessing on what grounds a firm may qualify as a resource-efficient low-carbon manufacturer.

In terms of implementing the SEZ it appears a good short-term strategy would be to:

- Apply for the designation of an SEZ in Atlantis under either option 2 or 4 which assume that the greenfield sites currently earmarked by the CoCT for the development of a 'green technology industrial park' would not be developed but would continue to be made available to investors who have specific or large-scale land needs.
- The SEZ entity could then work to identify existing industrial property to suit the needs of potential greentech investors the first period (2014 to 2017) and facilitate the refurbishment of the property and upgrading of surrounding public infrastructure including security. Ideally prospective investors would also able to identify the available properties in Atlantis that would meet their specific requirements (this however may be impractical).
- Further industrial property in Atlantis could be incrementally acquired and upgraded based on proven demand.

- In the medium-term Atlantis SEZ could consider applying to be designated as a ‘West Coast corridor ‘to unlock a range of other greentech and possibly ‘low-carbon resource-efficient activities’ along this corridor. These could include but are not limited to, landfill sites, small-scale biogas or biomass, co-generation opportunities, biomass pellets production, biofuel production, greentech installers and maintenance, energy audits and any other greentech firms who supply the medium firms on the corridor or who need to be close to a commercial/residential hub.

Annexure 1: Details of the environmental authorisation

The following paragraphs contain the detailed findings of the desktop environmental review of the Environmental Authorisation (dated January 2013; EIA Reference Number: 16/3/1/1/A1/2/3037/12 for site 1 and 16/3/1/1/A1/2/3036/12 for site 2), Basic Assessment Report (dated October 2012) and Environmental Management Programme (dated July 2012) applicable to the two sites earmarked for the proposed SEZ.

The list of activities authorised are:

1. Activity Number 38 (Government Notice No. R544 0f 18 June 2010): The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.

2. Activity Number 15 (Government Notice No. R545 0f 18 June 2010): Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for:

2.1. linear development activities; or

2.2. agriculture or afforestation where activity 16 in this Schedule will apply.

3. Activity Number 12 (Government Notice No. 546 of 18 June 2010): The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation

3.1. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;

3.2. Within critical biodiversity areas identified in bioregional plans;

3.3. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whiche1ver distance is the greater, excluding were such removal will occur behind the development setback line or erven in urban areas.

4. Activity Number 13 (Government Notice No. 546 of 18 June 2010): The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:

4.1. The undertaking of a process or activity included in the waste management activities

4.2. The undertaking of a linear activity falling below the thresholds mentioned in Listing 1 of GN No. 544 of 2010.

4.3. In … Western Cape:

4.3.1. In an estuary;

4.3.2. Outside urban areas the following:

4.3.2.1. A protected area in terms of NEMPAA, excluding conservancies;

4.3.2.2. National Protected Area Expansion Strategy Focus Areas;

4.3.3. Sensitive areas as identified in Chapter 5 of the Act and as adopted by the competent authority;

4.3.4. Sites or areas identified in terms of an International Convention;

4.3.5. Core areas in biosphere reserves;

4.3.6. Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;

4.3.7. Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined.

4.4. In urban areas the following:

4.4.1. Areas zoned for use as public open space;

4.4.2. Areas designated for conservation use in SDF adopted by the competent authority or zoned for a conservation purpose;

4.4.3. Areas seawards of the development setback line;

4.4.4. Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined.

The authorised activity is described as:

"The removal of indigenous vegetation and the transformation of undeveloped land to accommodate the construction of industrial buildings and facilities and associated infrastructure for the manufacturing of various renewable energy infrastructure such as turbine blades, turbine towers, turbine assemblers, photovoltaic (PV) assembly plants and inverters. The City of Cape Town intends to lease the land to companies within the renewable energy sector which produce renewable energy infrastructure.

The proposal will entail the utilisation of the entire site [s] for industrial development … The buildings (coverage, height, etc.) that will be located on the proposed site [s] will be in accordance with the existing zoning of the site and of the Atlantis Industrial Area. The relevant municipal building regulations and planning policies will be adhered to in this regard.

A landscaping plan will be prepared by a suitably qualified and experienced horticulturalist and will be submitted along with applications for building approval.

An appropriate off-site biodiversity offset site will be secured by the applicant in order to compensate for the loss of intact endangered and critically endangered indigenous vegetation located on the proposed site [s].

All services (i.e. potable water, sewage disposal, electricity, solid waste disposal) will connect to the existing Municipal Infrastructure. However, should the proposed development require additional electricity, the proposed development will also entail the upgrading of the existing electrical substation on site.

Industrial effluent will be treated in a bioretention facility to remove heavy and noxious elements. The bioretention facility will then discharge the treated industrial effluent into a dedicated municipal waste-water system specifically provided for effluent which is not suitable for recharging the ground water aquifer. The bioretention facility will be located in such a way that treated effluent will gravitate into dedicated municipal pipeline infrastructure for industrial effluent."

For site 1:

"There is currently no direct access to to the site. A private access road will be constructed onto the adjacent Dasenberg Road. Alternatively, access will be via Charel Uys Drive."

For site 2:
"The preferred access onto the local road network will be at the northern end of the site, leading onto Neil Hare Road."

In its application document inviting greentech manufacturers and/or associated businesses to apply to purchase or lease the vacant land proposed for the SEZ, the CoCT states that it has "resolved to acquire an alternative site, the Klein Dassenberg site, as an off-site biodiversity offset site which will enable the minimum conservation thresholds for the relevant vegetation types to be met and will compensate for the loss of endangered vegetation on the subject properties." As a result the development of the subject properties will not be constrained by any requirements regarding conservation of any endangered vegetation and the vegetation may be removed. The application document also states that:

- Dassenberg Road is identified as a scenic route and therefore any construction or development proposals should be suitably screened from the road with appropriate planting and/or vegetated berm.
- Any development proposals on the proposed erven will require a landscaping plan, signage plan and construction environmental management plan to be submitted to the City for approval. An operational management plan may be required depending on the type of development that is proposed and the impacts it may have during the operational phase.

Annexure 2: National Transport Policy

National, provincial and regional freight transport

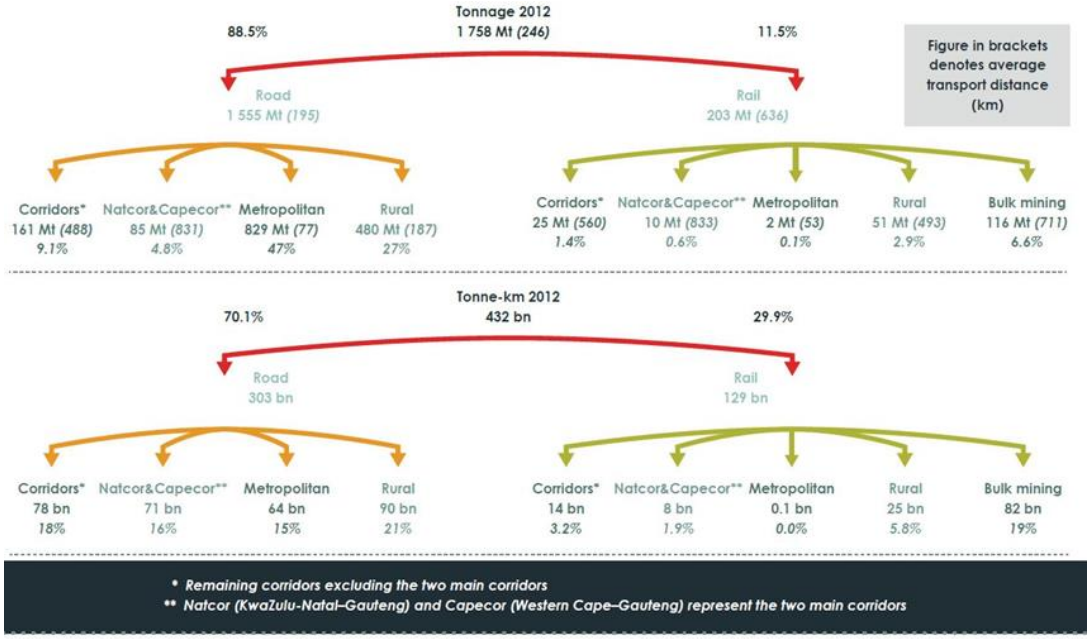
The 9th Annual State of Logistics Survey (2012) reports on an investigation into the road freight challenges and costs in South Africa. Results show that key challenges experienced by stakeholders in the sector are problems linked to the country's road infrastructure and government service delivery, as well as a lack of policies and policy implementation. Furthermore, when compared to the USA, the UK and Australia, South Africa has the highest percentage of road transport costs to GDP (4.7%). This is mainly due to the relatively low investment in road maintenance and the contribution of poor road conditions to road freight costs.

National Freight Transport Network

The leading transport mode for freight transport in South Africa is road-based freight haulage with 70.1% of the total tonne-km in 2012 being on road. In the Western Cape this is typified by the flows over the major arteries of the N1, N2 and N7, i.e. the north-easterly, eastern and northern corridors respectively.

The figure below shows the distribution of freight volumes between rail and road for 2012. The 2012 volumes are measured in tonnes and tonne-km. It is worth noting there was slight increase in rail market share, from 11.1% in 2010 to 11.5% in 2012 in terms of tonnes, and from 29.3% in 2010 to 29.9% in 2012 in terms of tonne-km.

Figure 70: National road and rail freight volumes, 2012

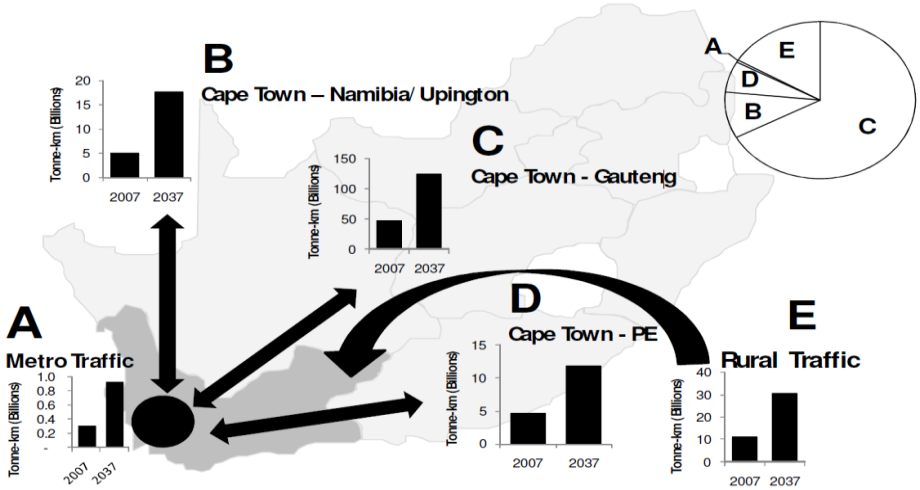


Source: 9th annual State of Logistics Survey

The largest growth in tonnes transported was for the two main corridors (KwaZulu-Natal-Gauteng corridor and the Western Cape–Gauteng corridor), which saw an increase of 15.9% between 2010 and 2012 when combining road and rail.

The figure below provides a summary view of freight transport that has either its origin or destination or both in the Western Cape, illustrated for 2007 and 2037 respectively.

Figure 71: Original and destination of freight transport



Source: Western Cape Provincial Freight Transport & Logistics Plan (March 2009)

The New Growth Path, launched in 2010 spells out the framework to drive job-creation in the wake of the global recession. One of the employment drivers is Infrastructure Development, which gave rise to the development of the Presidential Infrastructure Coordinating Commission whose mandate is to develop a twenty-year infrastructure pipeline. In 2012 the National Infrastructure Plan was adopted aiming to transform the economic landscape and simultaneously create jobs through 18 Strategic Integrated Projects (SIPs) and 645 infrastructure projects across the country.

As part of the SIP 5, the Saldanha-Northern Cape Development Corridor, Transnet proposes the expansion of the iron-ore export capacity at the Port of Saldanha. This requires the development of the region in an integrated manner and includes rail and port expansion, back-of-port industrial capacity and strengthening maritime support capacity.

The rail and port development is required to increase iron ore export capacity from the current 60Mtpa to about 82Mtpa by 2020 to accommodate the projected future volume demand. The following projects are in support of the developments in Saldanha:

- The deepening of the shipping channel by dredging in the Saldanha Bay. The material recovered will be used for the construction of new shipping berths.
- The creation of more space for stockpiling iron-ore.
- The construction of additional train passing loops to enable the more efficient handling of trains at Salkor yard have been completed, as well as the replacement of 302km of rail track through the rail replacement programme.
- Sixteen of the additional 32 locomotives needed to facilitate the increase in iron-ore capacity have been delivered.
- Additional rail and material-handling infrastructure for a new railroad car rotary system.

At the Port of Cape Town, projects are under way to increase the capacity of the container terminal by an increase in container stack capacity from 720 000 to 1.4 million Twenty-foot Equivalent Units (TEUs) per annum.

Annexure 3: City Budget for Infrastructure

City budget for infrastructure

The City's budget illustrates the expenditure emphasis on those votes responsible for infrastructure development e.g. Utility Services and Transport for Cape Town. This allocation in 2014/15 represents just over R4 524 million or 74.4% of the total budgetary allocation (R6 081). Utility Services – including the services responsible for the provision of electricity, solid waste, water and sanitation – receives the largest allocation of R2 872 million in 2014/15, 47.2% of the budget. The second highest allocation amounting to R1 652 million or 27.2% is made to Transport for Cape Town, followed by Human Settlements at R688 million, Corporate Services at R359 million and Community Services at R241 million. In the outer years the majority of the allocations were also made to infrastructure development: R4 907 million (79.1%) in 2015/16 and R4 666 million (78.4%) in 2016/17.

The strategic objectives prioritised for capital expenditure are:

- Providing and maintaining economic and social infrastructure to ensure infrastructure-led growth and development.
- Ensuring mobility through the implementation of an effective public transport system.
- Assessing the possible sale or transfer of rental stock to identified beneficiaries, using established criteria.
- Ensuring increased access to innovative human settlements for those who need it.

The table below summarises the proposed three-year budget allocations for wards 29 and 32. Critical is funding budgeted during 2015/16 and 2016/17 for the upgrading of electrical infrastructure in Atlantis Industrial.

WARD 29					
Directorate	Department	Project description	Proposed budget 2014/ 2015	Proposed budget 2015/ 2016	Proposed budget 2016/ 2017
Community Services	City Parks	Atlantis Cemetery upgrade	4 750 000	0	0
Community Services	City Parks	Develop park in Akkerboomlaan Mamre	200 000	0	0
Community Services	City Parks	Fencing Paradise Lane Park Mamre	100 000	0	0
Community Services	City Parks	Upgrading of parks in Mamre	0	0	800 000
Economic, Environment & Spatial Planning	Environmental Resource Management	Witsands office development	600 000	2 000 000	0
Human Settlements	HS Development & Delivery	Kanonkop (Atlantis Ext12) housing project	500 000	0	0
Transport for Cape Town	Maintenance	Resurfacing roads in Coral Place Flats	120 000	0	0
Transport for Cape Town	Maintenance	Traffic calming measures Hoop Crescent Atlantis	60 000	0	0
Transport for Cape Town	Maintenance	Upgrading entrance Silwerstroomstrand Beach	150 000	0	0
Utility Services	Water & Sanitation	Wesfleur WWTW capacity extension	0	5 000 000	0

		Ward 29 Total	6 480 000	7 000 000	800 000

Source: CoCT

WARD 32					
Directorate	Department	Project description	Proposed budget 2014/ 2015	Proposed budget 2015/ 2016	Proposed budget 2016/ 2017
Community Services	City Parks	Upgrade of parks Atlantis	0	0	1 000 000
Community Services	Sport, Recreation and Amenities	Atlantis synthetic soccer pitch	7 000 000	0	0
Community Services	Sport, Recreation and Amenities	Protea Park SF Atlantis (cement pavilion)	50 000	0	0
Human Settlements	HS Development & Delivery	Witsand housing project Phase 2 Atlantis	2 000 000	1 000 000	0
Safety & Security	Traffic Services	Acquisition & upgrade Atlantis	1 499 000	0	0
Utility Services	Cape Town Electricity	Atlantis Industrial	0	20 358 800	64 880 300
Utility Services	Cape Town Electricity	POS lighting Robinvale Atlantis	120 000	0	0
		Ward 32 Total	10 669 000	21 358 800	65 880 300

Source: CoCT

Annexure 4: List of interviewees

Government Departments, Parastatals, Business Incubators and Development Finance Institutions

- Ntombi Futhi Ntuli, Director Renewable Energy Industries, Department of Trade and Industry (DTI), Interviewed 23rd of May 2014
- Landon McMillan, Chief Director Microeconomic Policy, National Treasury of South Africa, interviewed 5th of June 2014.
- Marissa Moore, Chief Director Urban Development and Infrastructure, National Treasury of South Africa, interviewed 5th of June 2014.
- Owen Wilcox, Director: Forecasting at National Treasury, South African Government, interviewed 5th of June 2014.
- Martin Odendaal, Senior Economist, National Treasury of South Africa, Interviewed 5th June 2014.
- Rezha Atcha, Director Budget Analysis, National Treasury of South Africa, Interviewed 5th of June 2014.
- Zubair Habib, Business Analyst, Industrial Development Corporation (IDC), Interviewed 2nd May 2014.
- Khanyiso Zihlangu, Deputy Director Off-grid Renewables, Department of Energy (DoE), telephonic interview 22nd May 2014.
- Andrew Etzinger, Senior General Manager for Integrated Demand Management and Spokesperson, Eskom, telephonic interview 10th June 2014.
- Deon Joubert, Corporate Specialist (Financial Planning and Regulation), Eskom, telephonic interview 6th June 2014.
- Thandeka Tyatyantsi, Incubation, Enterprise Development & Projects Manager, SAREBI, Interviewed 23rd May 2014.
- Gerschwin Williams, Board Chairperson, SAREBI, Interviewed 16th May 2014.

Firms Operating in Atlantis

- Pieter du Plessis and Cordell Rautenbach, Senior Manager Foundry Operations and Senior Manager Logistics, Atlantis Foundries, Interviewed 15th May 2014.
- Tommy Tesner, Sales Director, CA Components, Interviewed 12th May 2014.
- Ebrahim Kahn, Deputy General Manager, Hisense, Interviewed 11th June 2014.
- Murison Kotze, Managing Executive, Tellumat, Interviewed 9th May 2014.
- Hempies Kriel, Operations Director, Promeal, Interviewed 18th June 2014.
- James Hannekom, Manager, Swartland, Interviewed 18th June 2014.
- Jan de Villiers, Operations Manager, Pioneer Foods, Interviewed 18th June 2014.
- Sam Schaffer, CEO, Rotex, Interviewed 18th June 2014.

- Conrad Smith, Managing Director, Isoboard, Interviewed 19th June 2014.

Green Technology Firms

- Henk Schoeman, Group Marketing Manager Energy, DCD, Interviewed 5th May 2014.
- Rob Henderson, Managing Director, East Coast Safety Glass, Interviewed 13th May 2014.
- Ross Dunbar, Owner, Eco Insulation,
- Avijit Das, Marketing Manager, Eveready-Kestrel, Interviewed 26th May 2014.
- Christiaan Botha, Plant Manager, Gestamp Wind, Interviewed 21st May 2014.
- Bryn and Gareth Foulkes-Jones, IC Investments, Interviewed 21st May 2014.
- David Nunez, General Manager, ILB Helios
- Wido Schnabel, Manager Business Development South Africa Sub Sahara Africa, Jinko Solar, Interviewed 21st May 2014.
- Flemming Schlier, Director, Krier Africa, Interviewed 5th May 2014.
- Richard Lomax, Owner, LEDzShine, Interviewed 8th May 2014.
- Nirmal Gupta, Business Development, LM Wind Power, Interviewed 2nd May 2014.
- Asogan Moodaly, General Manager, Mabele Fuels, Interviewed 11tth June 2014.
- Barend Grobbelaar, Key Account Manager, Powertech Transformers, Interviewed 8th May 2014.
- Ryan Hammond and Sebastien Feit, Managing Director and Managing Director, SolaireDirect, Interviewed 15th May 2014.
- Thibaud Vibert, Country Managing Director, SunPower Energy Solutions, Interviewed 23rd May 2014.
- Channelle Keyser, Manager, Tasol, telephonic interview 3rd June 2014.
- Megan Louw, Director Sustainable Solutions and former General Manager of Phillips Lighting Solutions, Interviewed 3 June 2014.
- Bryan de Vit Fitchat, Founder, Earth Power, Interviewed 18th June 2014.
- Ecolube Gas Geysers18th June 2014
- Jaco Barnard, ITS Solar18th June 2014
- Textiles Manufacturers outside Atlantis
- Mike Stewart, Managing Member, Cotton Traders, Interviewed 2nd July 2014.

Education and Research Institutions

- Professor Alan Brent, Centre for Renewable Energy Studies, Stellenbosch University, interviewed 2nd June 2014.
- Professor Johann Gorgens, Department of Process Engineering, University of Stellenbosch, Interviewed 13th of June 2014.
- Henri Mafumba, Moderator, Northlink College, Interviewed 9th May 2014

- Paul Gauche, Senior Researcher, University of Stellenbosch3rd June 2014
- Gaylor Montmasson-Clair, Assistant Programme Manager, TIPS, Interviewes, 21st May 2014

Other Industry Experts

- Carla Mackay, CFO, Sunbird Energy3rd June 2014
- Justin Wimbush, Renewable Energy Business Leader, ARUP, Interviewed 15th May 2014
- Niko Nel, Manager, Deloitte Accounting and Financial Advisory, Interviewed 3rd June 2014
- Helmut Hertzog, Sector Development Manager, GreenCape, Interviewed 21st May 2014
- Stephen Wright, Industrial Development Facilitator, Cape Clothing and Textiles Cluster, Interviewed 10th June 2014.

Annexure 5: Summary of policies and plans in support of the green economy in South Africa

Table 41: Key policy frameworks promoting renewable energy and green technologies

Title	Year	Owner of Policy	Policy Target
White Paper on Renewable Energy	2003	Department of Energy and NERSA	Energy Sector, Electricity Generation, Renewable
National Development Plan	2011	National Planning Commission	Framework/ Multi-sectoral Policy 20 000MW of renewable energy by 2030
Integrated Resource Plan 2010 – 2030	2013 (update)	Department of Energy	Energy Sector, Electricity Generation Allocate 17 800MW to renewable energy by 2030 1 million solar water heaters by 2030
IPAP (Industrial Policy Action Plan)	2014/15 - 2016/17	Department of Trade and Industry	Manufacturing sector, Energy Sector, Electricity Generation, Renewable energy and Framework, Special Economic Zone in Atlantis dedicated to renewable energy manufacturing

Source: Deloitte analysis

Table 42: Key programmes promoting renewable energy and green technologies

Title	Year	Owner of Policy/ Programme	Policy Target
Renewable Energy Independent Power Producer Programme (REIPPP)	2011	Department of Energy	Energy Sector, Electricity Generation, Framework/ Multi-sectoral Policy,Renewable Energy Contribute 3 725MW of renewable energy in next 5 years

Source: Deloitte analysis

Table 43: Supporting Policies, Strategies and Plans

Title	Year	Owner of Policy	Policy Target
A National Climate Change Response Strategy for South Africa	2004	Department of Environmental Affairs and Tourism	Framework/ Multi-sectoral Policy, Energy Efficiency/mandatory submission of GHG emission data to the National Atmospheric Emission Inventory
National Energy Efficiency Strategy (NEES)	2005	Department of Energy	Framework/ Multi-sectoral Policy Energy Conservation Target: Energy efficiency improvement of 12% by 2015
Biofuels Industrial Strategy	2007	Department of Energy	Energy Sector, Biodiesel and bioethanol tax exception of 50% and 100% respectively
Vision, Strategic Direction and Framework for Climate Policy	2008	Department of Environmental Affairs and Tourism	Aid in limiting the increase in global temperature to no more than 2 degrees centigrade above pre-industrial levels, through a policy response comprising of six themes
Electricity Pricing Policy	2008	Department of Energy	Energy Sector, Electricity Generation
Policy to support the Energy Efficiency and Demand Side Management	2010	Department of Energy and Eskom	Energy Conservation Target: Energy efficiency improvement of 12% by 2015
National Climate Change Response White Paper	2011	Department of Environmental Affairs and Tourism	Emission reduction target: 398-583mt CO2 eq or 2020
The National Strategy for Sustainable Development	2011	Department of Environmental Affairs	Five strategic objectives are identified in the NSSD of which building a green economy is number 3
SANS 204	2011 update	Department of Energy and SABS	Buildings
SANS 10400 XA	2012	Department of Energy and SABS	Buildings

Strategic Integrated Projects (SIP) 8	2012	PICC and Department of Energy	1 million solar water heaters installed by 2014, Solar home systems (PV electrification), Implement IRP(2010). Development of a solar park (5000MW), Biofuels
Bio-Economy Strategy	2012	Department of Science and Technology	Bio-innovation, technology development
Integrated Energy Plan for the Republic of South Africa	2014 (draft)	Department of Energy	Multiple RE Sources
National Liquid Petroleum Gas (LPG) Strategy	2013	Department of Energy	Provide access to safe, cleaner, efficient, portable, environmentally friendly and affordable thermal fuel for all households
Carbon Tax Policy Paper (update of Carbon Tax Discussion Paper 2010)	2014	National Treasury	Outlines plans to introduce market-based instruments in the form of a carbon tax to encourage a shift in production and consumption patterns towards low carbon and more energy efficient technologies by altering the relative prices of goods and services based on their emissions intensity and encouraging the uptake of cost effective, low carbon alternatives.
Carbon Offsets Paper	2014	National Treasury	Outlines proposals for a carbon offset scheme that will enable businesses to lower their carbon tax liability and make investments that will reduce greenhouse gas (GHG) emissions. The carbon offsets scheme is meant to complement the carbon tax that South Africa plans to introduce from 2016

Source: Deloitte analysis

Table 4: Western Cape Specific Policy, Strategies and Plans

Title	Year	Owner of Programme	Policy Target
Western Cape Climate Change Response Strategy	2008	Western Cape Provincial Government and Department of Energy	Framework/ Multi-sectoral Policy, Energy
The Western Cape Draft Strategic Plan	2009	Western Cape Provincial Government	12 Provincial Strategic Objectives (PSOs) of the Western Cape Provincial Government. Climate change has been identified as a priority focus in at least 5 POSs

Green is Smart	2010	Western Cape Provincial Government	Roadmap to become the lowest carbon province in South Africa and the leading green economic hub of the African continent.
OneCape 2040	2012	Western Cape Provincial Government	Energy Sector
Western Cape Infrastructure Framework	2013	Western Cape Provincial Government	Aligns the planning, delivery and management of infrastructure provided by all stakeholders for the period to 2040.
Provincial Spatial Development Framework, Public Draft for comment	2013	Western Cape Provincial Government	PSDF sets out to put in place a coherent framework for the province's urban and rural areas that gives spatial expression to the national (i.e. NDP) and provincial development agendas and communicates government's spatial development intentions to the private sector and civil society.
CoCT Integrated Development Plan	2013/2014 review	Western Cape Provincial Government	Developing a policy to facilitate residential and commercial-led small-scale embedded generation, Has set a target of generating 10% renewable energy by 2020.Established a Section 79 Committee on Energy and Climate Change.
CoCT Economic Growth Strategy	2013	Western Cape Provincial Government	The principal objective of the Economic Growth Strategy (EGS) is to grow the economy and create jobs.
Cape Town Spatial Development Framework (CTSDF).	2013	Western Cape Provincial Government	The CTSDF specifically supports the investigation of alternative sources of energy, and encourages the use of green technology

Source: Deloitte analysis

Table 5: Programmes and Initiatives

Title	Year	Owner of Programme	Policy Target
Electricity Pricing Programme	2008	Department of Energy and Eskom	Energy Sector, Electricity Generation
Integrated National Electrification Programme	2001	Department of Energy	Solar

Free Basic Alternative Energy Policy (Household Energy Support)	2007	Department of Energy	Support indigent households allocated in un-electrified areas with free basic alternative off-grid energy
The South Africa Wind Energy Programme (SAWEP)	2008	Global Environmental Fund, United Nations Development Programme and department of Energy	Install and operate 5.2 MW of electricity generated from the Darling Wind Farm and the development of an additional 45 MW of wind power
The South African – German Energy Programme (SAGEN)	2011-2014	SANEDI and Department of Energy	Improve conditions for increased investments in renewable energy and energy efficiency
Working for Energy Programme	2012	Department of Energy	Job creation, local economic development, technology skills transfer and capacity development
Green Transport and Energy Mobility Programme	2012	SANEDI and Department of Energy	Technology Development, new industrial sector in alternate fuels and propulsion systems
The 12L Income Tax Allowance on Energy Efficiency Savings	2013	SANEDI and Department of Energy	Incentive to promote energy efficiency

Source: Deloitte analysis

Table 6: Eskom Programmes

Title	Year	Owner of Programme	Policy Target
The Energy Efficiency and Demand-Side Management funding program	2004 (update 2013)	Eskom	Reduction of Energy demand
State Utility Distributes Free and Subsidized CFLs	2006	Eskom	Appliances
Energy Efficient Motors Programme	2007	Department of Energy and Eskom	Industry, Small and Medium sized Enterprises (SMEs), Industry, Appliances
Eskom Solar Water Heating Rebate Programme	2008 (been put on hold)	Eskom	Energy Sector, Electricity Generation, Renewable, Solar Thermal
Energy Service Companies (ESCO)	2012 (been put on hold)	Eskom	ESCO qualify if meet demand reduction of 1MW

Standard Product Program	2013 (been put on hold)	Eskom	Focus on small and medium projects <250 kW
Standard Offer Program	2013 (been put on hold)	Eskom	Verifiable energy savings (from 50kW to 5MW)

Source: Deloitte analysis

Table 7: Specific Initiatives and Partnerships

Title	Year	Owner of Programme	Policy Target
The Renewable Energy and Energy Efficiency Partnership	2002	SANEDI	Ensure wide availability of reliable and coherent clean energy information
Global Village Energy Partnership	2002	Department of Energy and UK government	Small and Medium companies, increase access to modern energy services
The South Africa Renewables Initiative (SARI)	2010	Department of Trade and Industry and Department of Public Enterprises	Define an industrial strategy for securing the economic gains from an ambitious program of renewables development, including financing and associated institutional arrangements
Green Energy Efficiency Fund	2011	Industrial Development Corporation (IDC) and German Development Bank	Provide a R500-million loan facility
Renewable Energy Centre of Research and Development (RECORD)	2011	SANEDI and National Energy Efficiency Agency	Support and coordination of renewable energy (RE) research and development
Clean energy education & empowerment (C3E – SA) initiative	2012	Department of Energy	Education, Science, Technology, Engineering, & Mathematics, job creation

Source: Deloitte analysis

Table 8: Projects

Title	Year	Owner of Programme	Policy Target
Wind Atlas for SA (WASA) project	2009	Department of Energy, SAWEP, SANEDI, CSIR	Develop and employ numerical wind atlas methods and construct a Numerical Wind Atlas (NWA)
Carbon Storage Atlas	2010/11	SANEDI and Department of Energy	Potential for storage of 400 million tons of carbon dioxide per year

Smart Grid project	2011	SANEDI and SASGI	Development of Technology, Education
Sere Wind Farm	2011	African Development Bank and Eskom	Produce 100-MW of energy
Ingula Pumped Storage Scheme	2013	Department of Energy and SANEDI	Add 1 332 MW of hydro power to South Africa's electricity grid

Source: Deloitte analysis

Table 8: Agreements and Partnerships

Title	Year	Owner of Programme	Policy Target
Energy Efficiency Accord	2005	Department of Minerals and Energy	15% reduction in final energy demand for the industrial sector by 2015, and a 12% improvement in energy efficiency for the country as a whole by 2015
India-Brazil-South Africa Declaration on clean Energy	2007	Department of Energy	Promotion of nuclear energy, clean energy technologies and other renewable energies
Copenhagen Accord pledge of South Africa	2009	United Nations and Department of Energy	34% deviation below the "Business as usual" emissions growth trajectory by 2020 and a 42% deviation below "Business as usual" emissions growth trajectory by 2025
Green Economy Accord	2011	Department of Energy and NERSA	Low carbon based economic development growth through renewable energy
Local Procurement Accord	2011	Economic Development Department	75% localisation in the procurement of goods and services by both the private and public sectors

Source: Deloitte analysis

Annexure 6: Policies in support of the revitalisation of Atlantis

The CoCT and WCPG have issued a number of other policies and plans demonstrate the commitment of the province to uplifting and supporting the development in Atlantis.

Table 44: Overview of other relevant Western Cape Policies

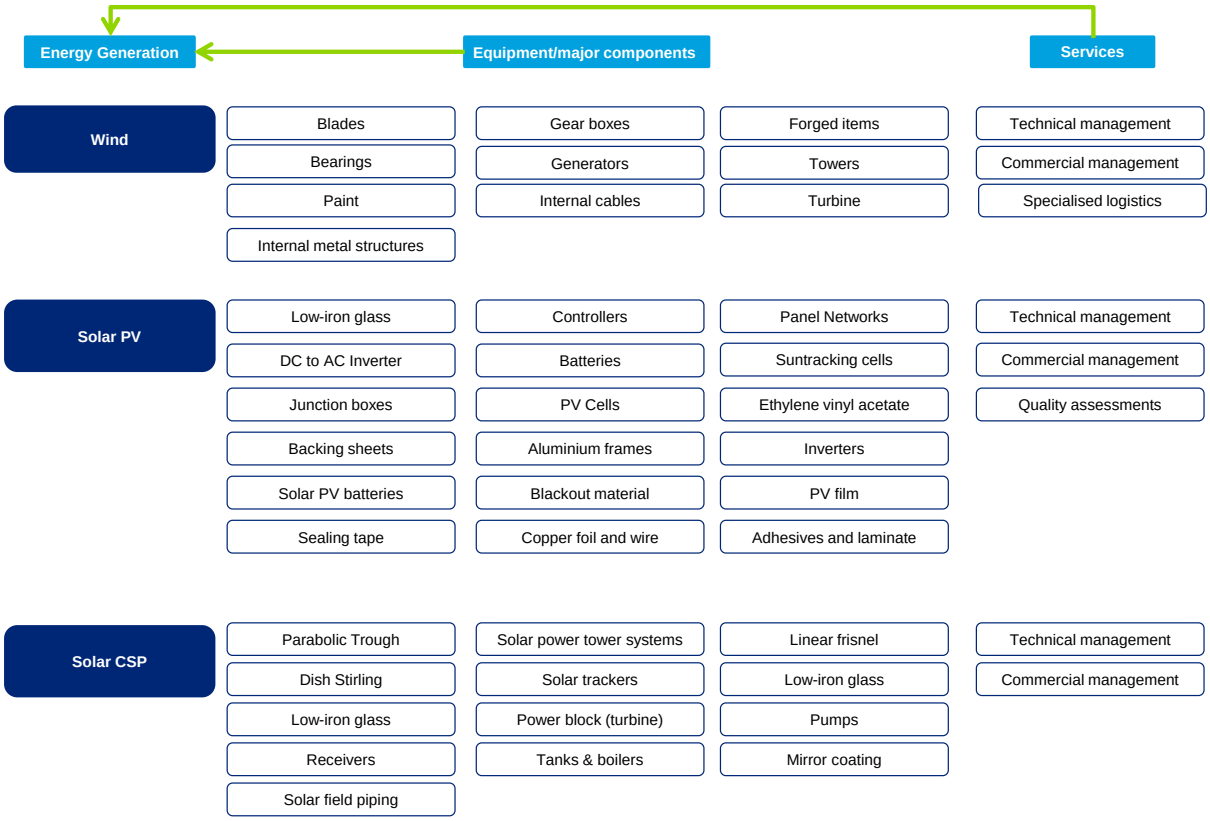
Title	Year	Owner of Programme	Policy Target
Koeberg Emergency Plan.	2011	City of Cape Town	Aimed at responsible development and risk/ disaster management related to the Koeberg Nuclear Power Station
Draft Atlantis Revitalization Framework (2012).	2012	City of Cape Town	The Atlantis Revitalisation Framework articulates a constructive and meaningful working relationship where responsibilities between the key stakeholders – government, business, and civil society – active in Atlantis are agreed and shared, so as to enable successful implementation of strategies and actions for the revitalisation, growth and development of Atlantis.
Blaauwberg Spatial Development Plan and Environmental Management Framework	2013	City of Cape Town	The Blaauwberg District Plan is one of eight plans prepared for specific districts of the city and is informed by the city-wide CTSDF
CoCT Integrated Transport Plan 2013-2018	2013	City of Cape Town	ITP seeks to establish an efficient and viable relationship between land use, supporting infrastructure and transport for the sustainable development of the City region.
Western Cape Broadband Initiative	2013	Western Cape Provincial Government	A partnership between the WCPG and CoCT, aims to implement an expansive fibre-optic communication network across the metro and will provide high-speed internet to 45 WGC and 130 CoCT buildings/ facilities.

Source: Deloitte analysis

Annexure 7: Value chain analysis

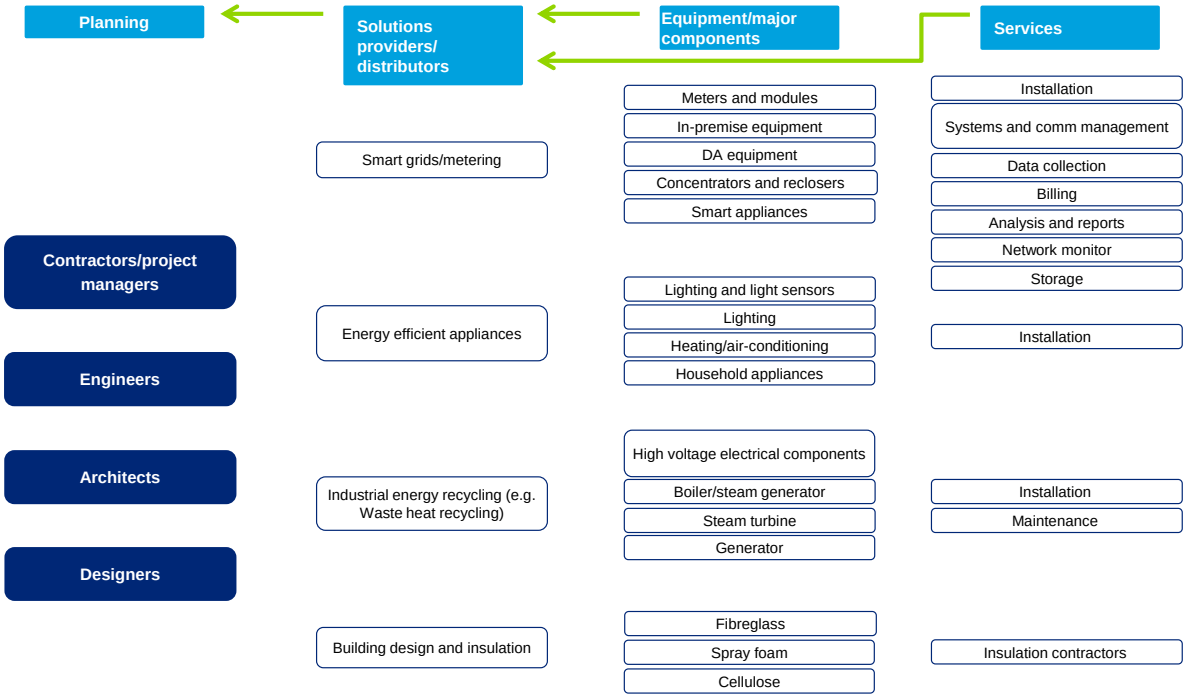
The section that follows attempts to identify the different steps of the value chain for the greentechnologies identified in the taxonomy above. This will allow for all of the business activities associated with greentech to be identified, which in turn, will help to establish the extent to which there are businesses that are likely to locate in a greentech hub. Note that we have attempted to identify the major components and services and, hence, the major business activities that could be associated with the Atlantis SEZ. However, manufacturers of intermediate components such as pumps, compressors, transformers, rods, drills, valves and boilers may also find it profitable to be located closer to their customers who produce the major components.

Figure 72: Value chain analysis of Wind, PV and CSP technologies



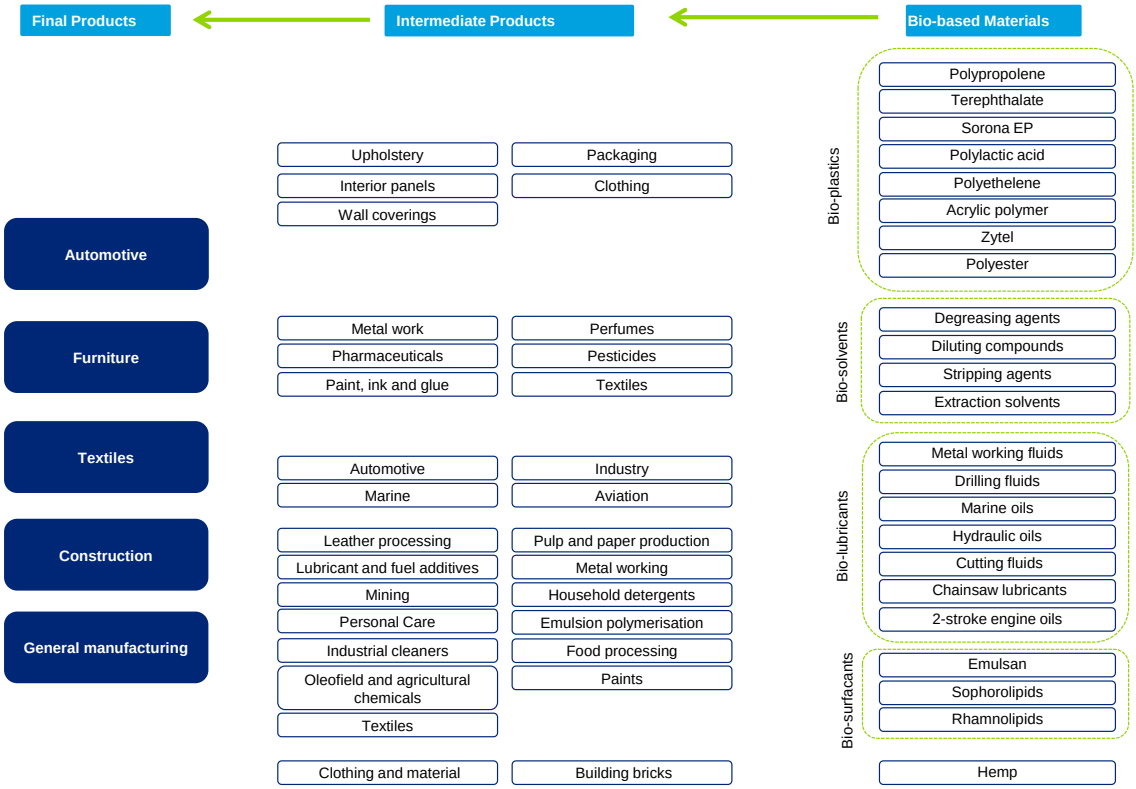
Source: Deloitte analysis

Figure 73: The energy efficiency value chain, Deloitte Analysis



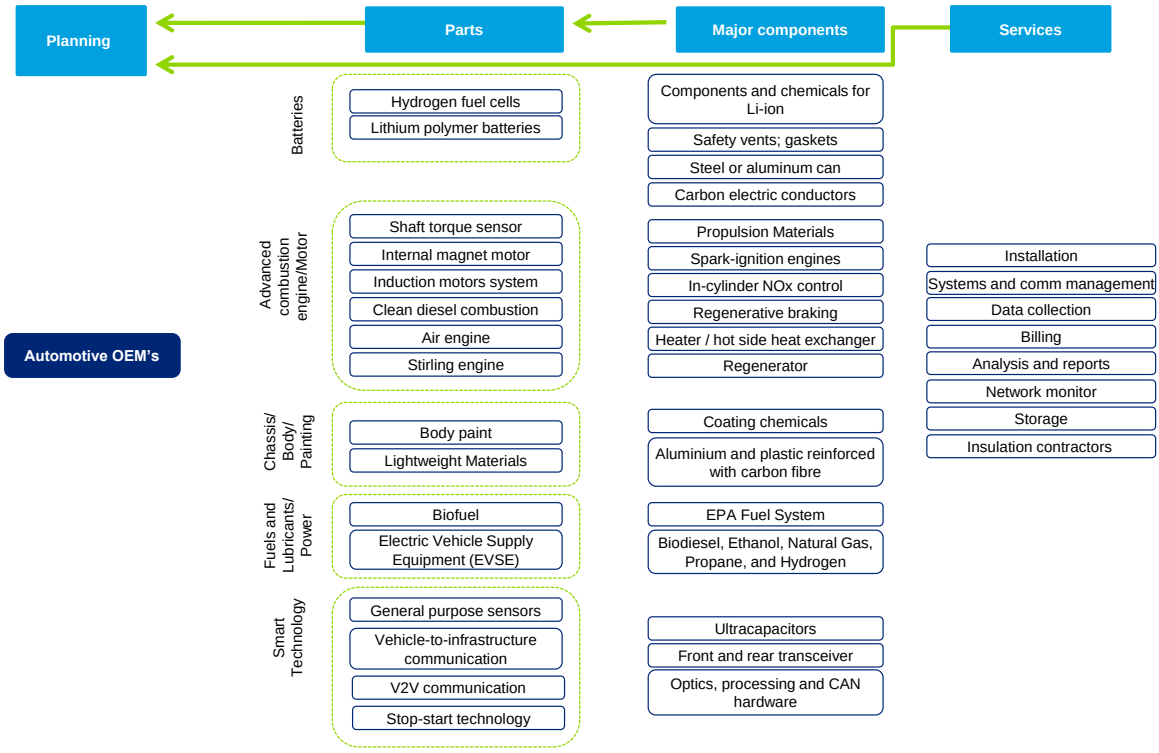
Source: Deloitte analysis

Figure 74: The bio-materials value chain, Deloitte analysis



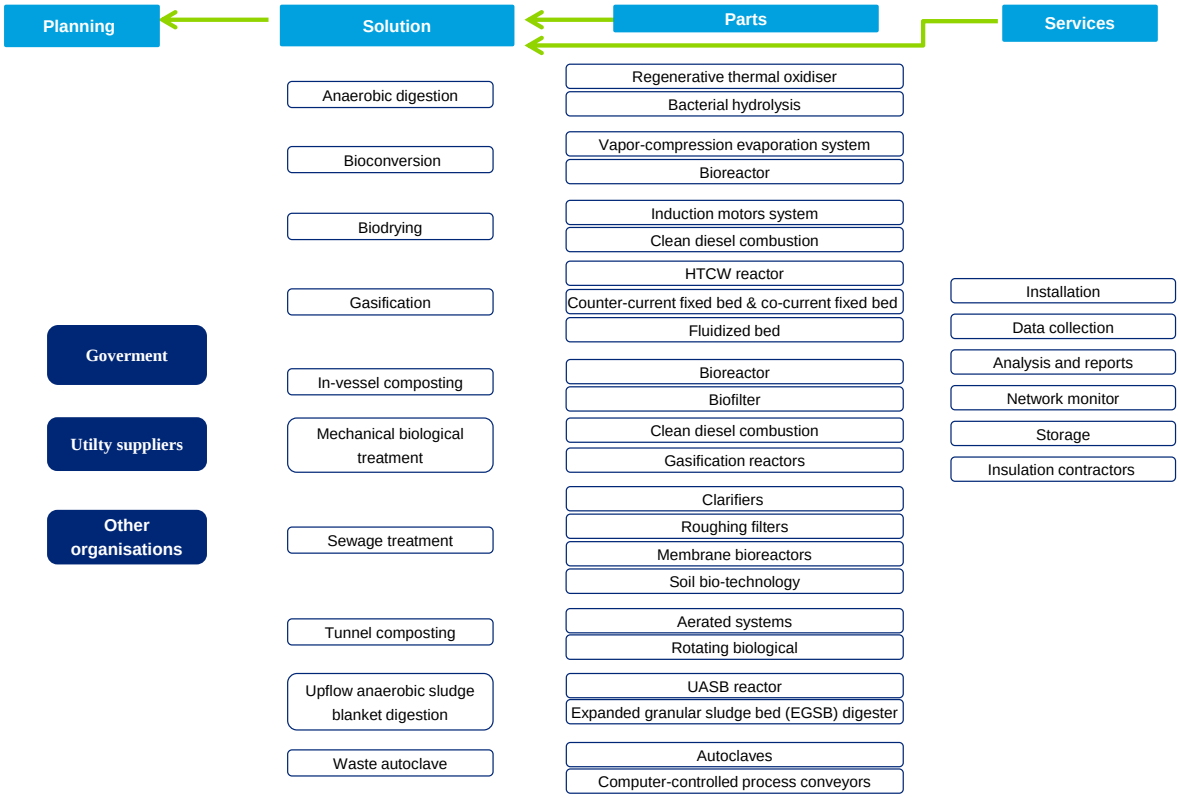
Source: Deloitte analysis

Figure 75: The transport sector greentech value chain, Deloitte analysis



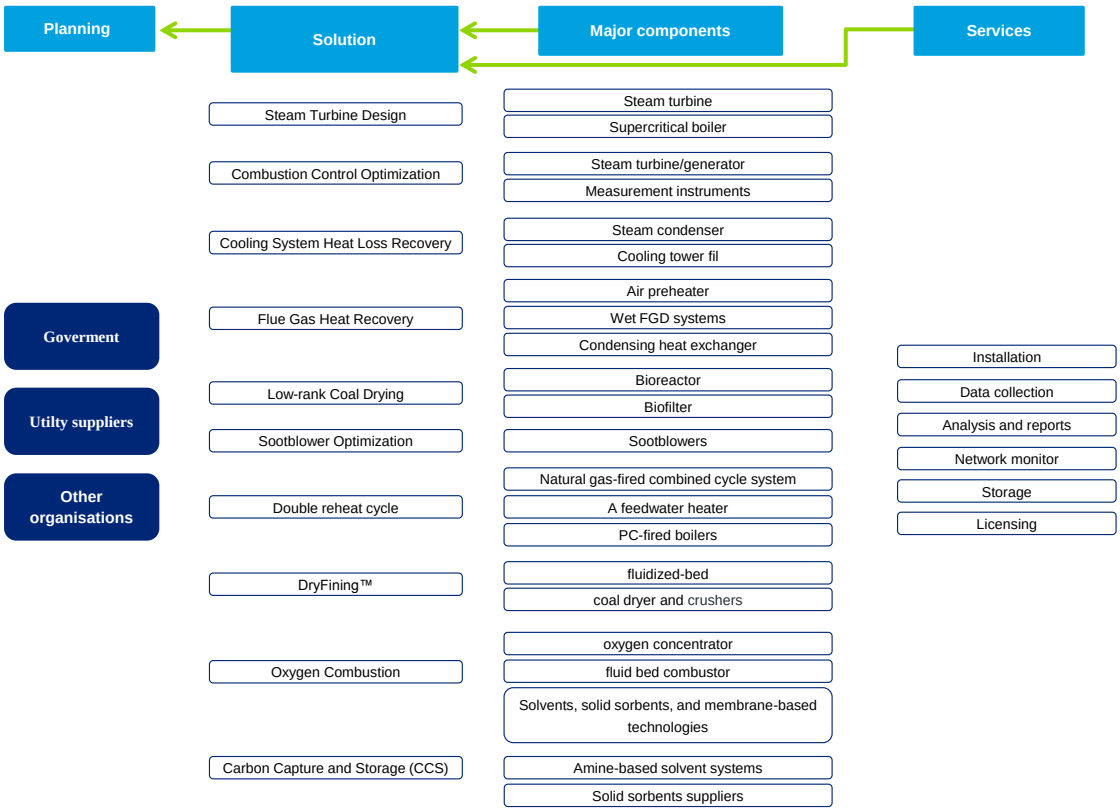
Source: Deloitte analysis

Figure 76: Environmentally friendly waste treatment value chain, Deloitte analysis



Source: Deloitte analysis

Figure 77: Environmentally friendly production processes value chain, Deloitte analysis



Source: Deloitte analysis

Annexure 8: Detailed assessment of green technologies

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
Solar water heaters (HP & LP)		Large market opportunity for fully subsidised units used in the DoE roll-out. Large potential market in high-pressure but slow uptake due to upfront costs and very low penetration of insurance geyser replacement market		DoE solar water heater programme - Low pressure (which is the bulk of the market) on hold since Jan 2013 but soon to recommence (mid-2014). HP rebate still available, but not a 100% rebate. Localisation requirements driving additional local manufacturing and assembling. Interview with National Treasury indicated that funding was still available and would be rolled over to next MTEF period		Currently a low percentage of systems installed are locally manufactured. The DOE however is set to introduce stricter localisation requirements for fully government subsidised geysers (70% for geyser, 70% for collector) and these should come into effect in 2014. Local manufacturing is possible for collectors and geysers		Existing manufacturer Tasol expressed an interest in using Atlantis as hub to locally manufacture SWHs and to service Western Cape Market. At least one other medium sized manufacturer looking at Atlantis via SAREBI incubator programme. When DOE Low pressure programme recommences, there will be room for more than one Atlantis based manufacturer
Heat pumps		Large energy savings are possible but more suitable for new buildings than retrofitting. New building regulations (SANS 10400 XA) mandate use of energy-saving technologies for water heating which should assist in driving demand for heat pumps. Solar water heaters however remain the preferred technology as they are subsidised by government. Heat pumps for commercial and industrial market a well known technology		Eskom introduced a heat pump rebate programme in 2011. The programme was discontinued in June 2013 due to a lack of funding - National Energy Regulators decided to reduce funding for Eskom EEDSM programme in the MYPD3 tariff application. The new building regulations on water heating will assist in driving demand, as well as 12L tax allowances, but SWHs likely to remain the preferred technology for compliance with standards as it is currently subsidised (for residential, commercial and industrial)		A large scale production of compressors is needed in order to justify further local manufacturing. Majority of the technology is Japanese and used for a variety of other everyday products. Casings and heat rails can be manufactured in SA, however it is not economically viable due to subsides received by international manufacturers on completed products and not components. (Interview with ITS Solar). "In addition a manufacturing plant would have to sell up to 10 000 units per month for the business to be sustainable. This is a challenging number compared to the demand of the South African market currently" - EE Tech report by F&S. Assembly (of imported components) within the commercial and industrial heat pump market is however viable where large industrial heat pumps also require more complex and custom installation with most heat pump manufacturers already involved in this space		Out of 18 primary suppliers that have thus far registered on the Eskom heat pump rebate program, only two companies do not import full products. The majority of heat pump suppliers import finished products, since the landed cost discrepancy for imports is between 30-40 per cent cheaper as a finished product, than what suppliers can locally assemble. The items imported consist of pumps, compressors, condensers and evaporators. F&S EE report

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		**Level of government support (standards, rebates or subsidies)**		**Ability to produce in South Africa (import competition, existing activity, export potential)**		**Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)**
Energy efficient appliances (residential & commercial)		Key drivers of demand- higher overall energy cost and increase in average living standards (as households move into higher LSMs they own more appliances). The market includes amongst others energy efficient refrigerators, TV's, washing machines, dryers, freezers for residential and commercial sectors		A labelling initiative by the DoE was introduced. This might alter consumer choices and possibly increase the demand for more energy efficient appliances but does not necessarily support local manufacturers. The aim of the initiative was to empower consumers by forcing manufacturers to state the energy (electricity and water) consumption levels. Engineering News, 'SABS introduces energy efficiency labelling standard for appliances'		There are a few consumer electronics manufacturers in South Africa but these face intense competition from Asian manufacturers. Tellumat, which refurbished its Atlantis factory in 2013, in our interview with them, indicated they were closing this plant down due to the loss of a big European clients who is downsizing. Hisense, a Chinese electronics manufacturer opened a plant in Atlantis in 2013, they manufacture low-end energy-efficient consumer electronics for the African market. The investment was supported with grant funding from the SA government. Overall it would appear that there is little scope for growth in local production, however the capabilities (skills) to do so locally do exist		Limited opportunity for more consumer electronics manufacturers, but there is scope for the production of the components of these products in Atlantis e.g. back and front casing for TVs and refrigerator compressors if sufficient scale can be achieved (Hisense interview).
Rooftop PV		Large future potential but at the moment very little uptake because of high upfront installation costs and long pay-back periods. Households would need to be able to sell power back into the grid (embedded or net generation) before it makes financial sense for this market. Currently users of PV use systems to off-set their own consumption, however, if embedded generation is allowed this opportunity could unlock another market capable of sustaining additional manufacturers. Self generation market for commercial and industrial users with poor/no grid access the most attractive market in the short term		NERSA produced guidelines on small-scale (household) embedded generation in 2011. Many municipalities including city of cape town are currently investigating the requirements to successfully enable and promote embedded generation - this contingent on the installation of smart meters, two or three part tariffs and introduction of time of use tariffs to promote load shifting. While the current (2014-2017) levels of support are low, the future outlook is much more positive and attractive. 12L tax allowance does not apply to RE products		Five PV module manufacturers already operate in SA. Three in Cape Town. See utility scale report for individual component opportunities. Also, PV localisation study by SAPVIA very informative and indicates the components which can be manufactured locally. PV cells are likely to be imported in the short to medium term due to international competition.		Market demand is currently dependent on the utility scale market. If government support (net-metering) is introduced, as it is in many municipalities and customers have confidence in the system then rooftop PV market would expand. Atlantis, being in CoCT which is the leading municipality in terms of net-metering, is an ideal location for a new PV module manufacturer. At present though the residential, commercial and industrial market is not yet large enough to sustain additional local manufacturers given the low-price offered by imports where local content requirements are not mandated

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
Smart meters (embedded generation, bi-directional and automated meter reading)		The demand for smart meters is dependent on the ability of households and other small generators of electricity to be able to off-set their electricity costs via net-metering. The city of CT leads municipalities in this endeavour but has not yet been able to implement. At present no reverse power flow allowed (The Challenges to get RE going in Municipalities, Electricity services perspective). For smart meters which do not have bi-directional capabilities, the existing market players in SA should be able to meet demand in the short term		NERSA requires smart meters to be provided by municipalities and distributors to all residential consumers using more than 1000kWh per month. Many municipalities are investigating or already rolling out smart meters (automated meter reading, not bi-directional). Until such a time that bi-direction tariffs are finalised and set so that households are encouraged to send power back into the grid at peak times as well as more marketing, the potential of this market remains low		Stiff global competition in low-end meters. Most internal electrical components are imported. GreenCape smart meter survey. 13 firms were identified who can and do manufacture smart meters in SA.		Thirteen companies (capable of manufacturing various types of smart meters) were identified by GreenCape in their smart meter survey 2013/14. Itron, a subsidiary of the global firm manufactures smart meters out of the Atlantis area. From the survey conducted by GreenCape it seems that there is enough local capacity to meet demand while smart metering begins to take off. Therefore minimal scope for new market players (in the short term) and bi-directional market still in early stages of development
Batteries & other PV storage		Depends on roof-top PV market which has a large potential. Currently the market is small. For the PV battery market to grow net-metering and peak bi-directional tariffs will need to be available for households in order to justify purchasing PV batteries. As is the case of rooftop PV, the most significant market opportunity currently is the rural market. According to StatsSA, household PV systems have a higher market penetration within the rural areas due to a lack of electricity, thus making storage a more viable option/investment.		No known support. Will rely on embedded generation and net-metering in the future		According to the PV localisation study there are local capabilities and existing activates. First national Battery manufacturers solar batteries. The report also suggests that most local car/truck battery manufacturers will be able to also produce solar batteries when the market outlook for these batteries improves.		Local capabilities exist, but require demand for further investment into solar deep-cycle batteries. Market outlook is based on how significant the rooftop PV market grows

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
LED lamps (residential, commercial & industrial)		Local manufacturers are confident that there are excellent prospects for LED lights in the market, but it would be at an increased risk to invest at the moment (F&S report and market interviews). The application of LED lights in street lighting is also expected to increase. Public , Industrial and commercial buildings represent 60% of global lighting electricity usage because of typically longer burning hours and use of outdated technologies. This segment represents a large potential market for energy efficient lighting installations in South Africa		Eskom funded CFL light exchange programme and more recently residential mass roll of CFL and LED lighting under the standard product programme started in 2011 previously supported demand for energy efficient lighting in the residential segment. Uptake in the commercial and industrial segment was supported by rebates provided for LED lighting under the Standard Product including, Standard Offer and Esco model programme. These programmes were placed on hold in October 2013 due to funding constraints placed on Eskom by NERSA who did not award Eskom a an electricity tariff increase for MYPD3 that was sufficient to support the continuation of the IDM programmes. Regulatory experts at Eskom have indicated that they are currently in the process of applying to NERSA for an additional tariff increase to cover the cost of IDM programmes (amongst other costs incurred), but this process will take some months and the provision of additional funding to cover these costs through a tariff increase will still subject to decision by the regulator. The 12L tax allowance will also drive demand for energy efficient lighting, especially within the industrial sector where savings can be significant		"LED lights are basically made up of an LED, a driver, a housing , lens and reflector and some wire and bits and pieces putting them together. Most of those parts can be made or at least a start can be made with them assembled here" - Earthpower, industry expert interview. However, import duties prohibit further local manufacturing of parts. The main issue lies with local manufacturers remaining uncompetitive compared to the Asian market that produce at such large scale. According to Megan Louw, former GM of Philips Lighting Solutions noted that it is not viable to manufacture LED modules and CFL lamps in South Africa given that there are significant economies of scale in production and the Sub-Saharan African market is not large enough to support competitive volumes. She noted that they were also volumetrically inefficient in transport and South Africa is not well placed geographically to serve large exports markets. The luminaires (fittings or casings) however can be produced locally. High-end industrial and residential LED lamps are integrated with the fittings for optimal results and those consequently cannot be locally manufactured but the lower end and customised fitting for both LED modules and CFL lamps for industrial can and are currently locally manufactured. It appears the largest unexploited opportunity is in industrial and commercial lighting as there are already many suppliers of residential LED fittings in South Africa		According to Bryan de Vit Fitchat, Earthpower: Atlantis would only be suitable for large scale manufacturing as Atlantis is too far from target market for small scale (SMMEs). Given import competition on the lower end scale and the opportunity in the commercial/industrial scale Atlantis could potentially be home to a larger assembler of industrial/commercial LED lighting

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
Basic components (luminaires, fittings) for LED & CFL lighting		See above		See above		See above		Luminaries and fittings can be manufactured locally according to industry players and experts
Residential gas solutions (heat, water heating and cooking)		Gas is less expensive than grid electricity. May be a viable option for areas where only gas is available and house structures cannot accommodate SWH.		No support found		Currently no gas geysers are manufactured in SA due to pricing and complexity of the mechanisms (Interview with Ecoblue gas geysers)		The market is too small and all products are currently imported. Local manufacturing in SA not yet viable, hence low opportunity for Atlantis (Interview with Ecoblue gas geysers).
Insulation (built environment)		The market relies on demand within the built environment. The construction industry has not yet recovered from the 2008/9 global recession. Demand for low cost housing and a general incline in demand for formal dwellings due to growing middle income class will create demand		Building standards require a minimum level of energy efficient design but no rebate or subsidy is currently provided. Building regulations and standards will drive uptake of insulation products. These include, ceiling insulation, water heating insulation (SWH, gas, heat pump), insulation for hot water pipes, wall insulation, floor insulation, glass glazing and shading, design		Currently 2 big companies and 2 SMMEs manufacturing cellulose fibre insulation (Eco Insulation). 29 insulation manufacturers are listed on the Thermal Insulation Association of South Africa, with some companies having office in most provinces. Government regulations and support only applicable to new builds - limiting market demand to this segment		Existing building related manufacturing exists in Atlantis, eg. Wooden products. Space requirements are good. Potential for SMMEs also possible based on interview with Eco Insulation. Isoboard currently manufacturing in Atlantis and have distribution warehouses in all provinces.

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
Micro-wind power		Small application and high costs. Good for remote energy solutions with back-up power. E.g. cellular towers in remote areas. interview with Kestrel - Three customer types are those who do not have access to the gird (e.g. farmers looking to power water pumps), companies looking to gain green credentials and household driven by government incentives. Sell about 300 turbines per year and employ 40 people (SMME). Kestrel does not see market growing attractively		No support found for micro-wind		Local manufacturer operates in SA where current demand is low - Certa. Krestel manufacturing in SA. But market outlook not attractive enough for additional local manufacturing. Palmtree Power manufacturers out of Gauteng, and provides micro-win (300kWp) systems for SSA off-grid market. This firm is a good example of how SMMEs in SA are able manufacture products for the SSA market		Already manufactured elsewhere in SA, and small market with low growth outlook for residential market. Some opportunity in commercial and industrial market but not significant according to Kestrel, who also indicated that Atlantis is not an ideal location for micro-wind manufacturing due to the distance from customers (incl. farmers, radio towers, rural schools, etc.)
Manufacturing of components for electrical vehicles		Small target market compared to other first world markets. Electrical cars have high purchase costs for now. Cars are likely to be imported. Current investor appetite for car manufacturing low in SA after labour unrest and BMW not extending their contracts to SA manufacturers		Car and car component manufacturing is well supported in SA. Automotive hum in East London and high import tariffs protect local manufactures and component manufacturers. The Government Motor Industry Development Plan.		East London automobile hub the ideal location for car component manufacturers. The Joule was an electrical car manufacturing initiative which eventually was shut down due to a lack of funding and international competition. Some additional research is continuing		Atlantis is not suitable for larger automobile manufacturing, however, smaller automobile components can be (and are being) manufactured in Atlantis. These may or may not be related to the green-tech transportation market
Waste management & recycling activities		Small, due to difficulties gaining access to sites and low financial feasibility of recycling. Generally activities are loss making but economically attractive or breakeven. REDISA is an example of what can be done, however government support (subsidies) is required		The Recycling and Economic Development Initiative of South Africa (REDISA) is a non-profit organisation whose aim it is to develop a sustainable South African tyre recycling industry through an Integrated Industry Waste Tyre Management Plan (IIWTMP).		Technology is not complex, and can be labour absorptive. Landfill site are cheap and therefore limit the financial feasibility of most recycling initiatives.		Landfill site near Atlantis and existing tyre recycling facility already operating in Atlantis (satyrerecyclers). Some activities though need to occur on the landfill site which would not qualify for SEZ status unless boundries are expanded. Through government support additional recycling initiatives may operate out of Atlantis where transport costs for low value cargo are not prohibitive

Technologies for the Residential , Commercial and Industrial Market								
		Current size of the market and tangible future demand		Level of government support (standards, rebates or subsidies)		Ability to produce in South Africa (import competition, existing activity, export potential)		Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)
Self generation waste-to-energy (biomass/ biogas)		The market exists, and is well known within the forestry and agricultural industry. Small scale farmers, abattoirs, rural communities or industrial firms who generate waste are all able to convert this waste into energy to help generate fuel or electricity for self consumption. There are a number of projects already underway, though the market is not expected to grow significantly in the short term given relatively low electricity prices. A large latent opportunity does exist for larger industrial users due to rising electricity prices and the possible introduction of a carbon tax		Potential carbon tax and the 12L tax incentive.		Local manufacturers include Biogas Agama, CAE, EnviroServ, CA Components and JT Boilers. Many project developers also exist. According to Emergent Energy, small scale anaerobic digestion systems for biogas digesters can in many cases be 100% localised (e.g. Biogas Agama. The plastic or brick domes are low tech and easy to install (Emergy, 2013). There is generally an abundance and variety of feedstocks in South Africa. Low tech biogas digesters have been rolled out successfully and implemented en masse in China and parts of Asia - DTI. The overall local content potential for bio-gas plants (50-250kW) is high – potentially above 80% or 90% when a local engine is utilised, such as CAE		Many of the manufacturers already operate in Atlantis. Being located near a larger agricultural area should be advantageous, but not necessary for manufacturing. Given the scope of users there seems to be the potential for additional manufacturing in Atlantis in the medium to long term once demand improves within the WC region

Technologies for utility-scale renewables market								
		Current size of the market and tangible future demand		**Level of government support (standards, rebates or subsidies)**		**Ability to produce in South Africa (import competition, existing activity, export potential)**		**Suitability of Atlantis and potential for new investor (Proximity restrictions, skill requirements, market saturation)**
Solar PV components (Glass, frame, junction box, packaging, adhesives, backing sheet)		Linked to utility scale PV market. PV solar has the highest allocation out of all the RE technologies in the IRP	High	REIPPP (IRP allocations) and local content requirements encourage local procurement	High	Local manufacturers already exist, and have indicated that they can ramp up scale when the market grows	High	PV manufacturers can also supply the residential and commercial markets. The location of Atlantis is not an issue, according to interviews with industry players and stakeholders. Atlantis is also situated in the WC province which borders the NC province, both of which have high allocations of PV through the REIPPP programme.
PV silicone cells		Linked to utility scale PV market. PV solar has the highest allocation out of allthe RE technologies in the IRP. While the market for PV is attractive, the market for manufacturing PV cells is too small.	High	REIPPP (IRP allocations) and local content requirements	Very Low	PV cell manufacturing requires a large local market to justify local manufacturing. Imports are too price competitive. Export market also not attractive due to price competition	Low	Requires specialised skills and a larger market to justify local manufacturing.
Basic inverter parts (casings, windings and wiring)		Linked to utility scale PV market. PV solar has the highest allocation out of all the RE technologies in the IRP	High	REIPPP (IRP allocations) and local content requirements	Medium	Local content varies between 35%-75% depending on the manufacturer. PV localisation report, DTI & SAPVIA. AEG, TUB, MLT drives, Microcare are already manufacturing inverters locally.	Low	Existing market players are considered sufficient enough meet growing market demand in the short term. Long term prospects better for inverter manufacturing and assembly in Atlantis
Solar CSP (heliostats, parabolic troughs, bent mirrors, collectors, etc.)		Relatively good allocation in REIPPP (600 MW, 3rd largest), with attractive IRP allocation post 2030.	Medium	REIPPP allocations. CSP projects in the Northern Cape Only. Only 400MW allocated during the first three bid windows of REIPPP. 200MW remaining. Allocations in IRP increase after 2030 only.	Low	Many of the key components are imported. (parabolic trough, collectors, bent mirrors, turbines). According to research by the IDC and GIZ, these components are expensive to produce and are only economically feasible with a lager local market >300 MW per annum. Current REIPPP = 600 MW total.	Low	High potential for SMME?

Solar CSP tracking systems, glass and mounting structures		Relatively good allocation in REIPPP (600 MW, 3rd largest), with attractive IRP allocation post 2030.	Medium	REIPPP allocations. CSP projects in the Northern Cape Only. Only 400MW allocated during the first three bid windows of REIPPP. 200MW remaining. Allocations in IRP increase after 2030 only.	Low	Tracking systems, mounting structures and glass can be manufactured locally according to SAPVIA PV localisation report, Assessment of localisation from CSP for SA, 2013 GIZ. All components have potential for local manufacturing but require additional market demand. Components are cheaper to import, but local manufacturing is possible.	Medium	Glass manufacturer interested to serve PV market has indicated an interest in moving to Atlantis. The investor indicated that he could also serve the CSP, SWH and building/construction industry. No view on trackers or mounting structures opportunity in Atlantis - TBC
Wind turbines (including bearings, generator, brakes, etc.)		Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025.	High	Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025. Local content requirements also drive local manufacturing.	Low	Advanced wind turbine products are imported. "To achieve further levels of localisation would require a turbine maker to set up shop in the country. For the time being, however, the market might have to make do without going this far" http://social.windenergyupdate.com/emerging-markets/home-grown-supply-chain-how-south-africa-meeting-its-challenges	Low	At the beginning of 2013 there was not even any training course anyone could attend that would equip them to become, for instance, a wind and turbine technician," van den Berg says, http://social.windenergyupdate.com/emerging-markets/home-grown-supply-chain-how-south-africa-meeting-its-challenges. Turbine manufacturing in general requires significant skills which are not available in Atlantis.
Wind turbine blades		Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025.	High	Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025. Local content requirements also drive local manufacturing.	Medium	LM Wind Power interested in investing into South Africa. In an interview with the company they mentioned that policy is the only concern, and not skills, inputs or other doing business concerns. They did mention that importing blades would be the cheapest option for the country.	High	LM Wind interested in the Atlantis area
Wind turbine towers		Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025.	High	Wind energy has the second highest allocation in the REIPPP (IRP) programme. 2000MW by 2025. Local content requirements also drive local manufacturing.	Medium	DCD already manufacturing in Coega. Gestamp in the process of building plant in Atlantis	High	Gestamp already establishing themselves in Atlantis. Flanges for wind turbines can also be manufactured in Atlantis, using foundry and forge.
Geothermal Energy		No mention or allocation for geothermal in REIPPP or IRP.	Very Low	No REIPPP allocations.	Low	Low market demand	Low	Low market demand
Hydropower		Mention of micro-hydropower (less than 40MW). South Africa has an average rainfall of 500mm, which is low by world standards. This, combined with the seasonal flow of the country's rivers and frequent droughts or floods, limits opportunities for hydropower, www.saaea.org, Hydropower technology in South Africa	Medium	Relatively small allocation (135MW) in REIPPP. Only one project so far (14MW). With REIPPP, the policy framework is much clearer, although effectively limiting options as development of grid feeding hydro schemes outside the REIPPP has become virtually impossible - www.smallhydroworld.org	Low	Civil works tend to make up the largest portion of costs which will be locally procured. Transformers are also locally sourced. Turbines will be imported as is the case with other turbine technologies	Low	Most costs are site dependent (civil) and therefore meeting local content requirements are not as challenging as in PV or CSP. Ability for the manufacturing of penstock and steel gates exists in Atlantis but the market is small and these can be manufactured by existing steel and structures manufacturers in SA

Production of biofuel and related machinery		Biofuel production in South Africa is guided by the Biofuels industrial strategy. This strategy sets a target for the intended biofuel penetration at 2% of the current fuel stock, approximately 400 mil litres per annum. Thus far there are no large scale biofuels manufacturers in South Africa. This is largely attributable to the fact that biofuel production is not financially viable given current feedstock (approximately 65% of total cost) and oil prices. To this end the government has initiated support mechanisms to foster growth in the biofuels market. The 2% mark is not expected to change until after the target has been reached and a cost benefit analysis has been performed to assess the viability of increasing the target given the required support	High	The blending regulation makes it mandatory for all petroleum producers to blend biofuels with regular fuels at fixed concentration volumes (5% for biodiesel and 2-10% for bio-ethanol). If achieved these values are above the targeted 2% biofuels penetration target and presumably would have to be achieved without additional support (once exceeded) unless the target is revised. The regulation sets stringent criteria for qualification as a licensed biofuel manufacturer. The pricing framework includes the provision of a subsidy for both biofuels and accelerated depreciation allowance and fuel levy exemptions for biodiesel. This is all to be funded through an extended fuel levy. The pricing framework has not as yet been finalised	Medium	None of the approved biofuels manufacturers have begun construction of their production facilities. This is largely due to the delay in the process of finalising the pricing framework. Based on the approved manufacturers it is assumed that the 2% penetration target will be reached 4 years after the finalisation of the pricing framework. Nonetheless no other factors have been discovered which would otherwise impede production in South Africa. The Bothaville and Cradock biofuel plants are very far advanced in terms of their business plans and will be able to supply enough fuel to reach the 2% target thus limiting any further opportunities until the 2% subsidised target is increased. Most equipment, according to an interview with Mabele Fuels (Bothaville plant)	Medium	Atlantis can be a suitable location for Biofuel production if grain triticale is allowed to be included in the biofuels plan as a mandated feedstock. Atlantis is also in close proximity from supported agricultural inputs where suitable land has been identified. Given that grain triticale is not yet a supported feedstock and the progress made by other parties (Mabele & IDC) is quite far advanced, the opportunity for a biofuel plant in Atlantis is more medium to long term, when the 2% blending requirement is more likely to be increased, as existing projects are able to meet the output requirements for 2%. According to an interview with Mabele, components for biofuel refineries can be supplied by existing manufacturers in South Africa, who have indicated spare capacity
Biomass components (utility and co-gen)		At a utility scale, biomass has been allocated a relatively small amount, 60MW with 43MW still outstanding and only 16MW in bid window 3. A big issue is that biomass requires fuel, and hence must be located near a fuel source. A benefit is that it can produce power 24hrs a day. "the price of biomass fuel is becoming more competitive, compared with traditional fuels such as coal, oil and gas, and the demand for biomass-fired boilers is steadily increasing. Subsequently, this has created a growing need for the manufacturing of boilers for these cleaner and more sustainable fuels" - John Thompson Boilers, Bellville, CT. There is however a large, but latent, opportunity in the co-generation market	Low	Low allocation in REIPPP and IRP for post MTEF (2017 - 2030). While waste from sugar, pulp and paper plants has the potential to produce 1,500 megawatts of power, industries have no incentive to increase generation because of a lack of off-take agreements and tax incentives, Kadri Nassiep, the institute's chief executive officer, told the energy committee. Although generated electricity can also be fed into the grid outside of the REIPPPP, this is often hampered by difficulties associated with obtaining power purchasing agreements (PPA). Even if a PPA can be obtained, feed-in tariffs are still too low (due to a price cap on bulk sales to municipalities) to make this profitable	High	Good agriculture industry. South Africa's 26 600 sugar farmers produce about 2.2 million metric tons of the sweetener a year, earning revenue of about 12 billion rand, the industry association's data show. The country has 14 sugar mills that produce sufficient power to meet their own needs from bagasse, a by-product from cane that remains once the juice has been extracted. Also, most boilers seem to only require retro-fitting, rather than replacement - which limits the amount of additional manufacturing required. Boilers are already manufactured in SA (JT boilers) and are exported.	Medium	JT boilers already supply biomass ready boilers - in SA and SSA. Retrofitting is only required for those who already use boilers. Sugar cane farming occurs in KZN. Steam turbines will be imported with a large amount of value adding activities taking place on site, and a large amount of equipment (pumps, storage, grinders and belts) are available within the general industrial and agricultural industry.

Large scale waste to energy components (biomass/ biogas)		Johannesburg landfill gas to energy project (18MW) and Mkuze (KZN) biomass (16MW) are the only two REIPPPP projects so far awarded out of the 110MW allocated for biogas, biomass and landfill gas projects. Market exists outside of the REIPPPP, however, this is generally still focused on self provision by large industrial users (large agriculture incl. livestock & paper and pulp). Outside of REIPPPP, according to notes form a public hearing on Cogen - Sugar industry has 15 projects in the pipeline and put forward at the DoE - 712 MW approx R20bn and Paper industry has 17 projects in the pipeline 390MW approx R5bn - so large latent opportunity	Low	Small allocation in the REIPPPP. IRP does not report biogas as a separate fuel, which indicates it is not a priority source of fuel in SA. Mr Tiepelt said there was "massive, massive potential" in the biogas sector in terms of energy production, waste elimination, job creation and manufacturing, but it was largely untapped because Eskom's rebate programme for renewable energy has been halted, www.saaea.org. Mr Tiepelt said biogas digesters were expensive, and that until the Municipal Finance Management Act was changed to allow municipalities to award tenders for longer than three years, biogas production was not viable, beyond own-use, for small businesses, www.saaea.org. Low feed-in tariffs for grid connected projects and difficulties in getting PPA's negatively impact project bankability	Medium	Local manufacturers include Biogas Agama, CAE, EnviroServ, CA Components and JT Boilers - however not all of these are suitable for utility scale production. Turbines, which make up a large amount of the overall cost, are not likely to be manufactured in South Africa	Medium	Waste to energy generation in Atlantis Industria not likely - need to be near a source of feedstock (such as cattle dung/waste water/ etc.). In terms of manufacturing Atlantis is a suitable location, however, there are market constraints that need to be addressed before additional manufacturing takes place in the area. The market at present can be services by existing manufacturers of boilers, tanks, digesters, gasifiers and pellets, and with imports of gas turbines and engines(such as General Electric). CA Components are currently manufacturing biogas/gas engines (not turbines) in Atlantis. Potential site are spread country wide (municipal solid waste, abattoirs, farms, wastewater treatment facilities, etc. - which implies Atlantis will be competing with all other industrial areas in the country

Annexure 9: Cost assumptions for business case

Costs and cost assumptions:

In developing our cost estimates for each of the options under each demand scenario we used the following infrastucture costs assumptions:

- CoCT greenfield land can be purchased by the entity at R110/m^2 up to a maximum of 78 ha;
- The SEZ entity will be able to purchase existing industrial property from existing industrial property owners, including CoCT and possibly private owners, at a rate of R2 000/m^2 per month. This figure was based on interviews with estate agents operating in the Atlantis area and on property market reports.
- The cost to develop a new industrial park (buildings) is assumed to be R5 000/m^2 ;
- Half of the existing floor space requires no additional infrastructure investment, i.e., is ready to be used for production. Refurbishment/upgrades costs assumed to be R1 000/m^2;
- Newly developed buildings require on-site service infrastructure investment at R1 436/m^2;
- Newly built production facilities are subject to a once-off grid connection fee of R700 000;
- An average of 4 768/m^2 floor space was estimated per new building for the calculation of total new electricity connection fees required;
- Average erf size was estimated at a multiple of 5.8 times the floor space requirements;
- The cost of upgrading off-site bulk infrastructure (i.e. upgrades to the electricity substation) is assumed to be R1 300/kVA which is the development contribution cost payable;
- Demonstration costs for rooftop PV are assumed to be R272/m^2 of floor space. This is based on rooftop PV accounting for approximately 5% of firms' electricity consumption; and
- Demonstration costs for solar powered street lights are assumed to be R45 000 per light with lights distributed 30m apart on both sides of the road for 10km.

Initial results: infrastructure costs per option

Before showing the infrastructure costs per option, we identify the square metres to which the various costs will apply. We also include the required number of electricity connections based on the number of investors as well as the number of street lights required based on the assumptions above. These inputs are summarised in Table (conservative) and Table (moderate).

Table 45 Summary of unit inputs for cost calculations under the conservative scenario

Cost factor	Option 1: Greentech SEZ, Develop greenfield sites		Option 2: Greentech SEZ, Existing industrial property and greenfield		Option 3: West Coast SEZ corridor		Option 4: Greentech and low-carbon manufacturing SEZ	
	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30
Greenfield land (erf, m^2)	150 500	183 000	90 000		90 000		90 000	38 083
Existing industrial property, (floor space, m^2)			12 100	27 500	18 100	33 500	18 100	26 900
Build new industrial park on greenfield land (floor space, m^2)	12 100	27 500						6 600
Refurbishment costs (floor space, m^2)			6 050	13 750	9 050	16 750	9 050	13 450
Cost of on-site bulk infrastructure excl. elect (floor space, m^2)	12 100	27 500						6 600
Electricity (no. of connections)	11	8						2
Green infrastructure (no. of street lights)	667		667		667		667	
Green infrastructure (floor space, m^2)	12 100	27 500	12 100	27 500	18 100	33 500	18 100	33 500
Electricity substation development cost (kVA)	484	1 100	484	1 100	724	1 340	724	1 340

Source: Deloitte analysis

Table 46Summary of unit inputs for cost calculations under the moderate scenario

Cost factor	Option 1: Greentech SEZ, Develop greenfield sites		Option 2: Greentech SEZ, Existing industrial property and greenfield		Option 3: West Coast SEZ corridor		Option 4: Greentech and low-carbon manufacturing SEZ	
	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30	2014-17	2018-30
Greenfield land (erf, m^2)	215 500	293 000	90 000	153 487	90 000		90 000	
Existing industrial property, (floor space, m^2)			21 100	23 900	37 600	40 400	37 600	7 400
Build new industrial park on greenfield land (floor space, m^2)	21 100	50 500		26 600		26 600		59 600
Refurbishment costs (floor space, m^2)			10 550	11 950	18 800	20 200	18 800	3 700
Cost of on-site bulk infrastructure excl. elect (floor space, m^2)	21 100	50 500		26 600		26 600		59 600
Electricity (no. of connections)	11	14		6		6		13
Green infrastructure (no. of street lights)	667		667		667		667	
Green infrastructure (floor space, m^2)	21 100	50 500	21 100	50 500	37 600	67 000	37 600	67 000
Electricity substation development cost (kVA)	844	2 020	844	2 020	1 504	2 680	1 504	2 680

Source: Deloitte analysis