



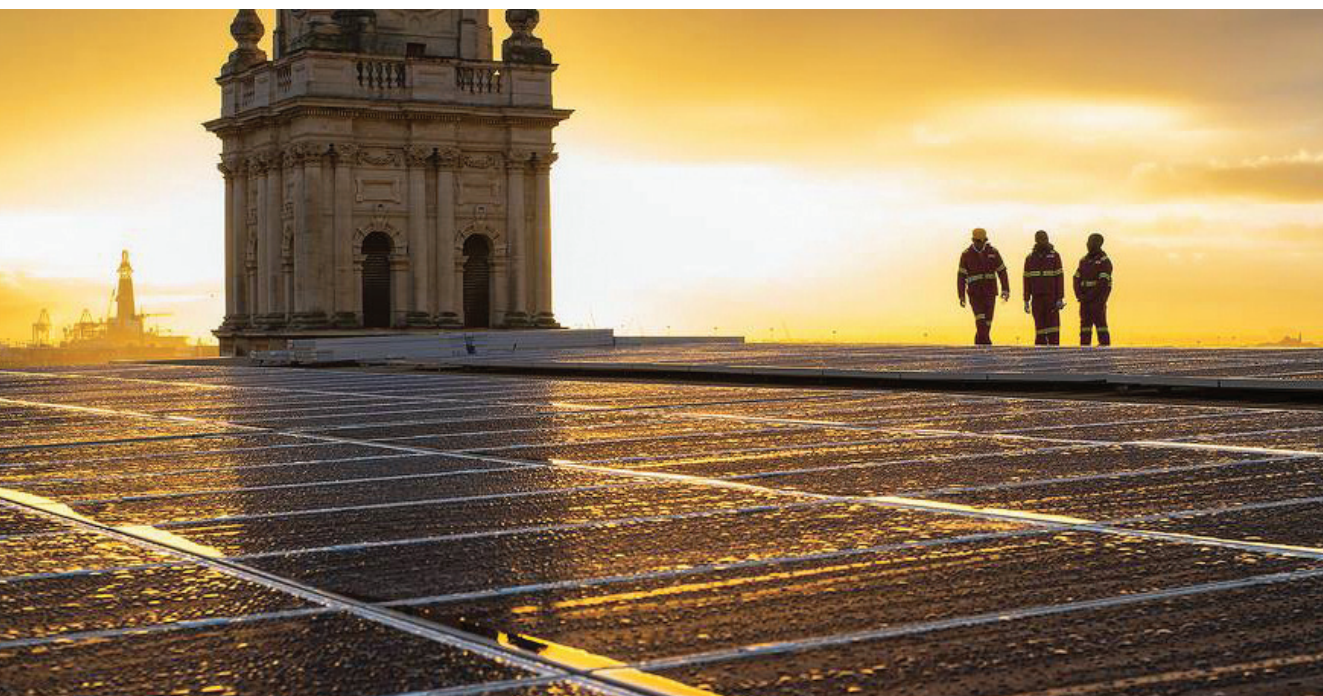
# Energy services

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2017

# Market Intelligence Report

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### GreenCape

GreenCape is a non-profit organisation that drives the widespread adoption of economically viable green economy solutions from the Western Cape. Our vision is for South Africa to be the green economic hub of Africa.

We work with businesses, investors, academia and government to help unlock the investment and employment potential of green technologies and services, and to support a transition to a resilient green economy.

### Acknowledgements

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Image courtesy of: Sola Future Energy

Caption: A beautiful Cape Townian sunrise over the City hall, signalling the start of another working day for another common Cape Townian scene – rooftop solar PV powering economic activity.



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# List of acronyms and abbreviations

AFD	Agence Française de Développement (French Development Agency)
AMEU	Association of Municipal Electricity Utilities
BoS	Balance of system
Capex	Capital expenditure
CCA	Customs controlled area
CHP	Combined heat and power
CMVP	Certified Measurement & Verification Personnel
CO <sub>2</sub> e	carbon dioxide equivalent
DBSA	Development Bank of Southern Africa
DEDAT	Department of Economic Development and Tourism (Western Cape)
DFI	Development Finance Institution
DoE	Department of Energy
DPE	Department of Public Enterprises
dti	Department of trade and industry
EDGE	Excellence in Design for Greater Efficiencies
EE	Energy Efficiency
EG	Embedded Generation
EPC	Energy Performance Certificate
ES	Energy Services
ESC	Energy Supply Contracting
ESCos	Energy Services Companies
ETI	Employment Tax Incentive
GBCSA	Green Building Council of South Africa
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (German Society for International Cooperation)
GWh	Gigawatt hours
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
kWp	kilowatt peak
Mt	Mega-tons/ Million tons
MWp	Megawatt peak
NBI	National Business Initiative
NEES	National Energy Efficiency Strategy
NERSA	National Energy Regulator of South Africa
PSEE	Private Sector Energy Efficiency



PV	photovoltaic
R&D	Research and Development
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for Proposals
SACN	South African Cities Network
SALGA	South African Local Government Association
SANEDI	South African National Energy Development Institute
SANAS	South African National Accreditation System
SANS	South African National Standard
SAPVIA	South African Photovoltaic Industry Association
SAREBI	South African Renewable Energy Business Incubator
SARETEC	South African Renewable Energy Technology Centre
SATIM	South African TIMES Model
sefa	Small Enterprise Finance Agency
SEZ	Special Economic Zone
SMC	Sheet moulding compound
SSEG	Small scale embedded generation
ToU	Time of use
WWTW	Waste Water Treatment Works





# Executive summary

**Globally, the demand for energy services (energy efficiency and embedded generation) is growing. Developments such as process heat/steam, embedded generation and battery storage options are emerging as the latest trends.**

Collectively, the policy framework, above-inflation electricity price rises and decreasing technology costs have motivated many individuals, businesses, government and industry to shift towards alternative energy service options, namely embedded generation and energy efficiency.

There are four main groups of service providers that play a role in the South African energy services market, namely:

- consultancy service providers
- technology suppliers
- energy service companies (ESCOs)
- engineering procurement contractors.

Their work is influenced by the Department of Energy (DoE), the Department of Public Enterprises (DPE), the South African National Energy Development Institute (SANEDI), the National Energy Regulator of South Africa (NERSA) and Eskom. The service providers are governed by a regulatory environment that spans several different government departments, regulatory bodies and standardisation agencies.

There is a shift taking place in the power sector value chain – from an old world dominated by energy extraction and generation, to a future where the growth of opportunities will depend on responses to demand and on managing distributed generation sources. It is a shift from a centralised view of energy to a more localised and distributed approach to managing and delivering energy.

The South African energy services market is driven largely through interventions in the **commercial and industrial sector**. A highlight of factors driving growth, is that embedded generation installations are now seen to

increase the value of a commercial building by as much as 30% over the cost of installing the system, especially taking into account the long-term greening value of embedded generation. This has improved the business case of energy services in the commercial building sector. The market in installation, operation and maintenance of rooftop PV is estimated at R2 billion over the period 2016 to 2019, with the potential to create 3 000 medium- and low-skilled jobs over the period. Efforts are now also being made to develop the solar thermal market, especially in the food processing sector. For example, the **food and beverages sector** presents a tangible opportunity for uptake of solar thermal technologies, as 79% of energy in this sector is used for heat. This market opportunity allows for the development of local technologies and therefore, potentially, manufacturing processes, as well as the setup of new businesses in the installation and servicing of these installations.

The rapid uptake of PV over the past two years has caught national regulators by surprise, resulting in a lack of effective regulation and policy. National regulations and acts mostly predate the small scale embedded generation (SSEG) revolution and are largely inadequate in the current landscape. In the current national legal framework, this void has left it up to local municipalities, in partnership with provincial governments, to develop their own policies and practices to govern the uptake of solar PV.

**Municipalities** are anticipated to play a huge role in unlocking investment opportunities for energy services in South Africa. Western Cape municipalities are beginning to understand the demand factors affecting their customers and many have already introduced rules and regulations to allow for small scale embedded

generation. Other opportunities are in energy savings in municipal water and wastewater infrastructure, which are reported to account for between 20% - 70% of the total energy consumed by a municipal administration. It is estimated that wastewater treated at the country's 968 municipal treatment works could generate up to 780 MW of power.

Similarly, public buildings account for a sizable portion of governmental energy use. The combination of high emissions and constrained supply has influenced the South African government to set stringent national targets to reduce energy demand. The National Energy Efficiency Strategy (NEES) 2005 set a target of reducing overall primary energy consumption by 12% by 2015, while the current update to the strategy indicates that an economy wide performance of 23.7% energy savings has been achieved. Presently, NEES is under review and extensive work is underway to introduce SSEG guidelines for all South African municipalities. These targets, regulations and several investment-friendly policy initiatives are designed to promote energy efficiency and a sustainable, clean economy.

**Energy storage:** While there is a lack of substantial data on energy storage market potential in South Africa, storage is expected to play a vital role in securing a reliable, low-carbon, and cost-effective energy future. The applications and related value streams of storage are only just beginning to be understood. ESCOs are anticipated to play a key role in driving this market growth, with increasing demand for embedded generation. As at December 2016, the combined installed PV capacity for privately owned systems equalled two utility scale sized solar PV parks in generation capacity, translating to over 159 MWp total installed capacity in the

residential, commercial, industrial sectors (PQRS 2016). Other opportunities are emerging in the public sector through Energy Performance Certificates (EPC) for public buildings.

**The residential sector** demand will be stimulated through the introduction of mandatory energy efficiency label for electrical appliances that will become effective in the first quarter of 2017, as well as continued implementation of the SANS 10400 XA building energy efficiency standard.

**Funding, subsidies and insurance** for solar PV are increasing. Although accessing funding can be a major challenge for service providers, an increasing number are beginning to unlock self-funding through innovative models being introduced by ESCOs and engineering procurement contractors. Subsidies are available and funding can also be accessed from the private sector, quasi-governmental and government organisations. Additionally, most of the large banks are beginning to explore the option of funding PV as a fixed asset as it has very limited resale value if removed and resold. Other key levers are the active interest by the insurance industry to reclassify PV as a fixed asset. There are also an array of incentives for energy efficiency in the commercial and industrial sector, further improving the case for energy service interventions.



# 1 – Introduction and purpose

**This market intelligence report was compiled by GreenCape's Energy team. It is aimed at investors and businesses that are currently active in the South African energy services market, or interested in entering it.**

The report provides potential investors and businesses with a greater understanding of the energy services market in the Western Cape and South Africa. Previously, energy efficiency (EE) and embedded generation (EG) were viewed separately, but the market has consolidated. The same players are now looking at offering the end user a more holistic, end-to-end energy solution or service.

**We define energy services (ES) as services that are delivering an energy solution to the end user, be it to achieve a reduction in total consumption, or to bring in new, own energy supply, or a combination of both.**

In providing insights into the ES market, this report begins (Section 2) by providing an overview of the market in South Africa, including current growth drivers and key industry players. It is followed by an overview of the size of the market. The policy landscape guiding the ES market is described in Section 3, followed by a description of pertinent opportunities and barriers in Section 4. In Section 5, an outline of available funding and incentives for businesses is presented. Section 6 outlines the Western Cape's advantages and position as Africa's greentech hub. Section 7 focuses on GreenCape's work in supporting the growth of the green economy in South Africa.

For questions, queries or to access our services, contact our Energy team at: [re@greencape.co.za](mailto:re@greencape.co.za)

## 2 – Sector overview

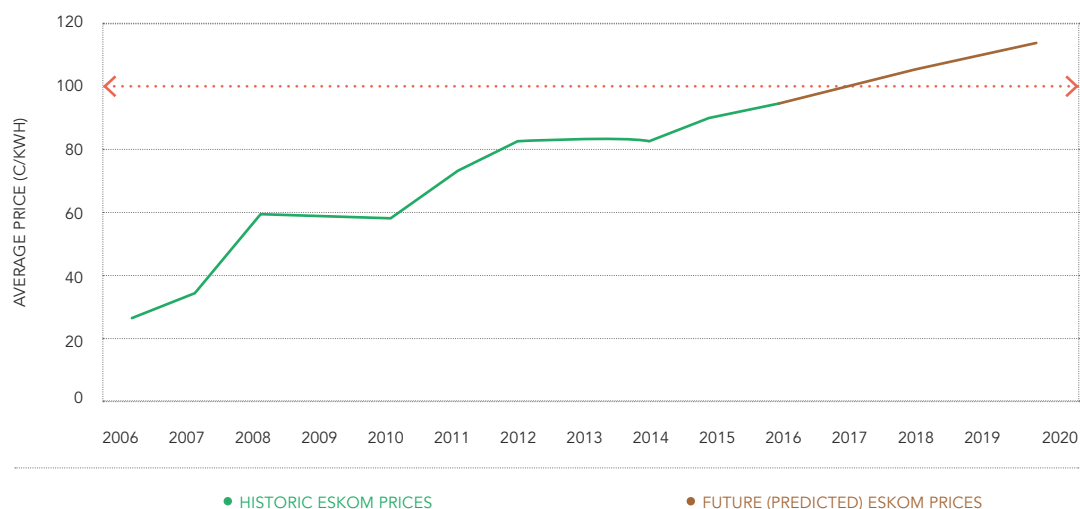
**Rising electricity prices, combined with energy security concerns, decreasing technology costs and an array of supportive energy policies and incentives, are prompting consumers to explore alternative energy options. These factors form the major drivers for the energy services market in South Africa.**

### 2.1. Context

Rising energy prices, increasingly conducive energy policies and access to incentives have stimulated interest in and growth of the Energy Services (ES) market. ES covers both Energy Efficiency (EE) and Embedded Generation (EG) services. Coupled with decreasing costs of renewable and energy efficiency technologies, end users have begun exploring alternative means to ensure their energy security. This section describes these driving factors in some more detail.

#### 2.1.1. Rising electricity costs

The price of electricity in South Africa has risen significantly over the past decade as a result of Eskom's new build programme and the cost of essential plant maintenance. The cost of energy from Eskom's new generation capacity will be significantly higher than its historically low energy costs. This rising cost trend is depicted in Figure 1 (Eskom Holdings, 2016a). This trend, coupled with market pressures for cleaner energy sources, has been a significant driver of the growing interest in alternative, cleaner energy sources.



**Figure 1: Historic and future Eskom price trajectories**

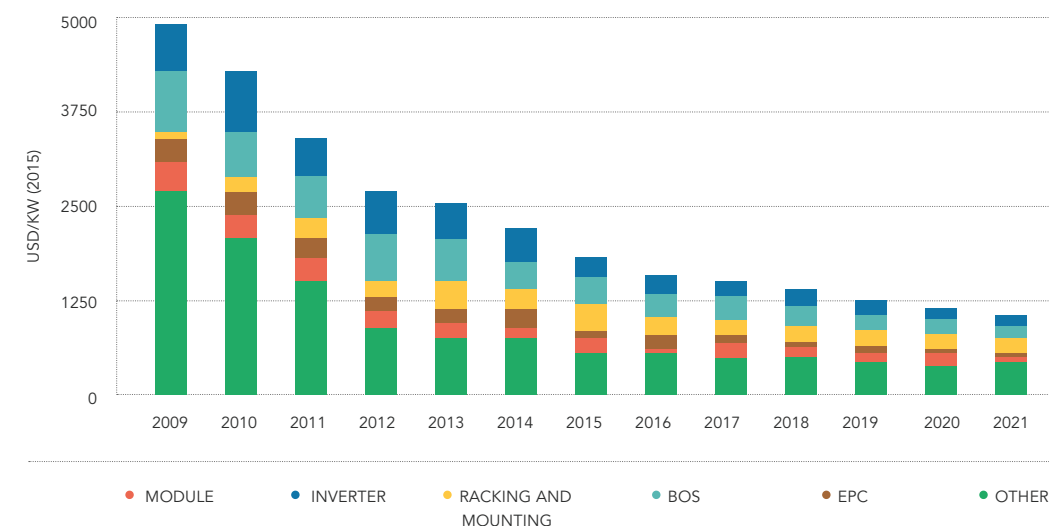
The dotted line super-imposed above the graph shows the R1/kWh price point. It is the critical point at which a large portion of end users will find the case for own generation not just viable, but even compelling. This is especially relevant as utility scale installations have crossed this point, with EG solar photovoltaic (PV) installations also fast approaching this price point.

#### 2.1.2. Decreasing costs of renewable energy technologies

A significant driver of market growth is decreasing costs of technologies. Technology cost reductions have been observed across a variety of technologies. Solar PV technologies, especially in the South African market, represent the most significant decreases.

A sample of technology cost decrease is presented in Figure 2 (IRENA, 2016), detailing the reductions in the component costs of a solar PV system.

As a result of these decreases, for example, the installed cost of an embedded generation scale solar PV installation has decreased significantly as depicted in Figure 3. As these costs come down – and it must be noted that such trends are being observed across a variety of ES technologies, including energy efficient lighting options –, the financial case for investment into energy interventions improves.



**Figure 2: System costs decrease over time for utility scale PV systems<sup>1</sup>**

<sup>1</sup> Diagram has been reconstructed from data found in source



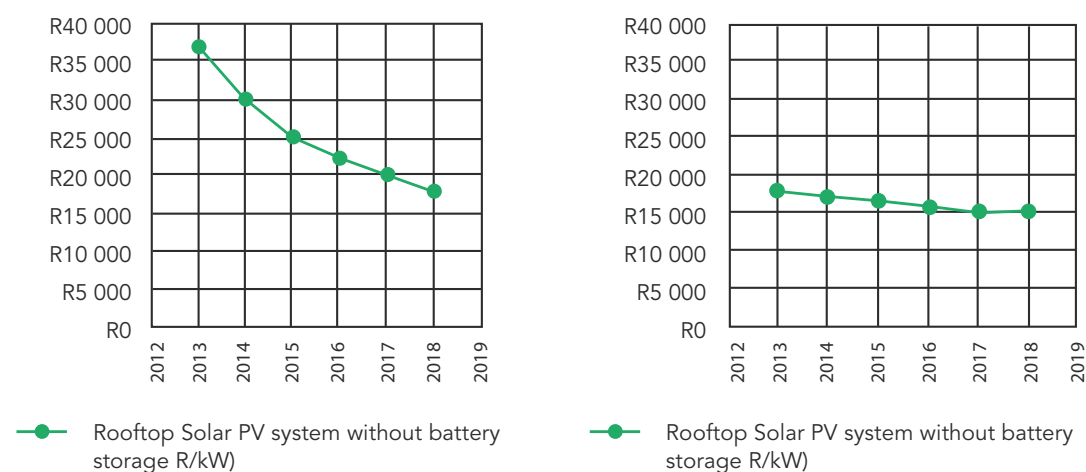


Figure 3: PV price curve for systems smaller than 10kW<sub>p</sub> (left) and larger than 100kW<sub>p</sub> (right)

### 2.1.3. Supportive policy incentives for energy services

To lower demand on the national grid and reduce carbon emissions, several energy policies and incentives have been put in place to encourage energy efficiency and alternative energy generation. More recently a mandatory labelling for electrical appliances and improved tax incentives for energy efficiency projects in South Africa have been included. It is discussed in more detail in Section 3.3.2.

### 2.2. Key players

The ES market uses different definitions to reflect the varying interests of stakeholders involved. The service providers that are highlighted in Figure 4 are key actors in promoting technologies and solutions associated with energy services. It is useful to classify service providers according to the types of services or products that they provide during various stages of an energy service intervention, hence the value chain representation in Figure 4.

The four main groups of service providers that play a role in the market are presented in Table 1.

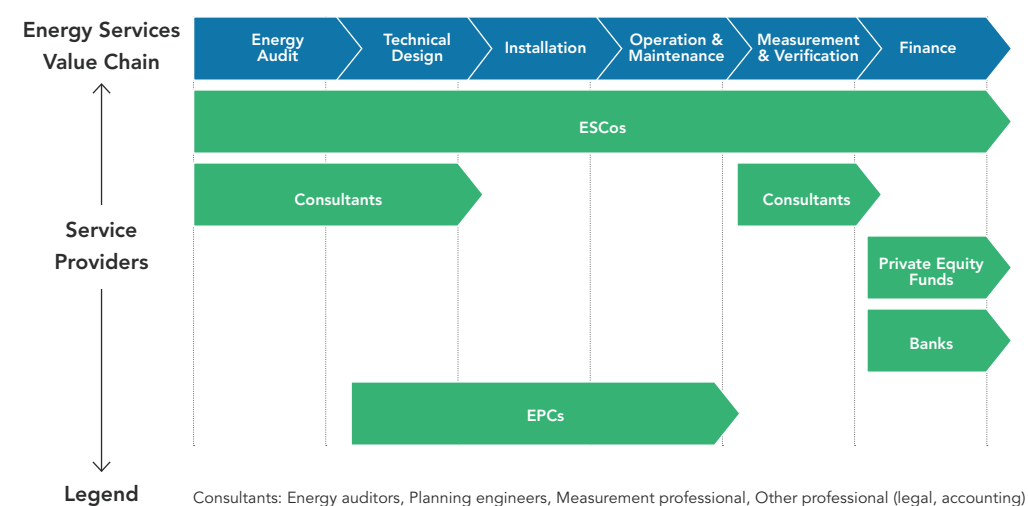


Figure 4: Energy Services market value chain<sup>2</sup>

Table 1: Main groupings of stakeholders in the ES value chain

Service provider	Function
Consultants	Include energy auditors, planning engineers, Certified Measurement and Verification Personnel (CMVP), accountants, lawyers and others who provide advice.
Technology suppliers	Provide hardware such as lighting, combined heat and power (CHP), and solar components or systems; or software – such as energy accounting or management packages; and related operation and maintenance services including software updates.
Energy Services Companies (ESCOs)	Provide performance-based energy contracting. The two basic business models are: <ul style="list-style-type: none"> <li>Energy Supply Contracting (ESC), which delivers units of used energy</li> <li>Energy Performance Contracting, which provides energy savings determined by comparison to an established and agreed upon baseline.</li> </ul>
Engineering Procurement Contractor	Design, procurement, construction.

<sup>2</sup> GreenCape sector analysis

2.3. Market size

According to Navigant Research (2015) the global market for ESCos is set to grow to \$14 billion by 2024. South Africa’s current share of the ESCo space is R2.6 billion based on capital expenditure investments in energy saving interventions implemented by South African businesses.

**The global market for ESCos is set to grow to \$14 billion by 2024. South Africa’s current share of the ESCo space is R2.6 billion.**

The International Institute for Energy Conservation lists several key elements that support growth in the energy services market, all of which are evident in South Africa. They include:

- upward trends in energy prices
- enabling energy policies from local and national government
- utility programmes and incentives
- energy saving initiatives, such as tax incentives and financing programmes
- new regulations that support energy services
- decreasing costs of renewable energy technologies such as rooftop solar photovoltaic
- increasing interest in the energy storage market potential.

The opportunities that this market growth presents to businesses are described in Section 4.

2.3.1. Size of the solar PV market

As an example, the rooftop solar PV market has been a significant driver of growth of the ES market. At the time of writing, there were an estimated 100 000+ systems installed throughout South Africa (PQRS 2016). Part of this growth is a result of service providers such as ESCos offering customers end-to-end energy management solutions (consisting of a variety of EE and EG options, or combinations thereof), and removing the financing burden from clients.

According to a local, voluntary database of solar PV installations hosted by PQRS (PQRS, 2016), the commercial and industrial sector presents the largest opportunity for installations. As shown in Figure 5, at the time of writing (November 2016) the sector far outstrips the rest of the market in terms of installations. These installations represent over 170 MW<sub>p</sub> of generation capacity.

2.3.2. Growing demand-side opportunities

Through a very successful programme conducting energy audits for small and large industrial sector businesses on the demand side (i.e. energy end users) the National Business Initiative (NBI), through its now discontinued Private Sector Energy Efficiency (PSEE) programme, not only identified but facilitated the final implementation of the energy saving opportunities as set out in Table 2 (Gaegane, 2015). The table highlights the benefits of interventions from total energy savings and carbon emission reductions to investment leveraged.

**In the rooftop solar PV market, the commercial and industrial sectors present the largest opportunities.**

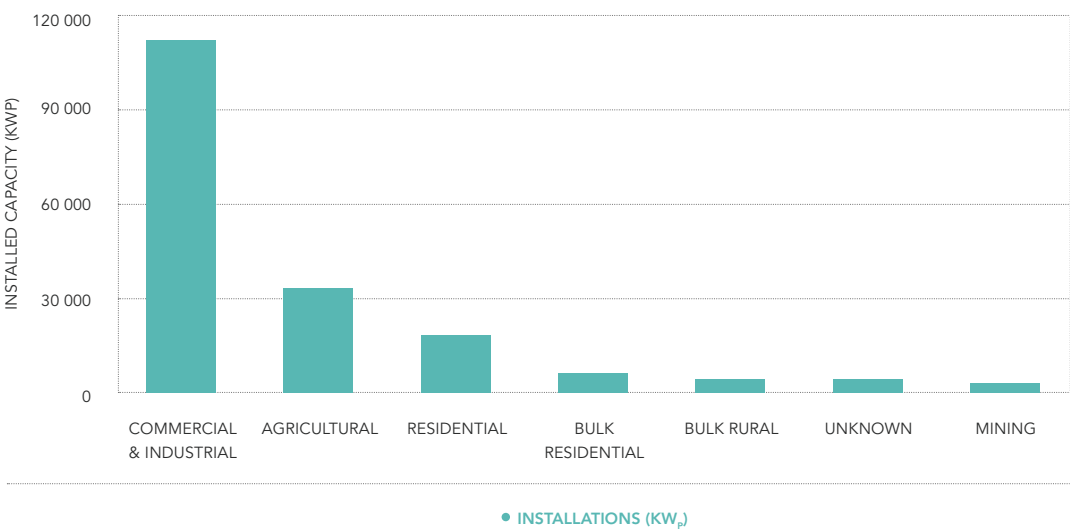


Figure 5: Distribution of solar PV installations across end-user segments

Table 2: Total energy saving opportunities for small and large businesses

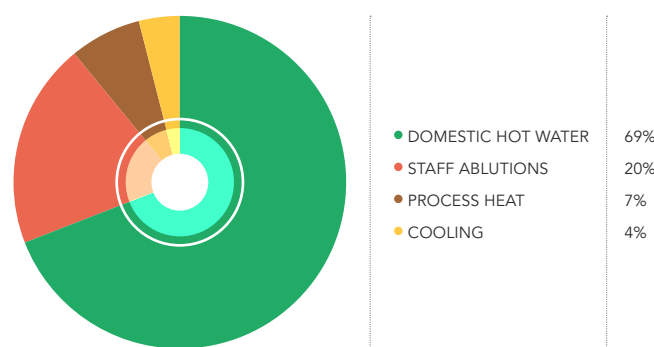
Type	Identified	Implemented
Number of opportunities	5 609	294
Annual energy savings (GWh)	1 593 GWh	124 GWh
Lifetime energy savings (GWh)	17 360 GWh	617 GWh
Lifetime carbon saving (Mt CO <sub>2</sub> e)	13.6 Mt CO <sub>2</sub> e	424 748 t CO <sub>2</sub> e
Capex leveraged (South African rand)	R2.6 billion	R68.8 million
Average payback of opportunities (years)	2.3 years	1.4 years

### 2.3.3. Industrial scale solar thermal market

There are at least 89 large (>10 m<sup>2</sup>) solar thermal systems in South Africa with a total collector area of over 13 800 m<sup>2</sup> (Joubert et al., 2016). This represents a conservative estimate of the current installations, with additional installations already being added to the database.

The current applications for solar thermal technologies, predominantly in solar water heating, are broken down in Figure 6. There are, however, opportunities (see Section 4.5) in the application of solar thermal technologies in industrial processes, such as in the food and beverages sector.

**Figure 6: Breakdown of current solar thermal applications**



## 3 – Policies and regulations

**A number of acts and policies guide the development of the electricity sector, with the main guiding policy being the integrated resource plan (IRP) 2010 – 2030.**

The IRP outlines the planning, sourcing and quantities of electricity sources contributing to the country's generation mix. The electricity sector is regulated by the National Energy Regulator of South Africa (NERSA), with the DoE as the custodian department.

### 3.1. Guiding policies and regulations

#### 3.1.1. Policies

**Energy White Paper of 1998:** This paper identifies the need for demand-side management and the promotion of energy efficiency in South Africa. Appropriate and supportive energy policies are required to attain the energy efficiency and conservation targets embodied in the IRP framework.

**National Energy Efficiency Strategy (NEES) 2005, (2008):** NEES set out a national energy efficiency target of at least 12% by 2015. Sector targets ranged from 9% for transport to 15% for industry, commerce and the public sector. While, at the time of writing, the document was out for public comment and in the process of being updated, a report of the economy's performance up to the year 2012 shows that in most cases, the target was exceeded. Economy-wide energy savings achieved, against a target of 12%, were 23.7%, while the following sector-specific savings were also achieved: industry (target: 15%, achieved: 34.3%), residential (target: 10%, achieved: 28.2%), commercial and public (target: 15%, achieved: 0.3%), transport (target: 9%, achieved: 14.1%), power sector (target: 15%, achieved: 26%)

**Integrated Resource Plan (IRP) 2010:** The IRP, which has recently been published (November 2016) for public comment, outlines the country's electricity plan. The document indicates how much capacity and from what sources they will come, taking into consideration technology costs, present and future, expected demand trajectories and the country's climate change mitigation commitments. The IRP itself is based on the broader Integrated Energy Plan (IEP).

**Integrated Energy Plan (IEP):** The IEP has recently been released (November 2016) for public comment on an updated version, gives direction to the country's broader energy needs. The policy seeks to ensure diversity of energy supply as well as security. This policy combines the objectives of the country's climate change, energy supply and energy demand plans and aspirations.

**Carbon taxes 2016:** It is envisaged that a carbon tax proposed by the National Treasury will be implemented, commencing in 2017 at a rate of R120 per ton of carbon dioxide equivalent (CO<sub>2</sub>e) on direct emissions, increasing by 10% per annum until 2020. Tax-free allowances of between 60% and 95% will be provided, based on trade exposure, fugitive emissions, carbon budgets compliance and other factors (National Treasury 2016a)

#### 3.1.2. Regulations

**Electricity Regulation Act, 4 of 2006 and Electricity Regulation Amendment Act, 28 of 2007:** These regulations guide the issuance of licences for generators and transmitters, wheelers and distributors of electricity.



The draft licensing exemption and registration notice published on 2 December 2016 in the Government Gazette for public comment provides the conditions under which a generation facility may not require a licence to be granted – which if set appropriately may stimulate significant growth of the embedded generation. The suggestion (as set out in the published draft) is that own generation systems below 1 MW<sub>p</sub> will not require a generation licence, but only registration with NERSA.

**National Energy Act (Act 34 of 2008):** The National Energy Act was promulgated to ensure that diverse energy resources are available to the South African economy in sustainable quantities and at affordable prices in support of economic growth and poverty alleviation. The Act takes into account environmental management requirements and interactions among economic sectors. It provides for the development of the IEP and the formation of the South African National Energy Development Institute (SANEDI).

**Energy mandatory reporting (2015):** It is mandatory for all energy users consuming above 180 TJ per annum to submit their energy consumption data to the DoE. Companies using 400 TJ or more per annum are required to submit a detailed energy management plan. The reporting requirement is applicable to all forms of energy.

See [Section 9](#), which contains an appendix of all major guiding policies, regulations and standards for the energy services sector, for a more comprehensive listing of relevant policies, regulations and standards.

### 3.2. Relevant government departments

Below are the main national government departments and institutions directly involved in guiding the development of the energy services sector, as well as a summary of their individual roles:

- **Department of Energy (DoE)** is the custodian of all energy policies and energy security in South Africa.
- **Department of Public Enterprises (DPE)** is responsible for the country's energy infrastructure, primarily through its responsibility over state-owned entities such as Eskom.
- **Eskom** is the state-owned energy utility. Currently it owns most of the electricity transmission and distribution as well as distribution infrastructure. As such it is an essential player in the electricity sector – especially as a delivery vehicle for numerous government programmes.
- **South African National Energy Development Institute** is responsible for achieving the objectives of the National Energy Efficiency Strategy (NEES).
- **National Energy Regulator of South Africa** is of particular importance as it sets and approves the annual Eskom tariff increases.
- **Local (municipal) government** is the third tier of government (after national and provincial government), and is the arm of government closest to the end users. Municipalities are responsible for a large portion of electricity distribution in the country.

### 3.3. Policy updates

The past year has seen an increase in both the number of government incentives and supporting mechanisms, as well as their uptake. This section highlights some key policy updates concerning the ES market.

#### 3.3.1. Revision of electricity licensing regulations

The rapid rise of embedded generation has required paradigm shifts in the electricity sector. With multitudes of project developers showing interest in installing increasingly larger renewable energy generation facilities, there has been a need to amend the existing regulations around the licensing of such facilities. Current regulations exempt systems from requiring a generation licence that are:

- for own use<sup>3</sup>;
- not connected to the grid;
- for demonstration purposes.

The amendments to licensing regulations, as suggested in the Draft Licencing and Registration Notice published for public comments in December 2016 by the Minister of Energy, which were out for public comment at the time of writing, specify that facilities meeting the following criteria will not require generation licences:

- facilities connected on the load side of the national grid (i.e. embedded within a load) and exports onto the grid from the same point that the load imports from the national grid
- facilities that serve to supply an end user or 'related end users'
- facilities under 1 MW<sub>p</sub> in size.

The major caveat underlying these amendments to existing regulations is that: these three categories of generation facilities will continue to be eligible for exemption – until such time that the Minister of Energy determines that the amount of megawatts allocated to embedded generation as per the IRP has been reached.

For installations larger than 1 MW<sub>p</sub> and below 10 MW<sub>p</sub>, a generation licence will be required, but without a dedicated ministerial determination – with the same caveat described above. The IRP update which is currently out for public comment, at the time of writing, does not, however, outline a specific allocation for embedded generation<sup>4</sup>.

#### 3.3.2. Local municipal guidelines on embedded generation in 2016

Across South Africa, local and national government have been involved in efforts to develop small-scale embedded generation (SSEG) rules and regulations to support the growth of the EG market. The purpose of the rules and regulations is to give each stakeholder relevant guidance on the connection of SSEG installations connected to the municipal electrical grid and intended for own use / self-consumption by the end user. GreenCape, in support of municipalities within the province on behalf of the Western Cape provincial government has developed a set of guidelines through which municipalities are able to allow SSEG for their end users. The uptake of these rules and regulations has seen a dramatic increase in the past 18 months. Where previously fewer than five municipalities around the country had any rules and regulations in place, within a little over a year later there were close to 25 municipalities with SSEG rules. This accounts now for circa 10% of South African municipalities, a trend commensurate with the significant increase in solar PV installations across the country. The uptake of these rules and regulations presents significant opportunities for the energy services market, as discussed in [Section 4.1](#).

<sup>3</sup> Without a clear definition of the conditions of own use

<sup>4</sup> The caveat here is that the systems fall within the conditions set out in DoE's electricity generation licencing regulations



### 3.3.3. Release of national smart metering standard

A national smart meter specification was released by Eskom in October 2016 after two years of work with industry stakeholders, large metros and Eskom, in which GreenCape played a coordination role with considerable support from the stakeholders mentioned. The specification allows all municipalities to specify a similar smart meter, affording manufacturers adequate demand to manufacture locally, and in doing so reduce the cost of smart meters. Smart meters will play a critical enabling role

in future, as South Africa embraces smart grids. The meters will enable services such as demand response, time-of-use (ToU) tariff structures and other automation services that utilities may provide to end users. The immediate short-term benefit of a locally produced, affordable smart meter is that private end-users' business cases for solar PV systems will be improved by a reduction in this component's cost, while public entities procuring solar PV systems, which have been designated by National Treasury, will be able to comply with regulations.



© Image courtesy of GreenCape member  
Image: Solar PV installation on a small business, for own consumption, enabled by SSEG rules and regulations within municipalities.



## 4 – Opportunities and barriers

**The shifting energy and electricity landscape creates new opportunities in the energy services value chain. The main opportunities lie in the embedded generation market – predominantly rooftop solar PV, improvements in energy management in the public sector and various demand-side interventions.**

### 4.1. Embedded generation market opportunity

Regulatory developments as described in Section 3 are facilitating growing uptake of renewable energy options – from rooftop solar PV systems, small wind energy installations, to the mass uptake of biogas options. Similar to the amendments to licensing regulations and guidelines from DoE and NERSA, shifts in the regulation of EG system installations at the municipal level have contributed to increasingly conducive market conditions. While the regulations are specifically aimed at enabling EG, they also inspire interest in the energy space as a whole, with electricity end users increasingly demanding holistic energy services.

Concerted work by the Western Cape provincial government through GreenCape has driven uptake of SSEG rules and regulations in Western Cape municipalities. The latest statistics at the time of writing, presented in Table 3, clearly demonstrate the province's leadership in forging a conducive policy environment. These same rules and regulations, tailored for easy adoption by all municipalities, were adopted in November 2016 by the Association of Municipal Electricity Utilities (AMEU) – assisted by the South African Local Government Association (SALGA) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) – and will be rolled out across the country. Though a significant amount of work has to be done to ensure municipal capacity and understanding in setting up these rules and regulations, the opportunity to foster a sustainable and responsible EG market is significant.

Four factors have contributed to the growing improvement of the business case for solar PV. These are:

- regulatory improvements that guide the uptake of embedded generation options;
- municipalities exploring the option to procure from independent power producers (IPPs);
- significantly lower technology costs;
- funding and insurance of solar PV as a fixed asset by major banks and insurers, respectively

These solar PV market drivers are creating opportunities for equipment suppliers, project developers, technical advisors (for larger and more complex systems) and financial investors in renewable energy generation. In 2015, the South African Photovoltaic Industry Association (SAPVIA) estimated that there was market potential for up to 500 MWp annual installed capacity, given the right environment. This remains the market's goal.

**Table 3: Number of municipalities that allow SSEG in Western Cape**

	Allow PV	Allow PV to feed into the grid	PV tariffs in place	PV rules and regulations in place
Number of municipalities				
Yes	15	12	4 (3 experimental)	4
No	3	4	7	4
Unknown	2	5	6	6
No rules	5	4	0	0
In progress	0	2	8	11

**Metros and large municipalities are exploring options of procuring power from sources other than Eskom**, complementing ongoing shifts in regulations, towards an increasingly liberalised electricity sector. This essentially points to a fundamental shift in the electricity system, in which both municipalities and end users are more empowered in their energy options. Again, this presents significant opportunities not only for ES stakeholders, but also for utility-scale RE developers where municipalities are allowed to procure from IPPs. The major hurdle in this trajectory remains a ministerial determination allowing municipalities to procure from sources other than Eskom.

**With decreasing technology costs**, especially for solar PV, embedded generation interventions are approaching a point where the payback per month on an installation will exceed the financing costs, turning such interventions from savings into investments.

**Funding of PV as a fixed asset** is an option being explored by the large banks, given that solar PV has limited resale value if removed and resold (Fin24, 2015). Currently, banks are offering financing of installations via existing products, as opposed to unique products

specifically tailored for solar PV infrastructure, with preference, or ease of access, given to existing bank clients.

**Insurers are looking into insuring PV as a fixed asset.** This has lowered insurance costs and improved the business case if investing in PV.

**With decreasing technology costs, especially for solar PV, embedded generation interventions are approaching a point where the payback per month on an installation will exceed the financing costs, turning such interventions from savings into investments.**





## 4.2. Alternative energy pathways for the public sector

### 4.2.1. Energy efficiency for public buildings

The DoE, with the Department of Public Works, has set an energy savings target of 15% for the government's portfolio of nearly 100 000 public buildings (ESI Holdings, 2016). This creates opportunities for many players in the ES value chain, including technology providers, project developers, installers and financiers, or ESCos offering a consolidated solution. The opportunity applies to existing buildings (i.e. retrofits) and for new buildings, the developers of which may seek to achieve certain energy efficiency targets.

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**Nearly 100 000 public buildings require energy efficiency retrofitting. This creates opportunities for many players in the ES value chain.**

Additionally the **mandatory Energy Performance Certificates (EPCs) are to be used to drive energy efficiency in public buildings**, in line with the South African National Standard (SANS 1544) requirements. These EPCs will be issued by trained assessors. Although the regulations will only apply to government buildings that have a floor area greater than 1 000m<sup>2</sup>, it is expected that the regulations will be extended to the commercial sector by 2020 (SANAS, 2016). The DoE noted that it was keen to provide opportunities for small business and youth owned enterprises in delivering energy solutions to the public buildings portfolio – achieving a dual objective of local enterprise support as well as energy efficiency.

By way of example in the Western Cape, the Department of Agriculture at their Elsenburg facilities has procured services from a local metering company, which conducted an energy audit of the main campus and satellite facilities. The results of the audit have presented the department with several interventions, with short- and medium-term returns. What has been proposed to the department is to use the savings from quick-win interventions to fund longer term interventions that require more capital investment. These efforts, driven by the provincial energy security game changer, are the first steps towards viable models in which public entities may procure services from ESCos and other energy services providers. This will support their efforts to lessen their energy intensity and maintain financial sustainability of their operations. The ability of public institutions to acquire the capital funds to implement some of the larger energy savings opportunities presents a barrier to increased uptake, though the proposed ESCo procurement template may ultimately address this issue.

### 4.2.2. Designation of solar PV systems for local procurement

The National Treasury's designation of solar PV systems for local content creates opportunities for South African-based manufacturers of solar PV systems. Considering the more than 100 000 public buildings mentioned in [Section 4.2.1](#), there are significant opportunities for the installation of various sized systems as well as the local manufacturing and assembly of designated components. Over and above providing opportunities for local enterprises, the government, by so doing, is providing leadership towards a more resource-efficient economy and the promotion of local goods and services. The targeted levels of local content for publicly procured solar PV systems are presented in [Table 4](#) (National Treasury 2016b).

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**The requirement for Energy Performance Certificates for public buildings larger than 1 000m<sup>2</sup> will be extended to commercial buildings by 2020.**

Table 4: Local content threshold for designated solar PV systems

Solar PV component	Minimum local content threshold	Conditionality
Laminated solar PV modules	15%	The local process will include tabbing and stringing of cells, encapsulation and lamination, final assembly and testing in compliance with IEC standards.
Module frame	65%	Aluminium components: all aluminium PV module frames, PV mounting structures/ racks, clamps, brackets, foundation components and fasteners are to be manufactured from locally produced extruded, rolled, cast or forged products.
DC combiner box	65%	DC combiner boxes: enclosures must be made from sheet moulding compound (SMC) and moulded in South Africa.
Mounting structure	90%	All aluminium PV module frames, PV mounting structures/ racks, clamps, brackets, foundation components and fasteners are to be manufactured from locally produced extruded, rolled, cast or forged products.
Inverter	40%	Must be assembled locally.

4.2.3. Public sector ESCo procurement and the water-energy nexus

Energy service companies (ESCOs) are likely to benefit from a process being developed to allow municipalities to procure energy services for longer than three years. A standardised Request for Proposals (RFP) is being created, funded by the GIZ. The RFP seeks to overcome the hurdle for municipalities to enter into long-term service agreements by creating a template that all municipalities can easily adopt, adapt and follow in procuring services from ESCOs.

The water-energy nexus is becoming increasingly topical, and rightly so with South Africa currently facing serious water constraints

and significant changes happening in the country’s energy mix. Municipalities again present a microcosm of the opportunity at hand, with more municipalities looking to reduce the energy consumption of their large infrastructure such as wastewater treatment works (WWTW), pump stations and bulk water supply stations.

As an indication of the size of the opportunity, in 2015 the City of Cape Town’s WWTWs used about 28% of the city’s total electricity consumption<sup>5</sup> (City of Cape Town 2015). A South African Cities Network (SACN) study indicates that EE measures in pumping infrastructure can achieve energy savings of 5% to 10% (SACN, 2014).

<sup>5</sup> Electricity used in the rendering of services by the City and not the electricity supplied to City’s customers

As municipalities make bolder moves to secure their energy security, the use of EG systems to power facilities such as WWTWs (over and above public buildings, traffic lights, etc) presents an increasingly attractive opportunity to secure a predictable (price wise) supply of clean energy. Perhaps in future municipalities will be able to employ the services of ESCOs to deliver this energy service. More on this opportunity is presented in GreenCape’s Water Sector Market Intelligence Report – 2017.

Public sector procurement around water and energy creates many opportunities for ESCOs. In Cape Town, treatment works consume 28% of all energy used. EE measures in pumping infrastructure alone can achieve energy savings of 5%-10%. EG measures can, in future, help power treatment facilities.

4.3. Demand-side opportunities

As mentioned in Section 2.3 the work done by the NBI’s PSEE programme has quantified the potential energy savings that can be achieved by a portion of the energy demand side, represented by a set of small and large industrial businesses. Through its efforts, the programme was able to see the implementation of a small portion of the potential energy savings, leaving a significant opportunity for further interventions. However, more importantly, the programme demonstrated the latent energy efficiency opportunity in industry and other demand-side sections of the economy. Table 5 (Gaegane 2015) presents the opportunities still available within those companies that had energy audits conducted.

Table 5: Remaining energy savings opportunities from sampled small and large businesses

Type	Identified	Implemented	Remaining opportunity (%)
Number of opportunities	5 609	294	94%
Annual energy savings (GWh)	1 593 GWh	124 GWh	92%
Lifetime energy savings (GWh)	17 360 GWh	617 GWh	96%
Lifetime carbon savings (Mt CO <sub>2</sub> e)	13.6 Mt CO <sub>2</sub> e	424 748 t CO <sub>2</sub> e	97%



#### 4.3.1. New models for industrial zones – proposed Atlantis SEZ energy model

In line with a focus on greentech manufacturing and by paving the way towards a sustainable energy future, the Western Cape provincial government is working to establish an energy service entity in the proposed Atlantis Special Economic Zone (SEZ) that will provide clean, sustainable energy services to tenants of the proposed Atlantis SEZ. The SEZ entity plans to tap into Department of Trade and Industry (dti) funding to allow an operator to access funding for providing a low-cost and sustainable energy supply, and potentially delivering affordable energy efficiency services.

As a first step, a solar PV rooftop pilot project will be undertaken in Atlantis. The proposed ESCo model foresees a minimum of 20% equity participation of the private ESCo whereas the remaining 80% will be provided by the proposed SEZ energy entity through grant funding. This is aimed at creating a model that enables industrial areas to collectively create sufficient demand for energy services and therefore allow for the right economies of scale for an ESCo to deliver said services. Simultaneously, the numerous additional benefits of using cleaner energy more efficiently are realised by individual companies as well as the wider economy.

#### 4.4. Energy storage in South Africa

In the medium and long term there are two drivers for energy storage opportunities in South Africa, namely decreasing technology costs and the scant likelihood of further investments by Eskom into energy storage. This creates opportunities for distribution service providers (i.e. municipalities) and end users to explore available options.

Technology costs for energy storage are decreasing and are nearing the tipping point required for viability in some of the applications shown in Figure 7. These price reductions are driven primarily by technology developments such as the decreasing price of lithium-ion batteries (IRENA, 2015).

Figure 7 presents an array of storage applications (RMI, 2015), with the five highlighted blocks presenting those applications with short- to medium-term application potential in South Africa. The diagram presents a variety of storage applications for different categories of the electricity sector, namely:

- utility services, which include electricity transmission (mainly Eskom);
- distribution services, which involve medium voltage distribution networks (mainly municipalities); and
- customer services, which pertain to electricity end users.

Though pumped storage remains the most efficient and cost effective storage technology, there is an increasing number of uses where alternative, more distributed technologies such as batteries make more sense – especially so for the end user.

— **Technology costs for energy storage are decreasing and are nearing the tipping point required for viability.**

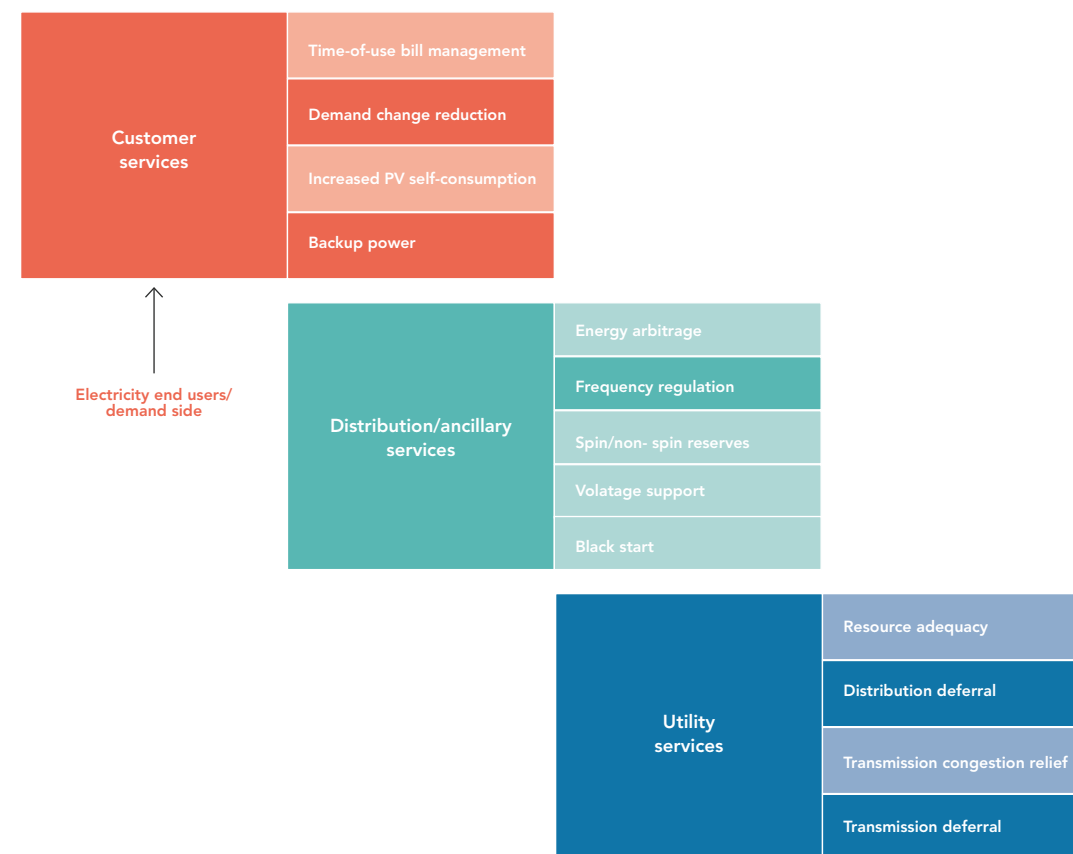


Figure 7: Short- to medium-term battery storage potential applications

A further driver of energy storage opportunities is the low likelihood of Eskom making further investments in energy storage.

— **The nascent battery storage industry in SA is seeing growing interest, with local technology developments by a number of local players.**

Eskom's current focus is on maintaining sufficient generation capacity, with the 1 332 MWp Ingula pumped storage facility (Eskom Holdings, 2016b) currently under construction likely to account for the majority of Eskom's investment in storage. While municipalities can explore distribution deferral benefits, the most significant opportunities will come from the 'customer services' block, which will be exploited by the demand side looking to optimise energy services available to them.



The battery storage industry in South Africa is still nascent, but is seeing an increasing amount of interest as well as local technology developments by some local players. Some of the most active players in the local battery technology space include:

- FreedomWon
- BattCo
- Bushveld Energy
- First National Battery
- Tesla.

While battery technology costs are decreasing, as are generation technology costs, the combination of both generation and storage is still at price points higher than that which many customers obtain from the conventional grid, and so the case for these systems is still some distance away. Regardless, many industry stakeholders are buoyant and confident in the game-changing capacity of battery technology.

4.5. Industrial applications of solar thermal technologies

Solar thermal systems have a wide range of applications but are most economical in low-temperature applications (SOLTRAIN, 2016). As a result, the food and beverages sector represents a tangible opportunity for the application of these technologies, as 79% of energy in the sector is used for heat (Lampreia, 2014). The potential within the food and beverages sector is further supported by the international experience with industrial scale solar thermal systems accounting for 47% of installations within food and beverages (AEE Intec, 2016).

Potential installations in this sector alone, according to the South African Times Model (SATIM), are estimated at 425 000 m<sup>2</sup> worth of solar thermal collection area. Assuming system costs of between R 5 800 m<sup>2</sup> and R 9 200 m<sup>2</sup>, this market presents a potential opportunity of up to R 3.9 billion.

Table 6 presents a sample set of case studies of solar thermal technology applications across numerous economic sectors. It demonstrates the viability of different applications and application sizes in the South African context.

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**The food and beverage sector offers the largest opportunities for solar thermal, as 79% of energy in the sector is used for heat.**

Table 6: Demonstration of industrial scale applications of solar thermal technologies

Beneficiary/ Client	Beneficiary Industry	Collector type	Year of installation	Gross Area [m <sup>2</sup> ]	Storage Volume [litre]
Fairview Cheese Factory	Food and Beverage	Evacuated tube	2012	90	4 000
Tanker Services, Imperial Logistics	Logistics	Evacuated tube	2013	67.5	5 000
Cape Brewing Company	Food and Beverage	Flat-plate	2015	120.6	10 000
Floraland	Horticulture	Flat-plate	2012	288	20 000
ACA Threads	Textiles	Evacuated tube	2013	156	22 000
BMW manufacturing plant	Automobile	Evacuated tube	2012	200	24 200

# 5 – Funding and incentives

**The South African government has made available a variety of incentives in the form of tax incentives and grants, aimed at encouraging the uptake of energy services in the drive towards a low-carbon economy.**

Similarly, an increasing number of mechanisms comprising private funds and development finance institutions (DFI) are being created to take advantage of the opportunities highlighted in Section 4. Table 7 and Table 8 present a wide variety of these funding solutions. They are not exhaustive, are indicative of more green-focused funds or incentives available, and provide potential leads or starting points to explore various options.

Note: The links below are clickable in the electronic version of this MIR, which is available on our website. For further funding and incentives, please download the SA Business Directory for 2016 / 2017 on the GreenCape website.

## 5.1. Available general funding solutions

**Table 7: General funding mechanisms available**

Entity Name	Opportunity overview	Product	Website
<b>Commercial Bank</b>			
GroFin	Financing and supporting small and growing businesses across Africa and the Middle East.	Loan	<a href="https://goo.gl/liynqq">https://goo.gl/liynqq</a>
Investec	Power & Infrastructure Finance: Arranger and underwriter of debt for projects. Selectively develops and take equity in projects.	Loan Equity	<a href="https://goo.gl/CC4JJJa">https://goo.gl/CC4JJJa</a>
Old Mutual	IDEAS fund: Invests in commercially viable developmental projects in SADC.	Equity	<a href="https://goo.gl/UUI6nh">https://goo.gl/UUI6nh</a>
Nedbank	Responsible lending that rejects transactions that do not meet the required- sustainability standards, and includes guidance to enable compliance.	Loan	<a href="http://www.nedbank.co.za">www.nedbank.co.za</a>
Nedbank / WWF	The Green Trust supports programmes with a strong community-based conservation focus in multiple areas, including climate change.	Grant	<a href="https://goo.gl/DMSiHA">https://goo.gl/DMSiHA</a>
SCF Capital Solutions	Unsecured working capital based on invoice or supply contracts. R250k - R5m is offered with interest rates of 2-3% per month.	Loan	<a href="http://www.scfcap.com/">http://www.scfcap.com/</a>

© Image courtesy of SAREBI.

Image: Solar thermal installation in Worcester, Western Cape. The agriculture/agri-processing sector presents significant opportunities for the uptake of solar thermal for large heating and cooling.



Development Finance Institutions			
German Investment Corporation	Amount ranging R4m-R30m for a duration of 4 years.	Loan Equity	<a href="http://www.deginvest.de">www.deginvest.de</a>
Development Bank of South Africa	For green initiatives related to the green economy.	Loan Equity Grant	<a href="http://www.sagreenfund.org.za">www.sagreenfund.org.za</a>
European Investment Bank	Direct and intermediated loans, minority investments in specialist private equity funds focussing on renewable energy and energy efficiency projects in emerging markets.	Loan	<a href="http://www.eib.org">www.eib.org</a>
GEF Special Climate Change Fund	Worth, ~USD350m, the fund is designed to finance activities, programs and measures under the following four financing windows: Adaptation to climate change (top priority), technology transfer, mitigation in selected sectors including: energy, transport, industry, agriculture, forestry and waste management, and economic diversification.	Grant	<a href="https://goo.gl/1QNu2i">https://goo.gl/1QNu2i</a>
German Bank for Reconstruction & Development (KfW)	For public entities focussing on energy and climate change	Loan	<a href="https://goo.gl/RALjFZ">https://goo.gl/RALjFZ</a>
Global Environmental Facility	The Small Grants programme (SGP) invests in communities affected by environmental degradation.	Grant	<a href="https://goo.gl/qwA6Ed">https://goo.gl/qwA6Ed</a>
International Finance Corporation	Funds private sector development projects. May fund smaller businesses through financial intermediaries that on-lend.	Loan Equity	<a href="https://goo.gl/k4Br3Z">https://goo.gl/k4Br3Z</a>
Overseas Private Investment Corporation	Private project development focussed on renewable resources (and less on technology, health care, food and people). Involvement of a US company preferred.	Loan Guarantee	<a href="http://www.opic.gov">www.opic.gov</a>
The African Development Bank	Development projects in the public and private sectors.	Loan	<a href="https://goo.gl/QnTCz4">https://goo.gl/QnTCz4</a>
Global Innovation Fund	Invests in social innovations that aim to improve the lives and opportunities of millions of people in the developing world.	Grant Equity Loan	<a href="http://www.globalinnovation.fund/">www.globalinnovation.fund/</a>
World Bank	World Bank Green Bonds are an opportunity to invest in climate solutions through a high-quality credit fixed income product.	Loan	<a href="https://goo.gl/RBZMGS">https://goo.gl/RBZMGS</a>
Government Department			
Department of Higher Education and Training	National Skills Fund: Finances costs directly related to the delivery of learning – not infrastructure and/or ongoing operational costs of SETAs.	Grant	<a href="http://www.dhet.gov.za/">www.dhet.gov.za/</a>
Department of Science and Technology	11D Tax Incentive: Undertaking R&D in South Africa qualifies for a 150% tax deduction of operational R&D expenditure.	Rebate	<a href="http://www.dst.gov.za/r-d">www.dst.gov.za/r-d</a>

dti	Industrial Financing Loan Facilities encourage manufacturers to upgrade production facilities.	Loan	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
dti	12I Tax Allowance Incentive supports capital investment and training. Application deadline: 31 December 2017	Rebate	<a href="http://www.thedti.gov.za/">www.thedti.gov.za/</a>
IDC	Industrial financing loan facilities (the Working Capital Component) to promote competitiveness in manufacturing while ensuring job retention in the sector	Loan	<a href="https://goo.gl/FySmGc">https://goo.gl/FySmGc</a>
Department of Small Business Development	The Black Business Supplier Development Programme (BBSDP) is offered to small black-owned enterprises to improve their competitiveness and sustainability.	Grant	<a href="http://bbsdpgrants.co.za">http://bbsdpgrants.co.za</a>
dti	Black Industrialist Scheme: Unlocks industrial potential through targeted and financial and non-financial interventions, described in the IPAP and other government policies.	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
dti	Strategic Partnership Programme (SPP) supports manufacturing and services supply capacity of suppliers with linkages to strategic partner's supply chains, industries or sectors	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
dti	The Capital Projects Feasibility Programme (CPFP) contributes to feasibility studies that lead to projects increasing local exports	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
dti	Critical Infrastructure Grant (CIG): A cost sharing grant for projects to improve critical infrastructure.	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
Department of Small Business Development	Co-operative incentive Scheme (CIS): A 100% grant for registered primary co-operatives.	Grant	<a href="http://bbsdpgrants.co.za">http://bbsdpgrants.co.za</a>
Department of Small Business Development	The Shared Economic Infrastructure Facility (SEIF) provides an enabling environment to crowd in investment, mostly in townships, rural areas and the inner city.	Grant	<a href="http://bbsdpgrants.co.za">http://bbsdpgrants.co.za</a>
dti	Sector Specific Assistance Scheme (SSAS): A reimbursable 80:20 cost-sharing grant offering financial support to for-profit export councils, joint action groups and industry associations.	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
dti	Export Marketing & Investment Assistance Scheme: Develops export markets for local goods and services, and recruits new foreign direct investment.	Other	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
National Research Foundation	Research/study funding for public tertiary institutions.	Grant	<a href="http://www.nrf.ac.za">http://www.nrf.ac.za</a>
dti	The Technology and Human Resources for Industry Programme (THRIP) is a research and development programme.	Grant	<a href="http://www.thedti.gov.za">http://www.thedti.gov.za</a>
Small Enterprise Development Agency	Seda Technology Programme (STP) is responsible for the provision of technology transfer, business incubation and quality support services for small enterprise. Excludes R&D.	Grant	<a href="http://www.seda.org.za/">www.seda.org.za/</a>



Small Enterprise Development Agency	Direct Lending where individuals apply directly to sefa. Direct Lending: R50k - R5m with tenors of 1-5yrs.	Loan Guarantee	<a href="http://www.seda.org.za/">www.seda.org.za/</a>
Small Enterprise Development Agency	Wholesale Lending where financial intermediaries (Joint ventures, funds, RFI, MFI) are used. R20m-R100m with tenors of 1-5yrs.	Loan Guarantee	<a href="http://www.seda.org.za/">www.seda.org.za/</a>
South African Revenue Services	37B and 37C: Deductions regarding environmental expenditure and environmental maintenance.	Rebate	<a href="https://goo.gl/sCSWos">https://goo.gl/sCSWos</a>
South African Revenue Services	12K Clean Development Mechanisms (CDM) Tax Incentive (2009): South African businesses receiving CDM benefits are exempt from tax derived from such benefits, in Income Tax or Capital Gains Tax.	Rebate	<a href="http://www.sars.gov.za">www.sars.gov.za</a>
Western Cape Government - DEDAT	Cape Capital Fund: Grows small businesses in agri-processing and oil and gas sectors: supports purchase or new equipment and and improvement of business processes.	Grants	<a href="https://goo.gl/OUHkM">https://goo.gl/OUHkM</a>
Technology Innovation Agency	Financial support to proposals based on merit. Includes R&D funding.	Grants Loans Equity	<a href="http://www.tia.org.za/">http://www.tia.org.za/</a>
<b>Private Equity</b>			
Atlantic Asset Management	Focus: Intermediaries or businesses creating new jobs with a record less than 5 years. Investment range of R15m-R60m with a duration of 3-5yrs.	Loan	<a href="http://www.atlanticam.com/">www.atlanticam.com/</a>
Business Partners	For: Businesses which actively develop, manufacture and provide goods and services by implementing measures and/or technology which reduce their adverse impact on the environment. Investment range: R500k-R30m.	Equity Loan	<a href="http://www.businesspartners.co.za/">www.businesspartners.co.za/</a>
Adlevo Capital	Investments available to the public and private sector with technology-enabled business models.	Equity	<a href="http://www.adlevocapital.com">www.adlevocapital.com</a>
Treacle Private Equity	Equity capital to mid-market private and small cap listed companies in Southern Africa.	Equity	<a href="http://www.treacle.co.za/">www.treacle.co.za/</a>
<b>Sovereign Funds</b>			
Entrepreneurial Development Bank of Netherlands (FMO)	Supports private sector entrepreneurship in developing countries: energy, agribusiness, food and water.	Loan Guarantee Equity	<a href="http://www.fmo.nl/home">www.fmo.nl/home</a>
French Agency for Development (AFD)	Development projects in energy, water, municipal sector support and biodiversity.	Loan Guarantee Grant	<a href="https://goo.gl/7QuiyH">https://goo.gl/7QuiyH</a>

German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	International Climate Initiative (IKI), supports climate and biodiversity projects in developing countries. Fund size: EUR 120m, annually.	Grant	<a href="https://goo.gl/9qJEEb">https://goo.gl/9qJEEb</a>
Ireland Development Cooperation	Projects across various sectors involving an Irish Partner company.	Grant	<a href="http://www.idaireland.com">www.idaireland.com</a>
Japan Bank for International Cooperation	Focus areas: Energy & Natural Resources, Infrastructure & Environment and industry finance. Accessed through a Japanese business partner.	Loan Equity	<a href="http://www.jbic.go.jp/en/finance">www.jbic.go.jp/en/finance</a>
Japan International Cooperation Agency	Intergovernmental work regarding technical cooperation.	Loan Grant	<a href="http://www.jica.go.jp/english">www.jica.go.jp/english</a>
PROPARCO	Private sector development projects (energy, infrastructure, agriculture, etc.).	Equity Loan	<a href="https://goo.gl/XQ7IOb">https://goo.gl/XQ7IOb</a>
United Kingdom: Prosperity Fund Programme	Fund to tackle climate change, strengthen energy security and promote an open global economy in emerging economies.	Grant	<a href="https://goo.gl/Rn4jLX">https://goo.gl/Rn4jLX</a>
Embassy of Finland	Local Co-operation Fund: Supports initiatives in export and investment promotion, businesses and other groups.	Grant	<a href="https://goo.gl/AmNv2P">https://goo.gl/AmNv2P</a>
<b>Venture Capital</b>			
4Di Capital	An independent seed- and early-stage technology venture capital firm based in Cape Town.	Equity	<a href="http://www.4dicapital.com/">www.4dicapital.com/</a>
AngelHub Ventures	Angel seed fund investing into lean start-ups with disruptive business models and technologies. Investment range: R500k-R5m	Grant	<a href="http://www.angelhub.co.za/">www.angelhub.co.za/</a>
Edge Growth	Edge Growth has 2 funds to fund Green projects. Investment range: R1m-R20m. For: SMEs that have limited equity or don't qualify for credit from a bank.	Loan Equity	<a href="http://www.edgework.com">www.edgework.com</a>
Hasso Plattner Ventures Africa	Invests solely in fast-growing and IT-driven companies in seed stage or growth stage.	Equity	<a href="http://www.hp-ventures.co.za/">www.hp-ventures.co.za/</a>
<b>Other</b>			
Anglo-American Zimele Green Fund	Targets opportunities that mitigate carbon, reduce energy and water consumption, and improve waste and emissions management in the Anglo-American value chain. The Fund provides funding of up to R10 million per project or business.	Grant	<a href="https://goo.gl/wr4cPF">https://goo.gl/wr4cPF</a>

## 5.2. Energy Services and general energy-related funding mechanisms

Table 8: Energy services and energy-specific funding mechanisms available

Entity Name	Opportunity overview	Product	Website
<b>Commercial Bank</b>			
ABSA	Funding of up to R100 million to private projects aimed at driving EE/RE.	Loan Rebate	<a href="http://www.absa.co.za/">www.absa.co.za/</a>
FNB	Private project financing and credit line from AFD to finance EE/RE.	Loan	<a href="http://www.fnb.co.za">www.fnb.co.za</a>
Merchant West	Seeking to establish relationships with suppliers of solar energy, related installations and end users/ customers.	Loan	<a href="http://www.merchantwest.co.za">www.merchantwest.co.za</a>
Nedbank	Project financing and credit line from AFD to finance private EE/RE.	Loan	<a href="http://www.nedbankgroup.co.za">www.nedbankgroup.co.za</a>
Sasfin	Sasfin Eco Finance helps clients to claim cost-sharing grants from the dti, which provides manufacturing incentives for businesses that invest capital in EE/RE projects.	Grant	<a href="https://goo.gl/UJBeBA">https://goo.gl/UJBeBA</a>
Standard Bank	Private project financing and credit line from AFD to finance EE/RE.	Loan	<a href="http://www.standardbank.co.za">www.standardbank.co.za</a>
<b>Development Finance Institution</b>			
Energy and Environment Partnership	Focuses on local private sector RE/EE project opportunities that are close to commercial maturity but need a limited amount of 'bridging' finance (around R1m) to enable sustainable business growth.	Grant	<a href="http://www.eepafrica.org">www.eepafrica.org</a>
Industrial Development Corporation	To fund EE and self-use RE projects, as well as EE/ RE municipal projects included in their IDP.	Loan	<a href="https://goo.gl/TprS3L">https://goo.gl/TprS3L</a>
Renewable Energy and Energy Efficiency Partnership	RE and EE projects in the private and public sector; aiming to leverage R50m of donor funding into R1b of private investment in clean energy solutions by 2022.	Grant	<a href="http://www.reeep.org">www.reeep.org</a>
DBSA / SouthSouthNorth (SSNA)	The Sustainable Settlements Facility provides a financial product to scale up EE interventions for large-scale, low-income public housing.	Grant Subsidy Rebate	<a href="https://goo.gl/reNQI4">https://goo.gl/reNQI4</a>
The African Development Bank	Sustainable Energy Fund for Africa: Project Preparation Grants and Seed/Growth Capital.	Equity Grant	<a href="https://goo.gl/D71MEh">https://goo.gl/D71MEh</a>

<b>Government Department</b>			
Department of Energy	Energy Efficiency Demand Side Management (EEDSM) Programme: Available to municipalities for EE projects.	Grant	<a href="https://goo.gl/JvIWgJ">https://goo.gl/JvIWgJ</a>
Eskom	Integrated Demand Management (IDM) programme: Rebate received on purchasing and installing selected EE/RE products.	Rebate	<a href="https://goo.gl/3NR79d">https://goo.gl/3NR79d</a>
South Africa National Energy Development Institution	12L EE Tax Incentive: Tax incentives are being introduced for businesses that can show measurable energy savings.	Rebate	<a href="https://goo.gl/nDcWZ9">https://goo.gl/nDcWZ9</a>
South African Revenue Services	12B RE Depreciation Incentive: Under section 12B of the Income Tax Act, businesses can depreciate investments in renewable energy and bio-fuel production at a rate of 50:30:20.	Rebate	<a href="https://goo.gl/lQkHr6">https://goo.gl/lQkHr6</a>
<b>Private Equity</b>			
Inspired Evolution	Evolution One fund: Providing equity financing to innovative projects in clean energy (private or public) and clean technologies sectors in the SADC.	Equity	<a href="http://www.inspiredevolution.co.za">www.inspiredevolution.co.za</a>
Triumph Venture Capital	Invests in the renewable energy sector with a focus on providing equity for growth capital financing, corporate acquisitions and recapitalisations.	Equity	<a href="https://goo.gl/ua9HRz">https://goo.gl/ua9HRz</a>
<b>Venture Capital</b>			
Persistent Energy Capital	Aimed at private sector and community based organisations	Loan Equity	<a href="https://goo.gl/yxJSrh">https://goo.gl/yxJSrh</a>



© Image courtesy of Sola Future Energy  
Image: A test panel used to configure and monitor the performance of a rooftop solar PV installation

### 5.3. Local content and manufacturing incentives

Complementing the drive towards increased uptake of ES interventions and technologies is the effort to attract local manufacturing of these technologies and capturing the most economic value. It echoes the sentiment of deliberate local content stipulation within the large-scale renewable energy programme run by the DoE. In this light, the proposed Atlantis SEZ is well suited to capture investments in manufacturing of ES technology components. It forms part of the national dti's SEZ programme with its specific focus on greentech manufacturing. The supportive eco-system composed of the various institutions highlighted in [Section 6](#); the existence of an increasing number of companies along the ES value chain described in [Section 2.2](#); the opportunities highlighted in [Section 4](#); and the proposed Atlantis SEZ, all combine to position the Western Cape as a premier location for ES companies.

The national SEZ programme, over and above provincial and or municipal-specific incentives offers the following set of incentives<sup>6</sup> to SEZ tenants:

#### Reduced Corporate Income Tax Rate:

Qualifying companies will receive a reduced corporate tax rate of 15%, instead of the current 28% headline rate.

#### Employment Tax Incentive (ETI):

Aimed at encouraging employers to hire younger and less-experienced work seekers. It will reduce the cost to employers of hiring young people through a cost-sharing mechanism with government.

#### Building Allowance:

Qualifying companies will be eligible for an accelerated depreciation allowance on capital structures (buildings). This rate will equal 10% per annum over 10 years.

#### VAT and Customs Relief:

Companies located within a customs-controlled area (CCA) will be eligible for VAT and customs relief in accordance with the relevant legislation (dti, 2016).

Other incentives available to investments in a designated SEZ will include:

- 12i Tax Allowance Incentive (Application deadline: 31 December 2017)
- One-stop-shop facility within designated SEZ area
- SEZ fund for infrastructure development within the designated area.

Within Atlantis, the City of Cape Town has made vast tracts of land available at low cost for purchase or lease by greentech companies through an accelerated land disposal process. The SEZ application has now been submitted by the Western Cape Provincial Government, and a decision is expected in the first quarter of 2017.

GreenCape's Atlantis SEZ team can assist with information and facilitate access to permits, licences, planning and development approvals, incentives and finance. It should also be noted that the dti has been willing to assure investors that investing prior to SEZ designation will not disqualify them from receiving benefits once the zone is designated.

<sup>6</sup> In the case of the Atlantis proposed SEZ the City of Cape Town put in place an accelerated land disposal programme to expedite access to land for manufactures locating in the identified SEZ area



#### 5.4. EDGE Green certification

The International Finance Corporation (IFC) has developed the Excellence in Design for Greater Efficiencies (EDGE) tool, an online platform that allows design teams to estimate the efficiency of a 'green building' by using practical solutions and alternative materials. The EDGE green building certification system is being implemented in South Africa by the Green Building Council of South Africa (GBCSA). With the system aimed at new residential building projects and retrofits, the GBCSA can draw on nine years of experience in the South African property market.

EDGE certification requires a performance improvement over and above regulatory compliance. For example, the energy section requires a 20% performance improvement over and above SANS 10400 XA compliance in three categories – Energy, Water and Materials. The tool has unlocked further financing opportunities for projects in the built environment, with both Old Mutual and Nedbank making funding available for projects that comply with EDGE metrics (GBCSA, 2016).

While there is a case for concessionary and preferential financing to green projects and green home owners, the South African banking market is still on the cusp of offering this at a commercial level. Players like Nedbank, through the Development Bank of Southern Africa's (DBSA) Green Fund, have shown leadership in this space. GBCSA acts in an advocacy role to stimulate this process, with the expectation that 2017 will see innovation in financing of green residential projects.



© Image courtesy of Sola Future Energy  
Image: Solar PV installation in the City of Cape Town. Large commercial operations are increasingly installing solar PV. The City has created an enabling environment for such installations through SSEG rules and regulations.

# 6 – The Western Cape: Africa's green economy hub

**The Western Cape is a world-class investment destination.**

The province provides businesses and investors with prime locations, modern infrastructure, a skilled workforce, low operational costs and an abundance of natural resources. It is also a sought-after place to live, with unrivalled natural beauty, vibrant culture, excellent schools and universities, and an outstanding quality of life. Cape Town has been ranked among the top 21 global investment destinations by Foreign Direct Investment (fDi) Intelligence, a division of the Financial Times.

## A great place for green business

There are compelling reasons why the Western Cape Province is viewed by many as Africa's green economic hub. Coupled with a strong and rapidly growing market for green technology and services in South Africa and beyond, the Western Cape offers:

- Africa's renewable energy and cleantech hub, with a critical mass of leading companies present.
- Local presence of major professional services and financiers.
- Significant market opportunities for businesses and investors in agriculture, energy services, utility scale solar and wind, waste, water, bioeconomy and resource efficiency.
- A supportive government that has made ease of doing business and the green economy key priorities.
- Five universities with comprehensive R&D capabilities and dedicated green economy skills programmes.
- A range of investment incentives in proposed Atlantis Greentech Special Economic Zone (SEZ).

## Supporting businesses and investors

The province also offers dedicated support for businesses and investors focusing on green tech and services, including:

**GreenCape:** Provides dedicated support and market intelligence to green economy sectors

**Wesgro:** The official investment and trade promotion agency for the Western Cape

**SAREBI:** A business incubator providing non-financial support to green entrepreneurs

**SARETEC:** Offers specialised industry-related and accredited training for the wind and solar industries

Businesses and investors will soon be able to make use of a convenient one-stop-shop for investment support, offered by the Department of Trade and Industry (dti), the WCG and the City of Cape Town. Called the Cape Investor Centre, it will house various institutions with a permanent or semi-permanent presence at the centre.

## Market opportunities in the province and South Africa

Some of the major market opportunity areas in the province and South Africa in the next five years are outlined in the graphic on the next page (see individual MIRs and the GreenCape website for more information).

## Major market opportunities: Western Cape and South Africa



### Agriculture

#### Solar irrigation

R2.9 bn market (SA)

#### Conservation agriculture

R114 m market, ~R1 bn potential market (SA)

#### Controlled environment agriculture

R600 m potential market; 15% growth p.a. (WC)

#### Sustainable agriculture

Tools, data analysis, machinery rentals, local manufacturing, financing

#### Solar energy for packhouses

R1 bn potential market (WC)

#### Precision agriculture

Tech & services to improve water & energy efficiency



### Energy services (SA-wide)

#### Solar PV systems & components

500 MWp installed capacity & R2 bn investments predicted (2016-2019)

#### Local manufacturing & assembly

Solar PV systems and components – systems require compliance with local content regulations

#### Energy efficiency retrofitting

100 000+ public buildings require retrofitting



### Utility scale renewable energy (SA-wide)

#### Independent power production

Ministerial determination for 6.3 GWp more RE generation capacity: 1.1 GW (670 MW wind; 450 MW solar) p.a.

#### Rest of Africa

RE deployment in the rest of Africa, some programmes mirroring REIPPPP

#### Local manufacturing

Through REIPPPP local content requirements



### Waste

#### Municipal PPP

Public-private partnership projects of R1.3 bn (WC)

#### Secondary materials

Robust & growing market for plastics, metals, e-waste, etc.

#### Construction & demolition waste

Growing reuse & recycling market



### Water

#### Industrial water reuse

Recycling & resource recovery; R600 m market: (WC)

#### Water & energy

Opportunities for efficiency & use of renewables

#### Local resource development

Brackish water desalination, ground, storm & grey water



### Bioeconomy & resource efficiency

#### Food value retention

R600 m value through improved cold chain management & waste reduction (WC)

#### Solar thermal

>R100 m industrial-scale installations, R3.7 bn potential market for agri-processing (SA)

#### Biogas

For LPG replacement, heating & electricity generation: >R450 m market, R18 bn potential market, 395 MW potential generation (WC)



#### R&D capabilities and skills

The region's five universities – University of Cape Town, Stellenbosch University, University of the Western Cape, the Cape Peninsula University of Technology and the George campus of the Nelson Mandela Metropolitan University – underpin all of this with comprehensive research and development (R&D) capabilities and dedicated green economy skills programmes.

#### Atlantis Greentech Special Economic Zone (SEZ): Investment incentives

The City of Cape Town established a greentech manufacturing hub in Atlantis in 2011 in response to the government's focus on localisation of manufacturing as part of the Department of Energy's Renewable Energy Independent Power Producer Programme (REIPPPP).

The City has made tracts of land available at low cost for purchase or lease by greentech companies through an accelerated land disposal process. A number of other financial and non-financial incentives are also on offer, including discounted electricity and rapid turnaround on development applications.

An application has now been submitted by the Western Cape Provincial Government for the Atlantis Industrial area to be declared a Greentech SEZ, a decision on which is expected in 2017. GreenCape's Atlantis SEZ team can assist with information, and facilitate access to permits, licenses, planning and development approvals, incentives and finance.



Image courtesy of City of Cape Town  
Image: Installation of energy efficient street lighting in Cape Town.



# 7 – GreenCape's support to businesses and investors

**GreenCape is a non-profit organisation that drives the widespread adoption of economically viable green economy solutions from the Western Cape. Our vision is for South Africa to be the green economic hub of Africa.**

We work with businesses, investors, academia and government to help unlock the investment and employment potential of green tech and services, and to support a transition to a resilient green economy.

We assist businesses by removing barriers to their establishment and growth and provide our members with:

- free, credible and impartial market information and insights
- access to networks of key players in government, industry, finance and academia
- an advocacy platform to help create an enabling policy and regulatory environment for green business

We assist local, provincial and national government to build a resilient green economy by providing:

- support on the development of standards, regulations, tools and policies
- expert technical knowledge on key sectors in the green economy
- access to networks of key players across business, academia, and internationally

Since inception in 2010, GreenCape has grown to a multi-disciplinary team of over 40 staff members, representing backgrounds in finance, engineering, environmental science and economics. We have facilitated and supported R17bn of investments in renewable energy projects and manufacturing.

From these investments, more than 10 000 jobs have been created. Through our WISP (Industrial symbiosis) programme, by connecting businesses with waste / under-used resources, we have to date diverted over 4360 tonnes of waste from landfill.

Our Market Intelligence Reports form part of a working body of information generated by sector desks and projects within GreenCape's three main programmes – energy, waste and resources.

Figure 9 below shows the different focus areas within each of our programmes.

## Benefits of becoming a GreenCape member

We currently have over 800 members, and offer free membership. Becoming a member of GreenCape will give you access to the latest information regarding developments in the various sectors; access to tools, reports, and project information; and offer you the opportunity – through our networking events – to meet and interact with various stakeholders in the green economy.

## Cross-border matchmaking through the International Cleantech Network

GreenCape's membership of the International Cleantech Network (ICN) gives our members access to international business opportunities in countries where other cleantech clusters are based (mainly Europe and North America).



### 1 Renewable Energy

Utility-scale projects, small-scale embedded generation, and localisation of component manufacture.

### 2 Energy Services

Commercial, industrial and agricultural energy efficiency and embedded generation; incentives and financing options.

### 3 Alternative Waste Treatment

Municipal decision-making and policy and legislative tools on alternative waste treatment options; small-scale biogas, recycling and reuse (dry recyclables, construction and demolition waste).

### 4 Western Cape Industrial Symbiosis Programme (WISP)

The team matches businesses to share unused resources, cut costs and create value.

### 5 Water

Water provision and economic development; greentech opportunities for water use efficiency, treatment and reuse.

### 6 Agriculture and Bio-Based Value Chains

Sustainable agriculture, valorisation of wastes to high value bio-products, including bio-energy.

**Figure 9: GreenCape's focus areas**

For investors looking for opportunities in South Africa, GreenCape's Cross-border Matchmaking Facility offers a business matchmaking facility for green firms and entrepreneurs.

The matchmaking team helps international inbound firms and entrepreneurs looking for South African partners in the green economy. The team assists with contacts, introductions and matches to South African businesses. They also offer matchmaking activities for trade offices, missions and other inbound interests. These services can be accessed via the ICN passport or directly with GreenCape.

To become a member or to get your ICN passport, please contact GreenCape or visit our website: [www.greencape.co.za](http://www.greencape.co.za)

### 7.1. More on GreenCape's work in the Energy Services sector

The energy team at GreenCape encourages economic development and job creation through the transformation of the energy market in South Africa and in the Western Cape Province – by helping to grow the energy services sector and to increase the supply of cleaner energy. These two paths towards a lower carbon energy economy form the basis of GreenCape's work in this space.

Our work includes:

- **Supporting the uptake of energy services technologies** – be it energy efficiency interventions or own-generation (embedded generation) via rooftop solar PV technologies for example, as part of a path towards a more sustainable regional and national energy economy.
- **Sector development** which involves gathering and dissemination of up-to-date market intelligence.
- **Assisting decision making** by commercial and industrial stakeholders on their energy services options. The goal of this demand-side work is to enable executives and decision makers within companies to more easily make decision to procure energy services options available to them.
- **Driving and enabling the uptake of small scale embedded generation** by helping address the barriers to market growth.

- **Assisting municipalities** to implement rules and regulations to enable the uptake in SSEG. This work, in 2016, also included recommendations on appropriate tariffs for municipalities.
- **Supporting the development of the national prepaid split smart metering specification** (published November 2016). This specification will enable municipalities to specify the required functionality of smart meters connected to their networks – an example is in the embedded generation space where the municipality dictates the specifications of components connecting to the grid. The national smart meter specification will drive down the cost of the metering equipment required on embedded generation installations.

This is a step closer towards ensuring that South Africa's electricity services sector keeps pace with the rest of the world, and moves closer to achieving the ideals of a smart electricity grid. A transformed energy sector will create a great number of opportunities for all players in the ES value chain.

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**Electricity Regulation Act, Act 4 of 2006 and Electricity Regulation Amendment Act, Act 28 of 2007** – The act states that no person may operate any generation facility, without a licence issued by the regulator (NERSA). The Electricity Regulation Act, Act 4 of 2006 holds that exemption is held for non-grid-tied projects. Note that NERSA has issued a communication giving licence exemption to SSEG installations in municipal areas under 100kW.

**South African Distribution Code (all parts)** – The South African Distribution Code applies to all entities connected to the distribution network, including embedded generators. It sets the basic rules for connecting to the distribution network, ensures non-discrimination to all users connected to the distribution network and specifies the technical requirements to ensure the safety and reliability of the distribution network.

**South African Grid Code (all parts)** – The South African Grid Code contains the connection conditions that are required by all generators, distributors and end-users (customers) connected to the municipal electrical grid, as well as the standards used to plan and develop the transmission system.

**South African Renewable Power Plants Grid Code** – This document sets out the technical and design grid connection requirements for renewable power plants (0-1MVA LV) to connect to the transmission or distribution network in South Africa.

**Occupational Health and Safety Act 1993, as amended** – The Occupational Health and Safety Act provides for the health and safety of people by ensuring that all undertakings are conducted in such a manner that those who

are, or who may be, directly affected by such an activity are not negatively harmed as far as possible and are not exposed to dangers to their health and safety.

**Municipal Electricity Supply By-Law** – This document provides the general conditions of supply of electricity, and outlines the responsibility of the customers, systems of supply, measurement of electricity and the electrical contractors' responsibilities.

**SANS 10142 – Parts 1 to 4: The Wiring of Premises** – This document serves as the South African national standard for the wiring of premises in low and medium voltage networks (AC/DC). The aim of the document is to ensure that people, animals and property are protected from dangers that arise during normal as well as fault conditions, due to the operation of an electrical installation. Compliance to the standards and regulations as laid out in SANS 10142-1 is required. Proof should be provided in the form of an electrical installation certificate of compliance. The implication is that a registered professional is required to sign the installation.

**SANS 474/ NRS 057 Code of Practice for Electricity Metering** – SANS 474 specifies the metering procedures, standards and other such requirements to which electricity licensees and their agents must adhere.

**NRS 048: Electricity Supply – Quality of Supply** – The NRS 048 series covers the quality of supply parameters, specifications and practices that must be undertaken to ensure correct and safe operation. The NRS 048-2 and NRS 048-4 have the most relevance to the operation and connection of SSEGs to the municipal electrical grid: NRS 048-2: 'Voltage characteristics, compatibility levels, limits and



assessment methods' sets the standards and compatibility levels for the quality of supply for utility connections as well as for stand-alone systems. It is intended that generation licensees ensure compliance with the compatibility levels set in this document under normal operating conditions. NRS 048-4: 'Application guidelines for utilities' sets the technical standards and guidelines for the connection of new customers. It also sets the technical procedures for the evaluation of existing customers with regards to harmonics, voltage unbalance and voltage flicker.

**NRS 097-1: Code of Practice for the interconnection of embedded generation to electricity distribution networks** – Part 1 MV and HV (Eskom 240-61268576 / DST 34-1765: Standard for the interconnection of embedded generation is applicable until published).

**NRS 097-2: Grid interconnection of embedded generation: Part 2 Small Scale Embedded Generation** – NRS 097-2-1 (Part 2: Small Scale Embedded Generation, Section 1) serves as the standard for the interconnection of SSEGs to the municipal electrical grid and applies to embedded generators smaller than 1 000 kVA connected to LV networks of type single, dual or three-phase.

**NRS 097-2-3 (Part 2: Small Scale Embedded Generation, Section 3)** – this document provides simplified utility connection criteria for low-voltage connected generators.

### 9.1. Key standards

To enable the effective achievement of the objectives of the policies outlined previously, the country must adhere to the following set of standards:

**SANS 10400-XA: 2011 with SANS 204:** These construction standards require mandatory compliance on energy efficiency and energy use in the built environment, with all new buildings and extensions to buildings requiring energy efficiency initiatives before receiving municipal approval.

**SANS 941 – Energy efficiency of electrical and electronic apparatus:** This standard covers energy efficiency requirements, measurement methods and appropriate labelling of energy efficiency electrical and electronic apparatus. This standard has implications for both manufacturers and importers.

**SANS 151 – Fixed electrical storage water heaters:** This standard prescribes methods for testing durability, safety and performance of electrically heated hot-water storage tanks. The latest revision was published in 2013. The standard contains a section that prescribes minimum standing heat loss for different geysers. In the next draft, this section will be moved from this standard to SANS 941 for energy performance. The minimum requirement for electrical geysers will be raised to that of the current solar water heater requirements.

**SANS 941 – Energy performance and labelling of electrical and electronic apparatus:** This standard was published in 2012 to ensure that at the time of purchase, buyers have all relevant energy consumption information at their disposal.

**SANS 1544 – Energy performance certificates for buildings:** It specifies the methodology for calculating energy performance in existing buildings. This standard is mandatory for all public buildings with effect from 2016.

**SANS 10106 – Installation of solar hot-water systems:** This standard was revised and the new version published in November 2014. It updates the requirements for installation of domestic solar water heaters.

**SANS 50010 – Measurement and verification of energy savings:** Published in 2011, it specifies the methodology for calculating energy savings. This is a required tool for calculating savings for projects submitted on the 12L energy efficiency tax rebate programme.

**SANS 1286 – Local goods, services and works:** measurement and verification of local content: This technical standard has become highly relevant with the application for designation of solar water heaters.

**VC9004 – Compulsory specification for integral and close-coupled domestic solar water heaters, and thermal collectors for domestic solar:** This compulsory regulation intends to regulate the SANS 1307 as the current standard for solar hot-water systems. The specification is currently on hold until a suitable component testing standard has been developed.

**VC9006 – Compulsory specification for hot-water storage tanks for domestic use:** This compulsory specification was enacted in February 2014. All domestic hot-water cylinders imported, manufactured, sold or installed in South Africa must now adhere to the SANS 151 standard and cross referenced sub-standards. In addition, each product offered for sale must have a recent valid test report not older than one year. This is proving to be a challenge as the SABS does not issue full test reports for each model on the mark scheme.

**VC9008 – Compulsory specification for energy efficiency and labelling of electrical and electronic apparatus:** This specification was enacted in April 2014 and makes the SANS 941 a compulsory standard. It requires a range of electrical and electronic apparatus to adhere to certain minimum energy performance standards. It also requires that all appliances listed display the energy efficiency rating on the appliance.



