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tourism and environmental affairs
FREE STATE PROVINCE

[An Economic Intelligence Report]

**[State of the
Renewable Energy
Sector in the Free
State]**

[May 2017]

[Investments in the renewable energy sector can bring about significant changes in the economy of the Free State. Focus of this report therefore will be on the support structures for renewable energy generation, challenges, interventions and opportunities within the sector. It further outlines certain recommendations and opportunities in the various renewable energy fields, i.e. solar, bio-fuel, wind energy, hydropower and waste to energy.]

This report is based on the study, *Renewable energy projects and opportunities in the Free State*. The study is commissioned by the Central University of Technology (CUT) on behalf of the International Labour Organisation (ILO)/DESTEA partnership.]

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The issue of the *Economic Intelligence Report* focuses mainly on the three months quarter ending *June 2017*.

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1. INTRODUCTION

South Africa's Renewable Energy Programme was launched in 2011 and has helped turn South Africa into one of the leading renewable energy investment destinations. According to CNBC Africa¹, an estimated R193 billion has already been committed to renewable energy investment in the country. In 2013, Investec alone announced it was investing R8 billion in South Africa's Renewable Energy Independent Power Producer Procurement Programme ("REIPPPP") for concentrated solar power, photovoltaic projects and wind projects.²

Investments in the renewable energy sector as mentioned above can also bring about significant changes in the economy of the Free State. Alternative resources for renewable energy are needed desperately to provide in the rising energy demands nationally as well as provincially. It is thus imperative for the Free State to invest resources in renewable energy, as well as taking advantage of the opportunities presented by the natural resources and the REIPPPP.

An understanding of the current renewable energy landscape will assist role-players in the province to increase support for both large and small-scale producers of renewable energy. It is in light thereof that the Central University of Technology (CUT) was commissioned to conduct a study on the state of the renewable energy sector in the province.

The main purpose of the study was to provide up-to-date strategic information on the potential for economically viable renewable energy projects in the Free State.

The study therefore has the following objectives:

- Identification of opportunities and challenges faced within the renewable energy sector;
- Identification of potential areas of support and policies that can be offered by the Free State Provincial government to create a more enabling environment for these to flourish; and
- To encourage investment in these projects through better articulated plans and investment strategies.

Furthermore, the study seeks to identify and develop a segmented database of large and small-scale projects/businesses in various renewable energy fields, amongst others;

- Solar energy
- Bio-fuel
- Wind energy
- Hydropower
- Waste to energy

This report therefore will be based on the study *Renewable energy projects and opportunities in the Free State* that was commissioned on behalf of the International Labour Organisation (ILO)/DESTEA partnership. Focus in this report will be on the

¹ CNBC Africa is an African television network for Sub-Saharan Africa.

² <http://www.wylie.co.za/articles/the-state-of-renewable-energy-in-south-africa-2/>

renewable energy regulatory environment, funding and incentives available for this sector, barriers to renewable energy implementation, opportunities and current projects. The report concludes with recommendations, with specific reference to the role that higher education institutions can play in creating a conducive environment for the renewable energy sector.

2. SOUTH AFRICAN RENEWABLE ENERGY REGULATORY SETTING

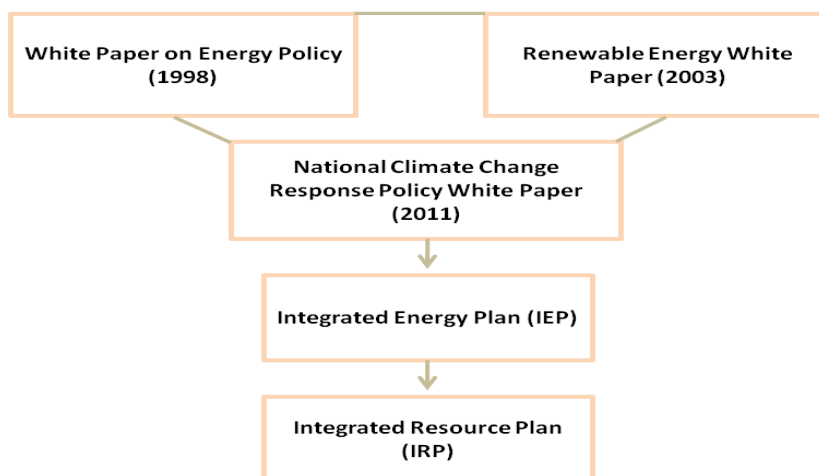
2.1 Policies relating to renewable energy generation

The National Energy Regulator of South Africa (NERSA) is primarily responsible for the regulation of South Africa's electricity sector, with the Department of Energy (DoE) as the custodian department. NERSA is also responsible for the approval of power generation licences for all of the projects named as preferred bidders under REIPPP. NERSA is the only regulatory body that has jurisdiction over the entire industry and regulates market access through licensing of all producers (greater than 5 Giga Watt hours per annum), transmitters, distributors, and sellers of electricity.

Specific policies and regulations need to be followed when generating renewable energy. In this regard, the South African Government has compiled several policies and regulations that provide the legal framework and guidelines for generating renewable energy. These policies and regulations are aimed at promoting and implementing sustainable generation of renewable energy within the country. It is imperative to fully understand these policies and regulations before considering investing in such projects or in the development of more renewable energy projects.

These policies form the foundation of the South African Renewable Energy Programme and are depicted in figure 1 below:

Figure 1: Policy platform on renewable energy planning

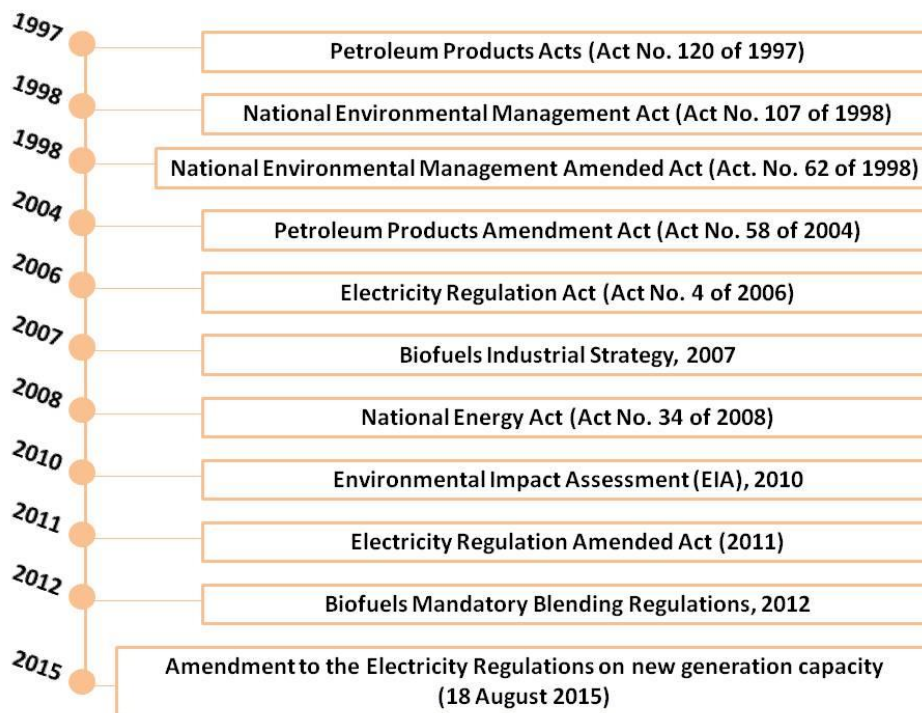


Source: Renewable energy projects and opportunities in the Free State, CUT, 2016

2.2 Regulations relating to renewable energy generation

Several regulations and strategies have been put in place to regulate and assist in the implementation of renewable energy development. The following regulations and strategies (as depicted in figure 2) are the most relevant when considering investing in renewable energy projects or in the development of new renewable energy projects.

Figure 2: Regulations and strategies to renewable energy generation



Source: Renewable energy projects and opportunities in the Free State, CUT, 2016

Furthermore, the Independent Power Producer Procurement Programme (IPPPP) was also designed in 2010 to initiate and stimulate the renewable energy industry. The DoE and National Treasury (NT) entered into a Memorandum of Agreement (MoA) with the Development Bank of Southern Africa (DBSA) to facilitate the implementation of the IPPPP.

3. FUNDING AND INCENTIVES FOR RENEWABLE ENERGY IN SOUTH AFRICA

Capital investment and support for renewable energy programmes play a major role in their success and sustainability. Funding opportunities available in South Africa are aimed at promoting the design and implementation of ambitious procurement mechanisms for renewable energy.

Diverse funding solutions are available to either focused on, or accessible to, renewable energy and related manufacturers and service companies, as well as those who use such services. This range covers development finance Institutions (DFIs) as well as local, public and private sector financiers and investors, and a considerable range of tax incentives.

Funding and incentive currently available in South Africa, which are also applicable for the Free State province include:

- *Central Energy Fund and the Equalisation Fund*
- *Renewable Energy Finance and Subsidy Office (REFSO)* - The Department of Minerals and Energy has established this office for managing funds that are meant to serve as incentives for renewable energy development.
- *The Manufacturing Competitiveness Enhancement Programme (MCEP)*
- Various energy efficiency tax incentives as per *GreenCape 2016*
- *Private Sector Energy Efficiency (PSEE) Programme*
- Government investment incentives (*as per www.investmentincentives.co.za*.)

The Free State Development Corporation (FDC) as a provincial development agency serves as the first point of contact for investors' needs in the Free State. At minimal or no cost to the investor, the agency assists investors in identifying opportunities and facilitates their development.

4. BARRIERS TO RENEWABLE ENERGY IMPLEMENTATION

Various barriers that have influenced renewable energy implementation have been identified by the White Paper on Renewable Energy. Such barriers are:

- ❖ Renewable energy technologies are expensive
- ❖ The initial investment in renewable energy technologies remain high and some may need support for extended periods before reaching profitability
- ❖ Consumer awareness regarding the benefits and opportunities of renewable energy is lacking
- ❖ Financial, legal regulatory and organisational barriers needs to be overcome in order to implement renewable energy technologies
- ❖ Non- discriminatory open access to key infrastructure

Once these barriers have been addressed (according to the study), it will increase investment opportunities in renewable energy in South Africa. Other barriers such as, trade agreements, access to land, environmental requirements, licensing and power purchase agreements have all been identified as obstacles that need to be addressed. The reliance of South Africa on the fossil and mineral sector has also had an effect on renewable energy development.

The study by CUT also highlights the fact that buyers may only purchase electricity if it is part of the REIPPP. This is however complex and expensive. Uncertainty about enabling legislation in South Africa has made deployment of significant renewable energy frustratingly slow. The lack of net metering and feed-in tariffs also hampers renewable energy uptake.

Other challenges include:

Lack of coordination and/or compromise between stakeholders including National vs Provincial vs Local Governments (municipalities). There is no

centralized agency with authority within spheres of each Government for effectively and collectively implementing “Integrated” energy-efficient infrastructure planning and rural development. A centralized agency should be involved with the numerous forums and bring together the essence of energy efficiency projects, waste removal, and renewable energy.

Lack of capability for fulfilling the policy implementation by planners, i.e., not enough skilled/ experienced manpower/managers to put the plan into practice within the Governments, especially at the municipal level.

Skills, skills transfer and training have been identified to be a major weakness and needs to be addressed.

Possibly the biggest concern raised regarding renewable energy and its growth potential in South Africa and the Free State is that there is currently no incentive for adding energy to the grid, except if part of one of the REIPPP projects. There is currently no Bill facilitating Government procuring from small producers and no regulation of the grid; thus, all additional power added to the grid is a mere loss to the consumer/entrepreneur to pump back into the grid.

The biggest hurdles facing municipal power procurement are in national regulations. A specific Ministerial determination is required to allow municipalities to purchase directly from Independent Power Producers (IPPs). Additionally, a successful power purchase agreement (PPA) requires a healthy balance sheet on the part of the off-taker, which cannot be guaranteed by all municipalities. In the REIPPPP, National Treasury acted as the guarantor.

5. OPPORTUNITIES AND CURRENT RENEWABLE ENERGY GENERATION PROJECTS

The Free State province offers various opportunities and also the potential for possible new generation technologies, opportunities and projects.

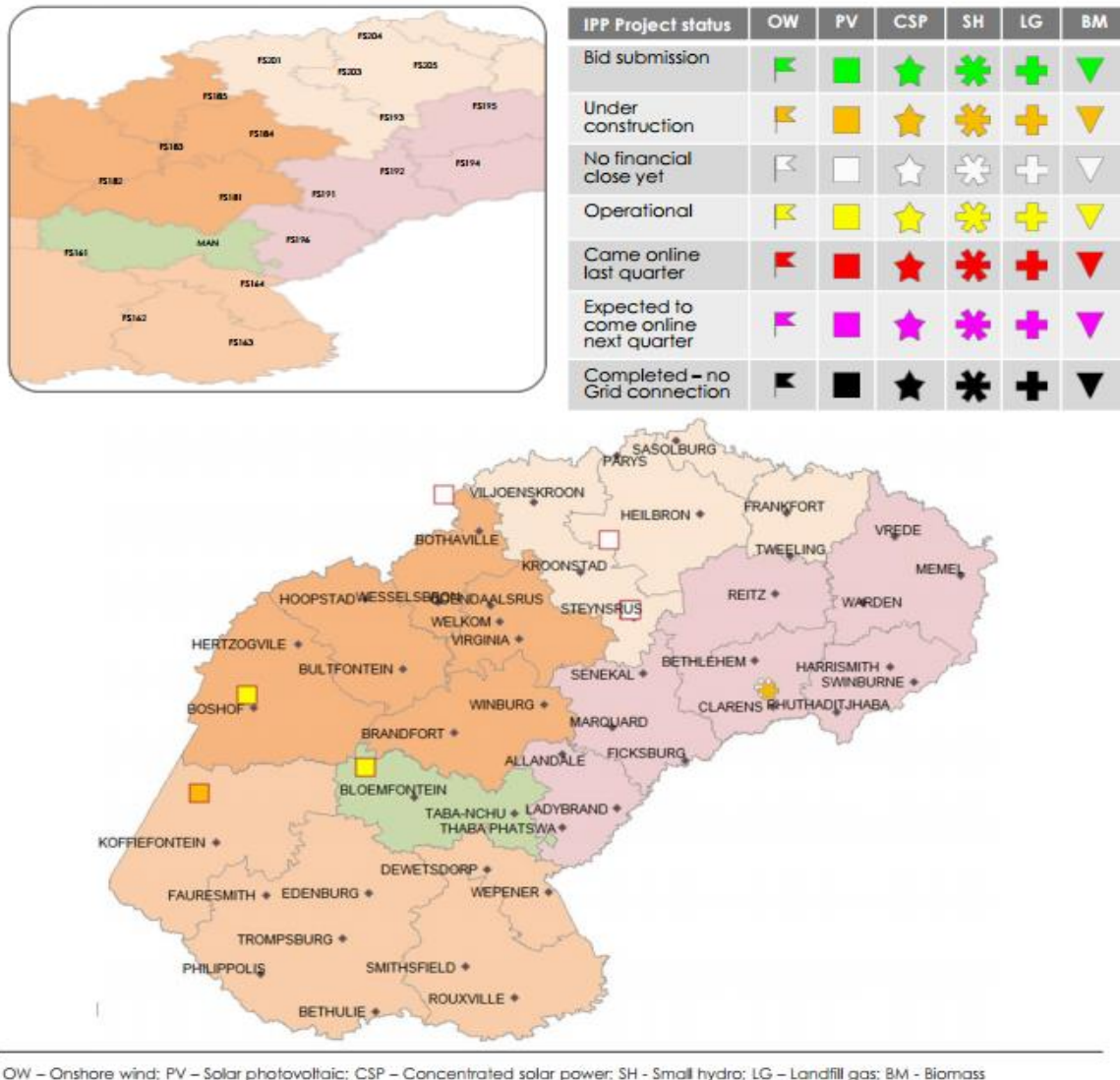
South Africa’s renewable energy industry has seen substantial growth in recent years. Some of the contributing factors include:

- ❖ Increases in electricity tariffs charged by the national utility, Eskom;
- ❖ Electricity supply constraints that have led to the introduction of load shedding (rolling blackouts);
- ❖ Global decreases in renewable energy technology prices.

As a result of increasing electricity prices and decreasing energy security, municipalities having a significant reliance on revenue from the sale of electricity have begun exploring options to procure electricity from renewable energy IPPs. This presents a significant opportunity to stakeholders in the utility scale market, as well as the embedded generation space. Until recently, the generation of electricity has been almost exclusively the mandate of national Government, through its state-owned company (SOC) Eskom, which supplies over 90% of electricity in South Africa.

The REIPPPP quarterly focus report indicated the location of REIPPPP projects in the Free State Province. These locations are reflected in *figure 3*.

Figure 3: Locations of REIPPPP projects in the Free State Province



Source: Renewable energy projects and opportunities in the Free State, CUT, 2016

Opportunities, in addition to the above, as well as potential for projects are in the following renewable energy fields:

- Solar - Free State province boasts substantial potential for the harvesting of solar energy. The Xhariep region has the second best solar-radiation index after Upington in the Northern Cape, and positions it as an ideal region for the development of concentrated solar power and photovoltaic solar power-generation technology.

The REIPPPP has procured 223 MWs through eight projects in the Free State, namely:

Table 1: REIPPP projects in the Free State

Project Name	Capacity (MW) REIPPP or IPP	Nearest Town	Status
Boshoff Solar Park	60 REIPPP	Boshof	Fully operational
Heuningspruit PV1	5 IPP	Koppies	Approvals, planning and financing
Kruisvallei Hydro	4.5 REIPPP	Bethlehem	Under construction
Letsatsi Solar Photovoltaic Park	64 REIPPP	Bloemfontein	Fully operational
Pulida Solar Park	75 REIPPP	Jacobsdal	Under construction
Steynsrus PV1	5 IPP	Steynsrus	Approvals, planning and financing
Steynsrus PV2	5 IPP	Steynsrus	Approvals, planning and financing
Stortemelk Hydro (Pty)	4.3 REIPPP	Clarens	Fully operational

- Solar PV - PV is a mature technology and used in many countries in the world. It offers an attractive solution for farmers and other remote residents, and compares favourably with diesel generation costs. The largest barrier for a PV system is the high upfront capital cost and theft. The advantage is no fuel cost and a fairly low maintenance cost.

The local manufacturing of PV cells is a huge opportunity for job creation and will definitely bring the cost of PV cells down. It should strongly be considered in the Free State due to its excellent solar resource, especially in the southern parts of the Free State where it has the best occurrence.

- Concentrated Solar Thermal Power (CSP) - Solar thermal power stations have the potential to become the main source of electricity in the province and to contribute tremendously to energy security. It can also attract large industries to the province, which will generate employment and revenue. Feasibility studies should be done and appropriate financial incentives put in place.
- Solar Water Heaters - Solar water heaters (SWH) are a mature technology and suited for the Free State due to the abundance of solar energy. SWHs offer a suitable, renewable energy alternative for water heating in South Africa.

There are local manufacturers and installers of SWHs in the Free State and, hence, the broad deployment of SWHs in the province can lead to job creation.

- Wind - From the wind data and wind atlases available, these concluded that the Free State, in general, does not have a good wind resource compared to the rest of the country. One area that does show possible potential is the eastern Free

State, which borders Kwa-Zulu Natal. Possible wind farm locations can be identified and others further pursued.

- Hydro & Hydrokinetic - In general, the annual rainfall distribution and the general topography of the Free State do not lend itself towards much hydro power development.

The Gariiep and Vanderkloof Power Stations are built adjacent to the Gariiep and Vanderkloof Dams. Their electricity feeds into the Eskom national grid to supply power for peak and emergency demand periods, as well as base load energy when excess water poses a flood risk. These two dams, together with the Eskom hydro power stations, are integral components of the Orange River Water Scheme.

The Free State Bethlehem Hydro project consists of two hydropower stations on the Ash River near Lesotho at two separate sites: Merino (3,6 MW) and Sol Plaatje (2,5 MW).

Another hydro project the Free State is the pumped storage scheme in the escarpment of the Little Drakensberg called the Ingula pumped Storage scheme. This is an Eskom-owned scheme that consists of an upper and a lower dam, each capable of holding approximately 22 million cubic metres of water.

The Bloemwater project, which is the flagship pilot plant of conduit hydro power in South Africa, was constructed at the Brandkop Reservoir in Bloemfontein through a partnership between the Water Research Commission (WRC) and Bloemwater during 2015.

- Geothermal Energy - Currently geothermal energy is omitted from the South African renewable energy mix. Geothermal Energy is expensive and specific and needs high percentages of water – something South Africa, and especially the Free State, does not have.
- Bio-energy Conversion to Energy - Biomass is the biggest renewable energy contributor to SA and already an important source (small yet significant) in satisfying South Africa's growing energy demand.

In the Free State, the utilization of invasive wood for energy production is not highly feasible because the energy ratio between inputs and outputs using pelleted sawdust are negative. On the other hand, it is clear that charcoal presents a sustainable way of harvesting wood and to use it in domestic stoves. Another new alternative to investigate is "green coal", where invasive plants are used for the production of coal through a patented torrefication process.

It is challenging to manufacture high quality biodiesel from oil crops at a price that is competitive to mineral diesel. Biodiesel can be manufactured at reasonable cost utilising soybeans. There is potential for the manufacturing of biofuel in the Free State. A current role-player in this field is Mabele Fuels.

The utilisation of bio-ethanol together with gelling agents to produce ethanol gel has many social advantages that warrant further investigation.

Many processes have been used for the treatment of waste over the past decades. Processes like aerobic composting, anaerobic digestion, bioreactor, conventional landfills, mass burn incineration, and gasification, autoclaving, and plasma arc are some of the more common processes used to treat waste. It has been proven that the cost of producing electricity from biogas out of animal waste (mainly from feedlots and abattoirs) holds definite promise.

Projects which should be considered for the five districts in the province include:

- Landfills – it poses numerous possibilities for renewable energy and opportunities for job creation by:
 - ❖ Minimisation of waste reaching the landfills, this will play an important role in future with regards to available landfill space. This highlights the need to expand the recycling which is already taking place on landfills throughout the province.
 - ❖ The introduction of buy-back centers at selected landfill sites.
- Energy Efficiency - energy efficiency should be explored before creating new renewable energy resources. Efficient energy use, or energy efficiency, refers to using less energy for the same or higher levels of output. This can be achieved through new technology and the replacement of old technology by using more efficient versions of existing technology, or through wholesale changes of technology. Technologies, such as lighting, heating, ventilation and air conditioning (HVAC), controls and metering, motors, pumps, and compressors.
- Mining Rehabilitation - Mining land rehabilitation could facilitate opportunities for local communities to become adaptive to their changing economic environments through innovative job creation and by building community resilience.

Harmony Gold Mining Company (Harmony) in this regard developed a long-term land rehabilitation strategy comprising of two elements. The first element pertains to the creation of carbon sinks on mining-affected land, as the proper restoration of former mined land could capture large quantities of atmospheric carbon dioxide. Harmony plants sweet sorghum, sugar beet and giant king grass, which are known for their high carbon sequestration potential. The second element of Harmony's rehabilitation strategy is to plant energy crops on mine-impacted land that has zero economic value. Once harvested, these crops will be converted into renewable energy, in the form of biogas, through an anaerobic digestion process. The biogas will be used to replace fossil fuels in Harmony's metallurgical plants.

6. RECOMMENDED AND POTENTIAL OPPORTUNITIES FOR GENERATION OF RENEWABLE ENERGY IN FS

The various types of renewable energy sectors are highlighted in *table 2* and the projects have been prioritised into the following development areas: New Enterprise Development, Skills Development, Community Development, Awaiting Approvals and or Authorisations and lastly innovative projects (under Blue Skies).

It is recommended that an economic feasibility study be done for a specific project with a specific application in order to determine the viability in practice. Such a study should result in a bankable business plan with a reasonably accurate cost estimation of capital and projected cash flows. All the recommendations should be implemented with proper planning, guidance and training.

Table 2: Recommended viable projects emanating from findings and discussions in this study

Project	Renewable Energy Sector	Details
New Enterprise Development		
CUT solar sunflowers, Prof Vermaak	Solar	Providing training to military veterans in order to become self-sustained and empowered. Render renewable energy services to the immediate community in order save cost and electricity.
The CENTLEC Renewable energy initiative	Solar and Wind, Waste	Providing of renewable energy as an alternative to Eskom supply and thereby providing a novel funding stream via green credits, and creating alternative energy related job opportunities
Bus/ Public transport on biofuel from landfills	Waste to Energy	Use Durban plant as a “pilot” and use for all municipalities and all governmental transport
Landfills	Waste to energy	Entrepreneurial /Business for collection and sorting of different waste streams
E-waste	Waste to energy	Entrepreneurial /Business for collection of all electronic waste and dismantling it
Determine water wastage (APP)	Energy Efficiency - Save water wastage	Prof Vermaak – student IP
Skills Development		
CUT – Prof Vermaak short courses in solar and renewable Energy	Skills Transfer	Providing training to military veterans in order to become self-sustained and empowered. Render renewable energy services to the immediate community in order save cost and electricity.
Ajax Non Profit Company with CUT	Skills Transfer	Providing training to mining community in order to become self-sustained and empowered. Render renewable energy services to the immediate community in order save cost and electricity.

Community Development		
Harmony bioremediation – small farmers	Skills Transfer and entrepreneurial, while rehabilitating mine ground	Biogas farmer project: Harmony Gold is currently busy to recover the environment around slime dams in the Welkom area. At least 50 developing farmers will be established and awarded 3ha of land. The grass they produce will be used by Harmony to produce biogas.
Korean Solar Provision Consortium (KSPC) projects	Mainly Solar, Energy efficiency and skills transfer	Make Free State the Solar HUB in SA
Awaiting approvals and or Authorisation / Regulatory concerns		
Mabele Fuels	Biofuels	Regulatory delays on regulated biofuel selling price and subsidy/incentive per litre of biofuel sold
Sunalex project: Green energy with Solar Farm	Solar	Red Tape around the direct selling of the electricity to be generated on this solar farm to the Municipality is holding project back. Land acquisition and layout of the solar farm prove to be a long process. The project is in the IDP and is supported.
KThompson Tyre pyrolysis plant(s)	Waste to Energy	REDISA controls waste tyres and with their BEEE mandate 51% needs to be black owned. Investors are not prepared to give away 51%.
Proposed underground coal and gasification power generation, Theunissen.	Biogas	Not all the information available – latest available status was awaiting approval
Blue Skies Projects		
Conduit Hydro power	Hydro	Identify other areas where a conduit Hydropower Plant can provide Green electricity. Identify dams that can be de-slugged. New concept of Hydro power from existing pipeline infrastructure (s) and other novel ideas.
Invasive plants - green coal via torrifaction	Waste to Energy and Energy Efficiency	Not yet established for the Free State - The green coal technology is being developed and tested by the South African National Energy Development Institute (SANEDI), which does energy research and commercialisation and is an implementing agency for the Department of Energy (DoE).
Removal of Sludge in Dams	Hydro	Removal of sludge in dams to increase water and increase possible Hydro power to be “harvested”.
Qwa Qwa Wind farm	Wind	Identify and put resources at the “most” windy areas of the Free State and utilise the Renewable energy possibilities
Neighbouring collaborations	Wind/Hydro/Solar	Investigate opportunities with close-by neighbours or stalling applications from renewable energy projects on other provinces

7. CONCLUSIONS AND RECOMMENDATIONS

It is imperative that the large metros in South Africa take the lead and become key drivers of renewable energy to take advantage of the opportunities the sector presents. The future of energy lies in the increased distributed generation thereof via sustainable, prosumer (producer & consumer) generated electricity that makes use of renewable energy technologies. At the utility scale, renewable energy projects have reached grid parity with conventional technologies, and are therefore most likely to see increasing shares in SA's energy mixes.

The report from CUT concludes with the following recommendations that are categorised under two perspectives, namely logistics and operational, and strategic.

7.1 Logistics and operational perspective

- Action is to be taken and dedicated people is to take control of some of the projects identified. Deadlines have to be agreed upon and individuals should be accountable and have to be provided with the necessary resources and assistance.
- Duplication of or overlapping of functions and responsibilities should be prevented. Systems, policies and necessary routes to follow should be streamlined and easy as possible without the creation of additional problems.
- The Free State Government should be actively involved in addressing the shortcomings in current regulations, specifically with regards to biofuels.
- Currently, with no infrastructure and policies for smaller scale production to cater for household electricity generation and grid feedback, there is no incentive for prosumers to generate their own energy. It is interesting to note that this problem is not unique to South Africa, as many European countries are experiencing the same shortcomings in dealing with feedback schemes and the dangers that come with it. The two biggest power utilities in Europe, the two German power giants E.ON and RWE, experienced major losses during the transition to a renewable-based energy grid and the swift phasing out of nuclear power. This however should be further explored.
- Municipalities should be empowered and incentivised to play a far greater role in jointly pushing forward solutions to the national energy crisis. The switch to renewable is a long term commitment and politicians and those in the decision making chairs also need to consider this even though they might be on a shorter term political cycle. Initiatives should be benchmarked with other municipalities to learn from mistakes and for improvement (e.g. with KwaZulu-Natal and Cape Town).
- There is potential to increase the amount of recycling in the country and provinces and to create opportunities for the development and sale of alternative waste treatment technologies. Recycling would likely be driven further by the call for the development of sector-specific industry waste management plans (IndWMPs) — such as the draft call for packaging, lighting and e-waste. These IndWMPs would potentially build on the initiatives already established in the industry. Alternative waste treatment may also be driven by restrictions that will come into force soon on materials going to

landfill and, in the case of municipalities, due to pressures on landfill airspace.

- Unlocking post-consumer waste and increase feedstock requirements for large-scale alternative waste treatment facilities (such as waste to energy), will require partnerships between private industry and municipalities. With the 2013 general notices (GNR 634, GNR 635 and GNR 636) that came into effect in 2016, cheap disposal at communal and small to medium landfill sites will be illegal. This is both a challenge and an opportunity, as it is forcing industry to seek alternative waste management solutions.
- Communities need to get involved and understand the benefits of renewable energy. Training in this regard and skills transfer is thus imperative.

7.2 Strategic perspective

- Empower existing entities

It appears that sustainability and resource provision is to some degree lacking at existing entities aimed at economic development. Line function systems and effectiveness are often challenged due to rapid job-replacements, whereas resources are scant, both in terms of human, financial and structural issues. Entities such as business chambers, development corporations, institutes with initial clear mandates, and related resources have experienced increased difficulties to retain momentum.

- Collaboration and ecosystem clarification

It was evident from the study that the operational and authoritative ecosystems amongst the various entities mandated to perform economic development in the region are operating isolated and non-optimal. Clear pipelines of projects amongst local government, business support, education, research and development, funding, business and societal entities are sometimes unclear. The establishment of clear flow diagrams, pipelines and an operational process that links these entities with clear layout of processes and authorities need to be clarified in the region. Articulation with national entities and international stakeholders should also be clarified. Conflicts between economic, social and environmental impacts and priorities should especially be addressed. The fact that numerous plans and strategies exist in the province without having been implemented is testimony of shortcomings that needs urgent attention.

- Partnerships with authoritative, pragmatic, neutral institutions with mandates to contribute to the region

The study suggests that new and lucrative partnerships be founded amongst regional entities that are authoritative, trustworthy, non-critical, and knowledgeable in the various aspects of regional development, with a specific empathy and loyalty toward the Free State Province. Higher education

institutions should be the implementing and consolidating agent that pulls together local government, business and commerce, broader society and other stakeholders toward identifying and implementing projects. The utilisation of students and staff should provide the necessary manpower to this effect, in collaboration with local government. The role of local government as sole implementing agent, as opposed to partners and regulatory agents should be revisited.

- Balance small, large, short, medium and long-term projects with various technological depth

Although projects may widen at a later stage, the province may consider smaller-scale projects that can be extrapolated effectively. If large-scale projects are considered, engagement with similar projects that have been successfully implemented elsewhere should be considered prior to partnering with unknown collaborators. Large scale projects with less technological depth, but more regional impact should be considered, with impact on rural and peri-urban communities. However, novel and creative technologies and ventures should also be considered outside of the known restrictions of the province and its resources.

- Focus on human resource development on both the skills and executive levels

The contracting and development of human resources to execute identified projects should be a priority, rather than delegation to existing structures that are already under pressure. Project managers, contract workers, advisers, etc., should be commissioned together with projects, mindful of the strict procurement and labour agendas. To this effect, the transfer of skills should be a priority in cases of contracting expertise from abroad or non-designated groups.

- Labour legislation and national interest

The study also highlighted apparent restrictive labour legislation and other regulatory obstacles to business development. The role of large parastatals in the awarding of projects and perceived authorities, as well as perceptions about risks related to employing larger numbers of staff, were listed as definite deterrents to business development. The progression of small businesses to medium sized and larger appeared to be especially challenging in this regard.

8. IN SUMMARY

The Free State can become the beacon or hub of Renewable Energy. As Matatma Gandhi once said, “The time for change is here and now. Action is needed. Be the difference you want to see; Create the future you desire.... It's the action, not the fruit of the action, that's initially important. No matter the challenges, never stop doing the right thing. You may never know what results might come from your actions. But if you do nothing, there will be no result.”