German Technical Cooperation

Regional Regulatory Action Plan for the Western Cape – November 2009

Commissioned by the Western Cape Department of Environmental Affairs and Development Planning and the German Technical Cooperation (GTZ)

report

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Report:	Final
Final:	8th December 2009

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Executive Summary

Overview

The Regional Regulatory Action Plan is part of a joint project carried out by the Department of Environmental Affairs and Development Planning (D:EA&DP) and the TERNA Wind Energy Programme of the German Technical Cooperation (GTZ). TERNA is funded by the German Federal Ministry of Economic Cooperation and Development (BMZ).

The aim of the Regional Regulatory Action Plan, developed for the Western Cape Provincial Government, is to identify and develop appropriate strategies and mechanisms for incentivising and supporting the implementation of renewable energy projects in the Western Cape Province. This specifically relates to grid-connected power projects implemented under the Renewable Energy Feed-in Tariff (REFIT), which was established by the National Energy Regulator of South Africa (NERSA) in March 2009, with a particular focus on wind power projects.

Although the REFIT provides an attractive incentive for developers, which significantly reduces the financial risk for clean energy power projects, there are still areas of regulatory uncertainty and barriers to the implementation of projects. This study aims to identify strategies and mechanisms to support the utilisation of the REFIT in the Western Cape Province, while encouraging interest from local and international project developers and provide concrete plans of action for specific measures.

Renewable Energy Resource

The Western Cape Province has significant renewable energy resources, in particular wind, but also solar, hydro, wave, waste and biomass. Based on a review of existing work, this report summaries the renewable energy resource potential for power generation, as shown in table 0.1, and the associated indicative energy production costs.

Table 0.1: Summary – Renewable Energy Power Generation Potential

RE Resource	Power Generation Potential (MW)
Wind • Onshore • Offshore	 3,100 1,500
Hydropower • Primary Power Generation • Pumped Storage	 15 1,800
Wave Power	4,116
Waste Management Systems • Landfill Gas • Waste Gasification • Sewage Waste	 12 40 10
Biomass	12
Solar	Potential scale of application not limited by the resource.
Total	**>10,602**

Even though these numbers indicate that renewable energy could supply a substantial part of Western Cape's pressing energy demands, it is noted that these are pretty low resource estimates. It is assumed that this is what could be developed in the short- to medium-term, whereas the true potential may be considerably higher.

Renewable Energy Feed in Tariff (REFIT)

In March 2009, the NERSA announced the launch of the REFIT with four priority technologies. Phase 2 of the REFIT was announced in October 2009 to provide tariffs for additional priority technologies.

Although the REFIT has provided an excellent foundation for supporting and kick-starting the renewables industry in the country, there are still a number of issues to be resolved which require strong policy support. First and foremost is the obligation on the Single Buyer Officer (SBO) under Eskom, which has been appointed as the Renewable Energy Purchasing Agency (REPA) to purchase the electricity generated. At present Eskom has expressed reluctance to purchase power under the REFIT until assurance is provided on cost recovery. A draft Power Purchase Agreement (PPA) has been developed and is under review; however the scope of the pre-qualification process to access the REFIT is still under development. There are also concerns about the implementation of a capacity limit on projects. All of these result in uncertainty amongst investors and increased project risk.

In addition, the REFIT in its present form only focuses on large-scale projects, i.e. those greater than 1 MW. Further consideration is required to enable access to the REFIT for smaller projects, including preferential pricing, a simplified generation licence procedure (at present anyone connected to the national grid requires a generation licence), and a simple and transparent structure for the management of connections and transfer of payments. NERSA has however announced that Phase 3 of the REFIT would focus on small-scale technologies.

Process Map

A key barrier for developments and a major motivation for the development of this study is to assist developers and investors in negotiating the many layers of complex bureaucracy related to getting a project approved. A first step to understanding the key challenges and barriers was the development of a process map. The process map highlights the main regulatory steps that a renewable energy developer needs to undertake in order to establish a project, including steps related to the environmental impacts of the project as well as the specific steps related to securing access to the electricity network and the sale of power generated. The process map is not a comprehensive developer's guide, but focuses on the renewable energy regulatory framework in South Africa and the Western Cape Province.

A number of constraints to the introduction of renewable energy projects have been identified; these include:

- The requirements to apply for an environmental authorisation prior to applying for required sub-divisions of land. This potentially introduces significant additional delays in the development process.
- The current uncertainty over the specific process to be followed in procuring new generation capacity, i.e. whether a structured request for prequalification and request for proposals process will be followed or whether renewable generators can simply apply for generation licenses with the expectation that the REPA will be obliged to purchase renewable energy from licensed generators.
- The difficulty is that Eskom, as the system operator, has left a great deal of uncertainty in their grid planning, specifically concerning the amount and type of renewable energy to be licensed. This makes it difficult for Eskom to provide developers with firm commitments around grid access and around the infrastructure costs of such access.

Key Project Development Challenges

There are three key areas of challenges for project developers and investors, summarised in table 0.2, which include:

- Institutional;
- Technical; and
- Financial.

Table 0.2: Summary of Project Development Challenges

Challenges
Institutional
• Ongoing regulatory uncertainty
• Proposed pre-qualification criteria and tender may discourage many investors and reduce effectiveness of REFIT
• Industry concerns regarding independence of Single Buyer Officer
• There is a need for finalisation of standardised Power Purchase Agreement
• Clarity is required on minimum project size restrictions
• Greater clarity on overall licensing procedures
• Grid connection for qualifying RE generators
• EIA delays
• Requirement for basic assessment for wind masts
Technical
• Grid connection
• Capacity and strength of the different network assets within reasonable distance
• Network integration of power from intermittent generation sources
• System impact studies
• Lack of accurate publicly available wind resource data
Financial
• Lack of information about what funding is available
• Access to finance
• More innovative options are required for smaller projects

Strategies and Supporting Mechanisms

There are different types of instruments available to support renewable energy projects which range from direct to indirect policy instruments. Direct policy measures, such as the REFIT, aim to stimulate the installation of renewable technologies, whereas indirect instruments focus on improving long-term framework conditions. In addition to regulatory instruments, other approaches are aimed at removing barriers which limit investments, such as lack of information, lack of skills, limited research and development, inadequate regulatory structures, and limited incentive programmes. This study reviews the different types of strategies and supporting mechanisms using both local and international examples and identifying which mechanisms

would be appropriate and practical for the Western Cape Province to implement and have the greatest impact on fostering a successful renewable energy industry.

Renewable energy incentive programmes can assist in establishing a competitive self-sustaining renewable energy supply while increasing the quantity of renewable energy generated country-wide. There are a range of incentives that can be used including: direct subsidies from government in the form of feed-in tariffs and capital grants; fiscal incentives such as tax rebates or exemptions; investment incentives which encourage the participation of national and international financiers; and incentives that promote public-private partnerships to increase the use of renewable energy technologies.

Institutional support in the form of clear, long-term legislation and policies supportive of renewable energy has a critical role to play in building investor confidence, and in ensuring the sustainable growth of the renewable energy sector. Institutional support can come in the form of infrastructure and planning regulations such as building codes, which could treat renewable energy projects as “privileged” or “special” projects, where local authorities are required to designate specific priority or preferential zones for renewable energy utilisation. A renewable energy bill can complement a broader suite of initiatives, such as existing government programmes and other new laws to be put in place, for example a green procurement law including renewable energy.

There is often a lack of clarity by both developers and also key institutions as to how to get projects moving, especially with regard to the many legal and regulatory requirements at both a local and national level. In order to encourage, support and facilitate the development of renewable energy projects, in many countries information portals (e.g. institutions and one-stop shops) have been established at both local and regional levels to provide a variety of functions, from providing basic information to developers, through to actively engaging and assisting developers in submitting projects to the relevant authorities, or even processing applications.

Industry development is an important aspect for both regional and national growth. It is important for provincial governments to do what they can to help promote a successful industry covering everything from actual raw materials to developing and financing projects, to consulting and other ancillary services associated with a thriving regional renewable energy market. There are many aspects to industry development beyond actions such as tax incentives/relief and relaxing licensing requirements to attract businesses. As part of a comprehensive industry development plan it is important to assist and incentivise the establishment of industry or trade associations. Industry associations or trade groups can help bring a unanimous voice to renewable energy related businesses in the region, which can help policymakers identify pros and cons of regulatory legislation and identify what steps need to be taken in the future to help reform or develop the market. In addition, trade associations can help with shaping public opinion to assist in the market growth.

Research and development is another area of importance to assist in stimulating the renewable energy industry. The Western Cape Province could support local universities and institutes through research grants and channelling public funding to secure intellectual property (IP) rights. The Western Cape Province could encourage the South African government to provide national funding towards renewable technology research and development and help develop or actively participate in both provincial and national level research advisory committees. In addition, the provincial government through one of its departments could identify important research needs specific to the Western Cape Province.

One of the most direct supporting mechanisms for renewable energy industry development in the Western Cape Province is training and capacity building. Capacity building could be done through trade associations, workshops, training programmes, or partnering with international and non-governmental organisations that assist countries with these types of activities.

An additional support mechanism to help facilitate the development of renewable energy projects is a platform where developers and financiers could be made aware of each other.

Situations in the market do arise when financing institutions or agencies are looking to invest in renewable energy project developers that have identified project opportunities and successfully completed a number of prerequisites, e.g. site location, REFIT approval, and/or Environmental Impact Assessment (EIA). Likewise, there are also project developers who have identified renewable energy project opportunities and require some level of structured finance. A platform where financiers and developers could exchange information about their needs and opportunities could prove to be invaluable in facilitating the development of renewable energy projects and the market.

A platform such as this could be hosted by the renewable energy project one-stop shop. A project developer and financier forum could be hosted on a one-stop shop website. It could have the contact details of all those developers that have identified renewable energy opportunities, as well as a list of local, national and international companies, Non Governmental Organisations (NGOs) and organisations that are willing to fund projects that fall under the REFIT guidelines for South Africa.

There is a need to focus supporting mechanisms and strategies on priority measures and potential long-term goals, due to the speed the market is envisaged to grow within South Africa and particularly in the Western Cape Province. A proactive approach to renewable industry development will not only create jobs and revenues, but will also help in long-term development of the region and more importantly assist in energy security and independence.

Some of the priority actions and mechanisms proposed include:

- furthering development and updating of the process map to identify project bottlenecks and make key information available;
- establishing of a one-stop shop to provide one to one support for developers on all related project development and investment issues;
- increasing access to financial incentives and support, locally and internationally;
- ensuring that appropriate and relevant infrastructure and planning systems and procedures are in place; and
- establishing a small-scale REFIT.

A process map is an instrument that illustrates the procedural steps project developers are obliged to complete. The process map would detail specific policy or regulatory requirements relevant to renewable energy projects, providing links to other sources of information or other departments which are responsible for specific project approvals, such as an EIA. The process map includes the main regulatory steps that a renewable energy developer needs to go through to establish a project, e.g. local municipal requirements, prerequisites which the Provincial Government is responsible for overseeing, to National project requirements such as interconnection and generation licensing.

Another priority measure is a one-stop shop. This could be an organisation, entity, or government body that acts as a focal point for information dissemination and market facilitation. The one-stop shop is where investors and project developers alike could gain access to information specifically focused on renewable energy project development. Importantly the one-stop shop provides information about the variety of required procedures that developers need to go through in order to get approval for their projects.

Other than priority measures there are also long-term measures which the Western Cape Provincial Government could engage in parallel or shortly after the implementation of the priority measures. The long-term measures are focused around a longer-term growth approach to position the Western Cape Province as a leader in renewable energy industry development. They include implementing measures which help to position South Africa as a leader globally for renewable energy research, investment, manufacturing and project development. There are barriers to renewable energy development which are outside the jurisdiction of the Western

Cape which the Provincial Government could address through other agencies or departments that will help promote renewable energy development with the Province and nationally.

One-Stop Shop

In the context of the development of the Regional Regulatory Action Plan, it is proposed to create a focal point for business and investors with an interest in developing and financing renewable energy projects within the Western Cape Province. Such an entity, referred to as a 'one-stop shop', would be aimed at providing the necessary information and support required by developers and financiers. The one-stop shop could either exist simply as an information portal or it could actually take a proactive approach to assist developers navigate the complicated licensing and permit requirements. It is noted that these services and functions may not be required by all developers, especially the larger developers who would have much greater internal infrastructures to develop projects, however the aim would be to provide a range of services and information to a wide range of clients based on the needs of those clients.

It is proposed the one-stop shop could be housed within the Western Cape Investment and Trade Promotion Agency (Wesgro), which already provides comprehensive support and acts as a first point of contact for investors and business entrepreneurs in the region. Wesgro would need additional resources to accomplish the priority measures of the one-stop shop. Mainly the immediate additional resources would be three new full-time staff and an administrative assistant. This would avoid the high costs, bureaucracy and time in establishing a new entity. The one-stop shop could be mandated to provide a series of clearly defined key functions, which include:

- information dissemination;
- maintaining a project developer toolkit with guidelines;
- one-to-one direct project developer support;
- support for municipalities on planning and infrastructure issues;
- engagement with other relevant national one-stop shops; and
- international engagement with relevant bodies.

Energy issues are multidisciplinary, encompassing aspects related to environment, planning, education, economy, health, transport and more. Currently, there is no single department or body which is addressing all these issues including, energy diversification, security of supply, promotion of alternative clean sources, just to name a few. In the longer term, it is proposed that a dedicated regional energy agency be established within the Western Cape Province. This would provide the one-stop shop roles within a much broader renewable energy and energy efficiency context. It could take over the responsibility for supporting and providing information to a wide range of developers and investors, but could also provide additional services, such as providing support to municipalities on planning issues, assist with small-scale renewables activities, and other energy activities such as solar water heater programmes and energy efficiency.

One-stop shops have been demonstrated to be an important factor in assisting with the development of renewable energy projects as part of a greater regulatory framework. Renewable energy one-stop shops have been seen to provide a variety of services from simple information dissemination to being proactively involved with project approval procedures and acting as a legal mediator for any disputes arising between developers and those entities responsible for approvals, licensing, and permitting.

The key function for a provincial renewable energy one-stop shop would be first and foremost an information portal. The market for renewable energy project development in the Western Cape Province and South Africa as a whole is largely untested with regard to permitting,

licensing, zoning, and approval procedures. Due to this lack of tried and tested experience, mandating the establishment of a one-stop shop information portal, providing guidance, is of utmost importance. The one-stop shop should disseminate information to the market providing informative and comprehensive guidance to developing clean energy projects. Guidance should cover all the local municipality, provincial, and national requirements for renewable energy project development, encompassing procedures pertaining to EIA, zoning, planning, interconnection and generation licensing, as well as any other renewable energy project needs, such as water use requirements for hydro or geothermal projects.

As part of the information dissemination key function, the one-stop shop could establish a project developer toolkit, which would outline all the necessary procedures required for implementing a renewable energy project. The toolkit would be based on the type of technology the project is implementing. As there are some overlapping procedures that cover all projects, some renewable energy technologies will have varying regulatory procedures. The most important aspect of such a toolkit with all the necessary guidelines would be that it is continually updated.

In addition to acting as a focal point for information, the one-stop shop could go beyond just indirectly assisting project developers and take a proactive approach. This could include conducting meetings or workshops that actively engage with project developers and financiers. In addition to providing information and guidance, the one-stop shop could actively work with project developers to advise them on how to navigate particular barriers that arise while developing a clean energy project. This assistance could come in the form of actively working with the institutions where the bottleneck occurs, both local and national.

As a one-stop shop entity, it will be working directly with advising project developers and will receive first-hand accounts on the nature of some of the barriers. Through liaising with project developers the one-stop shop could work directly with local authorities and municipalities to highlight and make suggestions as to potential legislation and policy changes that could help facilitate barrier reduction.

The one-stop shop should play an important role in liaising, actively engaging and working with NERSA, Eskom and the SBO. By doing so, the Western Cape Province will have direct contact with the entities that affect a significant part of the procedures needed to implement renewable energy projects. If feed-in-tariff payments, power purchase agreements, grid extension, generation and interconnection licensing are not streamlined to accommodate the implementation of renewables, there exists the potential to derail any regulatory action plan developed by the Western Cape Province or any other provincial or municipal government. Therefore an important aspect to any regional action plan for the development of renewable energy projects with the inclusion of a one-stop shop is that it should have a component of engaging national entities.

There are many ways the one-stop shop could engage with national entities. One option would be to promote the development of oversight committees or actively partake in those committees and working groups, which currently exist. The one-stop shop could provide national initiatives, programmes, policymakers, and market participants with vital information on the barriers and challenges facing project developers.

The one-stop shop need not only focus within the Western Cape Province and South Africa, but it could also act as a gateway for companies in South Africa to engage internationally and vice versa. The one-stop shop could provide information on how companies within the Western Cape could access international funding opportunities and/or project support. One such example is the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM). The CDM is an international project-based mechanism which provides additional revenues to projects which reduce the emission of harmful greenhouse gases. In addition to the CDM, there may be other international opportunities for project funding and support from a wide variety of charities, NGOs, and private and public sectors.

Opportunities for international support and financing can take the form of feasibility study support, EIA financing, resource mapping, or even direct project financing.

In summary, the renewable energy one-stop shop should consist of two main aspects:

- dissemination of information to market participants, namely project developers and financiers who are looking to develop renewable energy projects; and
- active engagement on both a local and national level to identify and address bottlenecks and barriers that hinder the implementation of renewable energy projects.

These two main aspects could take many forms and require a significant amount of strategic organising and mandating as described above. Investigating international examples, national centrally led legislation mandating a one-stop shop to become a single source for project developers needs, is the most effective at streamlining the development of renewable energy projects. A centrally led, top-down approach for setting up a single office or department that has the mandate to require other local authorities and government divisions to take action in reaching an agreed goal of installed capacity from renewables would be the most successful manner in which to reach renewable energy targets. However, in order develop a one-stop shop that could oversee the planning, permitting, licensing and general approvals requires national legislation mandating these capabilities for a new one-stop shop entity and also it needs to be well capitalised to engage in such a range of activities. In the short-term, if the renewable energy one-stop shop can be mandated and funded to participate in these two main aspects, for example under Wesgro, it would prove to be an invaluable tool to assist a regional action plan that helps stimulate the development of renewable energy technologies within the Western Cape Province as well as throughout South Africa.

Financial incentives and supporting mechanisms

Finance is a critical issue for renewable energy projects, which have so far had a rather poor reputation with the financing community as they are still viewed as higher risk investments, resulting in stiffer requirements for investors and developers alike. Such projects often require substantial amounts of money in order to plan, purchase and install the equipment, as well as to train staff for the operation and maintenance of the system installed.

There are multiple reasons behind the relatively limited financing for renewable energy in Africa, and these are:

- market related issues;
- political and policy related issues;
- technology; and
- inherent nature of projects.

Of the key financing opportunities reviewed in this study, in addition to conventional commercial finance and equity investment, the most appropriate and potentially available are:

- development grants for project feasibility, EIA etc;
- soft loans through local or international development finance;
- tax incentives; and
- carbon finance.

Project development grants would assist developers in the initial stages of getting the project off the ground and could include supporting activities such as wind monitoring, feasibility studies and EIAs. To date, there are limited options for project development grants locally, these primarily include: Renewable Energy Market Transformation (REMT); Industrial Development

Corporation (IDC) may provide development finance; Development Bank of Southern Africa (DBSA); Commercial Banks (through the French Development Bank- AFD). Development grants may be particularly relevant in the case of public sector or public private partnership projects.

Soft loans are an area where financial support is more likely, mainly via local and international development finance institutions. Development finance institutions that have demonstrated an interest in supporting renewable energy projects in Africa include: local development finance; donor development finance; and international development finance.

Operational grants are expected to be fairly limited, as the REFIT is the major operational grant. However, there may be the possibility of applying for local funding or donor funding for activities that address wider capacity building and market facilitation, such as on-going wind monitoring with the aim of contributing to a comprehensive wind map for the region; monitoring of power production as part of a market assessment; and training and capacity building as part of a local empowerment programme.

In terms of tax incentives for renewable energy, during his 2008 budget speech, Minister Trevor Manuel promised that tax incentives for cleaner production technologies would be considered, however these are still to be developed and implemented.

Currently, section 12B of the Income Tax Act of 1962 provides some tax relief for the generation of electricity from wind, sunlight, gravitational water forces and biomass comprising organic wastes, landfill gas or plants. This section provides for an accelerated write-off period (50 percent in the first year, 30 percent in the second year and 20 percent in the third year) for the costs of such machinery used by a taxpayer for the purpose of trade.

There is also carbon finance which is a relatively new branch of environmental economics that is focused on reducing the emission of harmful anthropogenic greenhouse gases (GHGs). The world is becoming increasingly carbon constrained as more international and national policies are being developed which put a price on carbon dioxide (CO_2) and other GHG emissions. These polices are developing market-based instruments that are capable of transferring carbon emission risks.

In general, carbon finance refers to investments in projects which reduce GHG emissions below what the business-as-usual scenario is for GHG emissions in a specific industry and region. A tonne of CO_2 has the same affect on the global climate regardless of where in the world it was emitted. Therefore, a company, country, or even an individual could invest in a project anywhere in the world that reduces GHG emissions to assist in offsetting their own emissions. This investment is known as carbon finance and the size of the investment is directly correlated to the amount of GHG emissions that are reduced below the business-as-usual scenario.

Infrastructure and planning

As part of a comprehensive regulatory action plan, it will be important for the Western Cape Province to address issues concerning planning policies for renewable energy projects and infrastructure upgrades and investment. The South African REFIT is a powerful initiative to incentivise and stimulate investment in and developing of renewable energy projects; however, it is important that the REFIT is complemented with proactive planning policies and infrastructure improvement and investment which will assist in developing the Western Cape Province's extensive renewable energy resources.

International examples of successful diversification of energy sources and a high level of wind power project development highlight the need for planning policies specifically targeting renewable energy projects. It is essential that the Western Cape Government take a proactive top-down approach to renewable energy planning, particularly for wind power projects. This

requires that all spatial development plans on both a provincial and municipal level incorporate guidelines for wind energy projects, as well as other renewable technologies.

With regard to infrastructure and planning, the Western Cape Province's action plan should include regulatory measures to address the following:

- identification of suitable sites for renewable energy projects, particularly wind;
- inclusion of wind energy projects in provincial and municipal spatial development plans;
- improving the data on renewable resources in the Province and making it easily available; and
- clear decision-making process for planning and infrastructure investments.

The Western Cape Province's regulatory action plan needs to include the identification of sites suitable for wind project development as well as exclusion zones, which are near to airports, green belts, bird migration routes or other environmentally sensitive areas. It is important that when developing such exclusion zones, which would come out of establishing spatial development plans, that all available methodological tools are utilised. This includes the use of Sustainability Appraisals (SA) and specifically Strategic Environmental Assessments (SEAs). Using SEAs as a tool in planning guidelines will help to ensure the cumulative impact of wind farms are taken into consideration. The majority of countries with well developed renewable energy infrastructure employ these methodologies. For the Western Cape Province to have a successful renewable energy development programme it is important to ensure, through strategic planning and SEAs, that projects, in particular wind farms, pose little to no harm on the surrounding environment. Through a strategic planning analysis incorporating SEAs, it may be found that wind farm projects could be developed in clusters in some regions rather than having a generalised regulation of a 30 to 50km radius separating each project. This could help increase the amount of wind power capacity to be developed and decrease any negative environmental impacts.

To assist with the development of guidelines, municipal and provincial planning officials will need access to detailed information and Geographic Information System (GIS) mapping. The South Africa Renewable Energy Resource Database (SARERD) has been developed which maps the different renewable energy resources throughout the Western Cape Province and South Africa. As part of a regulatory action plan the Western Cape Province could improve upon the database to include continually updated information of renewable energy resources, location of current and future electricity grid infrastructure, access roads, areas of ecological sensitivity, urban areas, and more.

The Western Cape Province could develop detailed mapping that outlines the various renewable energy resources coupled with grid accessibility. Electricity grid study and renewable resource mapping could illustrate precisely favourable wind resource areas in addition to easily accessible grid connections. Due to the current grid structure, load demands, and location of renewable resources, some areas could be considered prime locations where a minimum amount or no grid extension or transmission line upgrades are required. Some areas will be better suited then others, while some may accommodate greater installed capacity due to the grid infrastructure. When establishing complex GIS mapping tools it is important to provide as many layers of information as possible. More detailed information available to project developers and planning officials will ensure that renewable energy projects get developed in the most cost effective and environmentally benign areas. Through making complex GIS maps with layered information available to the general public, it would also help reduce costs for policymakers, planning officials and project developers. This would make the Western Cape Province more attractive to all those involved in the renewable energy industry, from actual developers, consultants, manufacturers, to a variety of service providers.

The Western Cape Province could also engage with the grid distribution and transmission entity (currently Eskom) to identify areas within the Western Cape where the grid will be extended to.

Distribution and transmission companies will have future plans for grid extension, additional transformers and substations that are based on projected growth and demand for electricity in particular areas. This information could also be added to the renewable energy resource information to provide a comprehensive GIS mapping tool that illustrates where the best opportunities are for developing clean power projects, as well as where the future locations might be.

This would provide project developers with a clear idea of where the favourable and least cost options are for planning permission for their renewable energy projects. Ideally, comprehensive GIS mapping tool would be developed for each renewable energy resource and therefore also technology. The idea is to have a comprehensive GIS mapping tool that will provide guidance to planning officials and developers for developing spatial development plans. This improved GIS mapping tool would prove to be an invaluable tool for identifying suitable sites and will help facilitate zoning approvals for projects.

Taken one step further, the Western Cape Government in collaboration with municipalities could identify exclusions zones as well as pre-approve zoning permission for the most suitable sites for wind and other renewable energy projects. This would alleviate the need for developers to go through complicated planning approvals which adds a level of uncertainty and could create undue project delays.

In addition to the various regulatory steps in the process outlined it is important to note that there is also a strategic initiative developed by the Western Cape Province to facilitate wind energy projects. This initiative has developed a regional approach to the location of wind developments. The approach is established as a SEA and is intended to be used as a proactive regional planning tool to encourage the introduction of wind energy developments in the Western Cape. It should be noted that the framework, referred to as the “Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape” has important implications for the evaluation of individual EIAs. When entering an EIA process for wind projects, developers should include consideration of this regional strategy in their EIA application process.

Although planning consists of many different steps and at times could be quite complicated, essentially it could be broken down into two main fundamental aspects. The first main aspect of planning is managing the competing uses for space. The second is to make the places that are valued by society to have identity. These two aspects of planning focus on the location and quality of social, economic and environmental change. In setting out a vision for planning, it is important to set spatial planning guidelines which will encompass these aspects. The spatial planning guidance will support the implementation of a range of policies and legislation. It will set out a consistent approach to be applied across municipalities to assist developers in preparing renewable energy projects. The spatial planning guidelines for renewable energy projects should be incorporated into a holistic all encompassing development plan.

As part of a regulatory action plan for renewable energy the Western Cape Government could support municipalities to incorporate renewable energy facilities in all of the regional spatial development guidelines. The local government entities which oversee the development of spatial planning guidelines and policies should make provisions for renewable energy projects. The local planning should include guidance for all the important aspects that face wind power plant developments which include, but are not limited to: civil aviation, ecology, heritage, landscapes, local economy and tourism, telecommunications, and noise. The local municipal spatial development plans should be in accordance with and mirror the Western Cape Government planning strategies and importantly assist to facilitate achieving the goals for renewable energy installed capacity.

There are quite a few infrastructure elements which affect the development of clean energy projects and the renewable energy market as a whole. Infrastructure requirements for large-scale wind farm project development consist of many different components. The infrastructure

needs will cover everything from port delivery through to wind turbine erection and operation delivering electricity to the grid. Not all of the infrastructure requirements will be covered by the Western Cape Province. Wind farm development infrastructure could be divided in those provided by the Western Cape Province, the project developer and Eskom – as the electricity distribution and transmission company. Electrical infrastructure such as substations and transformers associated with grid interconnection is overseen by the network provider Eskom, but as part of a regulatory action plan, the Western Cape Province could actively engage Eskom with any barriers that project developers face when implementing projects.

The main infrastructure requirements that the Western Cape Government oversees and should incorporate proactive measures in addressing as part of a regulatory action plan are the ports, rail, and roads. Wind turbine generators, including blades and tubular towers are extremely large pieces of equipment housing electrical components and lighting, which need to be handled carefully. As South Africa currently does not manufacture wind turbines, project developers will have to have the turbines delivered by cargo ships to ports and then transported by road and rail if available.

One positive aspect is the Western Cape Province's access to main ports, Cape Town and Saldanha Bay. To off-load and transport large wind turbines requires specialised cranes and experience. As the wind turbine industry develops in South Africa and even in neighbouring countries, the Western Cape ports have an opportunity to be the premier destination to ship, off-load, and store wind turbines. This may entail additional investments in cranes, stackers, forklifts and warehouses. The ports will have to train employees on how to handle wind turbines and develop entirely new handling systems. Implementing rolling equipment and new techniques to efficiently and safely move wind power cargoes could prove to be a sound investment as the wind energy market develops in the Western Cape and throughout Southern Africa. Cape Town and Saldanha Bay ports can play an important role as a hub for wind turbine delivery and house workshops where the quality-control engineers can survey their turbines after long sea voyages before they head to project sites.

Once wind turbines are loaded onto lorries, they will have to navigate Western Cape's road transport network in order to reach the project sites. As part of the regulatory action plan, the Western Cape could conduct detailed wind turbine transport studies. These transport studies should conduct swept path analysis as part of a physical route survey to identify pinch points and access routes for wind turbine deliveries. Access roads for equipment, cranes and wind turbines are permanent roads that will be used during construction and post-construction used for operation and maintenance vehicle access. Roads that need upgrading around and on the way to the project site could then be used by the general public. The roads will need to be designed to accommodate for the turning radii of the lorries and heavy loads.

The Western Cape Province has implemented a Strategic Infrastructure Plan that highlights the importance of infrastructure investment to stimulate and improve economic and social development aspects, which undoubtedly includes renewable energy projects. The regulatory action plan should emphasise the need for improvement of ports and roads to accommodate the large loads necessary for clean energy project equipment transport.

Successful renewable energy project implementation requires the Western Cape Government to take a proactive approach to planning and infrastructure development. The South African REFIT is a powerful incentive for renewable energy project developers; however, if it is not integrated with sound planning policies and associated infrastructure development, the take-up of renewable energy projects could be greatly hindered. As part of the regulatory action plan, the Western Cape Government should introduce aspects which are focused on supporting the development of infrastructure and establishing spatial planning guidelines.

Regional Industry Development, Training and Capacity Building

There are opportunities to promote the region to foreign investors and get leading international wind turbine manufacturers to establish a manufacturing presence in the local market. There are also opportunities to support the development of a domestic renewable energy industry, either manufacturing full turbines or just certain components. This could be using local expertise or with international partners.

The first step could be to focus on importing turbine components and have assembly done on a local level. The second step would be to begin manufacturing components as the industry develops, e.g. tubular towers, generators, blades, etc. Lastly, steps can be taken to provide all the equipment and knowledge to design and manufacture entire wind turbine generators.

In order to establish a local market the Western Cape needs to implement a series of incentives and programmes based on demand. Supporting mechanisms and policy measures could include:

- requirements of locally manufactured components;
- quality control and certification;
- export credit agency support;
- research and development support;
- tax and other financial incentives; and
- favourable customs duties.

There is also a significant level of knowledge building that needs to occur in the Western Cape and South Africa in order to develop a successful renewable energy industry. Capacity building, training and industry development are vital issues that need to be addressed in order to develop a well-functioning industry and promote a high take up of renewable energy projects. It is important that Western Cape Province regulatory action plan focus on implementing measures which address the gaps in knowledge and uncertainty.

The regulatory action plan should have clearly defined goals of capacity building and training to facilitate industry development. The capacity development should focus on those market participants who are looking to invest in and develop renewable energy projects as well as assist and train municipal and provincial government employees. The major focus of capacity building will be to disseminate knowledge pertaining to the procedures of the REFIT and the necessary approvals and permitting within the Western Cape Province for primarily wind energy projects, but also including other renewable energy projects.

The Western Cape Government should establish a top-down approach to establishing a solid knowledge base and disseminate information. The one-stop shop could also play an important role in capacity development and training. The regulatory action plan inter alia should include:

- training and capacity building workshops that cover licensing, permitting, EIAs, and REFIT procedures;
- targeting audiences are government employees associated with any of the spatial planning permissions, zoning, and EIA approvals, project developers, trade associations, investors, business community related to renewable energy developing (e.g. consultants, conservation and environment experts, investors, etc);
- supporting local technical institutes and certification programmes that are focused on educating individuals on the technical aspects of renewable energy project development; and

- providing grants to institutes and universities for research and development topics related to renewable energy projects, e.g. new technologies, smart grids, feasibility studies, environmental impacts, etc.

The regulatory action plan should include training and capacity building to help ensure the long-term market growth of the renewable energy industry and promote the improvement of economic and social welfare within the Province.

It is essential that policies and programmes are developed on a provincial and municipal level to encourage and support the development of local manufacturing and enterprise development. This will be through providing the necessary incentives and a conducive environment for investors.

Pilot Small-Scale Feed-in Tariff

The current REFIT in South Africa excludes participation by small-scale generators. Given the rapid urbanisation taking place, improving living standards and the resultant rise in demand for electricity, the country is increasingly put under a lot of strain to meet these challenges. It is therefore critical that any future demand on electricity is supplied in a low-carbon way. One way of achieving this is through the expansion of the renewable energy industry in the country, by introducing a small-scale feed-in tariff which would provide individuals, communities and businesses an opportunity to generate their own renewable electricity.

The proposed small-scale feed-in tariff could be piloted in the Western Cape Province through interested municipalities. The NERSA would be requested to support this pilot by providing provisional tariffs for small-scale solar PV and wind, the two technologies that will be promoted as part of the pilot. It is also proposed that a request should be made to NERSA to assist the Western Cape Provincial Government and Municipalities to develop a simplified generation licence, which would enable the Regulator to keep track of installations connected to the grid. A simplified form of “Obligation to Purchase” agreement between a municipality and a small-scale generator for the supply of renewable power to the grid would also need to be developed.

The proposed pilot could be administered with a number of willing municipal customers, including government departments. The costs associated with connecting installations would be borne by the system owners, while the costs associated with upgrading the grid in order to connect new installations, would be borne by the grid operator. The costs associated with connecting installations would be borne by the system owners, while the costs associated with upgrading the grid in order to connect new installations, would be borne by the grid operator. There would be a need to identify the source of funding for the additional costs of generation. It has been suggested that an application be submitted to treasury to cover these costs. The details of this arrangement will need to be discussed further amongst the different parties involved, including the Regulator.

Since Municipalities will be issued with both a generation and a trading licence under the amended Electricity Regulation Act of 2006, this means that they will be able to participate in the national REFIT programme by bundling the same type of small-scale renewable energy installations up to a quantity that would qualify for the REFIT and enter into Power Purchase Agreements with the system operator.

Summary and Conclusions

Overall, although the REFIT has been established, there are still many issues to be resolved at a national level in order for it to be fully operationalised. There are opportunities for the Provincial Government to engage with key stakeholders such as NERSA, Eskom, Department of Energy (DoE) and Department of Environmental Affairs (DEA) to collaborate, support and drive the process forward

In addition there are a number of direct actions that the Western Cape Province can put in place to encourage and support developers and investors of renewable energy in the region. In particular, these will be focused around the establishment of a one-stop shop for renewables and the provision of support and guidance for municipalities.

There is also an opportunity for the Western Cape Province to establish a pilot small-scale renewable energy feed-in-tariff, which would assist in demonstrating the opportunities, and to identify and overcome the key barriers.

All of the above will support initiatives to ensure that the Western Cape Province becomes the number one destination for renewable energy investment in the country.

An overview of the key actions for D:EA&DP and other key stakeholders is provided in table 0.3.

Table 0.3: Summary of Key Actions

Action	Sub-action	Key Stakeholders
INSTITUTIONAL		
Support NERSA in the development of comprehensive REFIT guidelines	Establish Grid connection and Licensing Procedures - Resolve issue on pre-qualification criteria - Ensure independence of Single Buyer Officer - Put in place Standardised Power Purchase Agreement - Clarify project size issues - Greater clarity on licensing procedures - Ensure grid connection for qualifying RE generators - Clarify process of establishing REFIT capacity limits	NERSA/ Eskom/ DoE
Support NERSA in further expansion of REFIT	Ensure other key technologies/ technology bands are included in REFIT Phase 3	NERSA
Support NERSA in the establishment of a small-scale REFIT	Assist in development of pilot programme	NERSA
Support DEA in streamlining EIA process and reducing delays	Support the establishment of EIA guidelines for renewable energy power projects	DEA
Removal of EIA basic assessment requirement for wind masts	Ensure that this requirement is removed to reduce costs and delays for developers	DEA
General national engagement	Overall national engagement to support the development of the necessary integrated regulatory frameworks across a wide range of institutions	DoE, DEA, DTI, Treasury, Eskom, NERSA,
Local institutional support	Support for the establishment or ongoing activities of organisations such as trade or industry associations, e.g. a Western Cape Renewable Energy Industry Association	Local RE industry
ONE STOP SHOP		
Confirm institution	Engage with Wesgro and key Provincial Departments to ensure that Wesgro is the most appropriate institution and that there is the willingness and capacity to support the programme	Department of Economic Planning
Develop mandate and objectives	Develop full programme, budgets and identify roles and responsibilities	Department of Economic Planning
Develop operational guidelines	Establish application processing, administering of incentive programmes	Department of Economic Planning
Establish website	Set up an information portal on their website, including links to relevant entities and the process map outlined in detail	
Staffing	Secure funding for at least two employees who will continually update the site and actively engage with	Department of Economic

Action	Sub-action	Key Stakeholders
	project developers and market participants to address provincial and national barrier, i.e. Eskom's single buyer office, NERSA, Licensing, etc.	Planning
Review long-term institutional structure	Review options for establishment of provincial energy agency	
Process Map	Expand on and update process map	
FINANCIAL SUPPORT		
Monitor opportunities	Engage with relevant financial organisations to monitor financing opportunities and ensure up to date information is made available to developers and investors	Finance bodies
INFRASTRUCTURE AND PLANNING		
Spatial development plans and guidelines	Work with planning departments to regulate for spatial development plans (provincial level and local) to include guidelines for wind energy projects.	Municipalities/ Department of Local Government
Site identification	Identify appropriate sites and exclusion zones	
GIS Mapping	Develop comprehensive GIS mapping available to developers with resource date, environmental data, exclusion zones etc.	
Resource data	Improve data on renewable resources in the Province and make it easily available	
Planning process and infrastructure requirements	Work with planning departments and one-stop shop to establish clear and transparent decision-making process for planning approvals, as well as infrastructure investment and upgrade	Municipalities/ Department of Local Government
Wind turbine transport study	Assess port, road and rail capabilities and requirements for transporting turbine equipment in line with Strategic Infrastructure Plan	Dept of Economic Planning, Dept of Transport and Public Works
REGIONAL INDUSTRY DEVELOPMENT, TRAINING AND CAPACITY BUILDING		
Industry development	Development of policy measures and incentives to support local manufacturing	Dept of Economic Planning
Trade associations	Work with trade associations on the promotion of the REFIT and the potential wind energy market among market participants	Trade associations
Industrial Zone	Identify suitable areas; publish a call for tenders among municipalities; decide on industrial zone best suitable for wind power manufacturing; grant preferential rates for any new businesses for the first five years	WC Government
Training	Organise a row of training work shops for skills related to wind power plant manufacturing and operation	WC Government in conjunction with Chamber of Commerce

Action	Sub-action	Key Stakeholders
Tax and customs	Work with tax and customs office to implement favourable tax and customs incentives to develop the market and industry	Treasury/ SARS
PILOT SMALL SCALE FEED IN TARIFF		
Agree on SS-REFIT PRINCIPLES	Engage with key stakeholders on major issues	NERSA, DoE, Municipalities, Eskom
Establish tariffs	Engage with NERSA to establish pilot tariffs for solar and wind	NERSA
Establish small-scale generation licence	Engage with NERSA on the development of small scale generation licence	NERSA
Identify pilot municipality	Identify and engage with potential pilot municipality	Municipalities

Contents

1 Introduction

1.1 Study Objective

The overall purpose of the study is to identify and develop appropriate strategies and mechanisms for incentivising and supporting the implementation of renewable energy projects in the Western Cape Province. This specifically relates to grid-connected power projects implemented under the Renewable Energy Feed-in Tariff (REFIT), established by the National Energy Regulator of South Africa (NERSA) in March 2009.

Although the REFIT provides an attractive incentive for developers, significantly reducing the financial risk for projects, there are still barriers to the implementation of projects and areas of regulatory uncertainty. The study aims to identify strategies and mechanisms to support the implementation of the REFIT in the Western Cape, encourage interest from local and international project developers, and to provide concrete plans of action for specific measures.

This study takes into account all appropriate renewable energy technologies that could be developed within the Province during the short- to medium-term, however it is noted that wind power will be a high priority due to the known resource potential and the level of interest from project developers.

The overall objective of this study is to provide a comprehensive framework and programme which will assist the Province in meeting its renewable energy target.

1.2 Background

South Africa ratified the United Nations Framework Convention on Climate Change (UNFCCC) in August 1997 and acceded to the Kyoto Protocol in March 2002. Since then the threat of global warming has become more apparent and the mitigation of greenhouse gases (GHGs) has been adopted by the majority of nations internationally. As part of its response to climate change issues, the South African Government prepared a National Climate Change Response Strategy, developed the Long Term Mitigation Scenarios (LTMS) and formed an Inter-governmental Committee to address climate change and its effects on the country. Renewable energy is expected to form a key component of the country's long term climate change strategy.

In addition, it is now recognised internationally in South Africa that renewable energy can play a key role in contributing to energy security and sustainable social and economic development.

These national initiatives have filtered down to provincial governments, with the Western Cape Provincial Government playing a pivotal and leading role as the first provincial authority in the country to develop its own Climate Change Response Strategy and Action Plan in June 2007, with an official endorsement by cabinet in December 2008 and an official launch in January 2009. Following on with this drive, the Western Cape's Department of Environmental Affairs and Development Planning developed the Western Cape Sustainable Energy Strategy which forms an integral part of the provincial mitigation response plan. The findings of this strategy highlight the advances being made in the renewable energy sector and in energy efficiency. It sets a target of 15 percent renewable energy by 2014 which equates to an additional 1,000 megawatts or more of new renewable energy capacity. It is crucial to examine concrete and proactive means by which the Provincial Government may fast track and further support the development of an active and viable industry in order to ensure that the targets are met in as prudent and feasible a manner as possible.

1.3 Role of Provincial Government in Energy and Climate Change

In assessing the potential mechanisms and programmes that could be established to support the implementation of the REFIT, it is important to understand the role and context of the Provincial Government in relation to energy and climate change issues.

The overall role of provincial government includes ensuring sustainable environmental management, integrated development planning and equal access and sustainable use of the province's natural resources, including energy.

This requires the translation of national policies into concrete plans of action and providing leadership in matters relating to energy and climate change, for example through the development and implementation of provincial policies, strategies and frameworks and the co-ordination of the functions of the provincial administration and its departments.

The role of the provincial government is not to actually implement projects, but to assist in establishing the necessary supporting frameworks. It is also not expected that the provincial government would be in a position to provide significant funding for supporting renewable energy projects, for example by establishing its own feed in tariff.

1.4 Provincial Programmes and Initiatives

Having declared climate change as a governance priority, the Western Cape Provincial Government has embarked on a number of programmes and projects that help address climate change both directly and indirectly. These include:

- roll-out of the Sustainable Development Implementation Plan for the Province;
- alignment of municipal Integrated Development Plans and Spatial Development frameworks with the Western Cape Provincial Spatial Development Framework;
- expansion of the Law Enforcement and Compliance Monitoring Component to meet regulatory obligations associated with the National Environmental Management Act;
- establishment of moveable ambient air quality monitoring stations across the province;
- greening of government offices and introducing energy efficiency measures;
- roll-out of 1,000 solar geysers to poorer communities and promoting renewable energy;
- implementation of the provincial climate-change response strategy and action plan for the Western Cape;
- strengthen the Environmental and Recycling Economy through awareness and empowerment programmes;
- implementation of environmental and land-use management projects; and
- roll-out of the Integrated Energy Strategy for the Western Cape.

Legislation, for example a Renewable Energy Bill or a green procurement policy, are likely to follow the above initiatives to ensure further sustainability, along with other initiatives such as a dedicated Climate Change Unit in the Department of Environmental Affairs and Development Planning (D:EA&DP), i.e. a desk to deal with Clean Development Mechanism projects and intergovernmental relation building to work towards mitigation.

1.5 National Programmes and Initiatives

The South African government recognises the barriers faced by renewable energy project developers and acknowledges the financial implications of the uptake of renewable energy. The

Department of Energy (DoE) is thus developing financial instruments to ensure that renewable energy projects become a reality in South Africa. The department has already supported and put in place some programmes aimed at financing renewable energy such as the REFIT; the renewable energy finance and subsidy office (REFSO) within the department; the renewable energy market transformation (REMT) project administered by the Development Bank of South Africa (DBSA); and the potential use of Tradable Renewable Energy Certificates (TRECs).

These and other national programmes and initiatives that support and promote renewable energy are described below.

- **Urban Sustainable Energy for Environment & Development Programme (SEED).** The programme aims to promote sustainable development through the integration of energy and environmental issues into urban development in South Africa. The Programme develops partnerships with national and local government and with NGOs. It builds capacity in these organisations and provides training, supports information campaigns, demonstrations and implementation. At a national and international level SEED supports exchange of experience, networking and policy development. SEED is a co-operation programme between South Africa and Denmark and is funded by DANIDA and other partner organisations.
- **Renewable Energy Market Transformation Programme (REMT)** set up by the Department for Minerals and Energy (DME) and administered by the Development Bank of Southern Africa (DBSA), aims to remove the barriers and reduce implementation costs of renewable energy technologies and to promote grid-connected electricity from renewable sources. The programme aims to assist the government in meeting the 2013 renewable energy target through establishing policy and regulatory frameworks, providing technical assistance and building institutional capacity for:
    - Renewable Energy Power Generation – which has provided support to DME and NERSA to develop a framework for renewable energy
    - Commercial Solar Water Heating.

  The project is funded by the Global Environment Facility (GEF) through the World Bank and will run until 2012.
- **Renewable Energy Feed-in Tariff (REFIT)** run by NERSA focuses on remunerating Independent Power Producers (IPPs) for renewable power they feed into the national grid. Further details of this programme are provided in section 3.1.
- **Renewable Energy Finance and Subsidy Office (REFSO)** was established in 2005 with the mandate to:
    - Manage renewable energy subsidies and
    - Offer advice to developers and other stakeholders on renewable energy finance and subsidies.

  The key objective of the subsidy systems is to increase the share of renewable energy in the country's energy supply mix. The subsidy system provide incentives to developers and utilities to implement RE projects by reducing the risk and using the system as leverage to attract other sources of finance for RE projects. REFSO offers one-off capital subsidies to qualifying renewable energy projects and uses the following criteria:
    - projects should be located within the borders of South Africa, use commercially viable technologies, and generate at least 1 MW of power;
    - projects must have undergone pre-feasibility studies;
    - the capital costs should not exceed R100 million (however, this criterion is under review);
    - projects can receive R1,000/kW up to a maximum of 20% of total capital cost;

- a potential purchaser of the RE must be identified; and
- projects should have a high probability of reaching financial closure within 12 months.

Projects benefiting from REFSO funding can also use other financial instruments such as the CDM. The office had already subsidised two hydropower projects, as well as biogas and landfill projects. Out of the funded projects, some 17 permanent jobs and 279 temporary jobs were created.

- **Long Term Mitigation Scenarios (LTMS).** The LTMS process was mandated by Cabinet in March 2006, coordinated by an inter-Ministerial committee led by the Department of Environmental Affairs and Tourism, and the project was managed by the Energy Research Centre at the University of Cape Town. The scenarios were developed by a scenario-building team that included strategic thinkers from key stakeholders across government, business and civil society, informed by four research teams.

  The LTMS sets a pathway for long-term climate policy at national level. Cabinet will need to consider the LTMS strategic options and set policy directions. The Minister of Environmental Affairs and Tourism announced the key results during his Budget Vote speech, indicating that they had been initially presented to Cabinet and would be considered (with implementation plans) during the third quarter of this year. Following that, the LTMS is expected to "inform a legislative, regulatory and fiscal package" to give effect to mandatory policy. Once it comes to implementation, the big picture of the LTMS strategies will need to be translated into efforts by each sector.

  The LTMS also sets out to inform the country's position on multilateral negotiations. South Africa is proactively engaging in the multilateral climate negotiations, which will likely agree on the future of the climate regime by 2009. South Africa has broadly indicated that it is "willing to do more". In the next two years, numbers will need to be put to that willingness to take responsibility (Winkler, 2008).

- **SAWEP** The South Africa Wind Energy Programme (SAWEP) originated from the declaration by the Minister of Minerals and Energy (DME) in June 2000 in relation to the development of the Darling National Demonstration Wind Farm. The SAWEP now has many extended roles and responsibilities. The SAWEP assists in designing detailed financial instruments to stimulate commercial wind energy developments, as well as a Clean Development Mechanism (CDM) status report with recommendations for defining a baseline and Continued support for the REFIT.

  SAWEP has developed and implemented a green power guarantee fund hosting agreement between DME and Development Bank of South Africa (DBSA). This was coupled with green power marketing activities for selected urban centres which was designed and actively supported by UNDP/GEF. A system for Tradable Renewable Energy Certificates (TREC) has been designed, set-up and is under implementation by the DME and is supported by SAWEP.

  SAWEP is also involved in wind resource assessment, by assisting interested public and private entities with the generation of reliable wind energy data and other necessary information for wind energy development. They have assisted with the implementation for the establishment of a Wind Atlas for South Africa identifying the preliminary wind hot spots for wind energy project development. The SAWEP initiates capacity building workshops and seminars regarding the application of the wind atlas and database. In addition, SAWEP also engage in capacity building and strengthening South African institutions and support key government departments (both national and provincial environmental departments), public agencies, wind farm industry and independent private firms involved in wind energy development.

2 Western Cape Renewable Energy Resource Overview

2.1 Introduction

The Western Cape Province has significant renewable energy resources, in particular wind, but also solar, hydro, wave, waste and biomass. This section reviews the renewable energy resource potential for power generation and the associated indicative energy production costs.

2.2 Wind Energy

2.2.1 Overview of Wind Resource

Figure 2.1 shows an overview of the wind energy resource in South Africa. It is noted that this is purely for indicative purposes and does not provide a fully accurate and reliable wind map as the data is extrapolated from data from Weather Service Stations.

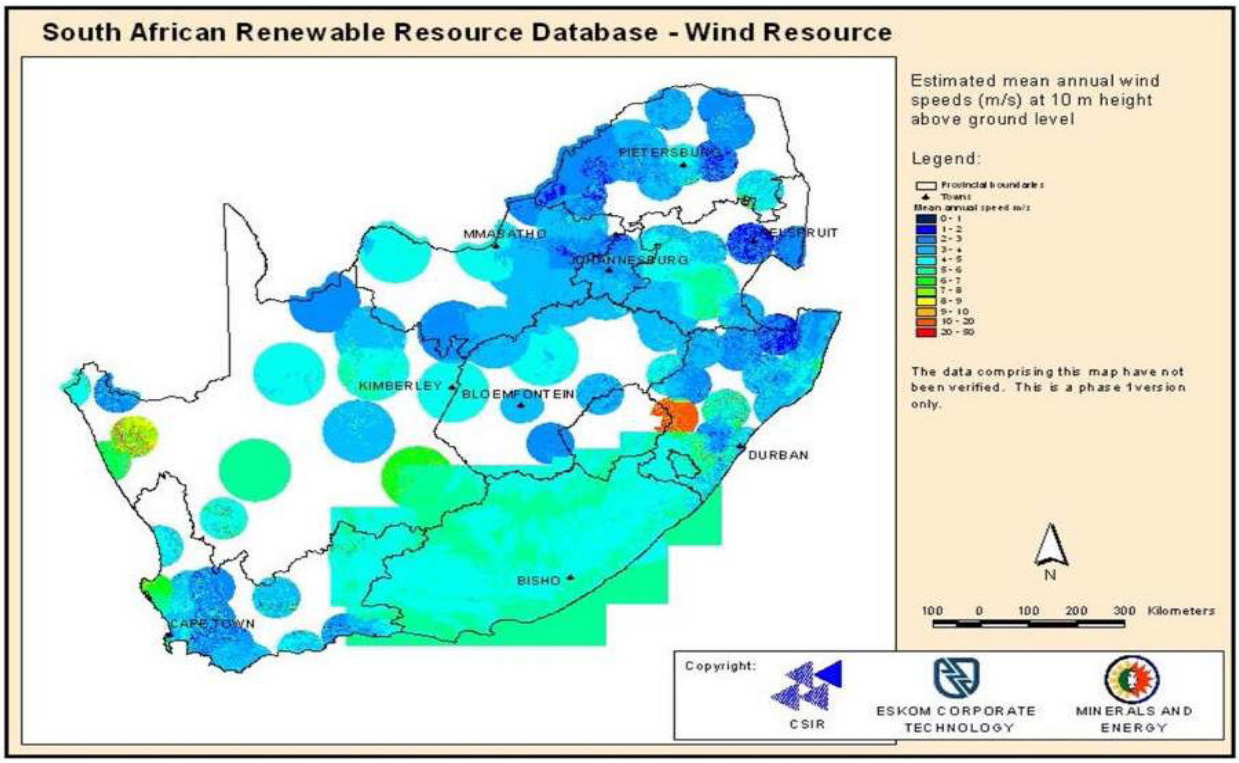


Figure 2.1: Overview of Wind Energy Resource in South Africa (DME/CSIR/Eskom 2002)

The renewable energy resource database developed by DME, CSIR and Eskom in 2004 classified the wind resource in Western Cape into three broad categories, namely:

- low capacity factor sites;
- medium capacity factor sites; and
- high capacity factor sites.

The capacity factor is an indicator of how much energy a particular turbine will make in a particular site or place. The mean annual wind speeds at 70m, the provincial land area (km^2) and the provincial land coverage (%) are as shown in Table 2.1.

Table 2.1: Western Cape Wind Resource Category Areas (Source: Renewable Energy Plan of Action for Western Cape)

Category	Mean Annual Wind Speeds at 70m (ms^{-1})	Provincial Land Area (km^2)	Provincial Land Coverage (%)
High Capacity Factor Sites	$8ms^{-1}$ and above	$3,820km^2$	4%
Medium Capacity Factor Sites	Between $6ms^{-1}$ and $8ms^{-1}$	$19,452km^2$	23%
Low Capacity Factor Sites	Below $6ms^{-1}$	$62,250km^2$	73%

Figure 2.2 indicates average annual wind speeds at 10m above ground level and the relevant transport and electrical infrastructure for the Western Cape. This was taken from the renewable energy resource database (DME/CSIR/Eskom 2002).

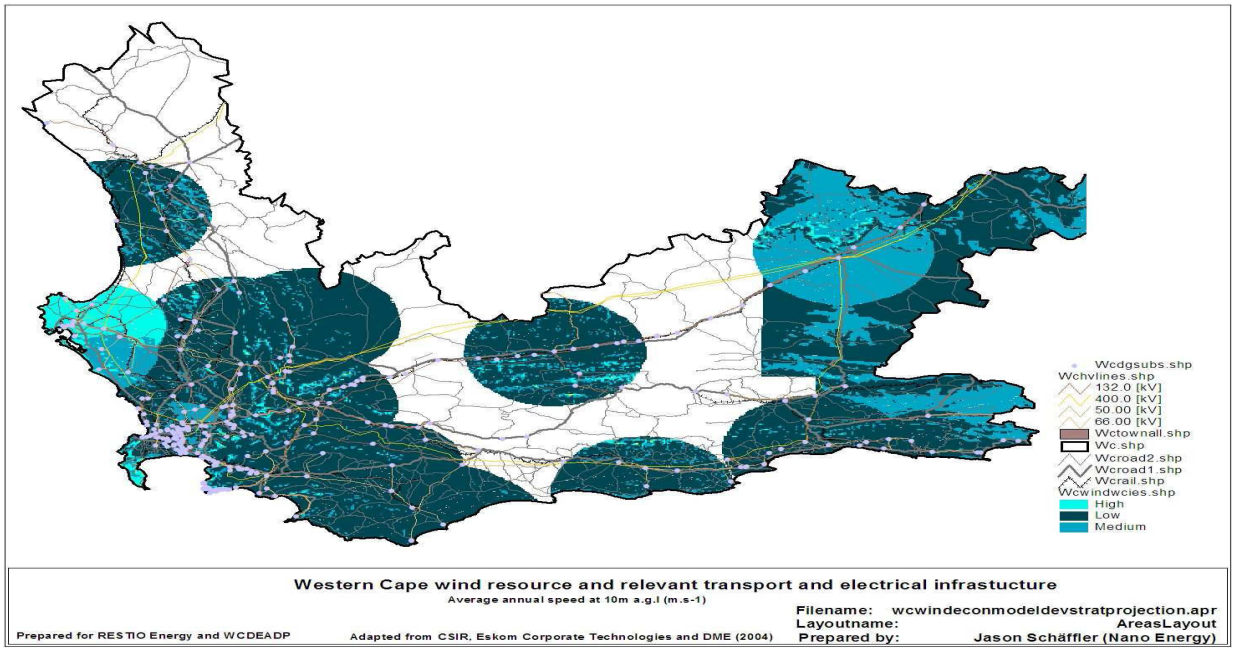


Figure 2.2: Western Cape Wind Resource and Relevant Transport and Electrical Infrastructure

2.2.2 Wind Resource Potential

Publicly available wind resource information is not good enough to facilitate accurate estimate of the wind resource potential. However, a study by Banks and Schäffler (D:EA&DP 2007) estimated that there is sufficient available land in areas with medium to high wind resource potential to conservatively justify installation of 3,100 MW in on-shore locations in the Western Cape. This was undertaken through a mapping exercise overlaying wind resources and relevant transport and electrical infrastructure (power lines) and taking into account recommendations of a provincial report on land use requirements. The assessment assumed only 1 MW per km^2 of land used for wind farms. In addition, the study estimates more than 1,500 MW potential for offshore

development in the longer term. The grid study carried out by Eskom in 2009 under the same programme as the Regional Regulatory Action plan identified the key grid reinforcement issues.

The results of the study indicate that an initial 3,000MW could be brought on line without major reinforcement of the existing network. Once generation capacity for wind has gone beyond this, then further grid reinforcement would be required.

2.2.3 Cost Indications

Wind and hydroelectric power generation have negligible fuel costs and relatively low maintenance costs. Wind power has a low marginal cost and a high proportion of capital cost. The estimated total capital cost of large multi-megawatt wind-based electricity generation plants range from R8 million to R11 million per Megawatt (D:EA&DP; 2007). Wind electricity generation costs have been estimated to range from about R0.40 to R0.70/kWh depending on the wind regime in which the turbine operates (DME 2004a), however it is considered that this is underestimated based on today's prices and is more in the range of R1/kWh.

A British Wind Energy Association report gives an average generation cost of onshore wind power of around 3.2 British pence (between US$0.05 and US$0.06 cents) per kWh and around 5.5 p/kWh for offshore (BWEA report on onshore wind costs; 2005). Generally wind power is one of the most financially viable renewable energy based generation technologies, and in favourable conditions wind can compete directly on commercial terms with conventional energy options. Cost per unit of energy produced was estimated in 2006 to be comparable to the cost of new generating capacity in the US for coal and natural gas: wind cost was estimated at US$55.80/MWh, coal at US$53.10/MWh and natural gas at US$52.50/MWh (International Energy Outlook, 2006).

2.3 Hydro

2.3.1 Overview of Hydropower Resources

Figure 2.3 gives an overview of hydropower resources in South Africa.

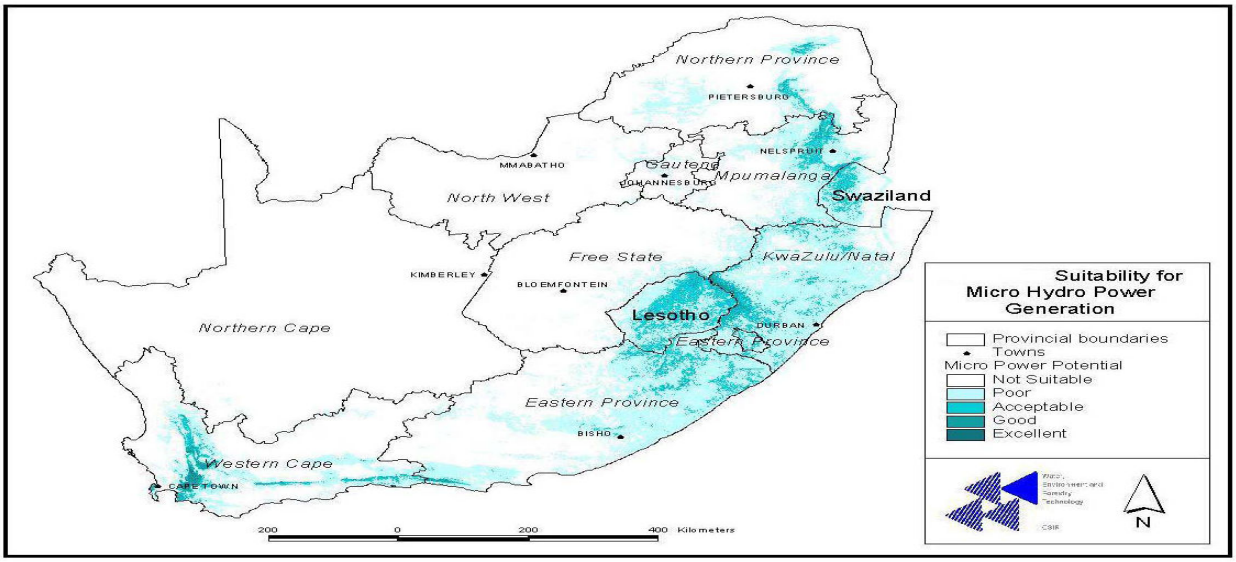


Figure 2.3: Overview of hydropower resources in South Africa (DME/CSIR/Eskom 2002)

2.3.2 Hydropower Potential

The potential for hydropower generation is generally low in the Western Cape Province. The resource potential has been assessed using two plant types, namely primary power generation units and pumped storage units.

Prior work and more recent site specific work conducted by Barta (2007) revealed that there is a reasonable scope for small hydropower generation within the province as shown in Table 2.2.

Table 2.2: Western Cape Small Hydropower Generation Opportunities

Known Potential	Desk Study Potential (Existing large dams)	Desk Study Potential (Revitalisation of schemes)
6.5 MW	13.0 MW	2.0 MW

The desk study potential is mainly from about 43 large existing large dams in the province. An assessment by Barta (2007) further reveals that some 25 of these dams can be equipped with small scale hydropower installations ranging between 0.3 and 1.0 MW to deliver a total capacity of 13 MW. The estimated potential is based on the National Water Act requirements for regular releases to the rivers from these dams. Revitalisation of existing schemes such as those at Ceres and Worcester could add an additional 2.0 MW.

Existing pumped storage schemes in the Western Cape are shown in Table 2.3.

Table 2.3: Existing pumped storage schemes in the Western Cape

Name	Installed Capacity (MW)	Source
Palmiet	447 MW	NER 2004
Steenbrass	180 MW	NER 2004

A recent study (Barta, 2007) estimated the potential for new pumped storage capacity to be about 1,800 MW, as shown in Table 2.4.

Table 2.4: Potential pumped storage sites

Site	Estimated Capacity (MW)
Elandsberg Pass PSS (near Tulbagh)	1,200 MW
Matsikamma PSS (near Vredendal/ Vanrhynsdorp)	600 MW

2.3.3 Cost Indications

Hydropower costs are highly variable and tend to be site specific, i.e. depend on the specific civil engineering work required to build the necessary dams or water off-takes, as well as the transmission distances. Hydroelectric power generation has negligible fuel costs and relatively low maintenance costs. The Long Term Climate Mitigation study conducted by ERC used an estimated cost of R0.47/kWh for small hydro power. The costs of storing electricity in pumped storage schemes depend strongly on efficiency and how much power is drawn on a daily basis from the unit (the effective capacity factor).

2.4 Solar Energy

2.4.1 Solar Energy Resource Overview

The Western Cape Province has a good solar energy resource by international standards. Solar radiation varies from 6,501 – 7,000 MJ/m^2/pa across the province. An overview of the solar energy resource in South Africa is shown in Figure 2.4. (Note: 1,300 MJ/m^2/year = 1 kWh/m^2/day).

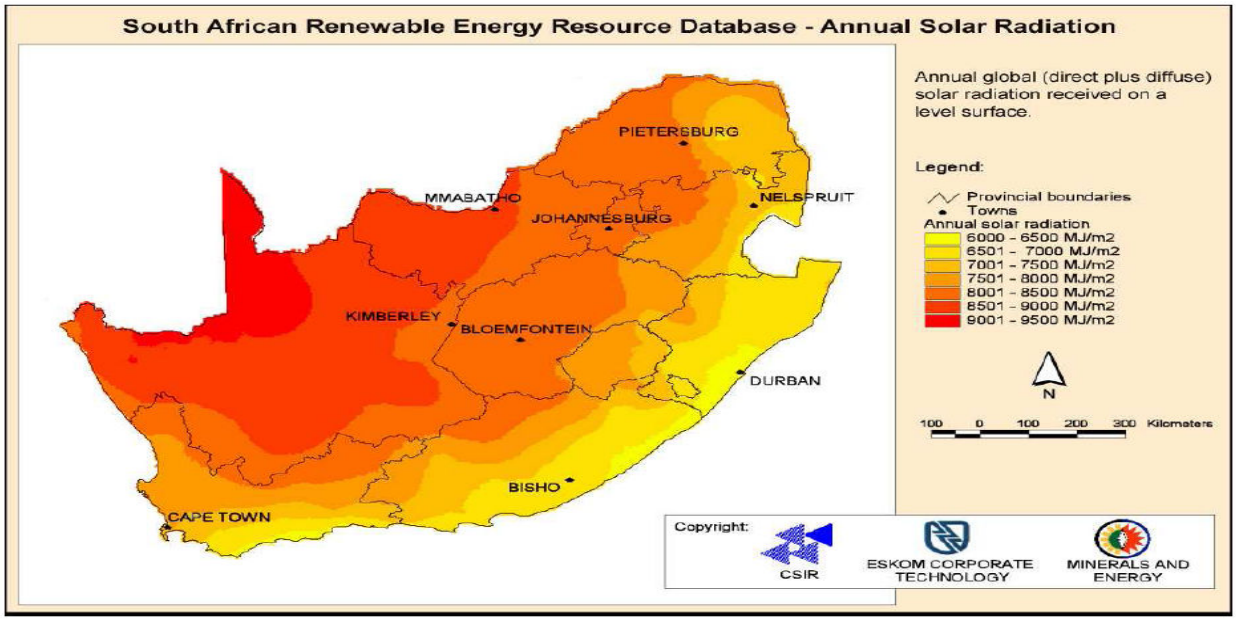


Figure 2.4: Overview of the Solar Energy resource in South Africa (DME/CSIR/Eskom 2002)

2.4.2 Solar Energy Potential

The solar energy potential in the Western Cape can be described as medium to high. Technologies, which can be harnessed to either generate electricity from solar include:

- Solar Photovoltaic (PV) electricity generation; and
- Concentrating solar power (CSP).

2.4.2.1 Solar PV Potential and Cost Indications

Solar PV can be used for both off-grid and grid-connected applications. The potential scale of application of solar PV electricity generation is not limited by the resource, but more by costs, industry growth rates and by the fact that electricity cannot easily be stored. Capital costs for solar PV electricity generation are in the range R27,000 to R46,500 per installed kW. These price ranges correspond to energy prices of between R1.22 and R2.16/kWh (D:EA&DP, 2007). Bekker (in press) has calculated the cost of energy from PV for a range of locations in South Africa, and came up with prices of R1.66 to R1.72 for De Aar, and R1.77 and R1.93 for Cape Town (using a maximum power point tracking inverter). Other locations have prices more in the R2.00 to R3.00 range. Recent studies indicate a price of around R3.00/kWh.

2.4.2.2 Potential for CSP and Cost Indications

Western Cape has a significant potential for large-scale CSP, with a potential site area of 294km^2. Assuming land use of 28km^2/GW (Pletka et al., 2007), this translates into a power generation capacity of 10.5 GW (University of Stellenbosch, 2009). This generation capacity will translate to a net annual generation of 35.7 TWh, assuming that the plant would operate at an average capacity factor of 38.8 percent (Pletka et al., 2007). It is important to note that though the Northern Cape has the best potential for CSP of 510.3 GW, the lack of water in that province is likely to push a big portion of a large-scale roll-out of CSP into other provinces.

The concentrating solar power industry saw many new entrants and new manufacturing facilities in 2008 (REN21 Renewables Global Status Report 2009). Two new CSP (thermal) power plants came online in 2008 – 50 MW plant in Spain and a 5 MW demonstration plant in California. The

pipeline of projects under development or construction increased dramatically during 2008, to more than 8 GW by some estimates, with over 6 GW under development in the United States alone. In South Africa, Eskom is assessing the feasibility of CSP. The focus of Eskom's efforts has been on a possible 100 MW CSP plant in the Northern Cape Province (Eskom, 2008).

Indicative capital costs and energy costs are in the region of R33,500/kW and R1.61/kWh respectively (Eskom Presentation, Van Heerden, 2007). These indicative costs were derived using reference capital and operating costs from a Spanish plant, which has similar radiation conditions. However, it does not take into consideration anticipated cost reductions due to significant local production as local industry develops.

2.5 Wave Energy

2.5.1 Wave Energy Resource Overview

South Africa's coast has the potential to generate between 8,000 MW and 10,000 MW of wave power (Engineering News, February 2008). The majority of this potential is concentrated in the west and south coasts of the country. Availability of appropriate technology to develop the resource still needs to be assessed.

2.5.2 Wave Energy Potential in Western Cape

There is high potential for wave energy development in the Western Cape. Significant resources are along the West Coast particularly Cape Columbine through to the Cape Agulhas area. Job creation potential is still to be quantified but could be significant. A summary of the potential in Western Cape is shown in Table 2.5 (Source: Banks & Schäffler, 2007).

Table 2.5: Initial estimate of the potential wave energy resource in the Western Cape – theoretical potential in MW

Region	Length of Coast (km)	Average Energy kW/m	Theoretical Potential
Hoekbaai to Cape Columbine	280	30	8,398
Cape Columbine to Marcus Island	54	45	2,420
Marcus Island to Mouille Point	252	40	10,071
Mouille Point to Cape Point	85	40	3,389
Cape Point to Kaap Hangklip	128	40	5,100
Kaap Hangklip to Danger Point	110	25	2,756
Danger Point to Northumberland	110	20	2,204
Northumberland Point to Bloukrans	525	13	6,820
Total			**41,158**
Assume that practical limitations limit access to 10% of this			**4,116**

(Source: Renewable Energy Briefing Paper; TIPS, 2008)

From Table 2.5 it seems quite feasible to consider that more than a 1,000 MW of wave power plant could be installed in the Western Cape.

2.5.3 Cost Indications

More work still need to be done to come up with indicative costs for wave power generation in Western Cape. Prior work by Banks and Schäffler in 2007 indicated costs of the order of R18,000/kW installed. However, a more conservative base figure of R25,000/kW was used, given that wave power plants would have high costs for connection to the grid. Expected generation costs are around R0.71/kWh (D:EA&DP, 2007). It is important to note that cost per kWh depends on the resource utilization factors, among other considerations.

2.6 Waste Management Systems

Western Cape has high potential for energy recovery from waste, especially from landfills.

2.6.1 Landfill Gas: Potential and Cost Indications

Landfill sites generate methane gas as a result of the decomposition of the biomass components in municipal waste. Landfill gas projects are viable and can benefit from the Cleaner Development Mechanism (CDM). Table 2.6 shows estimates of energy production potential.

Table 2.6: Landfill Gas Potential by Landfill Site (Source: Lombard de Mattos & Associates 2004)

Landfill	2005 (MWe)	2010 (MWe)	2015 (MWe)
Vissershoek CMC	3.0	9.0	5.5
Bellville South	2.0	2.5	1.5
Coastal Park	1.0	2.0	2.0
Swartklip	1.0	1.5	2.0
Brackenfell	0.0	1.0	0.5
Faure	0.0	0.5	0.5
Total MWe Potential	**7.0**	**16.5**	**12.0**
GWh	**61.3**	**144.5**	**105.1**

Production costs for landfill gas-based electricity generation are estimated to range from 17 to 30c/kWh (DME, 2004a). Costs depend primarily on the size of the generating unit.

2.6.2 Waste Gasification: Potential and Cost Indications

City of Cape Town hosted a workshop on “Alternatives to Land filling of Waste” in 2007. One presentation (Droste, T, 2007) discussed options for establishment of a plant that could treat 500,000 tons/annum. This could generate 3.56 Million GJ of syngas, which could be used directly for thermal applications. If it were used to generate electricity at 35 percent efficiency, the output would be 346 GWh, or equivalent to a 40 MW electrical generator running at 100 percent capacity factor. Costs for this power are not available at present, and are of course strongly dependent on the fee paid to the plant for the waste processing service that it renders. Syngas from municipal waste production plants have already been established on a significant scale in Japan and other countries. It is also necessary to note that there are several concerns regarding thermal treatment of waste, in particular related to the emissions from such plants, as well as a tendency for people to see this as an alternative to recycling. Minimisation of waste streams, re-use and re-cycling should be prioritised.

2.6.3 Sewerage: Energy Potential and Cost Indications

There is potential for generating energy from processing of sewage waste from large urban plants. The process also presents benefits for water saving and reducing the need for large capital intensive plant expansion as existing city sewage treatment plants need expansion. Prior study (D:EA&DP, 2007) estimate potential electricity production of less than 10 MW.

2.7 Biomass

Biomass has the potential to contribute to Western Cape energy needs through a wide range of resources and conversion processes.

2.7.1 Overview of Biomass Resource

Figure 2.5 shows an overview of biomass resources in South Africa.

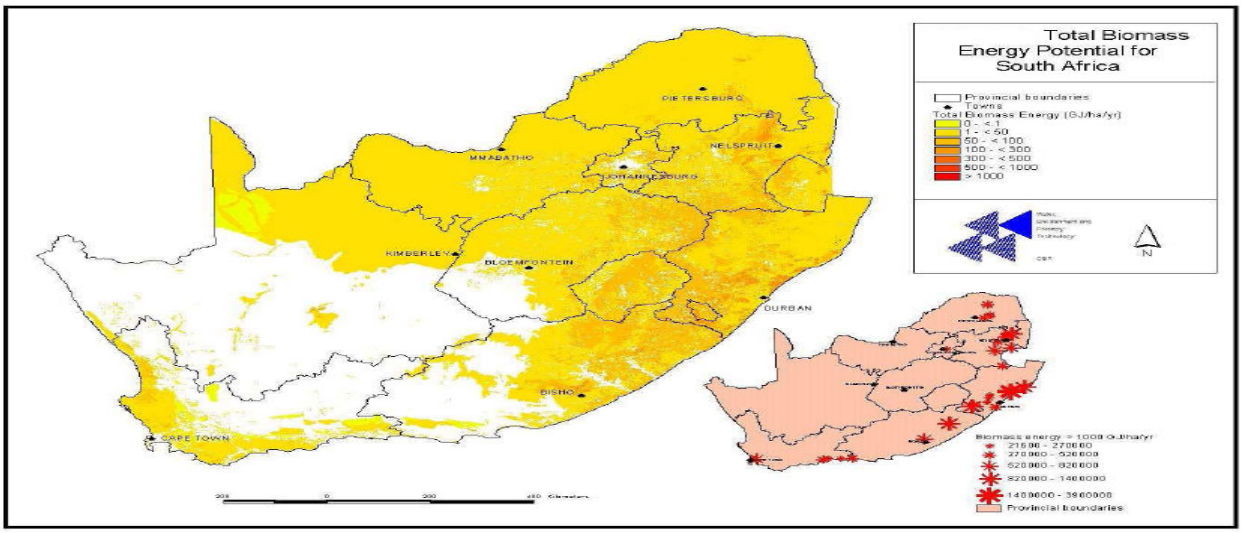


Figure 2.5: Overview of the National biomass resource in South Africa (DME/CSIR/Eskom 2002)

Key biomass resources are reviewed in the following sections.

2.7.2 Biomass Power Generation

There is potential to use forest products, and more specifically forest waste to generate electricity and process heat. The Western Cape has comparatively limited resources, compared to provinces such as KwaZulu Natal and Mpumalanga.

Figure 2.6 and Figure 2.7 show the estimated energy content of forest biomass waste, and sawmill waste by province in South Africa.

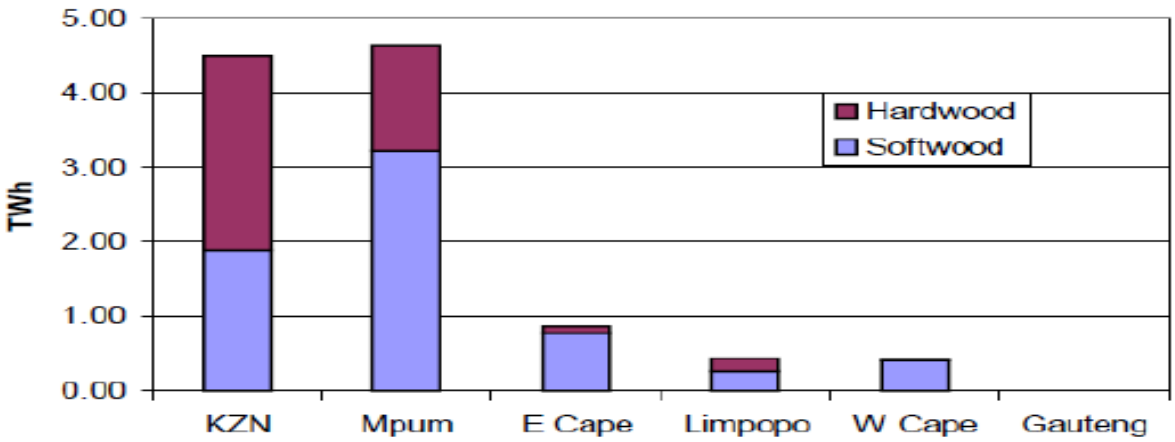


Figure 2.6: Energy content in forest biomass waste by province (DME, 2003)

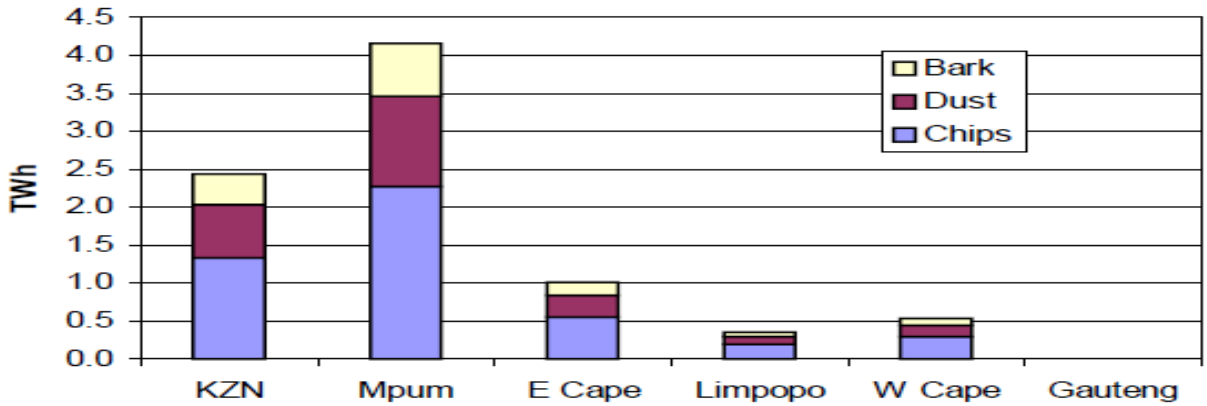


Figure 2.7: Energy content of sawmill waste by province (DME, 2003)

The estimated energy content of forest biomass waste and sawmill waste in the Western Cape is about 0.40 and 0.55 TWh respectively. This is equivalent to a 35 MW power plant, operating at 25 percent efficiency and 68 percent capacity factor (D:EA&DP, 2007). However, medium term potential is not much more than about 12 MW (Reynecke, 2007). Biomass based power generation is highly variable and depends much on whether the resource is grown as an energy crop or made available as a by product of other processes.

2.8 Summary of RE Power Generation Potential

Table 2.7 show a summary of the estimated renewable energy power generation potential for the Western Cape Province. Even though these numbers indicate that renewable energy could supply a substantial part of Western Cape's pressing energy demands, it is noted that these are pretty low resource estimates. It is assumed that this is what could be developed in the short- to medium-term, whereas the true potential may be considerably higher. In particular, the number of applications for onshore wind is in the region of ten times the figure estimated in the studies. It is also noted that many of the prices for necessary tariffs are under estimated based on today's prices for construction and development.

Table 2.7: Summary - RE Power Generation Potential

RE Resource	Power Generation Potential (MW)

RE Resource	Power Generation Potential (MW)
Wind • Onshore • Offshore	 3,100 MW 1,500 MW
Hydropower • Primary Power Generation • Pumped Storage	 15 MW 1,800 MW
Wave Power	4,116 MW
Waste Management Systems • Landfill Gas • Waste Gasification • Sewage Waste	 12 MW 40 MW 10 MW
Biomass	12 MW
Solar • CSP • Other technologies	 10,500 MW Potential scale of application not limited by the resource.
Total	**>21,105 MW**

3 South African Renewable Energy Feed-in Tariff

3.1 Basic Principles

At the end of 2007, NERSA commissioned the development of a Renewable Energy Feed-in Tariff (REFIT) for South Africa, under its authority to regulate electricity tariffs in the country. The feed-in tariff requires the Renewable Energy Purchasing Agency (REPA), in this case Eskom's Single Buyer Office (SBO), to purchase renewable energy from qualifying generators at pre-determined prices. These predetermined prices act as an incentive to renewable energy developers and private investors by reducing financial risk and providing market certainty.

The REFIT was finally launched in March 2009 and is aimed at supporting the government's 10,000 GWh 2013 renewable energy target and promoting competitiveness for renewable energy with conventional energies in the medium and long-term.

The key objectives of the REFIT are to:

- Create an enabling environment for renewable electricity power generation in South Africa;
- Establish a guaranteed price for electricity generated from renewables for a fixed period of time that provides a stable income stream and an adequate return on investment;
- Create a dynamic mechanism that reflects market, economic and political developments;
- Provide access to the grid and an obligation to purchase power generated;
- Establish an equal playing field with conventional electricity generation; and
- Create a critical mass of renewable energy investment and support the establishment of a self sustaining market.

The REFIT only includes power generation from renewable energy generators connected to the transmission and distribution systems and thus excludes off-grid power generation. There is however interest in exploring a REFIT for the establishment of isolated mini-grids in the future to help address national issues related to access to electricity.

All renewable energy power generators under the REFIT will require a generation licence issued by NERSA and a Power Purchase Agreement (PPA) with the REPA. There are proposals that in the long-term, the REPA and possibly the SBO are to be housed external to Eskom to ensure greater independence.

In addition, in order to support the growing green electricity market, NERSA has also permitted IPPs to sell power directly to entities willing to buy renewable energy outside the REFIT, provided that a generation licence has been granted.

3.2 Technologies

Phase 1 of the REFIT was launched in March 2009, with four priority technologies, namely, landfill gas, small hydro, wind and concentrating solar power (CSP). These, were selected on the basis of the 2004 Department of Minerals and Energy (DME) financial and economic study which focused on the optimal mix of technologies required to fulfil the country's RE targets. Biomass pulp and paper and sugar bagasse were excluded from Phase 1, because of the inclusion of these technologies in the Pilot National Cogeneration Programme (PNCP) implemented by Eskom within the same period when the REFIT was being developed. However this programme was not successful in terms of getting projects off the ground.

Phase 2 was published in October 2009, following public consultation, and includes the following additional technologies:

- biomass solid waste, however pulp and paper, bagasse and projects based on mill waste from industrial processes remain classified as cogeneration and presently excluded from the REFIT;
- biogas through anaerobic digestion;
- building integrated and ground-mounted large-scale solar PV systems with a capacity greater than 1 MW;
- CSP with a capacity greater than 10 MW, mounted on a two-axis tracker on the ground; and
- CSP without storage and central tower technology (CTT) with six hours of storage a day.

Wave energy, tidal energy and geothermal renewable technologies are also excluded as they are presently viewed as non-commercial, but could be considered in the future.

Concentrating PV is also not included at this stage, owing to the high economic cost, and fossil fuel will be allowed for the CSP technology, but will be limited to a maximum of 15 percent of the total primary energy input.

Small scale grid connected PV systems are also not included under Phase 2, however NERSA has stated that small-scale producers are likely to be included in Phase 3 of the REFIT, due in the second quarter of 2010.,

In addition to proposing the addition of new technologies to the REFIT, NERSA also published, for public review and comment, a draft PPA to assist in reducing the risk to developers and speed up the process of getting projects on line. The PPA was modified based on a PPA used under Eskom's Medium-Term Power Purchase Programme (MTPPP) in 2008. The public comments received on the PPA will be reflected in the final revision of the PPA scheduled for the end of November 2009. The other commercial agreements such as direct agreement, fuel supply agreement and transmission connection agreement will be considered for inclusion in the PPA. NERSA has also indicated that the standardised Direct Agreement, Fuel Supply Agreement, Transmission Connection Agreement, and Transmission Use of System Agreement would be included as schedules of the PPA, in the first yearly review of the REFIT.

3.3 Tariffs

The tariffs set out in the REFIT are generous when compared to international feed-in tariffs and cover the cost of generating renewable energy plus a "reasonable profit" to encourage developers to invest. The tariffs are competitive globally and have been designed to take into account the higher risks associated with project development in a new environment, where there may be greater challenges in terms of finalising power purchase agreements and actually getting grid connection.

Table 3.1 provides the REFIT Phase 1 tariffs, which have been published and gazetted by NERSA and Phase 2 tariffs, which have recently been published.

Table 3.1: REFIT tariffs

	Technology	Tariff(R/kWh)
Phase 1	Landfill gas power plant	0.90
	Small hydro power plant (less than 10MW)	0.94

	Wind power plant	1.25
	Concentrating solar power (CSP) with storage	2.10
Phase 2	Concentrating solar power (CSP) without storage	3.14
	Biomass solid	1.18
	Biogas	0.96
	Photovoltaic systems (Large ground or roof mounted)	3.94
	Concentrating Solar Power (CSP) Central Tower with storage capacity of 6 hours	2.31

3.4 Key Issues

3.4.1 Grid connection and Licensing Procedures

It is generally considered that there are three primary challenges to getting renewable energy generation on line, firstly the price (which is now being addressed by the REFIT), secondly the PPA (a draft is proposed under REFIT Phase 2), and finally the actual grid connection.

Although the REFIT guidelines provide a basic structure for the implementation of the programme, further clarity is still required on key issues such as the pre-qualification criteria, licensing process, and fixed timelines. Some of these issues are presently under discussion.

Pre-qualification criteria:

This is still an issue which appears to be an ongoing debate and is of major concern to developers. In order to quantify the potential market and make sure only good quality projects are brought on line, it is understood that a pre-qualification process may be proposed as part of the REFIT application process. Although this issue has not been finalised, this could have the effect of discouraging a certain amount of investment in renewables and increasing risk to developers and investors. Experience in other countries in the establishment of FITs shows that certain parties, including utilities have also proposed combining a tender with a FIT, however this proved to be unworkable and was rejected. The integration of any tendering processes would also significantly increase the costs of project development and would also slow down the project development process. A decision on this issue is awaited.

Single Buyer Office:

According to a Cabinet paper, Eskom was appointed as the single buyer of electricity in the country, with both the right and obligation to buy power. The need for a single buyer is justified in the country due to the small power market in which the various players operate. At present, it is considered that the market is not large enough or diverse enough to sustain multiple power buyers.

In response to this, Eskom established the Single Buyer Office (SBO). Under the REFIT, Eskom's SBO was appointed as the REPA.

The office is instrumental in facilitating investment in renewable energy in South Africa and because the SBO is critical for the take-off of the renewable energy industry and is responsible for the power purchase agreements between Eskom and IPPs, many industry players are calling for its independence from Eskom.

Although there is general agreement on the need for an SBO, there are concerns and questions about its impartiality since it is established within Eskom, and that it will not favour or support smaller power projects.

It is understood that there are proposals and discussions to house the SBO externally to Eskom, however no decision has been made to date, although it is understood that a draft bill has been proposed to establish an independent System Operator.

Power Purchase Agreement:

In order to provide greater certainty to developers and investors, it has been proposed by NERSA that there will be a standardised PPA. A draft PPA, based on the MTPPP, PPA was released for public comment in August and is expected to be finalised by the end of October.

The main concerns from developers about the PPA was the greater security and therefore limited risk it provided to Eskom, compared to that for developers.

Project size:

A small number of developers have raised concerns that the SBO may only be interested in larger renewable energy projects, with a suggestion that this may only include projects above 20MW. The REFIT however focuses on all projects above 1MW.

There is therefore a need to clarify this issue to ensure that the smaller projects are not excluded from this process.

Licensing procedures:

It is expected that the detailed guidelines will be developed and published in the near future to assist and support project development in a clear and transparent manner. These guidelines will also need to clearly specify the detail application process, identifying the roles of particular stakeholders, and also defining the timelines for the relevant authorities to address and respond to the various issues.

It is expected that these guidelines will also provide guidance on the specific obligations for the REPA, and therefore Eskom's Single Buyer Office, to purchase power.

Grid Connection:

The REFIT states that the developer is responsible for the shallow grid connection and that the utility is responsible for any grid upgrades. Although this principle is agreed, the precise mechanisms have not been put in place. This is of particular concern to a number of wind developers who have some sites identified, but could be facing a four year delay, which is the present timeline for such network upgrades.

3.4.2 Cost Recovery and Capacity cap

To date, no PPAs have been signed by the SBO, due to concerns and a lack of clarity on the cost-recovery mechanisms. Although the REFIT indicates that the costs of the REFIT will be recovered from all electricity consumers using existing pass-though mechanisms, there are concerns about the potential impacts on electricity prices if there is a high interest from developers and extensive project development. High electricity prices could have significant negative socio-economic impacts both for industry but also the country's poor.

As a means to address this, proposals have been made to put in place limitations on capacity for the various technologies. The capacity cap was provided for in the initial guidelines to allow some measure of control for NERSA on power projects, with the overall aim of preventing significant increase in consumer electricity prices in the event of major take up of the REFIT. Although the level of the cap is not specified, NERSA has the mandate to exercise this if it is considered necessary.

The concern from developers is that irrespective of what the renewable energy resource availability is in the Western Cape Province and throughout the country, it is possible that there may be limits on the amount of renewable energy projects that NERSA will approve and licence and the SBO will contract to purchase electricity from.

A renewable energy installation cap under the REFIT for all of South Africa would lead to a finite amount of renewable energy projects which would be approved for the feed-in-tariff. This would provide major uncertainty for investors and developers and would remove long-term security for the programme. In other countries, the implementation of a capacity cap has caused programmes to stall and fail.

It is therefore important that there is further debate on how this cap will be set and the implications. The first step will be to get a comprehensive understanding of the potentially viable resource and the cost implications on national electricity tariffs. Based on price projections for conventional power, many of the REFIT technologies will be competitive in the short- to medium-term with only solar PV and CSP requiring mechanisms to limit consumer tariffs increases.

3.4.3 Small-Scale RE Projects

Since the introduction of the REFIT, there have been calls from non-governmental organisations, private sector, lobby groups and the general public to include small-scale projects in the REFIT, as these are presently excluded. NERSA has indicated that this will be included in Phase 3.

It is noted that there are two key challenges to small scale projects.

Firstly, under the Electricity Regulation Act (Act No. 4 of 2006), all generators connected to the national grid require a generation licence, issued by NERSA. For the numerous small-scale projects, this could pose a significant capacity burden on the Regulator in terms of processing the licences. It is possible for the Minister of Energy to issue a notice to exclude certain technologies for example small scale solar PV, however it may be more advantageous to establish a small-scale generation licence in order to monitor projects connected to the grid. Such a licence could be simplified in terms of the application and approval process.

Secondly, the role of Municipalities is of importance and needs to be taken into account as these are the bodies that manage many of the municipal electricity networks and would be the ones most likely to interface with small-scale renewable energy generators. Their precise role and potential obligations needs to be defined.

3.4.4 Other technologies

Although phases 1 and 2 provide a REFIT for a wide range of technologies, there are still certain omissions that could be brought on at a later date, for example wave, tidal, bagasse and pulp and paper waste. This needs further analysis to define the status of the technology development and also if the REFIT is the most appropriate mechanism for support in the short- to medium-term.

In addition, it is possible that an off-grid REFIT may be considered in the future for mini-grids and isolated grids, taking into account the need for increasing access to electricity across the country, but also using renewables as a cost-effective and sustainable approach.

4 Process Map

The process map below includes the main regulatory steps that a renewable energy developer needs to go through to establish a project. These include those steps related to the environmental impacts of the project as well as the specific steps related to securing access to the electricity network and the sale of power generated. It should be noted that the process map is not a comprehensive developer's guide and focuses only on the renewable energy regulatory framework in South Africa and the Western Cape Province. The process map is also not a comprehensive repository of all the relevant regulatory information and provides links to information sources and regulatory departments where appropriate.

Technology

The process map primarily focuses on wind projects and generally notes specific policy or regulatory requirements relevant to wind power projects. However, where there are important regulatory processes or requirements that are specific to other renewable energy technologies these are noted.

Timeframes

Where specific timeframes are outlined in legislation or in the policy of government regulators these are noted. However, in many cases there are no specified timeframes and only an indication of the likely time required for a specific process can be provided.

The process map does indicate where regulatory processes can be followed in parallel and where particular regulatory steps are contingent upon the completion (or initiation) of other steps or processes.

Proactive planning and Strategic Environmental Assessment

In addition to the various regulatory steps in the process outlined below it is important to note that there is also a strategic initiative developed by the Western Cape Province to facilitate wind energy projects. This initiative has developed a regional approach to the location of wind developments. The approach is established as a Strategic Environmental Assessment and is intended to be used as a proactive regional planning tool to encourage the introduction of wind energy developments in the Western Cape. This initiative is discussed further below.

It should be noted at the outset that the framework, referred to as the "Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape" has important implications for the evaluation of individual EIAs. When entering an EIA process for wind projects, developers should include consideration of this regional strategy in their EIA application process.

4.1 Regulatory Processes

The regulatory processes required for a typical development have been divided into the following categories. It should be noted, and will be explained further below, that some of these categories overlap to a certain degree – for example, while the EIA process is legally distinct from processes around land-use planning there is significant interaction between these processes. An EIA is unlikely to receive approval if it conflicts with land-use plans or policy and similarly a change in land-use is unlikely to be approved if an EIA is not approved.

The categories used are:

- *Land Use Planning*: an explanation of the key regulations governing land-use planning and zoning at the local government and provincial level and related issues including sub-division of land and the securing of servitudes or other land use requirements.
- *Environmental Impact Assessment*: a description of the key steps and regulatory authorities in the EIA process as well as items of specific relevance to renewable energy projects.
- *Grid Connection*: the procedure and requirements for securing a suitable grid connection including interaction with Eskom.
- *Power Purchase Agreement*: the process for securing a PPA with the designated purchaser of renewable energy under the Renewable Energy Feed-in-Tariff system.
- *Generation License*: a description of the NERSA application process for a generation license and the key requirements.

- *Other Regulations*: where appropriate other potential regulatory requirements to be addressed in the project development phase will be identified. These will not be comprehensive as a renewable energy generation development will need to address a range of health and safety, labour and other regulations during construction and operation which the developer will need to address from early in the project design.

4.2 Land Use Planning

This section sets out the land development regulatory hurdles to be cleared by a prospective investor in renewable energy in the Western Cape. It assumes that the majority of proposed renewable energy developments, including wind, hydro power and solar thermal or PV, are likely to trigger off a number of regulatory requirements because they will require:

a) subdivision of land; and

b) change of use of the land.

There may be some projects where a change in land-use is not required, such as some landfill gas projects or urban solar PV projects.

A ***sub-division of land parcels*** may be required to facilitate the purchase of a smaller land parcel or may be connected to a subsequent consolidation of land parcels in order to reconfigure the cadastral boundaries of the land to meet the project's needs. In either case, where a project will require a subdivision of existing land parcels this triggers off requirements for approval in terms of the following legislation:

- Subdivision of Agricultural Land Act, 70 of 1970;
- Land Use Planning Ordinance, 15 of 1985; and, in certain cases
- National Environmental Management Act, 107 of 1998 (where there is the subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less).

Most projects will also involve a ***change of land use***. This triggers off requirements for approval in terms of:

- Land Use Planning Ordinance, 15 of 1985;
- National Environmental Management Act, 107 of 1998; and, in certain cases
- The National Heritage Resources Act, 25 of 1999.

A requirement of all these laws' procedures is that the applicants must either be the owner of the land in question or have the written consent of the land owner. If the applicant wishes to own the land then obviously he or she will need to engage in the purchase of that land by way of commercial transactions with existing land-owners.

As noted above, in most cases such purchase will require the reconfiguration of existing cadastral boundaries, hence the assumption that subdivision will be required at some point in the land acquisition process. The applicant may decide to avoid actually owning the land but rather engage in long-term leasehold arrangements with existing owners. Either way, these processes will be concluded independently of regulatory authorities, with the transactions simply having to be registered with the Registrar of Deeds and the Surveyor-General once they have been concluded.

4.2.1 Subdivision

A number of pieces of legislation need to be complied with in the case of the subdivision of land. These are discussed separately below.

Act 70 of 1970

Subdivision is likely to be needed either where parts of a farm that are suitable for renewable energy production are separated from those retained for other purposes or where various portions of various farms need to be excised from the current farms and consolidated into a new property. Currently the subdivision of any land that falls outside of what would have been a municipal boundary at the time when wall-to-wall local government came into effect requires the written approval of the Minister for Agriculture, Forestry and Water. This is in terms of Act 70 of 1970, the Subdivision of Agricultural Land Act.

Although this law was repealed in 1998 the repeal has not come into effect yet. Following a period of uncertainty as to its applicability a Constitutional Court decision in 2008 (the Stalwo case) resolved that the Act continues to apply. The Act is retained until such time as new legislation can be enacted to replace it. Draft legislation (known variously as the Sustainable Use of Agricultural Resources Bill and the Sustainable Use and Protection of Agricultural Resources Bill) has been in the pipeline at the then Department of Agriculture for more than five years. There is no certainty as to when it will be finalized and submitted to parliament. However it is highly likely that the new law will retain Act 70's requirement that the subdivision of farmland obtain Ministerial consent before it can be registered by the Registrar of Deeds.

Approval for a proposed subdivision in terms of Act 70 is obtained by submitting an application to the Provincial Department of Agriculture. The provincial Department will then consider the application and make a recommendation which is submitted to a unit in the national Department of Agriculture in Pretoria. That office then makes a recommendation to the Minister of Agriculture, Forestry and Water, who makes a decision whether or not to accept that recommendation. The Act also allows for an appeal process to the Minister in the event that the application is refused.

Land Use Planning Ordinance

Under Chapter III of the Land Use Planning Ordinance (LUPO), applicable in the Western and Eastern Cape provinces, permission to subdivide any land has to be obtained from the relevant municipality and a rezoning to Subdivision Area under some land uses/zonings is required before the subdivision can be approved. The applications for this rezoning and the subdivision may be submitted simultaneously.

The National Environmental Management Act

The National Environmental Management Act (NEMA) requires an environmental authorization for certain subdivisions. This would be addressed as part of the Environmental Impact Assessment process.

4.2.2 Change of land use

The legal processes related to a change of land use are distinct from those of sub-division although there is a relationship between the two (as noted above, rezoning has to be approved prior to approval for subdivision being granted).

Land Use Planning Ordinance

Changing the use of land – primarily in this case from Agricultural to a land-use zoning that permits, say, wind farming requires permission in terms of the Land Use Planning Ordinance as well as the National Environmental Management Act, 107 of 1998. The NEMA authorizations are dealt with elsewhere so this section focuses on permission in terms of LUPO. It is important to note that in the Western Cape there is a policy in place to the effect that an application for change in land-use may not be considered in terms of LUPO *until* the NEMA authorization has been granted. This clearly may introduce additional delays in the process.

In terms of LUPO (section 14) all land in the Western Cape that does not fall within an existing zoning scheme is 'deemed to be zoned in accordance with the utilisation thereof' with effect from the date of commencement of the relevant ordinance (Ord. 15 of 1985) (LUPO). The process entails an enquiry of a factual nature into the purpose for, and manner in, which the land referred to was actually being used as at 1 July 1986, the date on which LUPO commenced. The current use

of land, therefore, has no relevance in respect of a deemed zoning and in the case where the deemed zoning and current land use are at odds, a rezoning in terms of Section 17(1) of LUPO is required.

Thus even though land has never been formally zoned for a particular use it is deemed to be zoned in terms of the most restrictive zoning that would nevertheless permit the use on the date on which LUPO commenced. So, for example, land that was being farmed will be deemed to be zoned 'agricultural' in terms of the applicable provincial zoning regulations. A prospective renewable energy developer is therefore likely to have to rezone the land on which the renewable energy facility falls, through an application to the municipality concerned.

An applicant, unhappy with the outcome of a rezoning decision taken by a municipal Council, first has the right of appeal in terms of Section 62 of the Local Government Municipal Systems Act, 2000 (Act 32 of 2000). Once the process for applicant's exercising their right of appeal in terms of the Municipal Systems Act has been concluded, the applicant and any person who objected to such application, shall be afforded the right of appeal against such decision to the Minister of Local Government, Environmental Affairs and Development Planning in terms of Section 44(1) of LUPO.

The Western Cape province has a set of general Zoning Scheme regulations, in terms of section 8 of LUPO, that apply to all land outside of specific, municipal Zoning Schemes. There is no zoning in terms of these regulations that would specifically permit the operation of a wind farm or other renewable energy development. Unless these regulations are changed by the Provincial government the best option would be for the rezoning of the land to 'Special Zone' (paragraph 3.28 of the regulations).

The purpose of a 'Special' zoning is to accommodate a situation where 'special factors justify the creation of a new zone on the zoning map for a site or sites without justifying the creation of a new zone in the scheme regulations'. It could certainly be argued that the need to generate renewable energy is such a 'special factor'. In the longer term however it would probably make sense to revise the scheme regulations to provide specifically for either renewable energy generically or specific types of renewable energy such as wind farms, solar thermal plants, mini-hydro schemes and so forth.

4.2.3 Heritage impact

In certain cases – determined by factors that include the scale of the proposed project, whether or not there is a need to demolish or change buildings over sixty years old or whether the proposed project is on or near to a national or provincial heritage site – a permit has to be obtained from the Provincial Heritage Resources Agency, generally following the completion of a Heritage Impact Assessment. This is required in terms of the National Heritage Resources Act, 25 of 1999. In all cases it is advisable to consult the provincial Agency, or a knowledgeable heritage management consultant. Should a Heritage Impact Assessment be required – and whether or not this will be the case will depend very much on the nature and location of the proposed project – then it would be best for that to run simultaneously with any process required in terms of NEMA.

4.2.4 Sequencing

The first step for a prospective investor is to deal with the land ownership issues. He or she needs to do one of the following or, in some cases possibly a combination of the following in relation to different land parcels:

- purchase the land;
- secure a lease agreement over the land; or
- obtain the land-owner(s)'s written consent to the proposed project.

The second step is the application for an environmental authorization in terms of NEMA. This is necessary in the Western Cape before the rezoning application can be considered. It is also important to note that the project should also be in compliance with the regional Strategic

Environmental Assessment, as shown in figure 4.1. It is advisable to carry out a Heritage Impact Assessment at this stage too, should it be required. It is important to remember that the need for an environmental authorization in terms of NEMA is triggered both by the change of the land use and, in most cases, the subdivision of land (a subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less will trigger an EIA).

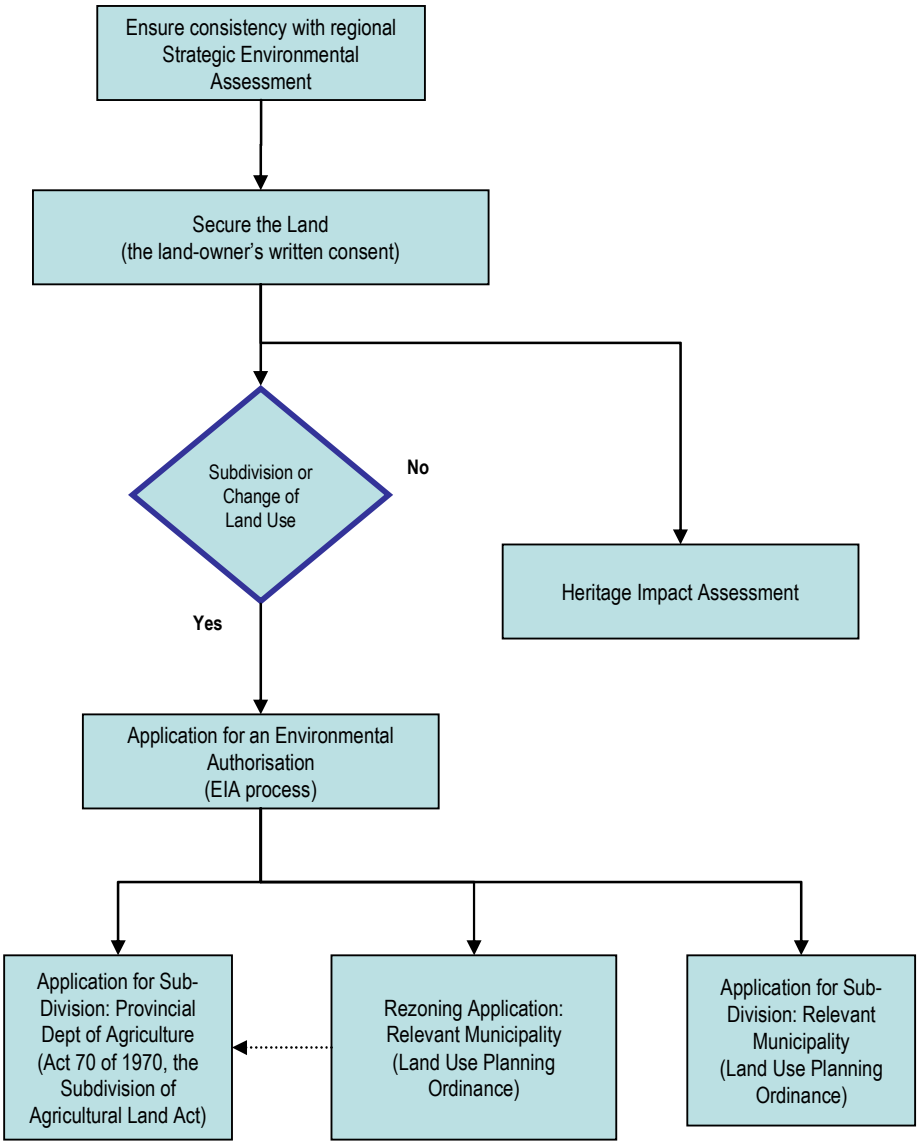


Figure 4.1: Land rezoning and sub-division sequencing

The third step is the various applications for subdivision and land use change. As indicated above in terms of LUPO subdivision cannot be permitted unless the land use zoning permits it, but the subdivision and rezoning applications can be submitted simultaneously. It is important to remember that two applications for subdivision have to be submitted, one in terms of LUPO and one in terms of the Subdivision of Agricultural Land Act, with the first submitted to the municipality and the second to the Department of Agriculture. It may well be that some municipalities have their own process of handing over subdivision applications to the Department of Agriculture.

4.2.5 Additional land use considerations

There are some additional considerations that should be considered by developers in relation to securing the required rights to land.

Land Claims

There is a specific land claims process in South Africa which was established to provide redress to individuals or communities who were dispossessed of their land due to racially motivated legislation since 1913. The Commission on Restitution of Land Rights (CRLR) and the specialised Land Claims Court were established in terms of the Restitution of Land Rights Act, No. 22 of 1994 as amended, in order to finalise land claims. The process is managed by regional Land Claims Commissions and allows for three mechanisms of redress: land to be returned to original owners; alternative land to be provided; or a comparable cash payment to be made in lieu of land. It is possible that some land being considered for renewable energy development may have land claims pending.

The deadline for the submission of all land claims has passed, however not all these claims have yet been verified, registered and compensation granted in terms of the required process. Out of a total 17,000 land claims lodged in the Western Cape Province, the regional office is now left with only 1,400 claims. Therefore in considering the lease or purchase of a parcel of land developers should ascertain whether a land claim exists on that land. The existence of a land claim does not necessarily preclude the use of that land for a renewable energy project but does raise certain issues which developers should be aware of which are discussed below.

If a decision is taken to return land to the original owners or their descendants and land is expropriated for the purposes the value of the land for the expropriation is established at the time of the registration of the land claim. The implication of this is that any improvements on the land made after that time will not be included in any future expropriation – this would include any infrastructure established for the purposes of renewable energy generation.

A land owner can also negotiate with the land claimants around future land use. For example, land could be leased from land claimants after a claim is settled. However, it should be noted that there may be restrictions imposed upon the sale of land after a claim has been granted. Further, care needs to be taken in ensuring that any agreement entered into is entered into with the correct land-owners or their representatives.

Servitudes and access

In addition to securing access to the land itself, developers will, depending on the location of the land, need to secure road access to the land itself and access to the transmission or distribution network. In certain cases this may require negotiating access rights and servitudes over neighbouring farms or other land parcels. Any such servitudes need to be registered with the Deeds Office.

Water use licenses

A renewable energy generator may require a water use license in terms of the National Water Act (Act 36 of 1998). A license will be required for all hydro-power schemes, even though the use is non-consumptive, as well as for any water used that is not from a service provider, local authority, water board, irrigation board, government water scheme or other bulk supplier. Details of the water use licensing and registration procedures can be found at the Department of Water Affairs website:

- http://www.dwaf.gov.za/Projects/WARMS/default.asp

Public Private Partnership regulations

In the event that a renewable energy developer is entering into some sort of financial or contractual arrangement with a local authority or other government department it is possible that the

arrangement may be viewed as a Public Private Partnership. The National Treasury defines a PPP as "a contract between a public sector institution/municipality and a private party, in which the private party assumes substantial financial, technical and operational risk in the design, financing, building and operation of a project." An example of this could be a landfill gas to energy project where a private party takes on the bulk of the financing and operational risk of the project while using a municipalities landfill assets. In such a case a developer may be required to comply with specific PPP regulations overseen by the National Treasury. Details on these processes can be found at: http://www.ppp.gov.za/.

4.3 Environmental Impact Assessment

Most renewable energy projects will require an Environmental Impact Assessment. A brief overview of the process is provided below. However, the full EIA process is complex and significant guidance is provided by both the Department of Environmental Affairs and Development Planning (D:EA&DP) of the Western Cape as well as outside organisations. Developers are directed to the Provincial website:

- http://www.capegateway.gov.za/eng/directories/services/11537/10199

where details on the EIA process as well as all the relevant documentation, forms and contact details are provided. In addition to this website, the Endangered Wildlife Trust (EWT) hosts an independent website which also provides detailed guidance to the EIA process from the perspective of an environmental non-governmental organisation

- http://www.eiatoolkit.ewt.org.za/

Developers can provide additional information, case studies and elaboration on the EIA procedures at this site.

The EIA process in South Africa is established via regulations in terms of Chapter 5 of the NEMA. These are Government Notices (GN) R385, R386 & R387 comprising:

- The EIA Regulations (R385)

Two processes for undertaking an EIA:

- Basic Assessment Process (R386)
- Scoping / EIR Process (R387)

The Department of Environmental Affairs is the competent authority for issuing authorisations with regards to renewable energy facilities requiring EIAs in South Africa[1]. In January 2008 the National Electricity Response Plan (NERP) was developed in response to the electricity supply shortages in the country. The NERP requires the programme for constructing facilities relating to the generation, transmission and distribution of electricity to be accelerated in the short term (2008-2013). In this regards the national Department of Environmental Affairs (DEA), Eskom and the Department of Public Enterprises have developed a draft Guideline on Environmental Impact Assessments for Facilities to be Included in the Electricity Response Plan and the Minister of Environmental Affairs requested delegation from all 9 provinces to deal with electricity related EIAs. The national department has indicated that shortened timeframes will apply to these projects. These projects include:

- Independent Power Producers (IPPs) including renewable energy generators;
- Non Eskom electricity generation, including additional municipal generation; and
- Co-generation by industrial entities.

[1] Much of the information for this section is drawn from a presentation at the D:EA&DP Renewable Energy Project Implementation Workshop held in Cape Town on the 14-15 May 2009 entitled, "The Environmental Impact Assessment Process" presented by Ms Lené Grobbelaar, Assistant Director: National & Parastatals, Department of Environmental Affairs and Tourism, Pretoria.

In terms of this agreement all applications for proposed renewable energy facilities must be made to the national DEA and provincial environmental departments must comment on all applications lodged with the DEA.

It should be noted that amendments to the current EIA process under the National Environmental Management Act are in the process of development. The publication of the amendments is expected in November 2009, with implementation of the amendments from January 2010. The implications of these amendments are not addressed here.

EIA triggers

A simple schematic of the EIA process is shown in the diagram below. From the diagram it can be seen that there are effectively two types of EIA – one in which the project requires only a 'basic assessment' for consideration by the competent authority; and the other more comprehensive process in which the project proponent first prepares a scoping report, outlining the required scope of environmental analysis, for consideration by the competent authority. After the authority is satisfied with the scoping report the project proponent then proceeds to the full environmental impact report.

Project types subject to the first process are listed in Government Notice R386 and those subject to the full EIA process are listed in Government Notice R387.

Basic assessment processes

There are a number of potential project activities arising from a renewable energy project that could are included in the basic assessment listed activities. These include the following:

Activites
The construction of facilities or infrastructure, including associated structures or infrastructure, for:
• The generation of electricity where the electricity output is more than 10 MW but less than 20 MW
• The transmission and distribution of electricity above ground with a capacity of more than 33 kilovolts and less than 120 kilovolts
• Any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use
• The off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of the activity listed in item 6 of Government Notice No. R.387 of 2006
• Construction or earth moving activities in the sea or within 100 metres inland of the high- water mark of the sea, in respect of buildings; or infrastructure
The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding – (a) masts of 15 metres and lower exclusively used (i) by radio amateurs; or (ii) for lighting purposes (b) flag poles; and c) lightning conductor poles

The above examples are not exhaustive and there are certainly other activities in the government notices which developers should consider to determine whether an EIA is required.

In consideration of activities requiring EIAs developers should also note that it is not only the project itself that may require an EIA but also any upgrades that may be required to infrastructure, or associated infrastructure.

Scoping / Environmental Impact Report processes

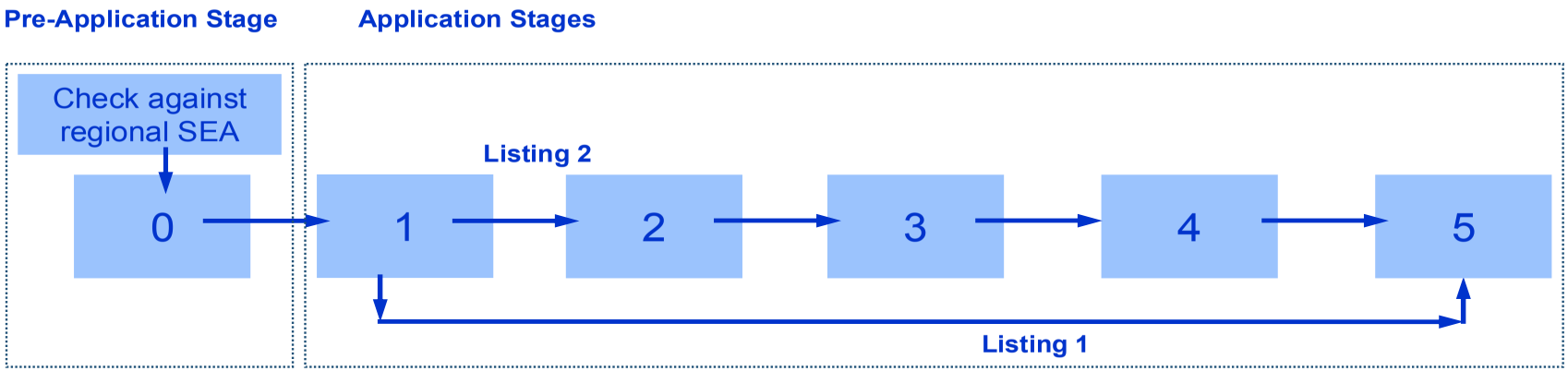
Activities contained in R387 are subject to a thorough assessment process. These are activities that due to their nature and/or extent are likely to have significant impacts that cannot easily be predicted.

Activites
The construction of facilities or infrastructure, including associated structures or infrastructure, for:

• the generation of electricity where:
  ○ the electricity output is 20 MW or more; or
  ○ the elements of the facility cover a combined area in excess of one hectare

• the extraction or processing of natural gas including gas from landfill sites
• the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more
• Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more
• The construction of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more

Again, the above examples are not exhaustive and there are certainly other activities in the government notices which developers should consider to determine whether an EIA is required. What is clear is that any renewable energy generation facility greater than 10 MW will require basic assessment and those greater than 20 MW will require a full scoping report and EIR. Many projects under 10 MW will also require at least a basic assessment due to other activities associated with their construction or operation.



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Intent to apply

- Confirm project is consistent with regional Strategic Environmental Assessment
- Voluntary submission of statement of intent to CA

This includes:

- Location of activity
- Land Acquisition
- Scale of activity
- Negotiations

1

Basic Assessment

- EAP appointed for duration of Assessment
- Perform minimum requirements for Public Participation Process
- Activities listed under **Listing 1** proceed to step 6
- Activities under **Listing 2** go to step 2
- Activity may be granted exemption from certain steps.

2

Scoping

- Plan of Study for EIA
- Scoping report
- Public participation process before and after scoping

3

EIA

- EIA Report submitted with I&APs comments on report

4

Environmental Management Plan

- Draft EMP included with EIA Report

5

Record of Decision

- CA is required to put in writing the outcome of the Application
- Notification of registered I&APs

** Note that at any step of the EIA Process before the Record of Decision, the authorisation can be refused, granted as well as appealed, amended, withdrawn and suspended.* ***Public consultation*** *may be necessary at any of the 5 key stages above. When submitting any of the above mentioned reports, the* ***NEMA application form*** *must be included.*

Figure 4.2: Schematic EIA process

Table4.1: Description of key EIA steps

Stage	Description	Time frame

Intent to apply	Where a regional Strategic Environmental Assessment is in place (as developed by the Western Cape Province) the developer should ensure that the project is consistent with the framework established by the SEA (see below for further information). Developer provides indication to the competent authority (CA) of their intent to apply for an environmental authorization	Developer to submit 14 days before first application form submitted
Basic Assessment	The basic assessment must include: 1. Activity information 2. Description of receiving environment 3. Public Participation process 4. Impact assessment	The competent authority has 14 days to acknowledge receipt of report
Scoping	The Scoping Report covers the main environmental impacts, the depth of analysis needed & the terms of reference for the full assessment. This stage applies to projects which may have impacts that cannot be predicted.	The competent authority has 30 days to either accept, reject or request amendment to Scoping Report
Environmental Impact Assessment	Full EIA is prepared in accordance with the Scoping Report. The EIA lays out: 1. Possible impacts of the activity/ies 2. Actions that can be taken to lessen these	The competent authority has 60 days to look at both these reports
Environmental Management Plan (EMP)	The EIA has to include a full EMP for consideration by the competent authority. The EMP aims to highlight: 1. Unnecessary negative impacts of the project for prevention 2. Promotion of the positive impacts	
Environmental Authorisation / Record of Decision (RoD)	The RoD includes: 1. Conditions for the authorisation 2. Ways in which the protection of human health and the environment can be ensured	The competent authority presents decision on authorisation within 45 days (includes conditions as well as relevant appeal information)

4.3.1 The Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape

In addition to the generic EIA process outlined above, which is applicable to all renewable energy projects encompassing any of the listed activities, there is a specific strategic initiative developed by the Western Cape Province to facilitate wind energy projects. This initiative has developed a regional approach to wind farm approvals and have recommended that the proposed method is deemed to be a Strategic Environmental Assessment that can be used as a proactive regional planning tool to encourage the effective introduction of commercial wind energy development in the Western Cape. Project details, including a number of detailed planning reports, can be found at the Provincial website:http://capegateway.gov.za/xho/publications/reports_research/S/138757/

The vision of the strategic initiative was to develop and establish a policy on the implementation of a methodology to be used for the identification of areas suitable for the establishment and implementation of wind energy developments in the Western Cape. The methodology proposed within this guideline is intended to be a regional-level planning tool to guide applicants, planners and decision-makers with regards to appropriate areas for wind energy development. As a strategic plan the application of the approach has important implications for the evaluation of individual EIAs. An important issue to note is that the strategy suggests that "given the large scale and value of South African landscapes to tourism, it is proposed that the regional method derive recommended Wind Energy Zones based on an overlay of the Preferred Wind Energy Areas to ensure that a minimum of 30km, and a preferred distance of 50km separate any future wind farm. (Note: A commercial wind farm is deemed to be more than 10 turbines.)". When entering an EIA process for wind projects, developers should include consideration of this regional strategy in their EIA application process.

However, the rule on the preferred distance is not justified. If pristine areas should be protected in terms of visibility, then there should be a minimum distance of wind power plants to these particular areas instead of randomly creating areas with no visual impact. We have not found any similar restrictive regulation world wide.

4.4 Grid Connection

The requirements and processes for a grid connection are outlined below.

It should be noted that there is no clear process yet mapped out with regards to grid connections and licensing for renewable energy – despite the existence of the feed in tariff policy. There are also some differences of opinion amongst the main organisations involved which make it difficult to outline a clear and simple process.

The processes below are therefore outlined based on discussions with Eskom and NERSA and with reference to the existing regulations and policy documents available. Where there are differences or conflicts these are highlighted.

The New Generation Capacity Regulations[2] published in August 2009 outline a number of processes required for the introduction of new generation capacity onto the South African grid. These regulations outline different processes for Independent Power Producers in general (s.5) and Renewable Energy (s.7) in particular. There is however, some difference of understanding as to which process will be followed in practice.

Although the process of grid connection is distinct from the process of securing a generation license and a power purchase agreement, in practice these three processes are closely linked. A renewable energy generator is unlikely to be granted a generation license in the absence of some certainty that the proposed generation capacity can be connected to and integrated with the electricity grid. Similarly, Eskom is unlikely to provide serious consideration to the connection

[2] *Department of Energy, 2009: Government Notice, Regulation. 721, Electricity Regulation Act (4/2006):* Electricity Regulations on New Generation Capacity*, Government Gazette, 2009: 5 August 2009, No. 32378, Vol. 530, Pretoria.*

requirements of a proposed generator unless there is some reasonable expectation that the generator will be granted a generation license and can secure a power purchase agreement. The New Generation Regulations also provide a role for the Minister of Energy who can determine that "the REFIT programme must be used to meet the required new generation capacity" (s.7(1)).

In the absence of close collaboration between Eskom (and the System Operator if separate from Eskom in the future), NERSA and the Department of Energy it can be envisaged that different views may arise over the suitability of a particular proposed renewable energy development. This may well lead to a mismatch between the various responsible agencies – for example the licensing by NERSA of renewable energy capacity in excess of that deemed financially prudent by the System Operator.

The most important concern is a possible mismatch in the total amount of renewable energy that is envisaged by the various responsible parties. In the absence of a clear target for the amount of renewable energy (and of different types of renewable energy) to be provided on the grid it is difficult for the system operator, currently Eskom, to plan the required grid infrastructure and to allocate suitable access to the grid between proposed projects. The Renewable Energy White Paper, as well as the National Integrated Resource Plan, provide some indication of the envisaged amount of renewable energy to be licensed but neither of these are fully up to date with current electricity generation planning and infrastructure developments. The Renewable Energy White Paper in particular also only provides minimum targets, not maximum amounts of renewable energy to be licensed. The REFIT policy itself does not prescribe upper limits to the amount of renewable energy which can be licensed and provided with the feed in tariff.

Given the current uncertainty, the process map sketched below outlines two alternative possible processes for securing access to the national grid by a renewable energy project developer. It is hoped that clarity will emerge soon over which of these processes will be followed, or if both are applicable, under which circumstances a particular process will be followed.

Strategic planning

In either case it is important to note the constraints currently being reviewed in a parallel Western Cape wind grid integration study that Eskom faces in evaluating numerous potential renewable energy projects which are at different stages of development, with different technical parameters and different likelihoods of eventually being funded and developed.

The processes outlined below pertain to a single embedded generator making a grid connection application. However, the process becomes considerably more complex when numerous developers apply to use the same network capacity. This requires a larger and more strategic grid planning process. Such a process is currently underway, parallel to this project. This is referred to as 'Eskom Strategic Planning" in the process map and will be important in outlining the realistic technically, environmentally and financially viable options for renewable energy generators to connect to the Western Cape and national grid.

4.4.1 Responsible authority and standards

Renewable energy generators are deemed by NERSA to be "Embedded Generators" operating on the national electricity grid. Eskom Transmission is responsible for the planning and integrity of the transmission network, defined as the network above 132 kV. The distribution network is deemed to be all electricity distribution at 132 kV or below. At different locations either local authorities or Eskom Distribution will be responsible for the distribution network. Eskom Transmission will nevertheless have a role to play in agreeing to distribution grid connection as such connections, especially where more than one embedded generator is being considered in combination, can affect the transmission network.

The Embedded Generator requires a grid connection agreement to be allowed to connect a generator in parallel with the Eskom or local authority distribution network. This grid connection agreement is a separate agreement to the commercial agreement (i.e. the Power Purchase

Agreement) which will, for example, address the feed-in-tariffs for generation exported into the distribution network. The connected Embedded Generator might also sell the generated power to another party (via wheeling through the Eskom network).

Eskom Embedded Generation Interconnection Standard

According to the South African Distribution Network Code, each distributor must have an interconnection standard specifying the technical criteria for the connection of an embedded generator. The Eskom Distribution Standard (DST 34-1765: Distribution Standard for the Interconnection of Embedded Generation) specifies minimum requirements for such items as generator power factor, frequency control, earthing, circuit breaker capacity, protection, synchronization, metering and tele-control.

It is likely that any other distributor, such as a local authority, will require that an embedded renewable energy generator complies with the same standard.

4.4.2 Embedded Generation connection process

As discussed above it should be noted that a full formal process for renewable energy grid connection has not yet been mapped out by Eskom. This process is currently being developed by Eskom Customer Services.

The process outlined below is the process that would typically be followed by Eskom[3]. There is not necessarily a comparable standard process that would be followed by all local authorities nor would most local authorities in fact have a standardised process. The Eskom process is therefore outlined and it is proposed that as far as possible local authorities follow a similar process to Eskom for the consideration of grid connection applications. This is especially important where such connections may influence the transmission network.

Two different process flows are shown below. The first process flow follows section 5. of the New Generation Regulations and assumes a process for renewable energy generation licensing which includes a Request for Prequalification stage, a Request for Proposals stage for further short-listing, and further negotiations prior to agreeing on a PPA and license. The grid connection applications would be linked to a developer moving through these other stages.

The second process flow assumes that the primary decision point for allowing new renewable generation capacity onto the grid is via a single step selection of the preferred renewable energy generation capacity by the system operator based on criteria to be established by NERSA as well as licensing of the generator by NERSA. In such a case the grid application process would not be dependent to the same degree on a developer's progress through the stages as in the first process. The second process flow shown below presumes that Eskom will therefore consider equally all applications brought to in on the assumption that any of them could feasibly be selected as new generation capacity. It does include an initial project assessment phase which would consider at a high level the grid integration merits of the project in line with the proposed criteria for selection of renewable energy generators under s. 7.3 of the New Generation Regulations.

Explanation of process steps

A brief explanation of some of the steps outlined is provided below:

1. **Project Concept**

The project concept is established by the developer who recognises the potential business opportunity of connecting the proposed plant to a distribution network. At this stage, the developer

[3] Some of the information below has been drawn from: *Bello, M., Carter-Brown, C., and Coney, R., no date:* A methodology for evaluation of Cogeneration applications under the Eskom Pilot National Cogeneration Project*, unpublished paper.* Other information has been drawn from discussions with Eskom personnel.

would have identified a potential site for the renewable energy plant, suitable energy resources, types of generating plant and cost estimates for the plant.

2. **Embedded Generator Application**

At the application stage the developer provides the following basic data to the operator of the distribution network:

- Number of generating units, type of generator, size (rating) and other electrical parameters
- Energy resource
- Physical location of the plant and single line diagram of the connecting equipment with major internal network equipment parameters.

On receipt of the application, Eskom carries out a preliminary system study which includes such issues as:

- Voltage performance: steady state system voltages must be within standard limits
- Network adequacy: equipment and conductor thermal limits must not be exceeded
- Short-circuit calculations: equipment fault level ratings must not be exceeded
- Losses: relative change in technical losses
- Load flow study:

The system study will identify network options for connection of the Embedded Generator. The costs of each option that satisfy the technical connection criteria are estimated considering the cost for both dedicated assets (as are required solely for connection of the Embedded Generator to the network) and shared assets (upstream network reinforcement that supports more than one Embedded Generator developer or conventional customer).

The renewable energy Embedded Generation developer pays the full cost of dedicated assets and a Rand per kilo volt-amperes (R/kVA) contribution towards shared network costs.

3. **Feasibility Quotation (FQ)**

A summary of the cost is then sent to the developer in a form of a Feasibility Quotation (FQ) to be incorporated in the business planning processes of the developer. Normally in Eskom, the FQ is only 65% accurate as a project design has not yet been determined. The developer is required accept this quote formally and may be required to pay a commitment fee to proceed to the next stage.

4. **Design Phase and Design Quotation (DQ)**

If the developer accepts the Feasibility Quotation, the design phase of the process proceeds. The developer pays for the design work. Further system studies are performed which would include such items as:

- transient stability studies;
- protection coordination studies; and
- specific studies related to the nature of the renewable energy plant under consideration.

The connection options, scope and costs are refined and a Budget Quotation (BQ) is issued. The DQ is typically committed as 100 percent accurate and is premised on Eskom certified service providers carrying out the required engineering. On the acceptance of the BQ, the processes for construction, testing and commissioning commence. The presumption, as shown in the figure, is that the developer would only accept the BQ if there was certainty that the project would proceed (i.e. that a generation license and PPA had bee secured).

The two processes incorporating these elements are shown schematically below. They show the possible different relationship of the grid connection process to the licensing and PPA processes.

However, it is noted that the issue of strategic planning is overestimated and too early to approach at this stage. Experiences from other countries indicate that grids can easily accommodate 20 to 30% of intermittent power without any strategic planning required.

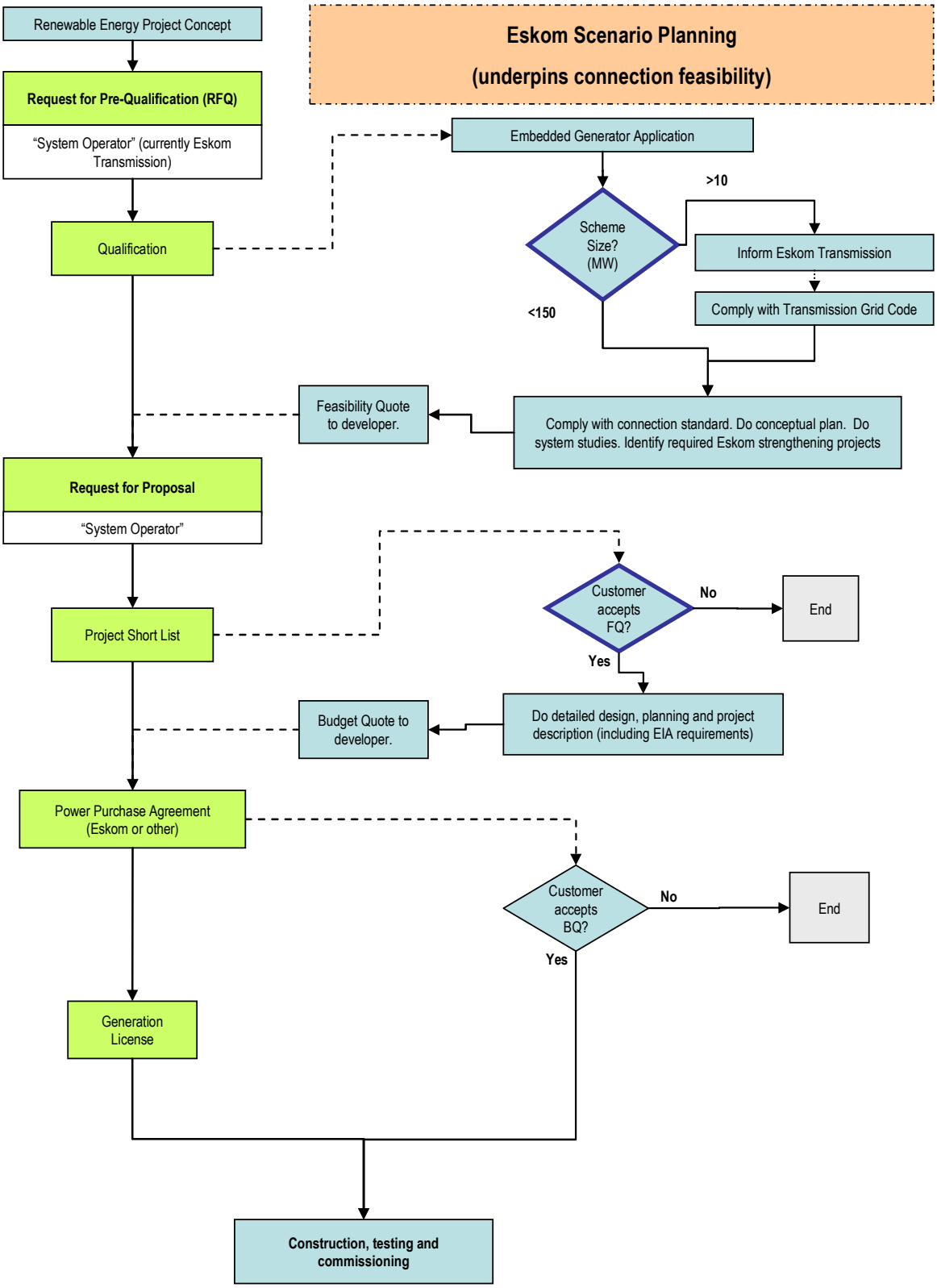

Figure 4.3: Grid connection process: Section 5 of the New Generation Regulations

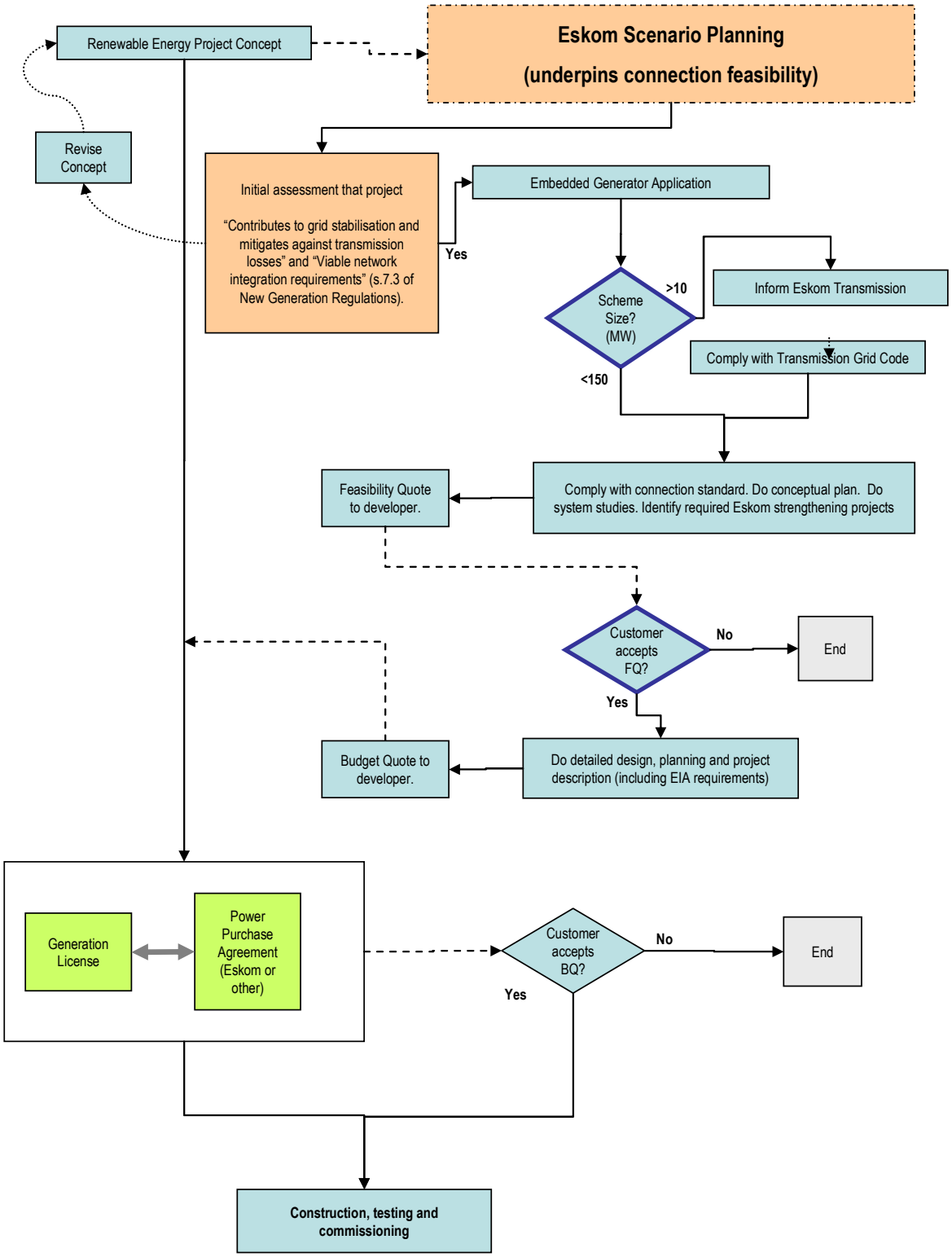

Figure 4.4: Grid connection process: Section 7 of the New Generation Regulations

4.5 Power Purchase Agreement

According to NERSA[4], "the Renewable Energy Purchasing Agency (REPA) will be obliged to purchase the energy delivered by the renewable energy projects licensed by NERSA under REFIT Phase I and II". The implication of this approach is that the primary regulatory step for a renewable energy generator is securing a generation license from NERSA, following which it will be obligatory for the REPA (currently the Single Buyer Office in Eskom) to enter into a PPA.

There is no formal process flow for securing the PPA itself. A draft PPA for renewable energy under the REFIT has been published by NERSA[5] and according to NERSA will be finalised during the last quarter of 2009. The main complexity related to the process for securing a PPA is the relationship between a generation license and a PPA. A generation license will only be provided to a generator if NERSA has a reasonable expectation that the generator has an off-taker for the power produced (in the case of renewable energy this would be the REPA with the REFIT tariffs). However, in the case of the REFIT, the license itself is the main regulatory step which unlocks the PPA under the REFIT process by obligating the REPA to purchase the power. Therefore, it is expected that NERSA may provide some leeway in the licensing process around the requirement for having a secured off-take agreement in the form of a PPA as this agreement will follow (and not precede) the licensing decision.

It appears, however, that Eskom may have a somewhat different view of the process and will expect that only those projects that are pre-qualified and then short-listed for purchase under the REFIT will enter into PPA negotiations and that only a sub-set of these will secure PPAs and then go on to apply for generation licenses. This alternative approach is reflected in figure 4.4 above.

Given the uncertainty, and the relationship between the PPA, generation license and grid connection for a particular project, it is expected that in practice there will be some form of iterative process between these three steps. In other words the developer may be expected to engage simultaneously with Eskom with regards to the PPA and grid access (albeit different departments in Eskom) and with the Regulator with regards to securing a generation license.

Although there is a degree of uncertainty about the process at the moment it is important to note that under the Electricity Regulation Act (Act 4 of 2006) NERSA is granted the power under s.4(b) to "mediate disputes between generators, transmitters, distributors, customers or end users". This gives NERSA the authority to engage with the various parties in a flexible manner if disagreement does arise around the procedure to enter into a PPA.

At this stage it is probably prudent for project developers to approach the Single Buyer Office of Eskom (in their capacity as the REPA) relatively early in their development process to discuss the potential for entering into an off-take agreement, the specific requirements of the Single Buyer Office, and the likely structure and terms of the PPA. Even in the case where the REPA is obligated to enter into a PPA the REPA may wish to include some specific PPA conditions or related financial provisions that the renewable energy generator should be aware of.

4.6 Generation License

The procedure for applying for a generation license from NERSA is outlined in the Electricity Regulation Act. The procedure starts with an application to NERSA. This application must include a set of information required for the Regulator to make an informed decision. These information requirements are shown in figure 4.5:

The information requirements are numbered by relevant section of the NERSA license application form.

[4] National Energy Regulator of South Africa, 2009: Renewable Energy Feed-in-Tariff Phase 2, July 2009, NERSA, Consultation Paper, Pretoria.
[5] As above

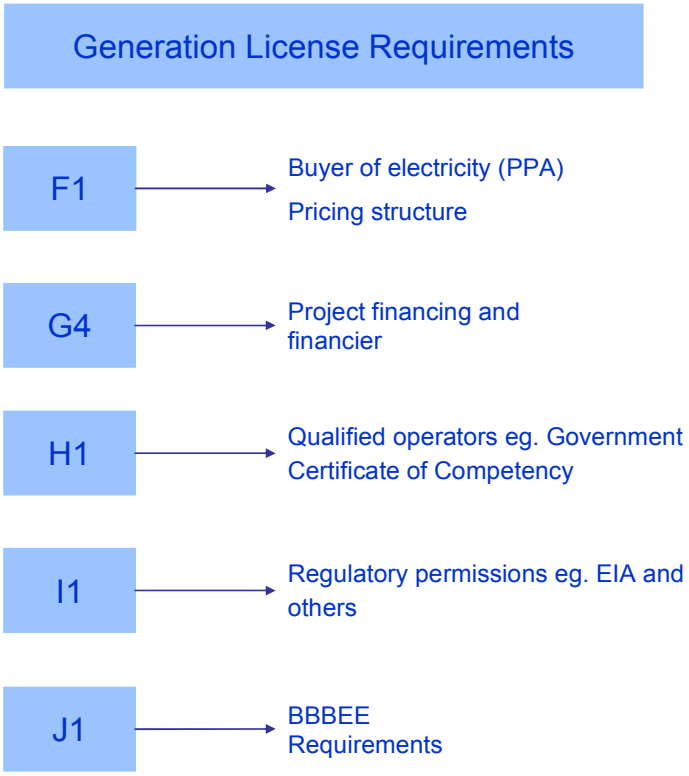

Figure 4.5: NERSA Generation License Information Requirements

Following the receipt of the application NERSA has the prerogative to publish the license application for public comment for a period defined by NERSA. In such a case before considering an application for a licence the Regulator must then furnish the applicant with all substantiated objections to the project (if any) in order to allow the applicant to respond to them.

The Regulator must then make a decision on the application within 120 days after the expiration of the public comment period. If no objections have been received within 120 days after receiving the response from the applicant, the Regulator must provide the applicant with a copy of its decision as well as the reasons for the decision.

4.7 Key Process Constraints

A number of constraints to the introduction of renewable energy have been identified in the process map discussions below. The most important of these are:

- The requirements to apply for an environmental authorisation prior to applying for required sub-divisions of land. This potentially introduces significant additional delays in the development process.
- The current uncertainty over the specific process to be followed in procuring new generation capacity, i.e. whether a structured request for prequalification and request for proposals process will be followed or whether renewable generators can simply apply for generation licenses in the expectation that the REPA will be obliged to purchase renewable energy from licensed generators.
- The difficulty that Eskom, as the system operator, has in grid planning given uncertainty about the amount and type of renewable energy to be licensed. This makes it difficult for

Eskom to provide developers with firm commitments around grid access and around the infrastructure costs of such access.

4.8 Key Contact and Links

Table 4.2 provides a list of key institutions and relevant links.

Table 4.2: Key institutions

Institution	Role	Link
Western Cape Province (including Department of Environmental Affairs and Development Planning)	Strategic Environmental Assessment/ Land use planning/ Heritage impact	www.capegateway.gov.za
Department of Environmental Affairs (DEA)	Environmental Impact Assessment	www.deat.gov.za
Endangered Wildlife Trust	EIA toolkit	www.eiatoolkit.ewt.org.za
Western Cape Department of Agriculture and Rural Development	Land subdivision outside municipal area	www.capegateway.gov.za/ www.elsenburg.com
Department of Agriculture, Forestry and Fisheries	Land subdivision outside municipal area	www.daff.gov.za
South African Heritage Resources Agency	Heritage impact	www.sahra.org.za
Department of Rural Development and Land Reform (Regional Land Commissioner/ Registrar of Deeds)	Land claims/ Registration of servitudes and deeds	www.dla.gov.za
Department of Water Affairs	Water use licences	www.dwaf.gov.za
National Treasury (PPP Unit)	Public private partnership info	www.ppp.gov.za
NERSA	Generation licence	www.nersa.org.za
Department of Energy	National energy planning	www.dme.gov.za
Eskom	Single Buyer Office/ Grid codes	www.eskom.co.za

5 Key Project Development Challenges

Although the REFIT is in place, there are still a number of institutional, technical and financial barriers in place in the country, which are restricting the development of the renewable energy sector.

The Western Cape Provincial Government is keen to identify opportunities for mitigating some of these barriers and challenges. Some of these can be mitigated directly through providing the necessary support institutions, others relate to external national institutions, which the province can lobby and support to ensure the necessary mechanisms are in place.

Some of these issues are being resolved, for example additional technologies and the PPA, others however are still the source of major debate, for example the pre-qualification criteria and the capacity limits.

5.1 Institutional

The development of wind energy and renewable energy projects in South Africa is a fairly new concept and the whole process, from site selection to initial build and operation, can take anything from one year to over five years, depending on the developer, the availability of wind resource data for wind projects and the time taken within the planning process.

The institutional challenges facing the development of projects centre mostly around regulatory uncertainty, involving the lack of clarity on the processes that need to be followed by all role players, the approvals necessary and the lack of clear guidelines on which national and provincial departments the approvals need to be obtained. This uncertainty significantly increases the project risk for developers and investors, thus increasing the cost of finance and a greater chance of project failure.

There are a number of issues involving multiple institutions. Firstly, a project developer would need to get planning approval from various departments and relevant data from various entities. Environmental Resource Management falls within the ambit of the provincial government and planning conditions would need to be set at that level.

Secondly, the supply of electricity falls under Eskom, while any connections to the grid require a generation licence from NERSA. In addition, the distribution of electricity is a municipal function in some areas and the necessary approvals would need to be sought from the municipality as well.

A third factor is the lack of capacity within some of the departments as well as limited understanding of the issues related renewable energy and on how to implement such projects. There is a critical need to institutionalise sustainable energy practices within government departments and a need for cross-cutting sector coordination to raise awareness among all role players.

5.1.1 REFIT

There is a great deal of interest locally and international in South Africa as a key opportunity for investment in renewables.

However, although the REFIT is in place providing an overarching framework, there are still many issues outstanding which create regulatory uncertainty for developers. As discussed in section 3, these include:

- Concern regarding a proposed pre-qualification criteria;
- Independence of Single Buyer Officer;
- Finalisation of a Standardised Power Purchase Agreement;
- Clarity on minimum project size issues;

- Greater clarity on licensing procedures;
- Grid connection for qualifying RE generators; and
- Process of establishing REFIT capacity limits.

5.1.2 EIA

The assessment and management of environmental issues in South Africa is governed by the National Environmental Management Act (NEMA, Act No 108 of 1998, as amended). In terms of Section 24 of this Act, environmental activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported to the organ of state charged by law with authorising, permitting or otherwise allowing the implementation of an activity. The EIA Regulations promulgated under the Environment Conservation Act (Act 73 of 1989) (Government Notice No R 1182 published on 5 September 1997) as amended, list specific activities which have to be authorised by the competent authority. The EIA regulations of 5 September 1997 listed 'facilities for commercial electricity generation and supply' as an activity that would trigger the requirements of the EIA regulations. When the regulations were amended (10 May 2002), a revised list of activities was generated. The activity was then described as 'the construction, erection or upgrading of facilities for commercial electricity generation with an output of at least 10 megawatts and infrastructure for bulk supply'. New regulations, drafted in terms of NEMA, have since been promulgated and will affect any future applications for wind farms.

A recurring theme in renewable energy project implementation is the necessity of limiting development costs. One way is to minimise the time required for development and for obtaining necessary regulatory approvals. The need to undertake an EIA prior to project development is one aspect which may attract significant cost. EIA costs include both the direct cost of hiring an environmental assessment practitioner to undertake the EIA, and the indirect costs accruing from potentially extended timeframes before project implementation, e.g., due to appeal and/or review processes challenging an environmental authorisation granted for the project (Green Gain Consulting, March 2009). Even under the new regulations, the timeframes for obtaining approvals remain the same.

Overall, there is a need for clear EIA guidelines related to the establishment of the various renewable energy technologies.

Another issue of concern is that related to the present requirement of an Environmental Assessment for establishing a wind mast. Since a wind mast is a temporary structure, this is considered to be an unnecessary delay and cost to projects. It is understood that there are proposals in place to remove this requirement.

5.2 Technical

Development of grid-connected RE technologies presents some principal technical challenges, which include:

- grid connection;
- capacity and strength of the different network assets within reasonable distance;
- network integration of power from intermittent generation sources;
- system impact studies; and
- lack of accurate publicly available wind resource data.

5.2.1 Grid Connection

One of the key issues to consider when developing a grid-connected wind power generation project is grid connection. The electric power grid connects generating stations with power users. It consists of high-voltage transmission lines which cover long distances, substations which convert

one voltage to another, lower voltage distribution lines which serve neighbourhoods and individual customers, and safety and control systems to keep the grid operating safely. Costs associated with the electrical works required to send the generated energy from the wind turbines to the electricity grid can be very significant, particularly in areas where the electricity network is more dispersed. This cost is an important consideration and there is a possibility that the connection cost could be so high that it might render the project uneconomic.

It is critical to identify where the most appropriate grid connection point is and the voltage level at the point of connection. In order to minimise the cost of connection to the electricity network, the distance between the proposed sub-station site and the nearest existing 11 kV or 33 kV/66 kV power line or sub-station should be as small as possible. The voltage of the nearest part of the local electricity distribution network is likely to be an important factor in deciding which voltage level to adopt on site.

The cost comprises:

- purchase and installation of the electrical infrastructure on the site, including the sub-station building and equipment (switchgear) contained in it;
- the electrical infrastructure from the site sub-station to the point of connection to the local network; and
- the connection fee charged by the distribution network operator. This covers any reinforcement of the existing system.

Equally important will be to get an indication of when a connection might be available as delays in getting a connection can result in significant project development cost.

5.2.2 Grid Capacity and Strength

The presence of a power line close to the project site does not necessarily present a guaranteed opportunity for connection to the network. It is critical to assess the capacity of the different network assets within reasonable distance of the project site and identify the most appropriate connection point and related cost. In some cases, new or improved power lines must be added to accommodate a new wind power project, while in other cases existing capacity on the grid can absorb the new project. In either case, the impact of the new project must be carefully evaluated.

Depending on proximity to transmission lines, power stations, and substations, a particular location on a grid can be considered “strong” or “weak.” A weak location would tend to be served by lower voltage lines, and be at or near the “end” of the system. All other things being equal, power generating stations and large customers would want to be located at a “strong” point on the grid. A factor known as the short circuit power level, measured in mega-volt amperes (MVA), can be used to measure how robust the grid is at any given point. The following general ranges can be used to evaluate whether a proposed wind power project is located at a strong or weak point on the grid relative to the wind project size:

- A strong grid will have a short-circuit level more than 20 to 25 times the size of the wind power project.
- A weak grid will have a short-circuit level less than 8 to 10 times the short-circuit level.

It is sometimes necessary to build or upgrade a transmission line to reinforce the grid to accept power from a new wind power project. These improvements can be very expensive, and may be necessary if the “best” locations for wind power development in a region are in locations with weak grids.

5.2.3 Grid Integration of Power from Intermittent Sources

The variability of electricity output from certain renewable energy technologies will, at a significant production share, necessitate changes in market and power system design, planning and communications, to ensure a balance of supply and demand. Not all renewables are variable in the

short-term, however: others, such as biomass, geothermal, reservoir fed hydropower and solar thermal technologies (with integrated thermal storage) can have capacity factors comparable to conventional sources of electricity. Their integration into transmission systems, while therefore less disruptive, should receive no less attention, not least of all because of the potential they represent for smoothing the output from variable output technologies.

These characteristics, among others, call for modifications on the supply side: to transmission and distribution infrastructures, the rules by which they operate, how they are managed, and how electricity markets are structured; as well as on the demand side, where management and demand side response measures have the potential to significantly contribute to balancing supply and demand.

5.2.4 System Impact Studies

Regardless of the size of the facility or the type of fuel used to produce power, there are several technical considerations that must be made before a new power plant can be connected to the grid. These considerations include:

- effects of proposed plant on operation of the electrical grid;
- effects on capacity, reserve margin and firm power transfers; and
- need for special protection requirements or operating constraints required for grid stability or safety.

For a wind project, a system impact study is designed to address these considerations, given a range of supply and demand scenarios, including:

- high wind, low system power demand;
- high wind, high system power demand;
- low wind, low system power demand; and
- low wind, high system power demand.

The study evaluates these scenarios, and perhaps others based on the assumed operational status of other nearby power plants and large power users. System impact studies typically use computer programs to simulate various operating conditions; to evaluate the anticipated magnitude of voltage fluctuations, flicker, system frequency disturbances, and harmonics resulting from the new plant's addition to the grid; and to recommend measures to mitigate any potentially adverse impacts.

However, it is noted that this will only apply when large volumes of wind are connected to the network and is not expected to be a major issue in the short- to medium-term.

5.2.5 Wind data

One of the key challenges facing prospective wind energy project developers, equipment manufacturers, investors, planners and other key stakeholders is lack of publicly available and accurate data on wind speed and wind variability at a specific site. To that end, mandatory disclosure of wind resource data is important. This might be incorporated into the PPA, i.e. wind measurements at existing wind power plants shall be disclosed to NERSA who will publish the data.

Other innovative programmes need to be developed to ensure a comprehensive wind map of the region, for example working with mobile phone operators to access towers to install data collection equipment.

5.3 Financial

Finding financing for renewable energy projects can be difficult and complex due to the lack of clarity of motive for investment in comparison, for example, with a typical retail or construction project. At the same time, this means that opportunities exist for viewing the financing opportunity in a more differentiated way, i.e. different funding sources will apply to different motivators.

There is a lack of awareness, knowledge, experience and skills related to renewable energy ventures among South African financiers. The lack of innovative financing mechanisms and general availability of finance is a key barrier. There is also an inhibitive mentality amongst financiers around the size of projects. Renewable energy projects are much smaller and more decentralised than the traditional large power station and centralised refinery models that South African financiers are used to; projects of that size are more attractive to financiers as it ensures that they make more money per transaction and the risks are easier to assess.

Another challenge facing wind project developers is the difficulty in obtaining financing or planning generation if there is no information on planned upgrades to existing transmission lines or plans to build new transmission lines.

There is also a need for strategic government-led incentives for investing in renewable energy to kick start projects.

However, it is noted that access to finance is not considered to be a major barrier for large scale international project developers. These developers tend to have access to finance and their major barrier relates to institutional conditions being in place. Without the necessary regulatory framework, few financiers will risk investment in South Africa.

5.4 Summary

Table 5.1 summaries the key project development challenges.

Table 5.1: Summary of Project Development Challenges

Challenges
Institutional
• Ongoing regulatory uncertainty
• Proposed pre-qualification criteria and tender may discourage many investors and reduce effectiveness of REFIT
• Industry concerns regarding independence of Single Buyer Officer
• There is a need for finalisation of standardised Power Purchase Agreement
• Clarity is required on minimum project size restrictions
• Greater clarity on overall licensing procedures
• Grid connection for qualifying RE generators
• EIA delays
• Requirement for basic assessment for wind masts
Technical
• Grid connection
• Capacity and strength of the different network assets within reasonable distance
• Network integration of power from intermittent generation sources;

Challenges
• System impact studies
• Lack of accurate publicly available wind resource data
Financial
• Lack of information about what funding is available
• Access to finance
• More innovative options are required for smaller projects

6 Strategies and Supporting Mechanisms

6.1 Types of Instruments

There are different types of instruments available to support renewable energy projects and these range from direct to indirect policy instruments. Direct policy measures aim to stimulate the installation of renewable technologies immediately, such as the REFIT, whereas indirect instruments focus on improving long-term framework conditions. Besides regulatory instruments, there are other approaches for promoting and supporting renewable energy, primarily aimed at removing the barriers which limit investments in renewable energy such as lack of information, lack of skills, limited research and development, inadequate regulatory structures, and limited incentive programmes. The different types of strategies and supporting mechanisms are detailed below.

6.1.1 Incentives

Renewable energy incentive programmes assist in establishing a competitive self-sustaining renewable energy supply while increasing the quantity of renewable energy generated country-wide. There are a range of incentives that can be used such as:

- direct subsidies from the government in the form of capital grants;
- fiscal incentives such as tax rebates for project developers and consumers or tax exemptions for the importation of renewable energy technology/equipment;
- investment incentives which encourage the participation national and international financiers;
- incentives that promote public-private partnerships to increase the use of renewable energy technologies; and
- power production incentives, such as the REFIT.

6.1.2 Institutional Support

Clear, long-term legislation and policies that support renewable energy have a critical role to play in building investor confidence, and in ensuring the sustainable growth of the renewable energy sector. A renewable energy bill for instance, would be designed to complement a broader suite of initiatives such as existing government programmes and other new laws that might be put in place such a green procurement law (which could include renewable energy use as one of the criteria).

Other forms of institutional support can come in the form of infrastructure and planning regulations such as building codes which could treat renewable energy projects as “privileged” or “special” projects where local authorities are required to designate specific priority or preferential zones for renewable energy utilisation.

6.1.3 Information Portals

There is often a lack of clarity by both developers and also key institutions as to how to get projects moving, especially with regard to the many legal and regulatory requirements at both a local and national level. In order to encourage, support and facilitate the development of renewable energy projects, in many countries institutions have been established at both local and regional levels to provide a variety of functions, from providing basic information to developers, through to actively engaging and assisting developers in submitting projects to the relevant authorities, or even processing applications.

In some cases, these institutions or one-stop-shops have been incorporated into existing organisations; in others dedicated organisations have been established. The form of these

agencies differs by location. In most instances they are national energy agencies nested within government ministries, in others they are located within local economic development agencies.

In the Mediterranean a number of countries have formed a regional body, called the Mediterranean Renewable Energy Centre (MEREC) which is geared not only towards investors but aims to develop regional competencies through the dissemination of information, training of staff, and technology transfers. In the United States a more general national body oversees developments within the field but, on a lower level individual states run one-stop shops or independent agencies which among other activities market local investment opportunities in renewable energies.

6.1.4 Industry Development

Industry development is an important aspect for both regional and national growth. It is important for provincial governments to do what they can to help promote a successful industry covering everything from actual raw materials to developing and financing projects to consulting and other ancillary services associated with a thriving regional renewable energy market. A proactive approach to renewable industry development will not only create jobs and revenues, but it will also help in long-term development of the region and importantly assist in energy security and independence.

Incorporating industry development is an integral component to a successful regulatory action plan to help foster the growth of the renewable energy market and help the region achieve its goals of clean energy capacity. There are many aspects to industry development beyond actions such as tax incentives/relief and relaxing licensing requirements to attract businesses. As part of a comprehensive industry development plan it is important to assist and incentivise the establishment of industry or trade associations. Industry associations or trade groups can help bring a unanimous voice to renewable energy related businesses in the region, which can help policymakers identify pros and cons of regulatory legislation and identify what steps need to be taken in the future to help reform or develop the market. In addition, trade associations can help with shaping public opinion to assist in the market growth.

Also, of importance to stimulate the industry is research and development. The Western Cape could help support research and development through numerous ways. The Western Cape Province could support local university and institutes through research grants and channelling public funding to secure intellectual property (IP) rights. The Western Cape could also encourage the South African government to provide national funding towards renewable technology research and development. The Western Cape Government could help develop or actively participate in both provincial and national level research advisory committees. In addition, the provincial government through one of its departments could identify important research needs specific to the Western Cape.

One of the most direct supporting mechanisms for renewable energy industry development in the Western Cape is training and capacity building. Capacity building could be done through trade associations, workshops, training programmes, or partner with international and non-governmental organisations that assist countries with these types of activities.

6.1.5 Project financier and developer matchmaking

An additional support mechanism to help facilitate the development of renewable energy projects is a platform where developers and financiers could be made aware of each other. Situations in the market do arise when financing institutions or agencies are looking to invest in renewable energy project developers that have identified project opportunities and successfully completed a number of prerequisites, e.g. site location, REFIT approval, and/or EIA. Likewise, there are also project developers who have identified renewable energy project opportunities and require some level of structured finance. A platform where financiers and developers could exchange information about their needs and opportunities could prove to be invaluable in facilitating the development of renewable energy projects and the market. In addition, such a platform could host information

regarding international organisations, NGOs and/or charities that are looking to finance clean energy projects or particular steps, such as EIAs, stakeholder consultations, feasibility study, etc.

A platform such as this could be hosted by the renewable energy project one-stop shop. A project developer and financier forum could be hosted on the website that will be developed for the one-stop shop. It could have the contact details of all those developers that have identified renewable energy opportunities, as well as a list of local, national and international companies, NGOs and organisations that are willing to fund projects that fall under the REFIT guidelines for South Africa.

6.2 International Examples

6.2.1 United States – Texas

In the State of Texas the renewable energy sector (primarily wind) has grown over the past two years with over 3,900 MW of installed wind generated electricity. In 2007 alone there was a record of a Gigawatt of wind electricity installations. The Department of Energy (DOE) reported wind to be the fastest growing renewable energy technology, which had grown by approximately 45 percent. The growth was due to a strong demand, investment of private capital and support from federal and state governments using various incentives.

Incentives are seen as a means of supporting renewable energy technological developments and to help reduce the up-front capital expenditure of investing in renewable energy systems. There are a variety of incentives which reduce costs by means of tax exemptions, funding for project implementation, and feed-in-tariffs. The goal is to make wind energy more cost-competitive against traditional fossil fuelled generated electricity. In Texas there is a franchise tax exemption for manufacturers, sellers, and installers of renewable energy systems. A franchise tax is a tax levied by some US states for corporations, which is based on the number of shares that are issued or in some instances, the amount of their assets. Business owners can deduct the total cost of the system from companies' taxable income. Texas also has 100 percent property tax exemption for the appraised value of the site which has a wind and solar energy generating system. These tax exemptions are all part of the Texas Tax Code.

Another form of tax incentive is the Federal Renewable Electricity Production Tax Credit. Production tax credits (PTCs) allow companies that invest in renewable energy generation to write off or deduct their investment against other investments they make. The tax deductions from the PTC allows for ¢2.1 credit per kWh against corporate income tax for electricity generated during the first 10 years of wind power operation. This PTC is regarded as an important incentive for wind growth as it encourages private investment in wind energy projects.

Another example of an incentive provided by federal and state governments would be grants, such as the United States Department of Agriculture (USDA) Renewable Energy and Efficiency Program. This Program provides grants and loan guarantees for use by farmers, ranchers and small rural businesses that invest in renewable energy and energy efficiency projects in rural areas.

6.2.2 Germany

In 2006, renewable energy in Germany rose by 12 percent of the total electricity generated. These figures saw a turnover of €11.3 billion from the erection of clean power plants and €10.3 billion from the operation of the plants, as well as creating approximately 214,000 jobs and preventing 101 million tonnes of CO_2 emissions.

The wind sector in Germany has developed to become a world leader – Germany has more electricity generated by wind than any other country in the world. The first incentive seen in Germany promoting wind generation was started in 1989 by an incentive known as "100 MW of

Wind" created by the Ministry of Research and Technology. Under this programme wind projects were paid a subsidy of €0.04 per kWh generated. In addition any project that was given a subsidy had to disclose the turbine and wind farm's performance. This coupled financial incentives with a research project that would help to lay the foundation of future technological developments and planning policies. This incentive proved popular and a year after its inception the quota was increased to 250 MW. A small-scale feed-in-tariff was introduced as part of the Electricity Grid Feed Act, which saw producers receiving €0.0849 cents per generated kWh and focused mainly on coastal areas with turbines ranging in size from 20 to 150 kW output.

Figures put out in 2008 by the German Wind Energy Association (BWE) shown that Germany had an installed capacity of 22,247 MW generating 37,525 TWh of clean, wind powered electricity were in operation by the end of 2007. The impressive take-up rate of wind energy in Germany is due to strong support mechanisms, such as the Renewable Energy Sources Act (EEG). The EEG was implemented in 2000 to replace the previous Electricity Grid Feed Act. The core element of the EEG legislation was to impose a priority purchase obligation, i.e. the grid operators were obligated to connect renewable energy producers regardless if they are utilities, businesses or private residential households to the grid. This was done so that renewable energy became the priority source of electricity above any other source.

Potential consequences of this Act might be that conventional fossil fuelled power sources would have to reduce their generation to accommodate for clean energy being fed into the grid. This also saw increased investor security in renewable energy and ensured that every unit of renewable energy would be sold. Germany has focused on installing some of the most powerful wind turbines in a given area as possible. Due to improvements in technological development of wind turbine design, which includes larger and more efficient wind turbines, Germany is able to maximise each site's potential for installed capacity.

Another government support mechanism took the form of a Market Incentive Programme for renewable energy (MAP) which was implemented in 1999. Intended to support solar power generation for the residential homes market the Federal Office of Economics and Export Control (BAFA) incentivised investors both private individuals and small-to-medium sized enterprises with grants for investments in solar thermal energy projects. Larger enterprises were eligible for reduced interest rate loans that were available specifically for renewable energy systems. In 2003 €203 million was made available by the German Government for clean energy projects and has grown to €350 million by 2008.

Through these various incentive mechanisms helped Germany achieve more than 10,000 MW of installed wind power capacity as early as 2002. In addition by 2006, the wind energy sector alone contributed to €5.64 billion in revenues to the market total of €10.3 billion. Also the wind energy market was employing 73,800 people out of a total of 214,000 employed in the German clean energy market. It is quite clear that with good market support mechanisms and strategies Germany was able to become a world leader in the wind energy market in a relatively short period of time.

6.3 Priority Measures

There is an entire host of strategies and supporting mechanisms the Western Cape can engage in the foster the renewable energy project and industry development in the Province. It is important that the Western Cape begin moving towards a holistic approach covering both short-term and long-term measures and strategies to achieve the Renewable Energy Action Plan of 15 percent of electricity generation through renewable resources by 2014. Some of the supporting mechanisms should be considered as priority measures over others due to their immediate impact to help navigate renewable energy project development and remove barriers.

From the above mentioned strategies and support mechanisms, it is proposed that the following measures are investigated and implemented as a matter of priority for renewable energy project developers in the Western Cape Province. The support mechanisms of priority include the one-

stop shop to act as a focal point for project developers and financiers, who are looking to develop and/or invest in renewable energy projects in the Western Cape Province. The one-stop shop will include a process map outlining the landscape of policies and regulatory requirements a project developer must navigate to implement a renewable energy project, particularly focusing on wind resource development.

It is also suggested that the one-stop shop houses information regarding financial incentives available for renewable energy project development. Such incentives would include grants, subsidies, tax breaks, and more. The financial incentives need not be project-based and could also include incentives available for industry development, such as for renewable energy research and development.

Another important priority measure if for the Western Cape to focus on is developing a renewable energy feed-in-tariff for small-scale residential and small to medium size businesses. The small-scale feed-in-tariff would be offered by the Western Cape for those projects developed within the Province. This small-scale feed-in-tariff would focus on financing projects that are either too small to qualify under the national REFIT.

6.3.1 Process map

A process map is an instrument that illustrates the procedural steps project developers are obliged to complete. The process map would detail specific policy or regulatory requirements relevant to renewable energy projects and providing links to other sources of information or other departments which are responsible for specific project approvals, such as an EIA.

The process map includes the main regulatory steps that a renewable energy developer needs to go through to establish a project. These steps include everything from local municipal requirements to prerequisites which the Provincial Government is responsible for overseeing to national project requirements such as interconnection and generation licensing.

The steps related to the environmental impacts of the project as well as the specific steps related to securing access to the electricity network and the sale of power generated are all items that would be illustrated in a process map. It should be noted that the process map is not a comprehensive developer's guide and focuses only on the renewable energy regulatory framework in South Africa and the Western Cape Province. The process map is also not a comprehensive repository of all the relevant regulatory information, but provides links to information sources and regulatory departments where appropriate.

6.3.2 One stop shop

A One-Stop shop in the context of renewable energy project development refers to an organisation, entity, or government body that acts as a focal point for information dissemination and market facilitation. The one-stop shop is where investors and project developers alike can gain access to information specifically focused to renewable energy project development. Importantly the one-stop shop provides information about the variety of required procedures that developers need to go through in order to get approval for their projects. This includes steps describing how and where to get all the necessary permits and licensing.

Due to the lack of projects developed in South Africa, the renewable energy market is largely untested. This leaves some questions as to precisely what all the necessary procedures to complete a project are. This is where the one-stop shop's added value is – it provides a host for all the necessary information developers might need for guidance. The one-stop shop would be home to all the required information regarding permitting, licensing, and approvals so developers only have to make contact with one entity for all their queries and guidance.

In the future, it may be more appropriate to focus these functions within a Provincial Energy Agency, with additional support on permitting procedures and administering of incentive programmes.

6.3.3 Financial incentives

Financial incentives play a crucial role for the successful implementation of renewable energy projects. Any successful example of a high take-up rate of renewable energy projects will have a combination of financial support mechanisms to reduce the risk associated with investing in new power generating technologies.

Financial incentives can take many different forms. Later on in chapter 8 there is a full discussion about the multitude of different financial incentives to support renewable energy projects. To start with one of the most successful financial incentives available to stimulate the renewable energy market is a feed-in-tariff – identical to the one proposed by NERSA for South Africa. A successful feed-in-tariff for renewable energy has managed to stimulate the clean energy market in Germany, USA, China, Denmark, and Spain, to name a few. The countries which have implemented a successful REFIT are also those with the highest up-take of renewable energy in the world.

In addition to REFITs, another financing support mechanism is a grant programme. The grant programme could be focused on subsidising particular technologies or helping to develop the infrastructure necessary to implement renewable energy projects. These grants could be established by local or national government or they could even come in the form of development grants from organisations such as the Development Bank of Southern Africa which makes an impact by expanding access to finance for implementing sustainable development solutions. Although the REFIT, combined with an appropriate PPA, provides sufficient incentive for many developers, there may be a need for grants to support other aspects of the RE industry development.

There are also capital grants which are designed to help with initial capital expenditure for the project. These grants are available from international donors such as the Global Environmental Facility (GEF), as well as locally through entities like Renewable Energy Finance and Subsidy Office (REFSO). Other financial incentives might come in the form of general enterprise development support and projects are likely to have to demonstrate an increase in local employment or additional flow of revenues to the local region.

Soft loans are loans that are given below market rates. These are mainly given via development finance institutions and include entities such as International Finance Corporation (IFC), European Investment Bank (EIB), World Bank other Development Finance Institutions (AFD, KfW, Norfund), to name a few.

Another type of financial support mechanism can come in the form of tax incentives. Tax incentives are locally developed and incorporated into the tax code and are designed to encourage a particular type of behaviour. This is accomplished through reducing or eliminating tax on certain goods and/or services, in this case those associated with the implementation of renewable energy technologies.

Financial incentives for renewables are support mechanisms designed to reduce risk by increasing the potential payback period for investments. It is important to mention that financial support mechanisms are not mutually exclusive. As a matter-of-fact, the most successful renewable energy programmes attempt to utilise and take advantage of as many financial support mechanisms as possible. One important aspect to financial incentives is making the market aware of the different options available to project developers.

6.3.4 Infrastructure and planning

Infrastructure and planning regulations can very easily derail any proactive renewable energy financial incentive programme such as a REFIT. It is important that the infrastructure and planning regulations are in line with expected renewable energy targets. International successes for renewable energy project implementation will always come in parallel with sound and well thought through infrastructure investment and development as well as favourable planning policies. In many examples of renewable energy programmes that have been less successful, planning policies and infrastructure upgrading tend to be one of greatest barriers.

For example, the UK which has a one of the best wind resources in Europe also has one of the lower rates of renewable energy project development despite implementing government targets and policies such as green tariffs in the form of renewable energy obligation certificates. One of the main reasons is that the UK government has up until now failed to develop top-down planning policies to streamline the development of wind energy projects.

Therefore, it is essential that infrastructure and planning policies are developed with the view to streamline and reduce barriers to the implementation of renewable energy projects. This includes making a proactive approach to disseminating information about planning approval and renewable resource assessment. It is important as part of planning policies to continually update wind resource data and provide comprehensive GIS mapping tools to both developers and planning officials. Renewable energy technologies, even though implemented around the world, are still relatively new technologies. Also with new technologies, comes new infrastructure and planning policies. In addition with new policies and project types, it becomes increasingly important to develop and require thorough training and capacity building in order to see positive industry growth. More detailed information regarding infrastructure and planning policies can be found in Chapter 9.

6.3.5 Pilot small-scale REFIT

As described in chapter 3 the South African renewable energy feed-in-tariff in its present form is tailored towards the development of large-scale renewable energy projects. This leaves a large part of the potential renewable energy market without any incentives develop clean energy projects. With the possibility of a capacity cap and potential difficulty in getting all the necessary approvals for large-scale projects, the Western Cape Government has the opportunity to develop a pilot small-scale renewable energy feed-in-tariff.

The large part of the potential renewable energy market which NERSA's national REFIT does not benefit is residential, small and medium enterprises (SMEs), and institutions throughout the Western Cape Province. It was just over the last two years that Eskom was announcing power shortages and implemented load shedding which resulted in large-scale rolling blackouts. There were many residents and small businesses that were negatively affected by these rolling blackouts. The rolling blackouts coupled with announcements of electricity prices potentially increasing dramatically could prove to be an extremely favourable environment for the take-up of small-scale renewable energy projects.

In addition, there are a growing number of community developments and business complexes that are being established in South Africa. These community developments and business complexes could also encompass the implementation of small-scale renewable energy installations that provide enough electricity for the community's or business needs. Unfortunately the current structure of the national REFIT only allows for large-scale utility size installation of renewable energy projects.

Hence there is a need to develop a small-scale REFIT, which will enable households, small business and institutions to participate in the renewables sector and have access to the necessary financial support mechanisms.

6.4 Long-Term Measures

Long-term measures are those which the Western Cape Provincial Government could engage in parallel or shortly after the implementation of the priority measures (mentioned above in section 6.3) depending on resource availability and allocation. The long-term measures are not intended to be a list of strategic supporting mechanisms for the Western Cape to sideline or delay implementing, but rather a set of measures which focus around longer-term growth approach to position the Western Cape Province as a leader in renewable energy industry development. In

addition, they include implementing measures which help to position South Africa as a leader globally for renewable energy research, investment, manufacturing and project development.

The Western Cape Government could assist with addressing cross-provincial barriers to renewable energy development. Addressing national barriers to renewable energy development could be an integral part to also assisting the Western Cape Province meet its targets for 2014. This is due to the fact that not all the priority supporting strategies and mechanisms are designed to alleviate barriers which exist beyond the provincial jurisdiction or ability to directly affect and enforce.

6.4.1 National engagement

Although the strategies listed about are focused on the direct actions that the Western Cape Provincial Government can pursue and support, there are also actions that can be undertaken to facilitate the development of comprehensive solutions to some of the national barriers and further the advancement of renewable energy industry development. The Western Cape Province can play a proactive role working with and encouraging national bodies to adopt policies and regulation that favours and fosters the development of clean energy industry in South Africa. It is equally important that the Western Cape develop a provincial regulatory action plan as it is to actively work with national entities remove institutional barriers hindering the progress to a diversified energy supply, such as the outstanding issues on the REFIT and others referred to in section 5.

The Western Cape could create a regional focal point that works with national companies and organisations, such as NERSA and Eskom. This entity could either be established as part of an already existing provincial government department or potentially add as part of the one stop shop. The focal point could also engage with and sit on committees, which have been formed to address national barriers for the implementation of clean energy, set future targets, and work to diversify energy resources and securitise supply. Importantly, this would help focus on energy stability and to ensure coordination across all provincial and national agencies and departments.

Support of this type would help to eliminate institutional barriers to establishment of clean energy industry. Examples of institutional barriers that require attention include, but are not limited to:

- complicated procedures, bureaucracy, and excessive red tape;
- government policies and regulatory action, which are uncertain, unsupportive, or even counterproductive to initiatives developed by the Western Cape; and
- lack of knowledge or understanding that sometimes translate to “fear of the unknown,” which could also encompass social, cultural, and behavioural barriers.

Many of these issues could be resolved with a comprehensive regulatory framework supporting institutions that highlight and address these concerns.

6.4.2 Institutional support

The Western Cape Province could also take actions to provide overarching institutional support to assist the development of a long-term and successful energy programme. Provincial institutional support could come in either the help of establishing new institutions to manage any new issues arising with the renewable energy industry development or providing assistance to already established institutions within the Western Cape. This could include supporting trade associations related to the renewable energy market or assisting with the creation of new industry associations, for example a Western Cape Renewable Energy Industry Association.

The Western Cape Province could support institutions by advising on areas of research needed to stimulate or streamline the implementation of clean energy projects. In addition, Western Cape Government could work to identify issues within the Western Cape that need addressing in order to facilitate achieving provincial or national renewable energy targets. The Western Cape would then work with local institutions to highlighting these issues that they could assist in addressing. As a long-term measure of supporting institutions, the Western Cape Province could consider funding in

the means of grants or subsidies to either help establish institutions or finance initiatives undertaken by existing institutions that are proposed as a need for provincial industry growth.

7 One-Stop Shop

7.1 Overview

In the context of the development of the Western Cape's Regional Regulatory Action Plan, it is proposed to create a focal point for business and investors with an interest in developing and financing renewable energy projects within the Western Cape Province. Such an entity, referred to as a 'one-stop shop', would aim at providing the necessary information and support required by developers and financiers.

The one-stop shop could either exist simply as an information portal or it could actually take a proactive approach to assist developers navigate the complicated licensing and permit requirements. It is noted that these services and functions may not be required by all developers, especially the larger developers who would have much greater internal infrastructures to develop projects, however the aim would be to provide a range of services and information to a wide range of clients based on the needs of those clients.

As an information dissemination entity, the one-stop would be web-based as well as providing experienced staff for one-to-one support. The website for the one-stop shop would be home to a comprehensive process map, which would illustrate the steps a project developer must execute in order to fulfil the necessary licensing and permitting requirements.

In addition to the process map, the one-stop shop could provide contact information for all the relevant regulatory bodies overseeing the different steps, e.g. EIA, construction permits, interconnection and generation licensing, etc. The one-stop shop could also provide information regarding the requirements of local municipalities and the Provincial Government, and advise on the necessary steps project developers would have to execute outside of provincial control or jurisdiction, such as securing a Generation Licence from the Regulator, a Power Purchase Agreement (PPA) from the Renewable Energy Purchasing Agency (REPA) or a grid interconnection from Eskom. Other issues could include a heritage assessment with South African Heritage Resources Agency.

The one-stop shop entity would be mandated and designed to provide guidance on all key issues necessary to kick start and fast track renewable energy power projects in the Western Cape Province.

Should a more pro-active approach be required, this could take the form of directly supporting and guiding developers in their applications through the various regulatory requirements or helping to resolve conflicts arising with licensing and permitting bodies.

As well as providing support to developers and investors, the one-stop shop could also be able to provide support to municipalities within the Province that are looking to promote and encourage the development of renewable energy projects.

The one-stop shop could initially be established under an existing institution, such as Wesgro, in order to reduce set-up and operation costs, but with the possibility of establishing a dedicated stand alone entity at some point in the future should the need arise.

The one-stop shop will be a vital institution to support the implementation of the priority measures for the development of renewable energy in the Western Cape Province, establish a long-term sustainable clean energy industry and local enterprise opportunities, and contribute to addressing national barriers to renewable energy development in the country.

7.2 International and Local Examples

There are a number of local and international examples of one-stop shop entities that have been used to promote and support the development of renewable energy. A review of key examples provides insight into the various solutions that have been developed to streamline the project development process. There examples range from a simple information dissemination portal to

more complex engagements where the one-stop shop has been designated to provide certain local, regional or national approvals, or to act as mediator with other institutions.

There are examples of how responsibilities could be bundled so that project developers and financiers have a single point of contact which is designed to provide information and sometimes approvals for renewable energy projects. The one-stop shop can act as a focal point when applying for permission for a wind power plant or other renewable energy projects, rather than several different and sometimes conflicting authorities. The approval process for renewable energy projects, in particular wind energy, differs largely from country to country. There are also variations within countries in different regions, states, provinces or municipalities, on the regulations and procedures to be followed for developing a wind farm. There are often varying specific regional laws and regulations; a one-stop shop can assist in reducing the delays and confusion by providing a single point of contact for project developers where information is simplified and aggregated.

7.2.1 United Kingdom

In the UK, there has been some action to develop one-stop shops to help combat some of the barriers to wind and other renewable energy development. The UK's Department for Energy and Climate Change (DECC) has developed a Renewable Energy Strategy and the Office for Renewable Energy Deployment which acts as a one-stop shop and information portal. The website for this initiative is called UK Renewables: Growing the UK capability for a global market[6]. This is a one-stop shop provides a variety of different information for policymakers, project developers and investor. UK Renewables is a Government service that utilises trade promotion in coordination with UK Trade and Investment, Regional Development Agencies and Devolved Administrations to facilitate the growth of UK renewable energy industry both national and on a world-scale. The main goal is to assist and support the achievement of the UK's 2020 renewable energy targets.

The UK Renewables service supports individual private companies that are looking to expand into the renewable energy industry and assist those which have already developed projects. The UK one-stop shop does this by providing all the required information, advice and contacts which individuals and companies would need. The overall aim of this one-stop shop is to help:

- promote the UK as a premier destination for investment in the wind energy market;
- communicate the latest developments in UK renewable energy policy and important information for investors;
- showcase all the benefits the UK has to offer which includes natural resources, business environment, infrastructure, policy frameworks, financial support mechanisms, existing manufacturing industries and more; and
- facilitate business opportunities by working closely with other UK Government entities, potential investors and ensuring lead points of contact are shared.

The BWEA has developed a web-based one-stop shop for small-scale wind turbines[7]. This is a portal that provides interested parties with relevant information, although it does not offer services to assist with approval procedures or liaising with authorities. The information offered ranges from a market overview of available small-scale systems, a wind speed database, advice on the permitting process, grant programmes for small-scale renewables, and experience and lessons learned from existing projects.

In addition to the BWEA, there are also some local initiatives of one-stop shops, for example Renewable Energy for Devon (RE4D). RE4D is a partnership providing free independent advice and support for small scale renewable energy projects. RE4D is a local one-stop shop that provides a range of services including:

- assisting to identify potential renewable energy options;

[6] See http://www.ukrenewables.com/ for more information.
[7] See *http://www.bwea.com/small/* for further information

- assessing technologies and installers;
- developing a financial case for renewable energy projects;
- accessing grants and loans for projects;
- address planning issues related to different renewable energy projects; and
- providing information about the renewable energy market, businesses, communities, households and the public sector that are engaged in project development and financing.

There are also not-for-profit companies working as regional one-stop shops due to limited national support for streamlining permitting, zoning, licensing, and EIA reporting. An example of a regional UK one-stop shop is Regen SW Energy Agency, which services the South West England, providing sustainable energy solutions and assisting with the transition to a low-carbon economy. The agency's mission is to speed up the transition to a low-carbon economy in South West England by:

- unlocking sustainable-energy business opportunities;
- accelerating the uptake of the region's renewable energy resources; and
- leading effective energy efficiency initiatives in the region.

The SW Energy Agency is a one-stop shop for the sustainable energy industry in the region and gives independent advice to decision makers and also works with renewable energy developers. The agency also supports demonstration projects across a range of technologies at both a micro and utility scale and assists in stimulating public debates about sustainable energy resources. The SW Energy Agency is quite a comprehensive one-stop shop that engages with businesses, local authorities, and residents and communities looking to implement renewable energy and energy efficiency projects.

7.2.2 Municipal or state level renewable energy bodies: USA

Early in 2009, US President Barack Obama signed the federal stimulus package (Recovery and Reinvestment Act) which makes provision for energy efficiency, conservation and renewable energy. On a state level this has translated into a gearing up of both existing energy offices as well as independent corporations, such as the California Centre for Sustainable Energy (CCSE), for streamlined facilitation of new renewable energy initiatives.

An example of a state-level energy agency is the South Carolina Energy Office. The Energy Office presents itself on its website as a renewable energy one-stop shop (www.energy.sc.gov). However, unlike Denmark it does not offer an online application procedure for potential developers. It is a collaborative initiative between state and federal governmental departments, as well as a number of key stakeholders in the public private sector, such as the South Carolina Department of Agriculture and the Clemson Institute for Economic and Community Development (CIECD). The South Carolina Energy Office has numerous services it offers to project developers, residents, local businesses, and financiers. The primary service that is marked as a one-stop shop, offers monthly meetings where interested parties may schedule private appointments with the necessary agents. These hosted monthly meetings provide important background information, a step-by-step analysis of state incentives and requirements, and concisely answer questions that may be raised by project developers or financiers.

The South Carolina Energy Office as organisation provides far more detail than just renewable energy information. It is a comprehensive source covering all details related to energy. This includes information on funding sources and incentives for energy efficiency and renewables, energy education, technical assistance for energy audits, green building design and construction, energy bill assistance, research and development information, alternative transportation fuels, information covering councils and trade associations, job opportunities, and much more. As part of the energy office's information dissemination it provides hyperlinks on its website to other relevant information sources.

One noteworthy hyperlink connects users to an exhaustive database listing state, local, utility and federal incentives and policies for the promotion renewable energy in the region. The Database of State Incentives for Renewables and Efficiency (DSIRE) is funded by the United States Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) and features a particularly useful option to search the site by incentive type, technology type, or sector (among other variables). The database makes it simple for project developers to gain insight into investment opportunities. A regional one-stop shop entity similar to the South Carolinian Energy Office would be a highly useful tool to be developed within the Western Cape Province in a South African context.

7.2.3 Government level renewable energy bodies: Denmark, the UK and Germany.

Denmark is hailed internationally as being a global leader when it comes to streamlining renewable energy project development. The Danish Energy Agency's one-stop shop offer investors an 'A' to 'Z' of services including:

- tendering of bids for renewable energy project construction;
- approval of pre-investigation of sites;
- environmental impact assessments;
- construction and operation; and
- licensing to produce energy.

The one-stop shop has significantly reduced the lead time for the development of renewable energy projects in Denmark. The one-stop shop in Denmark has gone far beyond just an information portal that assists with advising project developers and financiers. The Danish example of a one-stop shop helps to simplify the siting process for renewable energy projects (mainly on and offshore wind farms) and assists in reducing project uncertainty and risk. It is therefore not surprising that Denmark has positioned itself as a leading authority in wind farm project development. Denmark has the largest portfolio of wind farm projects, generating approximately 20 percent of national electricity using wind.

Denmark has taken proactive steps in developing regulatory legislation dating back as far as 1992 to streamline the implementation of renewable energy, mainly wind power. Due to this proactive regulation, Denmark has not only become a world leader in project implementation, but this has led Denmark to being the world's leader in wind turbine technology. In 2005 Denmark exported US$7.45 billion in wind energy technology and equipment.

Offering less exhaustive, but still practical, services are the Trade and Investment Departments of the UK and Germany. Renewable energy is listed as one of many investment opportunities within these countries. These countries have taken ambitious steps both on a state or regional level as well as nationally to speed up the facilitation of renewable energy project development. With ambitious regional and national goals to diversify energy supplies and assert themselves as major investment locations for renewable energy development, the UK and Germany have positioned themselves as key destinations for financiers looking for sound investment opportunities in projects and as a major exporter of equipment and project development expertise.

Both countries offer to help investors make connections, meet potential business partners and provide advice for attaining financial incentives. The British case takes this a step further by offering interested parties an opportunity to meet with investment agents in their home countries, provided that it is a location with a British Consul.

7.2.4 Regional and global renewable energy bodies – MEDREC and REEEP

In a move to develop a sustainable renewable energy market system in the greater Mediterranean Region a number of countries (Algeria, Libya, Egypt, Morocco, Tunisian, and Italy) and multilateral partners (The United Nation Environment Program (UNEP) and The Observatoire Méditerranéen

de l'Energie (OME)) came together in 2004 to form MEDREC. The countries represented by MEDREC additionally have their own local energy agencies but have recognised an opportunity for enhanced regional benefits through a collaborative body which highlights the investment appeal of the greater area. It is staffed by nine technical experts from within these countries. The body seeks to:

- Promote and develop renewable energy projects within the Mediterranean area;
- Develop finance sources and mechanism options to support renewable energy projects (for example the advancement of tradable renewable energy certificates); and
- Create networks between countries within the region through the exchange of experiences, knowledge and technology.

MEDREC is a regional focal point of the global Renewable Energy and Energy Efficiency Partnership (REEEP). This multilateral organisation's goal is to "accelerate the global market for sustainable energy by acting as an international and regional enable, multiplier and catalyst to change and develop sustainable energy systems" (www.reeep.org). It works with government, NGOs and businesses to facilitate the growth of the renewable energy sector and importantly hosts databases upon which project developers can source information as to the strengths, weaknesses, opportunities, and threats encompassed within particular markets.

The Southern Africa regional focal point of REEEP is located within the South African National Energy Research Institute (SANERI). REEEP-SA provides a link to an invaluable international service which assists project developers in assessing the local market, and finding potential partners and experts to implement renewable energy projects. It is therefore highly recommended that the Regional Secretariat of REEEP-SA is engaged in or made aware of future activities in the Western Cape Provincial renewable energy one-stop shop.

7.2.5 One-Stop Shops in South Africa

One-stop shops in South Africa are also not a new concept and the South African Government and the Western Cape Provincial Government have experience in developing and operating one-stop shops. This is important expertise which should be investigated and leveraged where possible for developing a new provincial renewable energy one-stop shop.

The South African National Department of Trade and Industry (DTI) provides a one-stop shop for investors, offering a variety of services to those interested in conducting business in South Africa. The DTI provides a range of different services and informative details. These details range from covering the regulations of how to do develop a business in South Africa to information about the country's economy, legislation and regulations, and news and events.

An important aspect of the DTI is the investment facilitation services for international investors. The facilitation services are quite comprehensive and provide all the details that one would require for conducting business in South Africa, which could include the establishment of a business to develop renewable energy projects. The DTI's investment facilitation services include, but are not limited to the following:

- information on South African major economic sectors and industries;
- consultation and advice on South Africa's regulatory environment;
- economic statistics and modelling;
- facilitation of investment missions;
- links to joint venture partners in South Africa;
- information on incentive packages and funding opportunities for investors;
- assistance with work permits; and
- logistical support for relocation to South Africa.

The Trade and Investment South Africa (TISA) Division works under the umbrella of the Department of Trade and Industry (DTI) and provides a one-stop shop for investors and exporters at a national level. The TISA's primary mission is to increase South Africa's capability and capacity to promote targeted markets and increase and retain foreign and domestic direct investment. TISA has a three-pronged investment strategy that has been adopted to provide high-level investment performance which includes:

- the development of Industrial Development Zones (IDZs) that are duty-free processing zones around coastal or inland ports for dedicated exporters;
- the development of special incentive packages, both new and more effective incentives to match those being offered by competitor countries; and
- policy input for the creation of an investor-friendly environment comprising of active engagement in the policy debate to improve the overall investment climate.

The Western Cape Provincial Government also has experience in developing and operating a similar one-stop shop for domestic and foreign investors looking to capitalise on and tap into the business potential of the Western Cape Province. Wesgro is the official investment and trade promotion agency for the Western Cape Province. According to Wesgro's website, it is the "first point of contact for foreign importers, local exporters and investors wishing to take advantage of the unlimited business potential" in the Western Cape Province.

Wesgro is a one-stop shop for the local and foreign business community. It provides much of the information and guidance companies and individuals are looking for when developing business opportunities in the Western Cape. The important detailed information dissemination and guidance includes identifying incentives and funding, liaising with regulatory institutions and government departments to resolve bottlenecks to developing business opportunities, and linking potential local and foreign individuals who are looking to develop joint venture partnerships.

7.2.6 International summary table

Reviewing international examples of one-stop shops, it is noted that the structure and offerings can be summarised with seven major characteristics, which could contribute to a comprehensive one-stop shop renewable energy project developer support mechanism. Table 7.1 illustrates the offerings, services or information and the relevant country. It is recommended the Western Cape one-stop shop be developed to provide all of the key services listed in table 7.1, although this may be developed using a phased approach. These services include general advice and information, technical expertise, linking partners, direct grants, site selection, on-line applications, and links to external funding opportunities.

Table 7.1.: One-Stop Shop Summary Table

	General advice & information on renenwables	Technical expertise	Linking partners for joint ventures	Joint financing / direct grants	Site selection	Online application procedure	Links to external funding opportunities	Other (specify)
USA[§§] (Energy Efficiency and Renewable Energy - EERE)	X			x			x	
UK (UK Trade and Investment - UKTI)	X		x				x	x 1. Advice and information available (in person) at British Consular General offices worldwide
Germany (Germany Trade and Investment - GTAI)	X		x		x		x	
Denmark (Danish Energy Agency - DEA)	X	x			x	x	x	x • Assistance with in-house licensing • Online application tracking service • Costs divulged (exploration, operation, administration and transportation)
Sweden (Swedish Energy Agency)	X	x	x	x	x			x • Research and information disseminated via regular seminars and conferences
Mediterranean (Mediterranean Renewable Energy Centre - MEDREC)	X	x	x				x	
New Zealand (Energy Efficiency and Conservation Authority - EECA)	x	x		x				x • Standards and ratings • Research centre

[§§] Has national as well as state-level energy offices dealing specifically with energy efficiency and renewable energy

7.3 Lessons Learnt and Conclusions from International Examples

It is clear from investigating one-stop shops both within South Africa and internationally that they provide an important function and added value. One-stop shops assist in supporting those companies and organizations that are looking to develop and invest in business opportunities within the context of regulatory frameworks established by policymakers and legislation.

The international examples of a one-stop shop reveal some interesting approaches worth considering for the Western Cape Province. Some one-stop shops have not only been developed as information portals, but have been mandated by a top-down approach from centralised government to implement legislation to streamline approval and planning procedures for renewables. Some examples have concentrated the administrative procedures for large wind power plants in one area, but left certain key responsibilities, especially with regard to demarcating suitable sites for wind turbine projects, with the local and regional administrative bodies.

It is quite clear that the importance of a successful renewable energy regulatory development plan is communication and simplified procedures. The success of a Western Cape Regulatory Action Plan will depend on how well it integrates multiple procedures in a one-stop shop with an aim to also engage with national entities to identify and address barriers to renewable energy implementation.

One-stop shops have important major components, which is what makes them such effective tools in helping develop business opportunities. The main aspects to a one-stop shop include the following:

- providing a source for information dissemination about the specific rules and regulations of the market structure;
- supporting potential investors in achieving all relevant permissions
- constantly updating market participants with new regulations and policies affecting a particular market;
- application processing and streamlining of administrative procedures;
- helping authorities to streamline administrative procedures; and
- helping companies, individuals, and organisations such as project developers, investors and regulators to connect and team up to work together towards a particular goal in a specific market.

It is proposed that a phased approach to providing a one-stop shop support is put in place. In the short-term, it is proposed that Wesgro is approached and supported to house this one-stop shop and provide the key services, which should include information based service, such as developing and operating the website. Wesgro is already an established one-stop shop that is a focal point for those interested in tapping into the business opportunities in the Western Cape.

This would primarily be focused on supporting developers and investors and connecting relevant parties where synergies are required.

Energy issues are multidisciplinary encompassing aspects related to environment, planning, education, economy, health, transport and more. Currently, there is no single department or body which is addressing all these issues including, energy diversification, security of supply, promotion of alternative clean sources, to name a few. In the medium- to longer-term, it is proposed that a dedicated energy agency be established within the Western Cape Province. This would take over the responsibility for supporting and providing information to a wide range of developers and investors,

but could also provide additional services, such as providing support to municipalities on planning issues, assist with small-scale renewables activities, and other energy activities such as solar water heater programmes and energy efficiency. There is extensive international experience of such agencies.

The renewable energy one-stop shop for the Western Cape Province would also benefit from liaising and working with regional organisations that are aimed toward increasing the use of and addressing any barriers to renewable energy project development. Some of the organisations that help promote renewable energy development in the region that the one-stop shop could work with include but are not limited to the following: REEEP; the Sustainable Energy Society of Southern Africa (SESSA); Western Cape Wind Action Group; and the African Wind Energy Association (AfriWEA).

These regional renewable energy organisations have been established to encourage and promote the development of renewable energy resources among manufacturers, developers, investors, and governments. For example, SESSA has been established to assist the continued growth of renewable energy markets and projects and promotes the increase use of renewable energy resources with informal education and information dissemination to end-users and other decision-makers of all levels. AfriWEA promotes the development and investment in wind energy throughout the African continent and aims to be an influential organization facilitating cooperation between all players in the energy sector and market.

Importantly, the Western Cape Wind Action Group has been established to organize the interests of the different stakeholders in the Province to promote renewable energy, particularly wind throughout the levels of public and private sectors. The Western Cape Wind Action Group works to build capacity through workshops and training in the Province while also addressing the technical requirements for connecting wind farms to the grid.

It would be a useful function of a local one-stop shop to maintain a database of policy and incentives related to renewable energy project development. This would assist the one-stop shop's function of effective information dissemination and updating. Good, informative data with a well-maintained website will be a crucial tool for project developers and financiers.

All international examples of a successful renewable energy market have some form of a one-stop shop to help guide project developers to all the necessary procedures while at the same time working with decision-makers to address barriers to renewable energy project implementation.

7.4 Key Functions

In order to facilitate the successful development of renewable energy resources in the Western Cape Province, the one-stop shop should be mandated to provide a series of clearly defined key functions. These functions could include:

- information dissemination;
- project developer toolkit with guidelines;
- project developer support;
- support for municipalities;
- one-stop shop national engagement; and
- one-stop shop in an international context.

These key functions are designed to implement a series of immediate priority measures that will benefit project developers and financiers. As the priority issues are addressed within the one-stop shop, the long-term measures for the development and support of a renewable energy industry could be investigated and managed.

7.4.1 Information dissemination

The key function for a provincial renewable energy one-stop shop would be first and foremost an information portal. The market for renewable energy project development in the Western Cape Province and South Africa as a whole is largely untested with regard to permitting, licensing, zoning, and approval procedures. Due to this lack of tried and tested experience, mandating the establishment of a one-stop shop information portal providing guidance is of utmost importance. The one-stop shop should disseminate information to the market providing informative and comprehensive guidance to developing clean energy projects.

The information provided will need to be continually updated as provincial and national legislation and regulation changes frequently. Guidance should cover all the local municipality, provincial, and national requirements for renewable energy project development that will encompass procedures pertaining to environmental impact assessment (EIA), zoning, planning, interconnection and generation licensing, as well as any other renewable energy project needs, such as water use requirements for hydro or geothermal projects. Much of this information could be shared through the inclusion of a process map section that will outline all the procedural needs and those that can be executed in parallel with other steps.

The information provided by the one-stop shop should not just cover the procedural requirements project developers must follow, but should also include information regarding local and national climate change policy and legislation. South Africa is currently in a state of flux regarding the development of proactive policies governing the future of renewable energy and other climate change mitigation strategies. It will be important that the one-stop shop mirror the changes in provincial and national legislation regarding the renewable energy sector. Acting as an information portal it will help guide project developers to all the requirements they need to fulfil in order to implement a renewable energy project.

7.4.2 Project developer toolkit with guidelines

As part of the information dissemination key function the one-stop could establish a project developer toolkit, which would outline all the necessary procedures required for implementing a renewable energy project. The toolkit would be based on the type of technology the project is implementing. As there are some overlapping procedures that cover all projects, some renewable energy technologies will have varying regulatory procedures. The toolkit would be web-based and will cover all the necessary local and national procedures developers are required to complete covering zoning, permitting, licensing, and more importantly this will not only have a list of project requirements but also links and contacts to all those entities which are responsible for permitting, zoning and EIA approval, licensing, etc.

The most important aspect of such a toolkit with all the necessary guidelines would be that it is continually updated. The web-based toolkit would have to be consistently updated as local and national regulatory requirements and those entities that are responsible for those requirements change over time.

7.4.3 Project developer support

In addition to acting as a focal point for information, the one-stop shop could go beyond just indirectly assisting project developers and take a proactive approach. This would include conducting meetings or workshops that actively engage with project developers and financiers. In addition to providing informative guidance, the one-stop shop could actively work with project developers to advise them on how to navigate particular barriers that arise while developing a clean energy project. This assistance could come in the form of actively working with the organisations where the bottleneck occurs regardless of whether it is local or national. The one-stop shop could act as a mediator for any confusion or disputes that may arise while implementing clean energy projects. However, it is important that the one-stop shop is not an additional "check-and-balance" or bureaucratic procedure that is added to what developers are currently required to go through to implement a renewable energy project.

As project developers begin to surface to develop renewable energy projects the one-stop shop could assist with bundling those projects under the REFIT. What that would mean is that if projects are below the threshold to apply for the REFIT the one-stop shop could assist with bundling the similar technology projects together and apply as one large project which would cross the threshold to be applicable for the national REFIT. This issue would require further discussion and clarification with NERSA; however it could incentivise small-medium enterprises (SMEs) to engage in renewable energy project development and open the market up to more diversity of ownership. Bundling measures could also lead to the creation of energy cooperatives, which are an autonomous association of developers or financiers who are united voluntarily to engage in a common economic, social, and cultural needs, such as in this case clean energy project implementation enterprises.

Where applicable and possible the one-stop shop could also prove to be a focal point in assisting project developers with the processing of any approvals required by the Province and Western Cape municipalities. This will likely be more resource intensive and would require greater collaboration between different local governmental departments and bodies to ensure that the one-stop shop could process all the necessary approvals for project developers. However, by mandating a one-stop shop to not act just as an information portal, but also as a proactive support mechanism assisting the management of approval procedures, it would likely stream line the process of implementing renewable energy projects.

The one-stop shop could also support and facilitate collaboration and connections between developers, technology providers, land owners and financiers.

7.4.4 Support for municipalities

In addition to working with project developers the renewable energy one-stop shop is in a great position to assist and work directly with local authorities and municipalities within the Western Cape Province. As a one-stop shop entity, it will be working directly with advising project developers and will receive first-hand accounts as to what some of the barriers are which they are facing. Through liaising with project developers the one-stop shop could work directly with local authorities and municipalities to highlight and make suggestions as to potential legislation and policy changes that could help facilitate and improve the approvals associated with renewable energy project development.

The one-stop shop could also assist and support municipalities in the development of planning guidelines and zoning for wind farms and provide capacity building on the local and regional administrative levels.

In addition, to assisting with municipality policy changes within the Western Cape to favour and streamline renewable energy project development, the one-stop shop would also be in position to raise concerns with national entities and governmental bodies. By raising issues within the Western Cape that have caused bottlenecks it could potentially lead to nation-wide policy changes that would help facilitate renewable energy development throughout all provinces and municipalities, not just within the Western Cape.

7.4.5 One-stop shop national engagement

The one-stop shop should play an important role in liaising, actively engaging and working with NERSA, Eskom and the Single Buyer Office. By doing so, the Western Cape will have direct contact with the entities that affect a significant part of the procedures needed to implement renewable energy projects. If feed-in-tariff payments, power purchase agreements, grid extension, generation and interconnection licensing are not streamlined to accommodate the implementation of renewables, there exists the potential to derail any regulatory action plan developed by the Western Cape or any other provincial or municipal government. Therefore an important aspect to any regional action plan for the development of renewable energy projects must have a component of engaging national entities.

Western Cape Province could assist in addressing any barriers which arise outside the provincial borders that has an affect on the development of the renewable energy resources within the Western Cape. There are many ways the one-stop shop could engage with national entities. One option would be to promote the development of oversight committees or actively partake in those committees and working groups, which currently exist. The one-stop shop could provide national initiatives, programmes, policymakers, and market participants vital information of what project developers are facing while trying to implement their clean energy projects within the Western Cape.

It is very likely that if developers in the Western Cape are facing institutional barriers outside the regulation of the Western Cape Provincial Government that is negatively affecting the deployment of a successful renewable energy programme, chances are other provinces are facing them as well. The Western Cape with its expansive wind energy resource could take a leading role through the one-stop shop to highlight some of the institutional barriers and work with other provinces and national entities to alleviate some of the constraints. This would not only assist with making any Western Cape renewable energy regulatory action plan a success, but it will also help to streamline the development of small and large-scale clean energy projects throughout South Africa.

In order to be a successful renewable energy development facilitator the one-stop shop should work beyond the Western Cape Provincial borders to assist with related national initiatives such as Solar Water Heaters (SWH) Programme. The one-stop shop could play an active role ensuring the successful implementation of any government initiatives by working closely with national policymakers. Engagement with national entities need not only focus on renewable energy, but also any energy efficiency programmes and initiatives.

7.4.6 One-stop shop in an international context

The one-stop shop need not only focus within the Western Cape and South Africa, but it could also act as a gateway for companies in South Africa to engage internationally and vice versa. The one-stop shop could provide information on how companies within the Western Cape could access international funding opportunities and/or project support.

One such example is to develop projects under the United Nations Framework Convention on Climate Change (UNFCCC) Clean Development Mechanism (CDM). The CDM is an international project-based mechanism to provide additional revenues through the sale of certified emission reductions (CERs) internationally. As renewable energy projects reduce the emissions of harmful greenhouse gases (GHGs) there are methodologies which were developed to calculate the reduction in the emissions each project would reduce. There are strict project approval and audit procedures and once a project has been properly approved by the UNFCCC Executive Board, the project developer is issued a certain amount of CERs based on how much GHG emissions the project decreases. These CERs could then be sold internationally on an annual basis and generate an additional line of yearly project revenues. In addition, the CDM opportunities include those potential projects to be developed as Programmatic CDM, also known as Programme of Activities (PoA) CDM project. This is discussed in greater detail in the section on carbon financing opportunities. There may be possibilities of administrating a PoA in future years.

In addition to CDM project revenue opportunities, there are other international options for project funding and support from a wide variety of charities, NGOs, and private and public sectors. Opportunities for international support and financing can take the form of feasibility studies, EIA financing, resource mapping, or even direct project financing. International companies, organisations, and financiers will focus on the potential of developing and investing in clean energy projects as South Africa's REFIT proves to be an effective incentive for renewables. The one-stop shop could act as a portal for local companies and developers to get in contact with partners internationally. As the one-stop shop becomes aware of international opportunities for project support and financing it could disseminate contact details throughout those engaged in the renewable energy industry in the Western Cape Province. This will help cultivate international partnerships and investments in the Western Cape, as well as foster technology and knowledge transfer which will assist in developing a renewable energy industry.

In addition, there may be opportunities in the future for the channelling and disbursement of funding, for example from national and Provincial Government or donors.

7.5 Proposed structure

For a one-stop shop to function effectively to help support the development of renewable energy projects it must be structured and designed to suit the needs of the Western Cape Province. In addition, the one-stop shop should be positioned to be able to help resolve issues and barriers to renewable energy development, which exist outside of the Western Cape Province regulatory jurisdiction. The one-stop shop should have the mandate to facilitate all of the key functions specifically tailored to the needs of the Western Cape and in the greater context of South African energy market structure. In order to achieve both priority and long-term measures, we propose an initial short-term structure that could be implemented immediately, as well as another structure which will assist in achieving long-term goals, but will also take more time and resources to set up.

7.5.1 Initial structure

We propose the initial structure of the one-stop shop to be embedded within Wesgro. There are multiple reasons for suggesting Wesgro as the initial home for the renewable energy one-stop shop. An important aspect is the fact that Wesgro is itself already a one-stop shop agency and acts as a first point of contact for foreign importers, local exporters and investors looking to tap into the business potential within the Western Cape Province. It would be fairly easy for such an agency to extend these services to encompass the foreign and local partner needs for developing and investing in

renewable energy projects, which will be a major business potential and revenue stream for the Western Cape Province. As mentioned previously, one of the key functions of the one-stop should be cultivate national and international partnerships to assist with the Western Cape in achieving its renewable energy target and act as part of a regulatory action plan to streamline renewable energy project development. There is a great opportunity for an agency such as Wesgro to leverage its current position and networks to play an important role in fostering such relationships and partnerships to assist in the implementation of clean energy projects.

Wesgro, as it is the official investment and trade promotion agency for the Western Cape Province, already engages in activities that are sought-after by those companies and organisations involved with energy project development and investment. Wesgro assists the business community's need for information and facilitation services from everything from marketing, accessing incentives and finance, site location, permits, business licenses, taxation, business regulation, intellectual property, black economic empowerment, and even environmental regulations. Many of these topics will also need to be addressed for those developing and investing in renewable energy projects within the Western Cape. The renewable energy one-stop shop and Wesgro could prove to be a symbiotic relationship being mutually beneficial for each other.

Also Wesgro has relationships and is currently working closely with some of key players in South Africa's Government, major businesses, trade associations and unions, district municipalities, and both rural and local authorities. The one-stop shop will have to not only address issues and barriers to project development in the Western Cape Province, but also those which arise beyond the Province's borders. These already existing relationships that Wesgro has with trade associations and unions, national government, and both local and rural authorities will prove to be vitally important when the renewable energy one-stop shop is attempting to work with developers to implement their renewable energy projects. The one-stop shop will benefit heavily from the contact networks and experience that has already been developed within Wesgro to disseminate information and work with the business communities developing and investing in projects.

In addition, by using Wesgro instead of the Western Cape Government website to initially house the renewable energy one-stop shop, it should speed-up the approval process of getting information, web pages, process maps, toolkits, and other publications into the public space.

7.5.2 Long-term structure

As the initial priority needs of a one-stop shop mentioned previously are fulfilled we propose the establishment of a new agency within the Western Cape Provincial Government called the Western Cape Energy Agency (WCEA). The Western Cape Energy Agency would be integrated as another Western Cape Provincial Government Department responsible for the oversight of all energy related topics and issues throughout the Western Cape Province. Energy related topics and issues include, but are not limited to energy efficiency, renewable energy, disseminating information to local businesses and households, education and training, organise and sponsor events, design and implement programmes, work with local authorities and national entities, and engage with other Western Cape Departments such as the Department of Environmental Affairs and Development Planning to ensure comprehensive energy solutions for the Western Cape are developed.

The new provincial energy agency would be the permanent home of the one-stop shop for renewable energy project developers and financiers. The one-stop shop would still manage and oversee the successful implementation of all the priority and long-term measures mentioned as key functions of the entity. By creating a provincial energy agency, it will provide the Western Cape with a focal point for all energy related concerns and issues raised amongst government officials (both national and

provincial), civil society stakeholders, and the business community. In addition, as the energy market develops and potentially grows more liberalised the Western Cape Province via the energy agency will be well positioned to pass the necessary regulatory plans to further stimulate the growth in renewable energy resources and energy efficiency management. This will certainly make the Western Cape Province a leader in comprehensive sustainable energy solutions, which will help to diversify energy supply and in time increase energy security for the province as well as South Africa.

Aside from the Western Cape Energy Agency being the main focal point for addressing renewable energy needs for the Province and acting as a representative for national energy issues pertaining to the Province, the agency could also focus on grant funding for energy research and development. The Western Cape Energy Agency could prove to be a main funding resource for local and provincial research centres, institutes, and universities. This has the potential to help guide local research to focus on topics and issues that are appropriate and pertinent to the market development within the Western Cape Province. Taking action on research and development needs could be a considerable advantage for clean energy industry development by engaging in groundbreaking research and helping to secure intellectual property rights.

The establishment of an energy agency will place the Western Cape Province on the leading edge of being able to develop innovative regulatory measures to promote the development of renewable energy projects and energy efficiency demand-side management programmes. The Western Cape could take the lead in implementing clean energy initiatives which could prove to be a positive case study for nationwide programmes. Additionally by establishing a provincial energy agency, any nationally lead initiative will be much easier to implement within the province as there will be already be a focused expert entity to assist with regulatory action to streamline the necessary processes.

7.5.3 Staffing of the one-stop shop

Under the “initial structure” of the one-stop shop there will be a need to hire three additional individuals and an administrative assistant to oversee the necessary work which needs to be carried out. There is already a position within Wesgro that focuses on investments in renewable energy within the Western Cape Province. The workload that is required to actually make a one-stop shop successful will require more resources. It is quite clear that from the work that needs to be completed in order to make the one-stop shop a success, one position will not suffice. In order to facilitate all the work and the national and local engagement a small team of four individuals and an administrative assistant should suffice. However, as the market begins to develop and more responsibilities are required a re-evaluation of the unit’s staff numbers will need to take place. Wesgro already extends its current services to focus on many of the one-stop shop services outlined in this chapter regarding assisting potential business activities of project developers and financiers looking to invest in renewable energy projects.

As mentioned previously, Wesgro is currently providing many of the services that will be needed by project developers and investors in terms of navigating the actual business landscape of the Western Cape Province. What Wesgro cannot provide and what is integral to the one-stop shop, is to have someone be able to consistently update the process map and toolkit as policies and regulations change to accommodate the streamlining of renewable energy development. The new staff will need to be intimately familiar with different renewable energy technologies and know precisely the obligatory procedural requirements for permitting, zoning, interconnection and generation licensing and EIA reporting.

In addition to assisting developers with direct queries, as part of the initial one-stop shop it will be important for the staff to work and liaise with national entities to address any issues, concerns and

barriers that arise outside of the regulatory jurisdiction of the Western Cape Province. This requires to be actively engaged with the national regulator and single buyer office as two examples.

By leveraging many of Wesgro's networks and expertise in advising local and foreign enterprises on the business landscape in the Western Cape, it should help to keep initial staffing costs and resources to a minimum.

7.5.4 Mandate and reporting

The one-stop shop should be mandated under the renewable energy regulatory action plan to provide all the necessary information and support to project developers and financiers looking to engage in the implementation of renewable energy projects within the Western Cape. The one-stop shop entity would also be mandated to work in collaboration with Wesgro, which will initially house the one-stop shop. As the market develops and the one-stop shop implements the priority measures the mandate could expand as the energy agency is developed. The mandate could be expanded to make the Western Cape a leading authority in the clean and sustainable energy sector. The aim would be to help individuals, businesses, and organisations develop renewable energy resources in the Western Cape while at the same time assisting with initiatives to increase energy efficiency.

Reporting of the one-stop shop would be directly to the Western Cape Government Department of Environmental Affairs and Development Planning, as currently they are tasked to implement a regulatory plan to develop the provinces renewable energy resources. Even though the one-stop shop will work with Wesgro and the web-based publically accessible site will be part of Wesgro website, reporting will be directly to the Provincial Department of Environmental Affairs and Development Planning.

7.6 Summary and conclusions

One-stop shops have been demonstrated to be an important factor in assisting with the development of renewable energy projects as part of a greater regulatory framework. Renewable energy one-stop shops have been seen to provide a variety of services from simple information dissemination to being proactively involved with project approval procedures and acting as a legal mediator for any disputes arising between developers and those entities responsible for approvals, licensing, and permitting.

Investigating international examples, it is clear that national centrally led legislation mandating a one-stop shop to truly become a single source for project developers needs is the most effective at streamlining the development of renewable energy projects. A centrally led, top-down approach for setting up a single office or department that has the mandate to require other local authorities and government divisions to take action in reaching an agreed goal of installed capacity from renewables would be the most successful manner in which to reach renewable energy targets. However, in order develop a one-stop shop that could oversee the planning, permitting, licensing and general approvals requires national legislation mandating these capabilities for a new one-stop shop entity and also it needs to be well capitalised to engage in such a range of activities.

7.6.1 Immediate steps forward

It is proposed that the Western Cape Province implements a one-stop shop for renewable energy developers and financiers looking to engage in clean energy projects within the Province. It is initially proposed in order to minimise upfront capital expenditures to host the renewable energy one-stop shop with Wesgro. The one-stop shop is proposed to be initially housed with Wesgro because it is an

ideal pre-existing institution that is already acting as a one-stop shop for business opportunities in the Western Cape Province. In addition to having the experience of working as focal point for those looking to do business in the Western Cape Province, Wesgro already has relationships with other government departments and entities outside Provincial jurisdiction. The renewable energy one-stop shop will need to leverage these networks and contacts to address concerns that developers have with barriers to implementing their projects existing outside of the Western Cape Government departments or local municipalities. Having the Western Cape renewable energy one-stop shop housed with Wesgro will minimise start-up costs for a new one-stop shop. Start-up costs will be minimised due to the new one-stop shop using Wesgro's existing website and offices for new staff.

Depending on Wesgro's support, it is proposed the new renewable energy one-stop shop will initially consist of one full-time and one part-time employee or possibly up to three full-time employees. Initially the most important aspect to the one-stop shop is information dissemination. Originally this will consist of developing a few web pages as part of the Wesgro website solely dedicated to the one-stop shop. To start with, it is important that the one-stop shop disseminate information and data through the website covering the following topics:

- mission statement and provincial mandate for the one-stop shop;
- process map outlining the necessary procedures for zoning, planning, permitting, EIA, and licensing project developers;
- project developer toolkit outlining not only the necessary procedures in the process map, but contact information of relevant approval departments, hyperlinks, and actual applications for the different steps;
- scientific measured data about the renewable energy resources in the Western Cape Province, e.g. wind speeds at different hub heights;
- necessary department and office contact information including names of individuals for all the necessary local municipal authorities, Western Cape Government departments, and National Government entities and departments, such as Eskom's Single Buyer Office and NERSA;
- calendar covering upcoming events related to renewable energy project development, such as workshops or dates new published reports, studies, and legislation;
- publication list of relevant studies and reports which have been developed by government departments or external consultants and research institutes;
- contact details for private sector market participants, e.g. project developers, consultants, technology providers, financiers, etc;
- information and hyperlinks covering the CDM and potential financing opportunities;
- identify and describe national and regional initiatives and programmes that promote renewable energy and energy efficiency, e.g. Solar Water Heaters Programme;
- list of national and international NGOs, charities, development and infrastructure banks that are willing to provide financing or other types of project support; and
- case study information of renewable energy projects implemented in the Western Cape as well as possibly those developed throughout South Africa.

The above information and details are what is required to be hosted on the renewable energy one-stop shop web-pages which will be part of the larger Wesgro website. All the above is part of the one-

stop shop's goals for disseminating information. We envisage that there would also be links from renewable energy one-stop shop guiding developers back to some of the necessary Wesgro data and information which project developers will be looking for advice on while engaging in business opportunities in the Western Cape.

Developing the one-stop shop website as part of Wesgro and uploading all the relevant information listed above is the main priority measure to get the one-stop shop implemented and covering the most immediate requirements of the market, i.e. to clarify precisely what the required procedures are for developers.

An important aspect to the one-stop shop priority measure for disseminating information will be to constantly keep the data updated. All the information on the one-stop shop website should always be updated with the most recent developments in market and significant national and local regulatory and policy changes.

7.6.2 Next steps after website is set up

After the website for the one-stop shop has been set up with all the relevant information to guide project developers, it is proposed that the next step is to begin engaging with other national entities, such as NERSA and Eskom. Engaging with national entities that form part of the procedures project developers are required to go through is vital for the one-stop shop. The one-stop shop's main goal is to advise renewable energy developers to assist in streamlining the implementation of renewable energy projects. In order to fulfil such a role successfully, the one-stop shop must have a close relationship with all entities responsible for granting project developers with their renewable energy permits, zoning approvals, and licensing. Therefore, a thorough understanding of where any bottlenecks and barriers exist outside of the jurisdiction of the Western Cape Province is a high priority.

Once potential delays and barriers are identified and investigated, the one-stop shop could work with either existing oversight committees or develop new regulatory working groups with market participants and government approval entities. These committees and/or working groups would be set up to discuss the best way procedural requirements could be amended or regulatory action taken (both national and local level) to reduce delays and streamline the implementation of renewable energy systems.

The renewable energy one-stop shop service should consist of two important aspects:

- disseminate information to market participants, namely project developers and financiers who are looking to develop renewable energy projects; and
- actively engage on both a local and national level to identify and address bottlenecks and barriers that hinder the implementation renewable energy projects.

If the renewable energy one-stop shop can be mandated and funded to participate in these two main aspects it would prove to be an invaluable tool to assist a regional action plan that helps stimulate the development of renewable energy technologies within the Western Cape Province as well as throughout South Africa.

8 Financial Incentives and Programme Funding

8.1 Overview

Finance is a critical issue for renewable energy projects, which have so far had a rather poor reputation with the financing community as they are still viewed as higher risk investments, resulting in stiffer requirements for investors and developers alike. Such projects often require substantial amounts of money in order to plan, purchase and install the equipment, as well as to train staff for the operation and maintenance of the system installed. Compared to conventional power projects, although the operational costs may be lower, the upfront capital costs tend to be higher, due to the type of technology and the scale of the project.

There are multiple reasons behind the relatively limited financing for renewable energy in Africa. These are:

- market related issues;
- political and policy related issues;
- technology; and
- inherent nature of projects.

8.1.1 Market-related issues

In general, there is limited market information on renewable energy for South Africa, mainly due to the limited number of active renewable energy project developers in the region. Although there is extensive international data, to a great extent this is not so relevant to the region.

Firstly, despite a number of studies, there are only rough estimates of the actual renewable energy potential, there is therefore a need to gather more comprehensive and accurate data as this can impact on market interest in the various technologies.

There are also only a limited number of feasibility studies available for a relatively small number of projects and very few of these are publicly available due their commercial sensitivity. For priority areas, the public funding of a small number of key feasibility studies, for example for community projects, will increase the availability of information and reduce some of the barriers to project development and may also speed up the process.

8.1.2 Political and policy-related issues

Renewable energy has really only come to the forefront of policy dialogue in the past few years, and until recently it has not been seen as a priority issue that will support other national priorities such as energy security, social and economic development and environmental goals. As a result the regulatory and operational frameworks on a municipal, provincial and national level are undeveloped. This creates significant operational risk and uncertainty.

8.1.3 Technology

In general, renewable energy projects tend to have significantly higher up front costs when compared to conventional energy sources, even though the operational costs tend to be much lower. Also, due

to the limited local experience of renewable energy and also the small scale of many projects, the project costs tend to be higher than conventional projects.

These issues result in a perception of high investment risk by financiers. In addition, there is presently limited access to finance for research, development and manufacturing.

8.1.4 Inherent nature of projects

Governments have traditionally been the main investors in energy and have tended to focus on centralised power projects, whereas the greatest potential for renewable energy is in decentralised projects.

This, and the relative small-scale nature of the projects, can result in the risk of a proposed renewable energy project being overrated and the required viability hurdle rate becoming untenable. Affordable financing is therefore of critical importance and there are various types of financing mechanisms available.

The key financing options reviewed in this study are:

- development grants;
- capital grants;
- soft loans;
- operational grants;
- reducing transaction costs;
- tax incentives;
- green electricity tariffs/ 'green power'; and
- carbon finance.

Issues related to conventional commercial finance and equity investment are beyond the remit of this study.

8.2 Development Grants

Project development grants would assist developers in the initial stages of getting the project off the ground and could include supporting activities such as wind monitoring, feasibility studies and EIAs.

It is noted that the availability of project development grants is not considered a major challenge for larger projects and larger international investors, where access to finance is not usually a problem. However, project development grants are essential for the small to middle scale local developers, or for example communities wishing to develop renewable energy power projects in their area.

To date, there are limited options for project development grants locally, these primarily include:

- Renewable Energy Market Transformation (REMT) ;
- IDC may provide development finance;
- DBSA; and
- Commercial Banks (through the French Development Bank- AFD).

The REMT project is financed from Global Environmental Facility (GEF) grant funds supplied by the World Bank in terms of an agreement between the South African Department of Minerals & Energy (DME) and World Bank. The project is being implemented by the DBSA. The main objective of the REMT project is to remove the barriers and to reduce the implementation costs of renewable energy technologies to help mitigate greenhouse gas emissions. The REMT has established a Renewable Energy Power Generation (REPG) matching grant facility to provide cost-shared grant assistance for eligible activities of participating companies and/or other qualified organizations to improve their business and market development capabilities. This 50 percent funding to bring projects to bankability could be utilised for prefeasibility studies, and EIAs.

The Industrial Development Corporation of South Africa Ltd (IDC) is a self-financing, national Development Finance Institution (DFI), established in 1940 to promote economic growth and industrial development in South Africa. They are a major source of commercially sustainable industrial development and innovation to the benefit of South Africa and the rest of the African continent. They operate in a broad spectrum of industries, and with specialized knowledge and experience, offer financial assistance to a wide variety of individuals and companies. The IDC promotes entrepreneurship through the building of competitive industries and enterprises based on sound business principles. Although not traditionally an area of focus, IDC is starting to take a much greater interest in the energy sector.

The DBSA Development Fund provides grant funding and co-funding for project-level capacity building projects in South Africa. Capacity building projects enhance the institutional capability of the DBSA's clients to identify, define and solve challenges that prevent them from managing functions, performing tasks and rendering services effectively, as well as those that develop their local economy. Grants are also approved for feasibility studies and BEE initiatives.

Lending products include a range of financial instruments and other lending related services that are available to the Bank's public and private clients. The Bank offers numerous combinations of financial instruments structured to fit the needs of the client, and lending focused on infrastructure and commercially viable projects. The Bank also provides credit lines to other development finance institutions and uses the following currencies: US Dollar, Euro and Rand. Long-term lending is generally for more than five years.

The Bank's financing role entails the provision of a range of financial products to private and public sector organizations. The Bank's financing role will be determined primarily by the need to play a catalytic role in leveraging private sector investment for infrastructure. Investing products include Equity Funds, BEE financing of equities, and private funding.

Development grants may be particularly relevant in the case of public sector or public private partnership projects.

One barrier to getting projects off the ground quickly is the limited availability of comprehensive wind data for the region. The Provincial Government therefore may wish to consider providing financial support for wind measurements, on the proviso that the results are made publicly available.

There may also be opportunities to access international project development financial support, for example through the European Commission, however this is expected to be focused more on small-scale projects with significant community and social development impacts.

French development bank Agence Francaise de Developpement (AFD) announced, at the end of September 2009, that it would be extending a €120 million credit facility to commercial banks in South Africa, to be used for smaller energy efficiency and renewable energy projects.

South African banks Absa, Nedbank and the Industrial Development Corporation are to distribute the credit as loan capital for the projects of small and medium sized enterprises (SMEs). AFD aims to help banks to increase their activity in the SME sector where the profitability of renewable energy investments is probably not as attractive as for larger projects.

The banks will offer a 12-year reimbursable credit facility up to €10 million, with no minimum amount specified. It is expected that suitable projects will be identified by early 2010, as the final terms are still under discussion.

AFD will spend some €700,000 on technical assistance to the banks to address capacity building and technology transfer. Part of this will involve the use of AFD's carbon footprint tool in investment evaluation.

In South Africa the AFD will work with the commercial banks to transfer the carbon calculator tool technology as well as the knowledge required to use it. In this way they will be better placed to assess the climate change impact of the development projects they put in place.

8.3 Capital Grants

There are three key categories of capital grants:

- project assets;
- infrastructure; and
- enterprise development.

Capital grants for project assets

There are limited sources of capital grants for renewable energy projects in the country, and this situation is not expected to change in the short-term for the lower cost renewables supported by the REFIT. However, there are a few sources that may be of interest to developers in certain circumstances.

The Renewable Energy Finance Subsidy Office (REFSO), established in 2005 and located within the DoE provides some capital grants. The mandate of this office includes:

- The management of renewable energy subsidies; and
- The provision of advice to developers and other stakeholders on renewable energy finance and subsidies, as well as opportunities for accessing finance from other sources.

RESFO offered one-off capital subsidies to qualifying renewable energy projects, and among other qualifying factors, projects should be located within the borders of South Africa, use commercially viable technologies, and generate at least 1 MW of power. Projects benefiting from REFSO funding could also use other financial instruments such as the CDM.

Key features of the renewable energy subsidy scheme are:

- the maximum capital cost of the project must be less than R100 million;
- the subsidy is R1,000/kW with a maximum subsidy amount of 20% of the total project capital cost;
- the minimum project size is:

- 1 MW for electricity
- 914 kl/year for bio-diesel
- 1 495 kl/year for bio-ethanol or equivalents

- the developer must comply with the Public Finance Management Act (written undertaking must be provided so that the applicant has financial and risk management systems and internal controls); and
- there must be a minimum Black Economic Empowerment equity participation.

The total budget of REFSO is, however, very small relative to the financing requirement and had a budget of only R5.4 million in the 2008/9 financial year, which it spent, and in the 2009/10 budget, the office had a R10 million financing capability, and of that R6 million was already allocated.

The office had already subsidised two hydropower projects, as well as biogas and landfill projects.

In addition, to the REFSO, the may be grant funding available from international donors, either bilateral donors in multi-country donors, such as the GEF, however by accessing such development finance may restrict projects from being eligible for CDM financing.

In June 2009, the GEF Council assigned nearly US$60 million in grants to 20 projects mostly related to renewable energy and energy efficiency, almost 50 percent of which were located in sub-Saharan Africa.

Infrastructure

Grants may be available on a regional or national level for infrastructure upgrades to allow projects to be developed. Such infrastructure may include roads, to allow access to site and enable equipment such as turbine blades to be transported. Other infrastructure could include the electricity network.

Enterprise development

Enterprise development is considered to be a key component of the national development programme in terms of encouraging long-term sustainable socio-economic development. Therefore any project which incorporates or supports local enterprise development may be able to access funding for these activities.

The RED Door project is an initiative of the Enterprise Development sub-directorate within the Department of Economic Development and Tourism within the Western Cape Province, with the aim of promoting the development of small and/or black-owned enterprises by helping build new businesses and helping strengthen and develop existing businesses. It is able to support enterprises in a number of ways including business plan development, assisting with access to finance and Government incentives, and other business service support.

In terms of working with communities, Local Economic Development incentives may be available at the local level. However, these are likely to be limited and also limited to projects that can demonstrate relatively significant local employment potential or inflow of funds to the local authority area.

There may be some investment grants via the DTI, under their enterprise development programmes. These may be in the form of tax incentives or tax holidays.

There may also be the potential for 'offset programmes' such as those under the arms purchase programme where international suppliers of large capital items may be required to invest in local projects. This would only be expected to apply to extremely large investment projects.

8.4 Soft Loans

Soft loans are an area where financial support is more likely available, mainly via local and international development finance institutions.

Development finances institutions that have demonstrated an interest in supporting renewable energy projects in Africa include:

Local development finance

Local development finance institutions in South Africa and throughout Africa include DBSA, IDC, AfDB.

The Development Bank of Southern Africa (DBSA) is one of several development finance institutions in South and Southern Africa. Its purpose is to accelerate sustainable socio-economic development by funding physical, social and economic infrastructure. DBSA's goal is to improve the quality of life of the people of the region

IDC is a self-financing, state-owned national development finance institution that provides financing to entrepreneurs and businesses engaged in competitive industries. It has recently taken an interest in renewable energy and low-carbon power projects.

The AfDB makes loans and equity investments in the public and private sectors of its African member countries. The AfDB provides technical assistance for investment projects; works with its member countries to coordinate development policies and plans; and provides financial support to its members in emergencies.

Donor development finance

There are a number of countries internationally with development programmes and aid programmes that may have an interest in providing finance for renewable energy projects. Examples include: Agence Française de Développement (AFD), DANIDA kfW, and Norfund.

International development finance

In addition to development finance from bilateral countries, there are also a number of international finance organisations such as the IFC, European Investment Bank (EIB), and World Bank.

IFC invests in enterprises majority-owned by the private sector throughout most developing countries in the world. The EIB also invests in such infrastructure projects.

There may also be opportunities for accessing project guarantees, such as through the IFC and the Multilateral Investment Guarantee Agency (MIGA).

8.5 Operational Grants

Operational grants are expected to be fairly limited, as the REFIT is the major operational grant. However, there may be the possibility of applying for local funding or donor funding for the following activities, which would address wider renewable energy other socio-economic and issues:

- On-going wind monitoring with the aim of contributing to a comprehensive wind map for the region;
- Monitoring of power production as part of a market assessment; and
- Training and capacity building as part of a local empowerment programme.

8.6 Reducing Transaction Costs

The financing of wind power plants results in costs. These financing costs could be reduced by cutting down transaction costs. The following approach describes how transaction costs of a credit could be reduced.

The wind sector has developed multiple financing structures to attract various investors to projects, manage project risk, and allocate tax benefits to entities that can use the tax benefits most efficiently. Some of these structures are intended to attract actively involved large equity investors with a strategic interest in the wind sector, labelled here as “Strategic Investors.” Others are designed to tap into more passive equity capital from “Institutional Investors,” which are primarily interested in a secure long-term income stream. Still others enable developers and equity investors to layer on debt financing to leverage their equity exposure and returns.

Debt financing is borrowing money from an outside source with the promise to return the principal, in addition to an agreed upon level of interest. The most popular source for debt financing is the bank. Before the bank decides to lend money to the project developer, the proposed wind project has to be reviewed by them. Those project reviews cause costs which may affect the credit costs. The aim is to reduce those credit costs by reducing project review efforts due to economies of scale. The cost reductions could be used to offer more favourable credit conditions for the project developer. The reduction of the project review costs could be performed as follows:

The bank agrees to mobilize a special amount of capital at favourable credit conditions for wind project developers in a region like the Province of Western Cape. Wind project developers which plan to build wind power plants in this region can borrow money from the bank at those favourable credit conditions to fund their projects.

The credit cost reductions can be achieved by standardising some aspects of the project review. Consequently, this would reduce the effort of the project review since not all issues have to be checked for each project. The main aspects to be reviewed when project developers apply for credit are:

- credit rating/credit standing;
- wind resource assessment and wind energy yield assessment at site;
- site conditions;
- wind turbines technologies and manufacturers;
- balance of plant;
- contractual tasks;
- counterparties qualifications; and
- assessment of applicability of project within the CDM framework.

The following identifies for each aspect whether a project review is necessary or not for each project located in one region.

Credit rating/credit standing

Credit rating, credit standing includes the assessment of legal capacity and of the reputation for meeting financial obligations. Therefore, credit rating/credit standing has to be assessed and reviewed for each wind power project separately.

Wind resource and wind energy yield assessment

Wind resource assessment and the estimation of wind energy yield assessment demonstrate the project site's potential. Wind conditions can vary from location to location and also depend on the applied wind turbine's hub height. Therefore, wind resource and wind energy yield assessment have to be performed for each project site separately.

Site conditions

The review of site-specific conditions that may affect the suitability of the proposed designs for the site, which are relevant for the specification of the equipments and the construction progress or which may result in operational disruptions is necessary for each project. Amongst others, geological, geophysical, geotechnical, hydrological conditions can be very different in a province. Each site features its own site-specific conditions. Therefore, the review of site-specific conditions for each wind project is required.

Wind turbines technologies and manufacturers

Review of wind turbines technology focuses amongst others on Supervisory Control and Data Acquisition (SCADA), certification status and the track record of turbine and manufacturer. Wind turbine models with good track records represent a proven technology. In addition, wind turbine manufacturers with a good and long track record are experienced and reliable.

In order to avoid the review of wind turbine technology and manufacturer for each wind project separately, a list of approved wind turbine manufacturers and their technically mature wind turbines could be established. When project developers use wind turbine models from the established list no separate review of the turbine technology is needed for every single project so that transaction costs are reduced. Another approach would be to set a list which includes some wind turbine standards. Project developers can draw on the special bank loan by using wind turbine models according to standards stated in the list.

Balance of plant

The balance of plant includes amongst other foundation work, electrical system, interconnection and civil works. Since the balance of plant is very individual and depends on the specific design and site conditions of each project it has to be reviewed for each wind power project separately.

Contractual tasks

Contractual tasks include contract conditions and warranties of all signed contracts. The required contracts for a wind power project and their content depend on the project design and get negotiated separately for each wind project. Just like balance of plant contractual tasks depend on the specific design of the wind power plant and has to be reviewed for each wind power project separately.

However, a review may not be required for each project separately, if legal frameworks are set by the country or the province. These are for example standard PPAs, grid codes and/or REFIT laws which

include REFIT tariffs and available grid connection regulations. These conditions would be mandatory for each project.

Grid connection

REFIT laws often regulate grid connection regulations between project developer and grid operator. There would be no need to review grid connection for each project if such regulations (e.g. shallow connection charging) exist. Nevertheless, the access from the project site to the nearest substation where the electricity is fed into the grid varies from project site to project site. This has to be reviewed. Moreover, if the law stipulates deep connection charging or mixed connection charging the project developer's portion of the cost of reinforcement necessary to connect their plant has to be considered in addition to the costs of equipment needed to connect their plant physically to the nearest point of the electricity grid.

Counterparties qualifications

The quality, experience and general capabilities of the contracted counterparties are very important. The quality of the wind turbine manufacturers does not have to be reviewed, if the manufacturer is selected from the list as described within the issue "Wind turbines technologies and manufacturers". However, all other contracted counterparties shall be reviewed.

Assessment of applicability of a project within the CDM framework

Under consideration that in chapter 12.6 "Programmatic CDM" explained approach "programme of activities" can be realised, no assessment of applicability of the project within the CDM framework is required for each project separately. All wind power projects would be part of the "programme of activities" and are considered as one CDM project. Therefore, the review for the bank regarding CDM applicability for each project separately would not be necessary.

The review of aspects in a typical due diligence of a wind power plant reveals that some aspects are very individual and depend on the project itself whereas other aspects have been identified which might not be reviewed for each credit application of wind energy project developer in a defined region.

The aspects subject to standardised conditions are:

- Wind turbines technologies and manufacturers
- Contractual tasks Includes amongst others:
    - PPA
    - REFIT Law
    - Grid connection agreement, Grid code
- Grid connection
    - Shallow connection charging
    - Grid code of grid operator / Grid connection agreement
- Counterparties qualifications
- Manufacturers of wind turbines

In a next step, banks needs to be approached on their willingness to provide loans with favourable conditions under the assumption of standardised and simplified due diligences.

8.7 Tax Incentives

Under the Draft Taxation Laws Amendment Bill, 2009, National Treasury has released for public comment a draft of the taxation laws to give effect to the tax proposals announced in the 2009 Budget and outlined in the 2009 Budget Review. Under this bill, the sale of certified emission reductions will be exempt from income tax, which increases the attractiveness of accessing carbon finance for projects.

In terms of tax incentives for renewable energy, during his 2008 budget speech, Minister Trevor Manuel promised that tax incentives for cleaner production technologies will be considered, however these are still to be developed and implemented.

Currently, section 12B of the Income Tax Act provides some tax relief for the generation of electricity from wind, sunlight, gravitational water forces and biomass comprising organic wastes, landfill gas or plants. This section provides for an accelerated write-off period (50 percent in the first year, 30 percent in the second year and 20 percent in the third year) for the costs of such machinery used by a taxpayer for the purpose of trade.

There may also be specific incentives for encouraging investment in local manufacturing, through the DTI.

Although there are no specific incentives available for land, the National Treasury has provided some incentives under property rates legislation for land under conservation and possibly similar approaches could be adopted for land used for RE generation.

8.8 Green Electricity Tariffs / Green Power

There is the potential to sell 'green power' directly to purchasers and a small market has already been established through the current key role players such as Amatola. Under certain circumstances this may be at preferential terms to the REFIT, however for the majority of renewable energy generators, the REFIT will provide the greatest security due to the high prices and long-term PPA.

With the REFIT in place it is expected that the direct sales of green energy are unlikely to increase and may reduce. There is however a growing market for green power. It would therefore be to everyone's advantage if Eskom were to establish a green power tariff. This could easily be established among the many various tariffs already in place. This would also have the added advantage of drawing down the cost of the REFIT, by selling some of the power purchased at a premium rate, although it is acknowledged that this may be small at first.

8.9 Carbon Finance

Carbon finance is a relatively new branch of environmental economics that is focused on reducing the emission of harmful anthropogenic greenhouse gases (GHGs). The world is becoming increasingly carbon constrained as more international and national policies are being developed which put a price on carbon dioxide (CO_2) and other GHG emissions. These polices are developing market-based instruments that are capable of transferring carbon emission risks.

In general, carbon finance refers to investments in projects which reduce GHG emissions below what the business-as-usual scenario is for GHG emissions in a specific industry and region. A tonne of CO_2

has the same affect on the global climate regardless of where in the world it was emitted. Therefore, a company, country, or even an individual could invest in a project anywhere in the world that reduces GHG emissions to assist in offsetting their own emissions. This investment is known as carbon finance and the size of the investment is directly correlated to the amount of GHG emissions that are reduced below the business-as-usual scenario.

8.9.1 CDM and Voluntary carbon markets

Carbon financing is part of a carbon market. Basically, the investments in GHG emission reduction projects create carbon credits which are equal to the amount of emissions which a project reduces, and each carbon credit is equal to the reduction of one tonne of CO_2 equivalent. CO_2 equivalent is based on the different global warming potentials (GWP) of each of the GHGs – for example, CO_2 has a GWP of 1, methane (CH_4) has a GWP of 25, and nitrous oxide (N_2O) has a GWP of 298. Therefore reducing one tonne of methane is equal to the reduction of 25 tonnes of CO_2, or 25 carbon credits.

Unfortunately we do not have one single global carbon market. The largest carbon market is the EU emissions trading scheme (EU ETS), which is a market that is has been developed out of an international climate change agreement known as the Kyoto Protocol. The EU ETS is also known as a compliance market because the participants are mandated by legislation to comply with particular emission reduction targets. Now these entities could either reduce their own GHG emissions to achieve their target or invest (through carbon finance) in another project around the world, usually in a developing country where it is comparatively cheaper to reduce a tonne of CO_2.

Under the compliance or legislated carbon market, the projects which are beneficiaries of carbon finance create what is known as a Certified Emission Reduction (CER). The international climate change agreement has created a UN body known as the UN Framework Convention on Climate Change (UNFCCC) which is the international entity that oversees this compliance market. The UNFCCC has set up the CDM. The CDM is a project-based mechanism for reducing emissions and outlines the procedures a country or company must go through when investing in a project through the purchase of CERs, i.e. carbon finance. The UNFCCC developed a set of strict methodologies for calculating the amount of GHG emissions a project will reduce below the business-as-usual scenario for a particular industry and region. There are different methodologies for a wide range of different project types.

Once a project is registered with the UNFCCC the emission reductions created by that project are subsequently audited by a third party and then the UNFCCC certifies the GHG reductions which then become CERs and are tradable financial instruments purchased by countries or companies looking to meet their compliance target.

Outside of this compliance market there is a voluntary carbon market. The participants in the voluntary market are not legislated to do so, but are engaging in purchasing emission reductions for corporate social responsibility (CSR) or ethical reasons. The emission reductions generated by a project are audited by a third party but do not get certified by the UNFCCC; therefore the emission reductions are known as Verified Emission Reductions (VERs).

In both the compliance and voluntary carbon market, an important fundamental concept that needs to be explained in detail and audited by a third party is project additionality. The concept of additionality addresses the question of whether the project activity would have still happened and been implemented, even in the absence of the carbon revenues from the sale of carbon credits. It is important to clearly show that even before financial close (during the conceptual phase of the project), that carbon financing was taken into consideration. The project developer will need to demonstrate

that carbon financing played a crucial role in bringing the project to fruition and then the emission reductions are said to be 'additional' to those that would have occurred in the absence of the project and without the carbon financing.

There is a step-wise approach to demonstrate and assess additionality. These steps include:

- identification of alternatives to the project activity;
- investment analysis to determine that the proposed project activity is either: 1) not the most economically or financially attractive, or 2) not economically or financially feasible;
- barriers analysis; and
- common practice analysis.

All of the evidence supporting the demonstration of additionality will be audited by a third party. And in the case of the compliance market (under CDM), the third party auditors are known as Designated Operational Entities (DOEs). The DOEs are companies that have been accredited by the UN to conduct detailed audits known as Validations. These validations ensure that all the evidence for additionality and emission reduction calculations are in line with the applicable UN methodology. The outcome of a successful validation is submitting the project documentation to the UN with a recommendation from the DOE to register the project. Once the project is registered, the applicable methodology has a detailed monitoring plan which the project developer must follow throughout the year. The monitored data will serve to calculate the emission reductions below the business-as-usual scenario. The monitored data will again be audited by a DOE on an annual basis and this procedure is known as Verification. The DOE will then submit documentation regarding monitoring and the emission reductions generated by the project to the UN for issuance of carbon credits, i.e. Certified Emission Reductions (CERs).

All renewable energy projects are likely eligible for carbon financing as long as they pass the additionality test. They will also need to show there was prior CDM (carbon finance) consideration. The project participant must inform a Host Party Designated National Authority (DNA) and the UNFCCC secretariat in writing of the commencement of the project activity and of the intention to seek CDM status. Such notification must be made within six months of the project activity start date and shall contain the precise geographical location and a brief description of the proposed project activity. Project developers must demonstrate prior consideration of the CDM and should inform the DNA of prospective projects and the intention to seek CDM registration

8.9.2 Programmatic CDM

The introduction of the REFIT will impose additional burden on South African power consumers. The additional costs will be comparatively low at the beginning but may increase over time with more and more renewable energy deployment triggered. To prevent excessive burdens, feasible financial schemes should be implemented to cover extra costs resulting from the feed-in tariff. A suitable option to ease the extra burden might be through the approval of wind power plants as a Programme of Activity (PoA) under the CDM. A more comprehensive review of PoA is provided in Annex 3.

The basic idea is that wind power plants remunerated through the REFIT will be approved under the CDM and eligible for issuance of CERs for these facilities. Through a wind power CDM PoA additional income would be generated by selling the CERs on the international carbon markets. The accrued revenues offer the opportunity to cover additional cost resulting from the REFIT. As primarily the final electricity customers are burdened with higher electricity prices the revenues could be used for

additional measures to promote renewable energy, resulting in lower energy consumption costs for the consumer.

Compared to the mechanism of Individual Activity in which developers submit individual projects for CDM approval (conventional CDM projects) the PoA offers the following advantages:

- involvement of CPAs running in multiple countries;
- new projects can be added without restarting the validation process;
- no registration fee on projects under the PoA added after validation;
- only one approved baseline and monitoring methodology for all projects under required; and
- reduction of transaction costs (CDM registration, validation, monitoring etc).

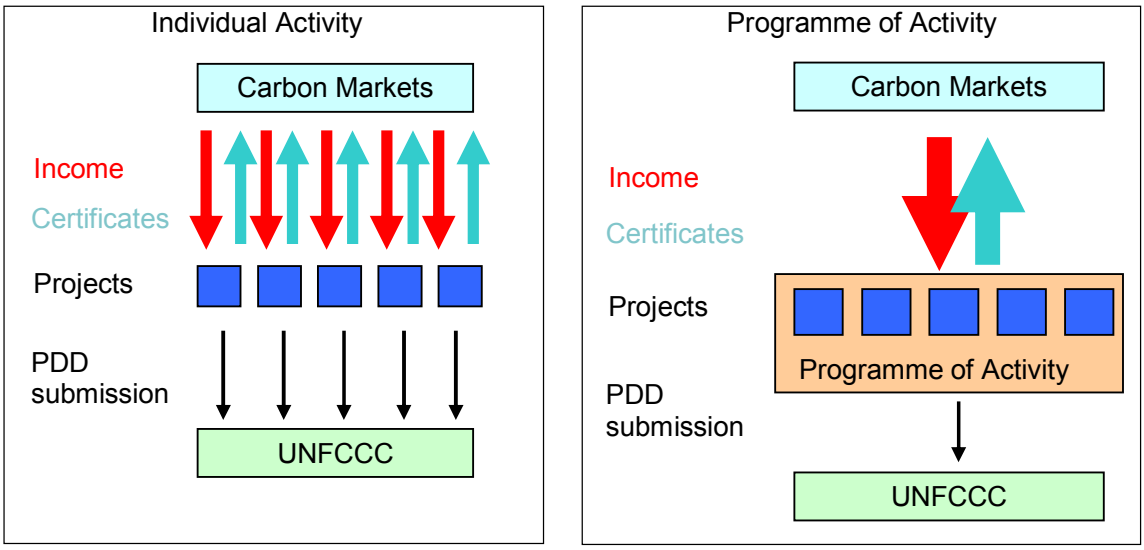

Figure 8.1: Comparison of individual submission of projects under CDM (left) vs. submission as a Programme of Activity (right).

For initiating the application process, a coordinating/ managing entity is necessary, being authorized by the DNAs involved and identified as the party which communicates with the board. Institutions feasible to take over the task of the managing/ coordinating entity in the Western Cape of South Africa are considered on governmental level. Here three different options come under consideration: national, provincial or local level. Another option is to give the responsibility for the PoA to a newly established independent entity in form of a CDM Office/PoA Centre.

The entity has the task to check that none of the CDM Programme Activities (CPAs) have been registered as individual project activities already. Moreover, the entity develops a Programme of Activities Design Document (CDM-PoA-DD) setting a framework for the implementation of the PoA and unambiguously defining a CDM programme activity (CPA). Further, the preparation of the PoA specific CDM Programme Activity Design Document (CDM-CPA-DD) using the provisions of the proposed PoA is needed.

The regulatory framework according to UNFCCC is governed by the requirement that a PoA must demonstrate real, additional and measurable emission reductions or removals attributable to the PoA. To avoid giving credits to projects that would have happened anyway, rules have been specified to ensure additionality of the project, depicting that the project reduces emissions more than would have occurred in the absence of the project and without registration under the CDM. The additionality shall be demonstrated and assessed using the tool for the demonstration and assessment of additionality agreed by the CDM Executive Board. Hereafter the following four steps are needed:

1) Identification of alternatives to the project activity consistent with mandatory laws and regulations – Examples of such technologies in South Africa include coal-fired plants, nuclear power, etc.
2) Investment analysis – Determination of whether the proposed project activity is economically or financially less attractive than other alternatives without the revenue from sale of certified emission reductions.
3) Barrier analysis – Is there at least one barrier preventing the implementation of the proposed project activity without the CDM, and is at least one alternative scenario, other than proposed CDM project activity, not prevented by any of the identified barriers?
4) Common practice analysis – No similar activities can be observed? If similar activities are observed, are there essential distinctions between the proposed CDM project activity and similar activities that can be explained reasonably?

Regarding South Africa as a whole, wind power may fulfil the additionality criteria. Wind power generation competes with coal fired plants which are generated at low costs due to the favourable conditions of coal mining in South Africa.

The duration of a PoA amounts 28 years and has to be checked every seven years regarding its baseline. In this respect, the baseline is the hypothetical reference case, representing the volume of greenhouse gases that would have been emitted if a PoA or CDM Programme Activity (CPA) is not implemented. For grid-connected renewable energies like wind power plants the approved consolidated methodology ACM0002 determines that renewable energy projects connected to an electricity grid are reducing CO_2 emissions by displacing electricity which otherwise would have been generated by fossil fuel power plants.

The baseline emissions are calculated by multiplying the displaced electricity generation of connected fossil fuel power plants, which is equal to the electricity generation of the project activity, by the CO_2 emission factor of the electricity system. The grid emission factor is calculated according to the tool to calculate the emission factor for an electricity system and determines how much CO_2 emissions are released into the atmosphere by a given electrical grid to produce 1 MWhe. The baseline and the emission reduction of a PoA changes constantly and has to be renewed after implementing new plants. There is a realistic option to implement wind power projects in the Western Cape Province as CDM PoA as the formal framework does not include obstacles.

As there are no guidelines published by the UNFCCC indicating how to use the CER revenues, two alternative scenarios are conceivable for the South African State as managing entity: Either financing projects in different business fields or in the energy sector only. Concerning the last named, revenues could be used to reduce the burden from REFIT on power customers as extra costs resulting from the REFIT could be covered to some extent. Alternatively, additional new wind power plants could be supported to extend the existing wind farms. Through adding new CPAs to the PoA the CERs income would increase. Moreover, the support of existing plants (maintenance and repair, add new technique) which generated the CERs is conceivable. Finally, also the financing of supporting means

for wind power development, e.g. providing soft loans, grid planning, wind resource assessment and establishing natural standards is possible.

Large scale PoAs under the CDM are internationally discussed by different institutions, stakeholders and countries such as the United Nations, Greenpeace, WWF and China. This is important to know in order to assess the sustainability of such an approach on the medium and long run.

8.10 Summary and Conclusions

Overall, the REFIT provides significant financial security for renewable energy projects, however there may also be other incentives which need to be leveraged to enable the project to become bankable. This can include access to project development finance, in particular in the case of smaller developers. In addition, access to soft loans may help reduce the long-term financing costs.

Carbon finance is also seen as a significant opportunity for investors and developers. Although the REFIT reduces the opportunities for projects qualifying under financial additionality, the present lack of a renewable energy sector in the country greatly increases project risk. There are also moves internationally for the CDM Executive Board not to take into account local initiatives such as feed-in tariffs, as this would be seen as perverse disincentives to adopt such progressive policies.

There is need for further clarity on the rules of application and eligibility for these and other financial support mechanisms and for this information to be distributed widely to developers and investors.

Table 8.1: Key contacts and links

Institution	Role	Link
Renewable Energy Market Transformation Project	Project Development Finance	www.dbsa.org
REFSO	Capital grants	www.dme.gov.za/energy/refso.htm
Department of Trade and Industry (DTI)	Support for enterprise development	www.thedti.gov.za/
National Treasury of South Africa	Tax incentives	http://www.treasury.gov.za/
Industrial Development Corporation (IDC)	Development finance	www.ifc.org
Development Bank of Southern Africa (DBSA)	Development finance	www.dbsa.org
African Development Bank (AfDB)	Loans/ equity investment	www.afdb.org
International Finance Corporation (IFC)	Development finance	www.ifc.org
European Investment Bank (EIB)	Development finance	www.eib.org
MIGA	Investment guarantee	www.miga.org/
Global Environment Facility (GEF)	Finance for environmental projects	www.gefweb.org
Agence Francaise de Developpement (AFD)	Development finance	www.afd.fr

Institution	Role	Link
DANIDA	Development finance	www.um.dk
kfW	Development finance	www.kfw.de
Norfund	Development finance	www.norfund.no/
UNFCCC	Carbon finance infrastructure	http://unfccc.int/
South African DNA	Carbon finance project registration	www.dme.gov.za/dna

9 Infrastructure and Planning

9.1 Overview

The Western Cape Province as part of a regional renewable energy regulatory action plan needs to explore and examine the state of infrastructure and planning within the Province. In addition to policies within the Western Cape Province, the regulatory action plan should where possible address infrastructure and planning policies affecting renewable energy project development that are outside of the Province's jurisdiction. The infrastructure and planning policies should set out a vision and strategic objectives. These objectives should be focused on facilitating the establishment of renewable energy projects and centred on achieving an improved quality of life for the local community and seek to ensure environmental, economic and social well-being. A key component of an infrastructure and planning strategy includes the identification of appropriate spatial planning guidelines and associated core policies to facilitate and guide necessary infrastructure development.

Sound policy and guidelines will bring together planning, local government and infrastructure responsibilities to deliver integrated solutions to economic challenges and secure a sustainable future for the Western Cape and South Africa.

There are some overall objectives that should be established in an infrastructure and planning framework which should assist to facilitate the development of renewable energy projects while in parallel securing long-term growth of the Western Cape Province. Some of the objectives inter alia should include:

- ensuring areas of renewable energy potential along with economic and social potential are not obstructed by ineffective infrastructure which requires upgrading;
- improving the coordination of provincial and national entities to focus on developing planning policies that are in line with stated goals for maximising renewable energy resources and furthering the economic growth of the Western Cape and South Africa; and
- leveraging private sector investment and assuring the priorities of public sector investment are consistent with those measures that will facilitate the establishment of renewable energy projects.

There are several reasons why the Western Cape should mainly focus on planning and infrastructure related to wind resource development. Primarily it is because the Western Cape Province has an abundance of wind resources, but also because many of the planning issues that arise when it comes to renewable energy project development are those related to the implementation of wind farms. Lastly, wind power projects are one of the most reliable renewable energy technology types as well as having a relatively low cost curve for project developers.

9.2 International Case Studies

This section informs about the planning and approval process for renewable energy project, specifically wind energy. There are examples of how responsibilities can be bundled so that project developers face only a single entity rather than several different authorities when applying for permission for a wind power plant. The approval process of wind energy differs largely in different

countries. There are some cases where regulation differs in a single country between municipalities with specific regional laws and regulations.

We have chosen examples from Germany and Denmark where wind power already represents a substantial share of total power generation (>10 percent of national installed generation capacity) As "consolidating markets" they feature a good level of maturity, high penetration levels, and limited greenfield opportunities available. Furthermore the UK is chosen as an example of a country with a very high potential for wind power (i.e. the best of all European countries), but limited wind power deployment due to complex and uncertain approval procedures.

9.2.1 Germany

In general, the German approval procedures for wind power plants are considered by project developers to be constructive and supportive, with good transparency, a clear focus and a well defined distribution of responsibilities. All relevant rules are arranged in laws, allowing some, but limited leeway for individual interpretation. German approval procedures are considered to be "one of the best" compared to other European countries.

Apart from the building regulations of the different federal states (i.e. distance requirements, and other regulations concerning roads, air traffic, or planning laws), the most important prerequisite concerning wind farm licensing qualification is the selection of the location for the wind farm. Germany's Federal Building Code grants privileges for the designation of sites for wind turbines. As a consequence, wind turbines are constructed in priority or reserve areas designated in a regional plan (*Regionalplan)* as well as in concentration zones designated by a local development plan (*Bauleitplan*). The construction of wind turbines outside these areas is not permitted in most of Germany's Federal States.

The regulatory requirements for wind turbines depend on the total height of wind turbines. Each single wind turbine, with a total height of more than 50 m, requires a license according to the Federal Pollution Control Act. If an EIA, according to the Environmental Impact Assessment Act, is required, a formal procedure (i.e. with public consultation) is necessary. Wind turbines that do not exceed a height of 50 m require a construction permit only according to the Building Regulations of the relevant Federal State. The construction permit is granted by municipal councils.

An important streamlining aspect of Germany's procedures is lack of prerequisite planning permission due to previously identified sites by the Federal and local Governments, which reduces several permitting procedures to one. The permitting process is regarded as clear and coherent with unambiguous rules and procedures.

The way in which Germany has set up its planning policies and EIA procedures is mainly from the top down and the Renewable Energy Sources Act provided planning security for renewable energy projects. This means that there are few institutional implementation barriers where a proactive one-stop shop could add value in terms of working with regulators, licensing, local zoning permits etc. As a result of the favourable support conditions, the straightforward planning policies written in law, and the obligation on network operators to preferentially connect to the public grid projects with planning support, has resulted in a very favourable and transparent market.

The comparable one-stop shop in Germany is a website that hosts a comprehensive list of the German renewable energy industries, companies, products, success stories, newsletter, events, history of German policy and legislation and a discussion forum.

Germany also has a special legal clearing office that manages any disputes which arise through the development of renewable energy projects. Therefore, there is no need for a one-stop shop to liaise with developers and other local or national regulatory entities.

Renewable Energies Law Clearing Office (Clearingstelle EEG)

If conflicts arise between the authorities responsible for pollution control, the municipality or other stakeholders, the so called "Clearingsstelle EEG" can be appointed as a mediator to resolve these conflicts. It has been established and financed on behalf of the German "Ministry for Environment, Protection of Nature and Reactor Safety."

There are three major fields of activity – agreement, vote, and recommendation procedures. The Clearing Office's purpose is not to give any advice or actual support in project development; it is only involved when conflicts arise. The largest share of requests to date has come from the field of solar electricity generation, followed by biomass projects, as well as hydro and wind power.

The Clearing Office consists of a chairman and two supplementary members. The agency's bureau comprises a lawyer and a technical advisor (in this case an industrial engineer) supported by two secretaries and a legal assistant. Altogether it has a staffing involving eight full-time employees.

9.2.2 Denmark

With wind power plants being highly visible, the development of models for developers to follow in addressing public planning issues has been very important for achieving public acceptance of wind power. In Denmark, the public planning procedures were initially developed through local trial and error, although by 1992 this took place more systematically on national level, providing directives for local planners. In addition, an executive order from the Minister of Environment and Energy placed a requirement on municipalities to identify suitable sites for wind farms. This prior approval process with public hearings, in advance of any actual applications for project development, helped the public acceptance of subsequent wind projects considerably and assisted in streamlining the approvals process.

The municipalities are required to designate suitable areas for wind power and submit those to the Ministry of Environment, who will map these sites in a planning act. A potential project developer in wind projects shall exclusively contact the competent municipal authority that will initiate all further steps. Therefore, the municipal authorities take the position of a one-stop shop entity. In the case of projects with more than three wind turbines or single wind turbines with an absolute height of more than 80m, an EIA is required, which considers the impacts of the turbine on neighbouring dwellings, nature, landscape, cultural heritage, and agriculture. In general the structure of the EIA is similar to other European countries, as it has been set up referring to an EU-directive. In the case of an EIA not being required, it is "substituted" by an informal scoping run by the municipality. In addition to the EIA, a so called Ombudsman is established who shall mediate between stakeholders.

For wind energy projects not demanding an EIA, the local plan developed by the municipality provides guidance. Local plans include a report, provisions and maps, and are subjected to an eight-week public comment period before being adopted by the municipal council. In this period national or regional authorities may veto the plan if it is in conflict with other relevant planning.

Danish Wind Turbine Secretariat

The Danish Wind Turbine Secretariat was established in 2008 in order to assist municipalities throughout the country with approval procedures. It is run and financed by the Ministry of Environment and provides assistance to municipalities free of charge and covers the following services:

- locating potential sites;
- providing process advice;
- providing examples from other municipalities;
- assisting in communication with politicians; and
- assisting in communication with relevant authorities.

The Danish Wind Turbine Secretariat does not assume any responsibilities related to approvals and regulations, as these remain entirely with the municipalities and national bodies. The Danish Wind Turbine Secretariat consists of four full-time and one part-time employee.

9.2.3 United Kingdom

Each of the four UK jurisdictions (England, Wales, Scotland, and Northern Ireland) has its own distinct approval system for town and country planning. The determination of planning applications is a primary function of Local Planning Authorities (LPAs). In Great Britain all wind turbine applications below 50 MW in capacity are determined by LPAs, and larger projects are submitted to the relevant National Government entities for approval consideration. In Northern Ireland the situation is slightly different with all applications currently determined by the Northern Ireland Planning Service, an agency within the Department for Environment. In determining an application, a planning officer makes a recommendation based on the content of local, regional and national planning policy and any applicable legislation. The final decision for a wind turbine application is usually decided by a LPA Committee.

Planning legislation varies across the countries of the UK and must take into account European and International legislation. Each country has its own national planning policies. An LPA, in consultation with its community is responsible for preparing local planning policies that take into account the unique needs and character of the local community and area. In Northern Ireland, the planning system is different again, and is centralised within a national Planning Service within the Department of Environment.

Local Planning Authorities in the UK are responsible for determining wind turbine proposals under 50 MW in capacity. Under the provisions of the Planning Act 2008 it is expected that by 2010, all projects over 50 MW in capacity will be determined by a new centralised entity called the Infrastructure Planning Commission (IPC). Currently projects greater than 50 MW are determined by the Department of Business, Enterprise and Regulatory Reform in consultation with LPAs. The Electricity Act 1989 is what LPAs use as the main legal background for guidance. The IPC will simplify the required procedures significantly. Consolidating the planning approval into one centralised entity is a good idea; however, most of the future wind power projects seeking approval are below the 50 MW threshold and will therefore not benefit from the new regulation. This is one of the main reasons why it is unlikely the UK will be able to achieve its goals of 15 percent of renewable energy generation by 2020. Due to that fact experts and some members of the House of Lords demand the 50 MW threshold is diminished to 20 MW.

The Planning White Paper 2007 is the policy which proposes the establishment of a centralised approval system for nationally significant infrastructure and planning. It has been proposed because of the following barriers and weak points in the present LPA approval system:

- takes too long;
- creates too much uncertainty;
- can be difficult and costly for groups and the public to participate effectively; and
- high costs and unclear planning approvals have knock-on effects in the energy market.

In general the planning permission for energy projects is not easy, but wind farms face particular problems. Large onshore wind farms are taking on average 20 months to complete the decision-making procedures for approval or rejection. The target to determine 60 percent of major applications was initially proposed to be completed within 13 weeks. According to British Wind Energy Association (BWEA) only 5 percent of applications for onshore wind projects have been decided upon within the statutory 16 weeks and several of the applications have been held up in the system for between four to five years. Another concern is the vast number of wind energy projects that are being refused approval. Due to a report published by the Environmental Protection Society, a non-governmental organisation states that about 40 percent of the proposed wind energy projects are being denied approval. Hence, potential investors and professional boards are not very satisfied with the UK system. The UK planning approval system for wind energy projects has been described as a lottery.

In addition, to make things even more difficult the approach towards planning is not a spatial led one. Spatial planning is used for many other zoning approvals throughout the UK. However, when it comes to wind energy projects permitting a criteria-based approached is what is used. It is only Wales that applies spatial development planning for wind energy projects.

9.2.4 Conclusions International Experiences

The international examples of permitting procedures highlight some of the regulatory frameworks that have and have not worked from other countries. The Western Cape Government when developing a framework for planning approvals it is important to consider international best practice.

1. Denmark leaves the full decision power on planning and permission with the municipalities, but has established a central agency providing guidance and consultancy to the municipalities on licensing procedures which thereby helps to streamline the process.
2. UK has decentralised planning approval procedures which has caused delays coupled with a disproportionate amount of wind energy projects being denied permission. Also, with the exception of Wales, the UK does not implement spatial development planning for wind power projects. This could potentially be another reason for the high number of rejected projects and delays that planning officials are faced with.
3. Germany with one of the most successful wind energy markets has implement spatial development planning to their zoning and approval procedures. Germany also has concentrated the administrative procedures for large wind power plants in one entity, but mandating the decision-making responsibilities for demarcating suitable sites for wind turbine projects with local and regional entities.

9.3 Current Initiatives

There are some initiatives that have investigated issues relating to renewable energy infrastructure and planning for both the Western Cape Province and South Africa. Investigating and looking into the outcomes of initiatives which have already been developed will assist the Western Cape in establishing infrastructure and planning policies for the favourable implementation of renewable energy projects. There have been some frameworks, studies, research, and initiatives that have focused on wind resource assessment, electricity grid research, strategic infrastructure planning, and spatial planning that could all be used to help the Western Cape in develop sound infrastructure and planning policies. It is important that the Western Cape use every tool and initiative available to establish comprehensive strategic solutions to the infrastructure and planning barriers to renewable energy projects. This will also help serve the Western Cape to manage associated risks, uncertainty and vulnerability when maximising renewable energy resources.

Data and policy support

One of the available initiatives is the South Africa Renewable Energy Resource Database (SARERD), which was developed by the Department of Minerals and Energy, Eskom, and the Council for Scientific and Industrial Research (CSIR). The purpose of the Renewable Energy Resource Database is to map the different renewable energy resources throughout South Africa. The database maps the energy potential of each renewable energy resource which is modelled within a geographical information system (GIS) at a spatial scale of one square kilometre. In addition, the database is linked to modelling software called Homer.

The first phase created an electronic GIS map that contained South Africa's renewable energy resource information for solar, wind, bio-energy and micro-hydro. The second phase created the planning software to identify the most suitable options by taking into account the renewable resources. The software system is called HomerGIS and it is able to calculate the cost of generating electricity using the resource potentials identified in the first phase. HomerGIS is a renewable optimisation model developed by the National Renewable Energy Laboratory (NREL) in the US and is an acronym for Hybrid Optimization Model for Electric Renewables. The model allows users to compare various options for off-grid and grid-connected solutions using combinations of available renewable energy resources.

Another initiative for wind energy assessment the Western Cape Province could evaluate is TERNA. The GTZ wind energy programme called TERNA (Technical Expertise for Renewable Energy Application) supports partner countries in the assessment and utilisation of their wind energy potential. Since the autumn of 2008, the TERNA wind energy programme has been working with the Department of Environmental Affairs and Development Planning of the Western Cape to implement a project to promote wind energy. This initiative is working to establish a legal framework for promoting wind energy and produced a study on the electricity grid that outlined all the infrastructural needs specifically for wind energy. One of the outcomes of this work is the establishment of the regional action groups focused on regulation, grid integration, and project development.

Grid infrastructure

The integration of wind energy within the electricity grid was investigated by GTZ, Eskom, and Digsilent. Their overall goal was to investigate and determine the technical requirements, impacts and feasibility for connecting wind farms to the distribution and transmission grid in the Western Cape.

The general scope of work included three key stages:

- Stage 1: Connection of 150 MW wind farm at Laingsburg to 132 kV grid
- Stage 2: Connection of another 750MW of wind farms in Karoo area to the 400kV grid
- Stage 3: Study the impact of all wind farms in the Western Cape, for which applications exist (2796 MW in total), on the existing ESKOM transmission system (400kV/765kV network).

The first stage was to identify potential issues and mitigation options for connecting a wind farm to the sub-transmission grid. The second stage was investigating any potential issues for connecting multiple wind farms to the main transmission grid.

The general study objectives included:

- Examples for wind farm connection studies (stage 1 and stage 2), showcasing on an exemplary basis possible opportunities and challenges and enabling Eskom carry out similar studies in other areas.
- General feasibility of up to 2800 MW of installed wind generation capacity in the Western Cape (stage 3).
- Identification of technical requirements for the connection of wind farms in the Western Cape (Grid Code aspects)
- Identification of possible bottlenecks/constraints in case of higher wind generation.
- Recommendation for further studies

The results of the grid study were found to be as follows:

- The preliminary results of the grid study where presented in a Workshop on 24th July at the Eskom Bellville Office. Major results are the following:
- For the cases studied in Stage 1 and 2, grid connection of the envisaged amount of wind energy (150 MW in Laingsburg; 750 MW in the Karoo) seems to pose no major problems. For individual challenges (as e.g. a minor excession of thermal limits and small voltage variations), mitigation possibilities are discussed and proposals as to the preferred options made.
- Stage 3 provides very interesting results not only for technical experts, but also for policy makers (for a more detailed summary see pages 13 and 14 of the attached presentation):
- Overall it could be shown that the 2800 MW, for which applications for grid connections existed at the date of commissioning, can be integrated without any problems in the transmission grid and even have grid stabilizing effects by reducing strain from the Cape Corridor. No new costly transmission lines will be necessary. Since no problems are encountered for 2800MW, it can be expected that from a transmission grid point of view, much more wind energy can be installed in the WC.
- Existing pumped storage facilities and gas turbines are ideally suited to balance the wind energy in the WC; no further back up capacity is needed to balance the 2800 MW.

- Positive effects to the electricity system arise in addition because of the reduction of import dependency of WC from the coal-fired power stations in the north and the reduction of expensive fuel costs for the gas fired plants (currently at approx 3 R per kWh).

The study found that the grid within the Western Cape Province is adequate for wind power integration; however there are suggestions for some additional studies needed for various generation-load scenarios as well as stability under various operating scenarios.

This feasibility study for the Western Cape grid helps to highlight specifically what the different needs are for grid infrastructural improvements. This initial study into the grid infrastructure for wind energy emphasises the additional studies which are needed to ensure the grid electricity infrastructure could handle the addition of wind energy projects.

Provincial growth and development strategy

A few years ago the Western Cape Government took steps to outline some of the provincial growth needs and requirements. The commitments embraced a vision for the province and agreed an agenda for directing the future of the Western Cape, which included guidelines to some of the infrastructure and planning needs. The Provincial Growth and Development Strategy took the name 'iKapa Elihlumayo' which means 'Growing the Cape'. There were 12 main strategies that were developed and resourced. Four of these initiatives which set objectives and strategies for infrastructure and planning are: Strategic Infrastructure Plan; Sustainable Development Implementation Plan; Climate Change Response Strategy; and Provincial Spatial Development Framework. These four strategies cover the following plans and frameworks:

- Provincial Spatial Development Framework (PSDF): This framework identifies the areas of growth in the Western Cape Province and the areas that are emphasised for sustainable development growth in the future. In addition, this initiative addresses the form and path that growth and development should be taking while highlighting the restructuring of urban settlements to facilitate the implementation of sustainability.
- Sustainable Development Implementation Plan (SDIP): This plan includes programmes to encourage biodiversity, effective open-space management and the better management of settlements by ensuring the sustainability of services related to land use, water, waste and energy.
- Strategic Infrastructure Plan (SIP): Establishes a planning framework that outlines the physical infrastructure which the Western Cape is to provide. This planning and infrastructure is to support the economic growth, increase labour market participation, and overall general wellbeing in the Western Cape Province. In terms of the Provincial Spatial Development Framework, this plan indicates the infrastructure needed and where and how it can be built over time as budgets allow. It includes the buying of public land for settlements and the improvement of bulk infrastructure (water, sanitation and energy), telecommunication and road transport network.
- Climate Change Response Strategy (CCRS): This initiative focuses on energy efficiency and public transport as the most effective ways of helping to slow climate change. It outlines that businesses and electricity generators increasingly have to focus on clean production to reduce harmful GHG emissions and both public and private sectors have to promote renewable energy including solar, wind and ocean (wave and tidal).

One of the most important initiatives to be evaluated for regional action plan is the Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape. This initiative

outlines a regional methodology for wind energy site selection. The strategic initiative sets out guidelines for planning requirements at a local level as well as land use planning and legal implications. More importantly this initiative highlights many of the planning barriers that wind energy in the Western Cape faces. The conclusions and recommendations suggest a set of proactive guidelines that should be included as part of a renewable energy regulatory plan.

All of these past and current initiatives that have been developed which highlight planning and infrastructure strategies related to energy and sustainable development should be incorporated in the development of a comprehensive action plan that facilitates the development of renewable energy projects. It will be important to consolidate the essential strategies related to planning and infrastructure that have been previously developed and incorporate them when developing a regulatory action plan.

9.4 Strategic Renewable Energy Planning

One of the key issues that will need to be addressed by the Western Cape Government will be to develop proactive renewable energy planning guidelines. The proactive guidelines should at first mainly focus on the development of the wind energy projects. This is because wind is one of the Western Cape Province's largest renewable energy resources and wind power projects tend face the greatest difficulty in getting planning approval.

Although planning consists of many different steps and at times could be quite complicated, essentially it could be broken down into two main fundamental aspects. The first main aspect of planning is managing the competing uses for space. The second is to give the places that are valued by society a sense of identity. These two aspects of planning focus on the location and quality of social, economic and environmental change. In setting out a vision for planning, it is important to set spatial planning guidelines which will encompass these aspects.

9.4.1 Spatial Planning

Spatial planning goes beyond traditional land use planning to bring together and integrate policies for the development and use of land with other policies and programmes which influence the nature of places and how they function. This will include policies which can impact on land use by influencing the demand on, or need for development.

Spatial planning operates at all the different possible scales of activity, from large-scale national or regional strategies to the more localised design and organisation of towns, villages and neighbourhoods. Spatial planning is about making policies and setting out visions for places, as well as making decisions about matters ranging from the location of major new transport routes or renewable energy facilities to the development of new shops, schools, dwellings or parks needed by local communities. It considers the things that are valued and supports the ongoing use of the environment to maintain or enhance those values. The planning should incorporate the need to limit climate change, the provision of habitat for individual species; and the identification of global cultural heritage to locally valued townscapes. While maintaining that which is important to the population, spatial planning should also encourage innovation in the design and development of future energy infrastructure such as wind farms.

There are four important aspects to the development of a successful spatial development framework. These four elements are:

- policy for land use and development;
- guidelines for land use management;
- capital expenditure framework; and
- Strategic Environmental Assessment (SEA).

9.5 Spatial Planning Guidelines and SEA for Renewables

As part of a comprehensive regulatory action plan the Western Cape Government will have to establish a set of spatial planning guidelines specifically for the development of renewable resources with a primary focus on wind energy. Using the tool of spatial planning the Western Cape Government should ensure to incorporate any national South African planning guidelines set out by the Department of Environmental Affairs which relate to the development of renewable energy projects.

The spatial planning guidelines for renewable energy should focus on two main aspects:

- First, the spatial planning framework for renewable energy developments should be based on capacity of the built and natural environment to accommodate the projects.
- Second the spatial plan for renewables should provide guidance on how to specifically address environmental, social and economic effects when preparing renewable energy project proposals. This includes using tools such as sustainability appraisal (SA) and more importantly Strategic Environmental Assessment (SEA).

The guidance will support the implementation of a range of policies and legislation. It will set out a consistent approach to be applied across municipalities to assist developers in preparing renewable energy projects. The spatial planning guidelines for renewable energy projects should be incorporated into a holistic all encompassing development plan in due course.

When preparing renewable energy project proposals a range of environmental, social and economic effects need to be considered by developers. The guidance should provide general advice on a range of issues that must be dealt with for planning reasons. These include aircraft and radar, biodiversity, cultural heritage, landscape and visual, local amenity, local economy (including tourism), soil types, hydrology of the area, and telecommunications.

There are several methodological tools which could be applied when developing comprehensive spatial planning guidelines to ensure the plans have a benign affect on the environment and long-term sustainable development objectives. Two widely used methodological tools are Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) – they differ slightly and SA is mainly used as a tool in the United Kingdom.

The purpose of an SA is to assess the likely social, environmental and economic impacts of implementing a proposed set of spatial development plans and programmes. SA is a set of procedures that examine the social, environmental and economic effects of the strategies and policies in the context of spatial planning development guidelines to ensure the decisions which are made are in accordance with sustainable development objectives. The SEA is a comprehensive analysis to ensure that all environmental considerations are incorporated into the strategies, policies, programmes, and spatial development planning. Usually, SA will incorporate all the requirements set out in the SEA. By incorporating an SEA methodology it may be found that in some locations wind farms may be developed next to one another. It may be found that in some regions it might be optimal

to develop wind farms within 30 km of each other and still pose a benign affect on the local environment.

The planning guidelines should provide a clear decision making framework to ensure that proposals for renewable energy facilities are thoroughly assessed against criteria important to both the project developers and the local community before development can commence.

A planning framework should include provisions to assist decision making on proposals for wind energy facilities, including:

- definition of a renewable energy facility (wind, solar PV, hydro, etc);
- provincial and national planning policy on renewable energy facilities;
- an outline of information required for planning permit applications; and
- criteria to ensure the protection of areas of high value established by legislation.

As part of an action plan for renewable energy the Western Cape Government should legislate municipalities to incorporate renewable energy facilities in all of the regional spatial development guidelines. The local government entities which oversee the development of spatial planning guidelines and policies should make provisions for renewable energy projects. As wind resource development is a high priority for the Western Cape Province all local planning should at least start with incorporating spatial guidelines for the wind energy facilities. The local planning should include guidance for all the important aspects that face wind power plant developments which were previously mentioned and include, but are not limited to: civil aviation, ecology, heritage, landscapes, local economy and tourism, telecommunications, and noise. The local municipal spatial development plans should be in accordance with and mirror the Western Cape Government planning strategies and importantly assist to facilitate achieving the goals for renewable energy installed capacity.

In the cases with under-capacitated local municipalities that do not have the resources to develop comprehensive spatial planning guidelines for renewable energy implementation the Western Cape Provincial Government should be able to assist or even develop policies and planning guidelines which would incorporate the needs of these municipalities. When developing the spatial planning development guidelines the provincial government should work collectively where possible to establish planning solutions which take into account both municipal and provincial needs and expectations. The development of planning guidelines as mentioned above should incorporate Strategic Environmental Assessments to ensure the affect of multiple wind farm power plants have an overall benign affect on the surrounding environment, be it biodiversity, water use, desertification, land degradation, etc.

The spatial planning guidelines and strategic environmental assessments the Western Cape Provincial Government engages in should be made public information and made available to the public. This includes all supporting studies, reports and background information not just the final outcome. This will assist in transparent information dissemination and help the local municipalities understand the reasoning behind any guidelines and would potentially also help to act as a tool which the municipalities could use in order to develop guidelines more specific to their own communities. Through making this information publically available will also help project developers understand the needs and requirements of the municipal and provincial planning guidelines. This would facilitate in risk reduction and has the potential to avoid lengthy misunderstandings and confusions which may lead to contentions about where renewable energy projects can and cannot be developed and why.

9.5.1 Further assistance

In order to further develop spatial planning guidelines to encourage the growth of renewable energy projects the Western Cape Government could work to provide more in depth geographic information system (GIS) mapping. One of the important tools to assist policymakers and planning officials are thorough and detailed GIS maps. As mentioned previously, there are some initiatives which have been developed to provide GIS mapping of the different renewable energy resources in South Africa; however, these could be improved upon by increasing the resolution and expanding on the information given.

The Western Cape Province could develop detailed mapping that outlines the various renewable energy resources coupled with grid accessibility. Electricity grid study and renewable resource mapping could illustrate precisely the areas where there is a favourable wind resource in addition to easily accessible grid connections. Due to the current grid structure, load demands, and location of renewable resources, some areas could be considered prime locations where minimum amount or no grid extension or transmission line upgrades are required. Some areas might be suited for only up to 10 MW, where as others due to grid infrastructure could accommodate for over 100 MW of installed capacity. When establishing complex GIS mapping tools it is important to provide as many layers of information as possible. More detailed information available to project developers and planning officials will ensure that renewable energy projects get developed in the most cost effective and environmentally benign areas. Through making complex GIS maps with layered information available to the general public, it would also help reduce costs for policymakers, planning officials and project developers. This would make the Western Cape Province more attractive to all those involved in the renewable energy industry, from actual developers, consultants, manufacturers, to a variety of service providers.

This could lead to including a ranking system or simply just identification of areas that have the required infrastructure in place to accommodate particular levels of installed power generation capacity.

These detailed mapping sets could also include highlighting areas that are zoned for particular activities that either hinder or assist in the zoning for renewable power projects – for example, urban sprawl, industrial facilities, such as large power electricity generation, manufacturing or mining, greenbelts.

The Western Cape Province could also engage with the grid distribution and transmission entity (currently Eskom) to find out areas within the Western Cape where the grid will be extended to. Distribution and transmission companies will have future plans for grid extension, additional transformers and substations that are based on projected growth and demand for electricity in particular areas. This information could also be added to the renewable energy resource information to provide a comprehensive GIS mapping tool that illustrates where the best opportunities are for developing clean power projects, as well as where the future locations might be.

This would provide project developers with a clear idea of where the favourable and least cost options are for planning permission for their renewable energy projects. Ideally, comprehensive GIS mapping tool would be developed for each renewable energy resource and therefore also technology.

To summarise the Western Cape would develop spatial planning guidelines for renewable energy projects, initially start with wind power. As part of a regulatory action plan, the Western Cape Government would ensure that all local municipalities would include wind and other renewable energy project types in their spatial development plans. The inclusion of renewables in Provincial and municipal development plans will assist in identifying favourable areas for renewable energy

development. Using the information from the spatial planning guidelines the Western Cape Government would include the data in a comprehensive GIS mapping tool. This GIS mapping tool would outline the following features:

- detailed areas of renewable energy resources, i.e. wind, solar, hydro, etc;
- sites for particular technologies (e.g. wind power) that conform to spatial planning guidelines;
- electricity grid infrastructure to accommodate different size renewable energy installations; and
- future grid expansion plans, which include transmission and distribution networks, transformers and substations.

Including all these details in a comprehensive GIS mapping tool will be invaluable to both project developers and also planning and zoning officials. Project developers will know immediately where they should concentrate their efforts to conduct feasibility studies and apply for zoning permission. In addition this also benefits planning officials, as they are the ones responsible for issuing planning permission to the developers. With a thorough GIS mapping tool at their disposal and a set of spatial guidelines for wind projects, this should help facilitate and streamline the decision making process for the planning officials.

9.6 Strategic Environmental Assessment

9.6.1 Identification of exclusion zones and strategic areas

The Western Cape could take the proactive spatial planning approach for renewable energy projects one step further. Rather than simply just providing comprehensive GIS mapping tools for developers and planning authorities, the Western Cape could work in partnership with local municipalities to identify exclusion zones as well as those areas that are specifically for renewable energy projects (this section will specifically address wind farm projects). The concept is to assist the decision-making process for wind and other renewable energy project planning.

There has been some mention of having a minimum radius of 30 to 50 km between different wind farm developments. However, once a thorough spatial development plan has been developed using SEA methodology it may be found that in some areas it is not necessary to have a blanketed radius policy. Once a proper SEA has been conducted it may be found that wind farm developments could be established in some areas closer than 30 to 50 km and still pose little harm to the local environment.

The assessment of individual wind energy development proposals needs to be conducted within the context of a ‘plan-led’ approach. This involves identifying areas considered suitable or unsuitable for wind energy development. These areas should then be set out in the development plan in order to provide clarity for developers, the planning authority, and the public.

As part of a regulatory action plan, the Western Cape Government could support local districts or municipalities to identify suitable and/or unsuitable areas for wind farm development. This would ensure that there is no confusion as to where developers could or could not erect wind power projects. The plan-led approach to wind farm development should be adopted to streamline the approval process for site selection. This plan-led process involves identifying areas, which are deemed appropriate for wind energy development due to the location of the site being at a certain distance from any airports, military bases, urban sprawl, ecologically protected areas, heritage sites,

or any other sensitive areas that could be negatively impacted by the implementation of a wind power project.

The plan-led approach would identify zones in each of the municipalities that are listed under the following three categories:

- strategic areas, i.e. those which are perfectly suited for wind turbines;
- areas open for consideration, which are areas that can be considered after further studies are conducted or research regarding the impacts is done; and
- 'No-go' areas or exclusion zones where it is not possible to build wind power projects.

There are two ways in which the sites of the three different zones or area types could be decided upon. One option is for the Western Cape Provincial Government to issue a mandate which requires local municipalities to allocate a set amount of land that must be used for the development of wind or other renewable energy technologies. This simplifies things as the sole responsibility is given to the local municipal entities which are required to designate some land use planning permission for wind farms. The local municipality will still use the spatial development guidelines for wind farms when making land use allocations for wind. A second option would be for the Provincial Government to collaboratively engage with the municipal governments to establish the three different categories of zones for suitability and unsuitability of wind and other renewable energy projects. This second option is slightly more complicated as there is a greater need for cooperation and an oversight/review committee will likely need to be formed. However, decision-making should still be based on a comprehensive spatial development plan for wind energy projects.

9.7 Infrastructure

The REFIT is certainly an important incentive for the implementation of clean energy projects, but without proper infrastructure support the development of the Western Cape's renewable resources will remain limited. The current state of infrastructure within the Western Cape Province is an important factor that developers will take into consideration when deciding to invest in renewable energy projects. Aside from proactive spatial development planning for wind and other renewable energy technologies, infrastructure investment and planning is of equal importance. The Western Cape Government needs to address the infrastructure requirements of renewable energy project developers in order to have a successful take-up of projects in the Province. This section will primarily focus on wind energy project infrastructure needs, but many of the recommendations will affect and benefit other renewable energy projects as well. In developing a final regulatory action plan for the Western Cape it will be important to highlight and encompass the infrastructure needs and requirements of all types of renewable energy technologies.

9.7.1 Project Infrastructure

Infrastructure requirements for large-scale wind farm project development consist of many different components. The infrastructure needs will cover everything from port delivery through to wind turbine erection and operation delivering electricity to the grid. Not all of the infrastructure requirements will be covered by the Western Cape. Wind farm development infrastructure could be divided into those provided by the Western Cape, the project developer and Eskom – similar to the electricity distribution and transmission company. In general, the overall infrastructure required to develop a wind energy project consist of the following listed below:

Civil works

- Ports, rail, and roads (including site access roads)
- Crane walk path/track construction
- Borrow pits and drainage
- Wind turbine and meteorological mast (met mast) foundations as well as for transformers and crane pads
- Buildings, housing for electrical switchgear, SCADA central equipment, and maintenance facilities

Electrical works:

- Equipment at the point of connection to the grid (substations and transformers)
- Cable trenching, underground networks and/or overhead lines
- Electrical switchgear for protection and disconnection
- Where required, reactive power compensation equipment
- Electrical grounding electrodes and systems

Supervisory Control and Data Acquisition (SCADA) system:

- Central computer
- Signal cables to turbines
- Wind speed and other meteorological transducers (usually incorporated in wind turbines)
- Electrical transducers

As mentioned above the Western Cape Province is not responsible for ensuring all the infrastructure requirements for wind farm project development. These days many of the SCADA systems are developed by wind turbine manufacturers and are built into the turbine hubs. The interconnection and electrical infrastructure will be the responsibility of the project developer and Eskom, the electricity network provider. However, the Western Cape Government could play an active role in identifying barriers or issues with electrical infrastructure and work closely with Eskom in resolving any bottlenecks.

The most important aspect to the wind farm developer is the potential amount of electricity generation that is possible at a wind farm site, as this constitutes the bulk of revenues and largely determines the economic viability of wind energy investment. However, ancillary civil and electrical infrastructure presents significant risks and is sometimes responsible for project delays and cost overruns.

One of the main electrical concerns project developers will likely have are those related to grid extension and interconnection. As part of a regulatory action plan the Western Cape should work closely with Eskom to establish sensible grid planning initiatives. These initiatives should include timeframes for the implementation of substations and transformers, as well as being incorporated in the GIS mapping tool mentioned in the previous section on spatial development plans. The Western Cape one-stop shop should provide all the necessary information regarding Eskom's generation and interconnection requirements to minimise uncertainty.

Some of the infrastructure requirements are addressed in the planning guidelines mentioned in the previous section. Access roads, cable trenching, crane track construction, foundations, borrow pits,

site drainage, site buildings and housing for electrical equipment and maintenance facilities should all be addressed in the EIA and wind farm planning guidelines. It is usually the responsibility of the project developer to manage and cover the costs of these activities; however, in order to have minimal negative environmental effects and maximise regeneration of the area post-construction the project developer should have a strict set of guidelines covering these activities. The guidelines should outline precisely all the precautions, requirements, and what can and cannot be done. The Western Cape Government should ensure that as part of a regulatory action plan these guidelines are easily accessible to developers and are as simple and straightforward as possible.

The main infrastructure requirements that the Western Cape Government oversees and should incorporate proactive measures in addressing as part of a regulatory action plan are the ports, rail, and roads. Wind turbine generators, including blades and tubular towers are extremely large pieces of equipment housing electrical components and lighting, which need to be handled carefully. As South Africa currently does not manufacture wind turbines, project developers will have to have the turbines delivered by cargo ships to ports and then transported by road and rail if available.

One positive aspect is the Western Cape Province's access to main ports at Cape Town and Saldanha Bay. To off-load and transport large wind turbines requires specialised cranes and expertise. As the wind turbine industry develops in the South Africa and even in neighbouring countries, the Western Cape ports have an opportunity to be the premier destination to ship, off-load, and store wind turbines. This may entail additional investments in cranes, stackers, forklifts and warehouses. The ports will have to train employees on how to handle wind turbines and develop entirely new handling systems. Implementing rolling equipment and new techniques to efficiently and safely move wind power cargoes could prove to be a sound investment as the wind energy market develops in the Western Cape and throughout Southern Africa. Some ports around the world have invested millions of dollars to gain market share in the wind turbine industry. Cape Town and Saldanha Bay ports can play an important role as a hub for wind turbine delivery and house workshops where the quality-control engineers can survey their turbines after long sea voyages before they head to project sites.

Once wind turbines are loaded onto lorries they will have to navigate Western Cape's road transport network in order to reach the project sites. As part of the regulatory action plan, the Western Cape could conduct detailed wind turbine transport studies. These transport studies should conduct swept path analysis as part of a physical route survey to identify pinch points and access routes for wind turbine deliveries. The transport studies would be conducted for the most promising wind farm locations throughout the Western Cape Province. Once any problematic points are identified the Western Cape could invest in upgrading the road transport infrastructure to accommodate wind turbine and crane deliveries to the potential project sites.

Access roads for equipment, cranes and wind turbines are permanent roads that will be used during construction and post-construction used for operation and maintenance vehicle access. Roads that need upgrading around and on the way to the project site could then be used by the general public. The roads will need to be designed to accommodate for turning radii of lorries and the heavy loads.

9.7.2 Industrial zones

In addition to providing support for project developers, there is also a need for supporting the development of industrial zones for wind power equipment manufacturing. The development of a manufacturing industry for components or whole turbines will ensure that the greatest value is gained from the REFIT in the Western Cape.

9.7.3 Strategic Infrastructure Plan

The Western Cape has developed a Strategic Infrastructure Plan (SIP) that indicates the infrastructure needed and how it can be built over time. The SIP highlights the importance of infrastructure to stimulate and improve economic and social development. There are a series of objectives that are stated, which include: improved coordination of public sector infrastructure investment; and ensuring that areas of economic potential which are being hindered by a lack of effective infrastructure are highlighted and then included in specific plans with timeframes and budgets to realise their potential. The economic infrastructure that is defined includes transportation, which is comprised of ports, roads and logistics among others.

More importantly the SIP identifies key drivers for investment and includes freight logistics to improve the competitiveness of the Western Cape's industries and to take advantage of the strategic location of the Province. In addition, another key driver stated is the need to address backlogs in the upgrading and construction of new roads.

The SIP illustrates and supports the potential of investigating ports and roads as potential top priorities for investment, particularly if it increases the Western Cape's competitiveness and addresses sustainable development and improvement of economic and social conditions. As the wind industry growth is realised the investment in infrastructure related to roads and ports will likely have to be increased to help foster the renewable energy and economic growth.

9.8 Summary and Conclusions

Successful renewable energy project implementation requires the Western Cape Government to take a proactive approach to planning and infrastructure development. The South African REFIT is a powerful incentive for renewable energy project developers; however, if it is not integrated with sound planning policies and associated infrastructure development, the take-up of renewable energy projects could be greatly hindered. As part of the regulatory action plan, the Western Cape Government should introduce aspects which are focused on supporting the development of infrastructure and establishing spatial planning guidelines.

Sound planning guidelines have proven to be a successful driving force to promote and streamline the development of renewable energy projects in other countries. Denmark and Germany have some of the most successful renewable energy programmes and a high take-up rate of wind farm development. One of the main reasons for this in parallel to their renewable energy feed-in-tariffs, is that both countries have focused on designing proactive planning policies for wind energy projects. Both countries have implemented top-down plan-led approach to identifying suitable and unsuitable site locations for wind projects.

In regards to infrastructure and planning the Western Cape action plan should include regulatory measures to address the following:

- Identification of sites suitable for renewable energy projects, particularly wind
- Inclusion of wind energy projects in provincial and municipal spatial development plans
- Improving the data on renewable resources in the Province and making it easily available
- Clear decision-making process for planning and infrastructure investments

The Western Cape regulatory action plan needs to include the identification of sites suitable for wind project development as well as exclusion zones, which are near to airports, green belts, bird migration routes or other environmentally sensitive areas. It is important that when developing such exclusion zones, which would come out of establishing spatial development plans, that all available methodological tools are utilised. This includes the use of SAs and specifically SEAs. Using SEAs as a tool in planning guidelines will help to ensure the cumulative impact of wind farms are taken into consideration. The majority of countries with well developed renewable energy infrastructure should employ these methodologies. For the Western Cape Province to have a successful renewable energy development programme it is important to ensure through strategic planning and SEAs that projects, wind farms in particular, pose little to no harm on the surrounding environment. Through a strategic planning analysis and by incorporating SEAs it may be found that wind farm projects could be developed in clusters in some regions rather than having a generalised regulation of a 30 to 50km radius separating each project. This could help increase the amount of wind power capacity to be developed and decrease any environmental impacts.

The regulatory action plan could mandate the Department of Environmental Affairs and Development Planning to collaborate with local municipalities to identify suitable areas which could be zoned for wind farm development. Another option would be to mandate each municipality to designate areas zoned for renewable energy projects, particularly wind. This would certainly streamline the development of wind energy projects by alleviating the need for complicated planning because the areas suitable for wind would already be pre-approve and zoned specifically for wind projects.

The Western Cape Province, as well as the municipalities, implement spatial development plans and as part of the regulatory action these spatial plans should include wind energy projects. There have been some initiatives that have developed GIS mapping of renewable energy projects, however, the detail of them could be improved upon with the addition of more data that would help both planning officials and project developers locate suitable sites for projects.

Importantly investors and project developers benefit greatly from clear and transparent decision-making procedures for planning. Planning approval procedures have hindered renewable energy programmes in other countries. The Western Cape Government needs to develop through the regulatory action plan a straight forward centralised planning approval process. The information on the planning permission process for projects could be disseminated through the one-stop shop defined in section 7. In addition as the industry develops and the Western Cape Government begins to implement long-term measures, the planning approvals could move into a centralised Energy Agency for the Western Cape. The long-term measures and proposed Energy Agency are discussed in previous sections under the Strategies and Supporting Mechanisms and the One-Stop Shop, respectively.

10 Regional Industry Development, Training and Capacity Building

10.1 Introduction

The deployment of wind power not only supplies environmentally sound energy but also involves job creation and industrial opportunities. When replacing fossil power plants with wind power plants payments for fuels are replaced with investments in power plants. Consequently, jobs will be created mainly in the manufacturing of wind power plants but additionally also with operation and maintenance of plants. This chapter investigates the potential opportunities of job creation and industrial development of wind power for South Africa. For this purpose it reviews the global prospects of wind power, the scale of present labour opportunities, the structure of the wind power industry, and international approaches; it reviews the strategies and mechanisms countries have used to attract wind power producers to their countries. This section concludes with recommendations for South Africa and the Western Cape Province in particular.

10.2 Global trends and prospects of wind power

Wind power plants with a capacity of 27,000MW were installed around the world in 2008, involving transactions worth €30 billion (VDMA, BWE 2009). Since 2000, annual turnover has grown by an average of around 30 percent. Forecasts of the German Wind Energy Institute anticipate a further 20 percent per year until 2015. The wind industry features outstanding and sustainable development perspectives. The market volume (installed capacity per year) will grow continuously from 20,000 MW (2007) to 107,000 MW (2017), according to a recent study conducted on behalf of HUSUM WindEnergy Fair. If this anticipated development is realised, a capacity of 718,000 MW will be installed around the world in 2017. In 2008, a capacity of 94,000 MW was installed worldwide.

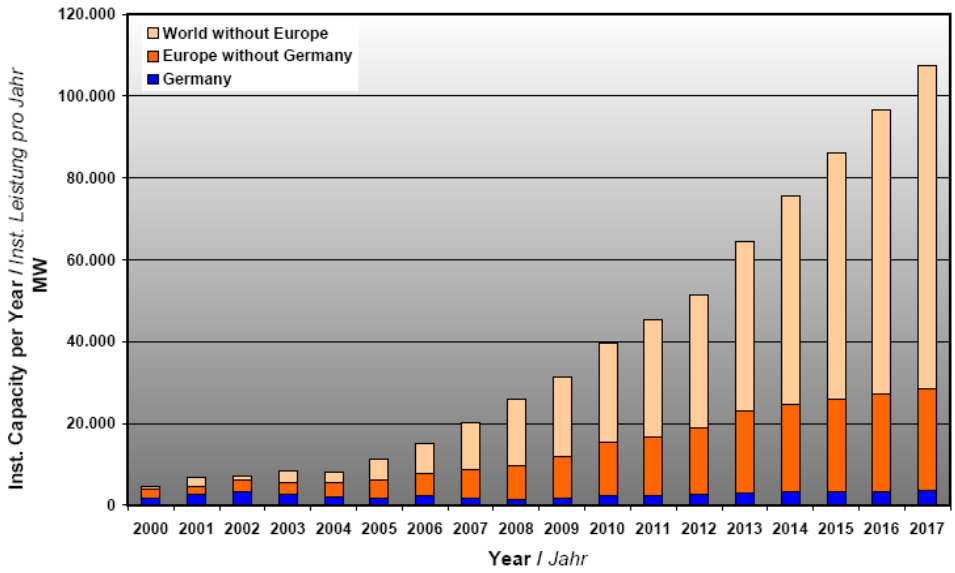

Figure 10-1: Installed capacity per year, MW (world); Source: HUSUM WindEnergy (2008)

According to the scenarios of the European Wind Energy Association (EWEA), by 2020, with 200 to 250 GW installed capacity, wind energy can provide around 12 to 15 percent of the EU's electricity supply. According to a forecast of the Global Wind Energy Council (GWEC), by then wind power should achieve a capacity of 1,200 GW and cover 12 percent of the worldwide electricity requirement. The US Department of Energy estimates that by 2030 the wind energy proportion of overall power consumption in the USA will be 20 percent.

Consequently there are great opportunities for manufacturing, maintaining and operating wind power plants world-wide. South Africa and the Western Cape Province in particular, with its strong existing general industrial base, may be well positioned to benefit from these developments by attracting manufacturing and service facilities for wind power plants to their region which may serve as a plant and service supply for the entire Southern Africa.

The potential benefits of local wind turbine manufacturing generally include (Lewis and Wiser 2005: 3):

- economic development opportunities through sales of new products;
- job creation with a wide range of different low and high skilled jobs;
- increased local tax base;
- opportunities for the export of domestically-made wind turbines to international markets, further enhancing the prospects for local economic development; and
- cost savings that result in lower-cost wind turbine equipment, a lower cost of wind-generated electricity, and therefore higher growth rates in domestic wind capacity additions.

Wind energy is on the upswing all around world, and therefore the demand for qualified jobs is growing continuously. This has resulted in the creation of thousands of new jobs in Europe every year. According to the Bundesverband WindEnergie and VDMA Power Systems, across Europe the wind industry has generated 60,000 new jobs in the last five years. A study by the EWEA about wind energy and job creation in the EU concluded that a total of approximately 160,000 people were employed in the European wind industry in 2007, whereas the wind energy sector directly employed approximately 108,600, mainly wind turbine and component manufacturing. Furthermore EWEA predicts wind energy-related employment to shoot from 154,000 in 2007 to 330,000 in 2020 and estimates that by 2030 the number of jobs in Europe will increase by about 250 percent.

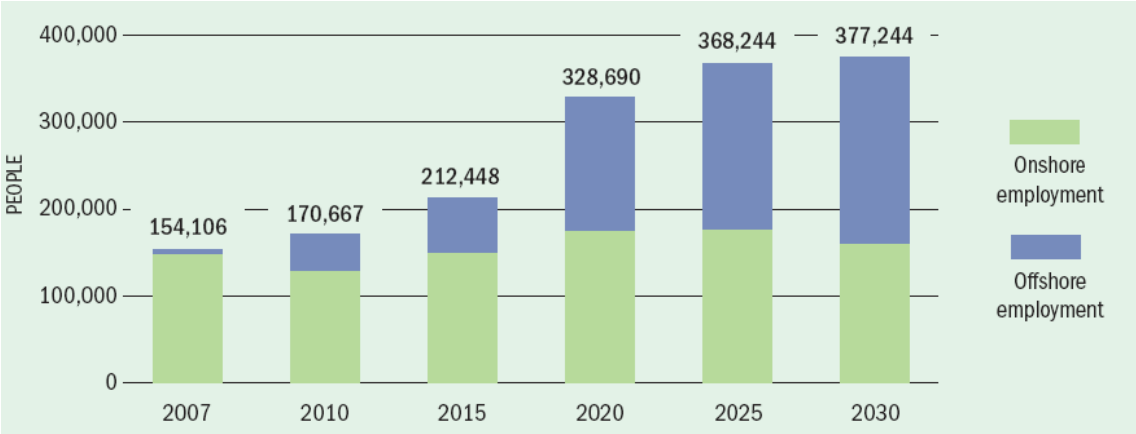

Figure 10-2: Wind energy sector employment (EU 2007-2030); Source: EWEA 2007: 9

Compared to a previous EWEA study conducted in 2003, direct employment has increased by 125 percent since then. On average, 12,047 new direct wind energy jobs have been created per year in the five-year period 2002-2007.

With reference to the economic report 2009 about the wind industry in Germany published by the Bundesverband WindEnergie and VDMA Power System, the greatest part of the value creation in the wind sector is achieved by the manufacturers of wind turbines and components.

Brand new suppliers have evolved from various industrial fields:

- Tower constructors and rotor blade producers have evolved from the steel construction, shipbuilding, and the chemical industry.
- Medium-sized companies from the classical mechanical engineering branch have opened up new business segments in the wind industry, including gear and generator manufacturers, bearing manufacturers, forges and foundries.

In the case of Germany, traditional mechanical engineering centres in North Rhine-Westphalia, Bavaria, Baden-Württemberg, and Eastern Germany have built up technology and production centres for the wind industry in recent years: foundries, steel processors and gear manufacturers are located here. Enercon, for example, the third-largest wind turbine manufacturer in the world and market leader in Germany, has started extending work shops of a former steel foundry in Magdeburg in order to produce rotor blades. In total, Enercon will invest €22 million and will create 450 new jobs. Moreover, this investment contributes to revitalise traditional machine construction in this region. Another example is Bremerhaven. Blighted by declining shipping and fishing industries, the mushrooming offshore wind energy industry has created up to 1,200 direct jobs in companies manufacturing turbines and components between 2006 and 2008 (EWEA 2007: 25).

BWE and VDMA Power Systems (2009) give details that wind turbine manufacturers either operate as system suppliers, who integrate custom-made components from suppliers into their turbine design, or as system producers with broad-based in-house production of components and pre-components. Manufacturers like Enercon GmbH, Nordex AG, Siemens AG, or REpower AG produce rotor blades, gear units, cast parts or towers and offer condition monitoring systems, control units, grid components and service packages. Moreover, planning and engineering offices have focussed on the wind

industry, as well as companies operating in the areas of installation, service, and maintenance. Germany has seen the development of so-called wind clusters, particularly in previously underdeveloped regions. In the coastal areas in northern Germany, a large number of small and medium-sized companies have come into being as a result of wind farm construction, from manufacturers and suppliers to project planners and financiers to service providers. With the construction of offshore wind farms, new business segments for the maritime industry have arisen on the coasts, such as harbour infrastructure, foundation technology and logistics as well as the construction and subsequent operation of power plants. Cable manufacturers are building their production plants at the coast with a view to the offshore business. The following figure displays the value added chain of the wind industry.

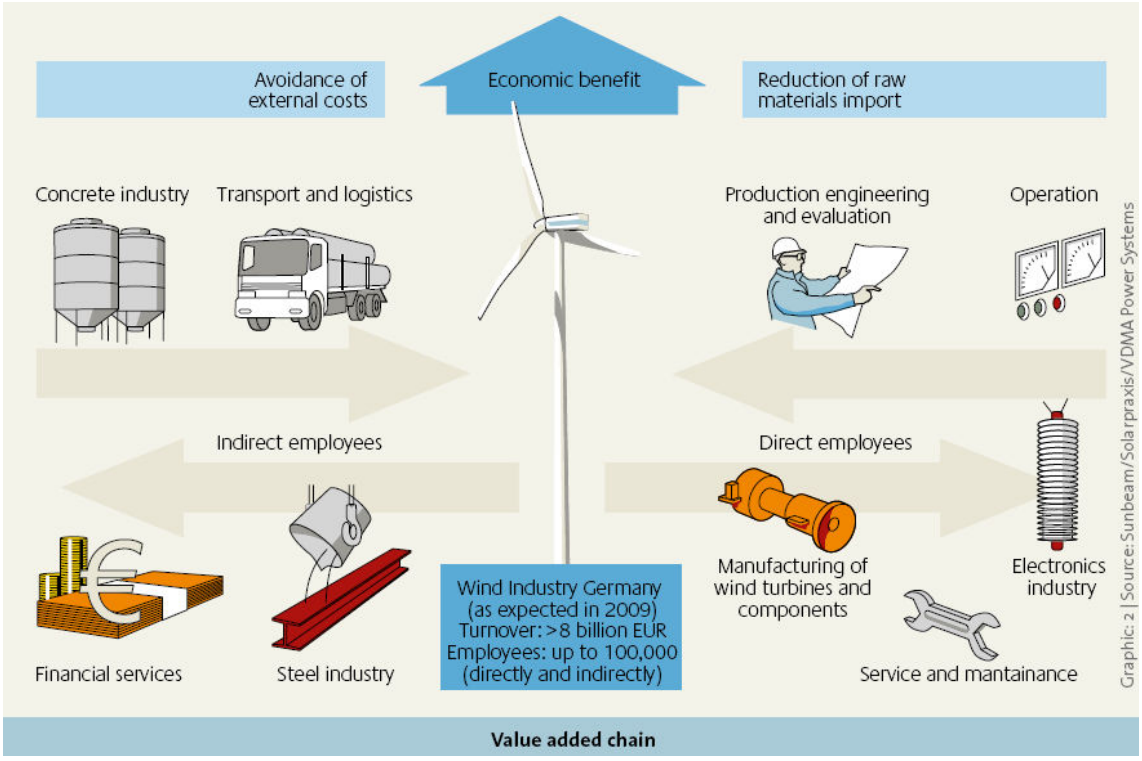

Figure 10-3: Value added chain; Source: BWE and VDMA Power Systems 2009: 9

In Germany, the wind industry has developed into a significant and one of the fastest growing industrial sectors. BWE and VDMA Power Systems (2009) believe that the German wind industry was responsible for around one quarter of worldwide value creation in the wind sector in 2008. Its turnover accounted for €7 to 8 billion.

After the sector in the 1990s primarily produced for the home market, it has since achieved an export quota of well above 80 percent. German manufacturers are expanding their exports to the main sales markets of Europe, North America, and Asia. Even medium-sized companies are opening up export markets that were previously only supplied by corporate groups operating globally.

In Esbjerg, south-west Denmark, the wind industry provides the bulk of the city harbour's business. Offshore wind farms in the North Sea have helped boost profits despite declining goods tonnage for Esbjerg, Denmark's key port on the west coast. The financial daily newspaper Børsen reports that despite total tonnage falling by 18 percent, Port of Esbjerg posted record results for 2008 with turnover up 10 percent and profits up 12 percent. The Horns Rev offshore wind farm is maintained from there, and a recent agreement with Siemens Wind Power will develop large areas of the harbour for manufacturing and storage of wind energy technology for exports, potentially creating several hundreds of new jobs in the sector (EWEA 2009).

With reference to the wind at work study of EWEA, wind energy development has brought about increased employment in the Spanish regions in which wind farms have been built. This is a consequence of the country's regional legislation, which obliges wind energy developers to install manufacturing and industrial centres in the municipalities where the wind farms will be located. While this requirement benefits the local inhabitants and has contributed to a positive attitude towards wind energy, it can bring about economic disadvantages, because it prevents sufficient economies of scale from being achieved.

10.3 International and local examples

Among the benefits of wind energy is the creation of local employment opportunities and support to the economy. This sub-chapter explains how regions and municipalities all round the world have tried to attract the attention of wind industry businesses.

The localisation of wind industry can take multiple forms. The wind technology may be developed entirely locally, through local innovation or domestic research organisations. The creation of an independent local industry is generally combined with strong R&D technology programmes. This was especially observed in Germany and Denmark in the 1990s, when complementary support policies included R&D financing (UNDP 2008). On the other hand leading foreign wind turbine manufacturers may simply decide to establish a local manufacturing presence in which certain components or entire turbines are manufactured in the local market. A different alternative is to transfer foreign techniques and know-how, like China and India did.

In general, the UNDP (2008) report about the promotion of wind energy concludes that besides specific public policies, the size of the national market is a key driver in the creation of a national wind industry.

Below, the development and set-up of wind technology manufacturers are highlighted by some examples from Denmark, Germany, Canada, India, and China. Finally, the conclusion of an international comparison of wind industry policy support mechanisms done by Lewis and Wiser (2005) summarises how to foster the wind manufacturing industry.

10.3.1 Nakskov, Denmark

In the late 1980s and 1990s, the southern Danish island of Lolland was an extremely depressed area. The shipyard in Nakskov that employed more than 2,000 people closed down in 1986, and a severe economic crisis followed. House prices fell sharply and skilled people left the city.

EWEA (2008) explains that through an active business development policy focusing on green energy and clean technology combined with targeted housing initiatives, the Nakskov municipality was able to attract the attention of the world's largest wind turbine manufacturer. In 1999-2000, Vestas set up a

factory in Nakskov making wind turbine blades, which created 650 new jobs – 600 of them in production and 50 in support services. Another 600 jobs were indirectly created in other companies in the area as a result. Since then the unemployment rate has fallen below the Danish average.

10.3.2 Schleswig-Holstein, Germany

The development of wind energy in Schleswig-Holstein, one of Germany's federal states, has been supported by the regional government, which has created an attractive environment for investment and ensured that the labour force and the public infrastructure are attractive to the sector.

The business structure in Schleswig-Holstein is made up of a large number of small and middle-sized companies, complemented by a solid network of R&D institutes, training and educational centres, universities, and financial institutions.

A report by the Ministry of Science, Economic Affairs and Transport of the State of Schleswig-Holstein (2009: 20) highlights the importance of supporting research. For example, the federal state government of Schleswig-Holstein continues to support the development of offshore wind-energy exploitation by joining the German federal government in subsidising the construction of the research platform "Fino3". Public funds are being spent on the project, which enables small and medium-sized companies, private research facilities and the federal state's universities to bring their products, services and processes in the offshore sector to market maturity. In this way, they cannot only participate in the progress being made in this quickly developing sector but also maintain their competitiveness.

10.3.3 China

China started focusing on technology transfer in the 1990s. The UNDP (2008) explains that China has tried to increase the national content of wind energy generation through various initiatives including the "Ride the wind" programme initiated in 1996 to import technology from foreign companies and to establish a high-quality Chinese wind turbine generator sector. "Ride the wind" led to two joint ventures with Nordex (Germany) and Made (Spain).

Moreover, to encourage the development of domestic wind power equipment manufacturing, the "National Debt Wind Power Program" was implemented later. This program required the purchase of qualified, locally-made wind power components for new generation projects. China's government provided bank loans with subsidised interest to wind farm owners as compensation for the risk of using locally-made wind turbine generators. These loans funded construction of demonstration project wind farms.

More recently, China made it a condition of its concession programme that a large part of equipment (50 percent and later 70 percent) was manufactured in China. In 2005, the market share of Chinese suppliers reached almost 28 percent (mainly Goldwind) although this is concentrated on turbines smaller than 750 kW. Nordex, Gamesa, Acciona, Suzlon, and GE Energy all began to invest or operate new plants in China in 2005.

10.3.4 Quebec, Canada

Quebec introduced local content requirements through the calls for tenders managed by Hydro Quebec in 2003 and 2005 (UNDP 2008: 32). Lewis and Wiser (2006: 21) explain that Québec is using a unique portfolio of local content requirements and other incentives to spur the development of a local wind turbine manufacturing industry within its borders. The province's first large solicitation for wind power projects, a 1,000 MW Call for Tenders that was issued in 2003 and finalised in early 2005,

was successful in attracting a leading global company in the wind turbine industry to set up manufacturing and assembly facilities in the Québec region. Its second call, for twice the installed capacity of the first, aims to bring in even more manufacturers within the broader Québec province.

10.3.5 India

The UNDP (2008: 32) describes that at least 15 domestic companies are manufacturing wind power turbines and components in India, either in joint venture or under licence from international companies. Turbine blades, as well as electric generators, are being manufactured locally. The Indian company Suzlon was the country's largest supplier in 2003, with 34.6 percent of the domestic market. The size of the potential wind energy market in India, along with customs duty rules in favour of importing wind turbine components over importing complete machines, has been the main driver for setting-up domestic wind manufacturing.

10.4 International Comparison of Wind Industry Policy Support Mechanisms

Examining the importance of national and sub-national policies in supporting the development of successful global wind turbine manufacturing companies, Lewis and Wiser (2005) recommend adapting policy incentives according to the respective goals for the localisation of the wind industry, which are likely to change over time. For example, a country may start with a goal of attracting foreign turbine manufacturers, then attempt to initiate local component manufacturing, and eventually develop its own turbine manufacturers. Furthermore, Lewis and Wiser (2005) suggest a gradual, staged approach to ensure that policy goals and local content requirements match local industry capabilities, and do not unnecessarily raise the cost of wind power in the local market.

Nevertheless, a first step should be a comprehensive assessment of potential economic, employment, and cost reduction benefits associated with different forms of local wind turbine manufactures as well as a detailed assessment of existing domestic capabilities in the wind sector. Once the localisation strategy is clear, Lewis and Wiser (2005) underline that a set of policy tools to implement that strategy must be selected. According to the authors, a country can maximise its attractiveness for local manufacturing by establishing a combination of direct and indirect policies to support wind industry development.

Direct support for local manufacturing, e.g. by local content requirements, financial and tax incentives, favourable customs duties, export credit assistance, quality certification, and research, development, and demonstration, has proven effective, as demonstrated in a number of countries. These policy mechanisms do not all target the same goal; some provide blanket support for both international and domestic companies to manufacture locally, while others provide differential support to domestically-owned wind turbine or components manufacturers. Most countries have employed a mix of policy tools, e.g. local content requirements, financial and tax incentives, favourable customs duties, export credit assistance, quality certification, research and development.

According to Lewis and Wiser (2005: 11), a stable and sizable home market may also be a pre-requisite to luring leading foreign manufacturers to establish local manufacturing facilities or to develop local joint venture partnerships. A stable home market signals to both local manufacturers and to foreign firms that they have the long-term planning horizon necessary to allow them to reasonably invest in the market. Companies facing unstable or small markets, on the other hand, will be less willing to spend money on R&D, product development, and local manufacturing facilities.

Achieving a sizable, stable local market requires, according to Lewis and Wiser (2005: 17), aggressive implementation of wind power support policies. Feed-in tariffs, mandatory renewable energy targets requiring a fixed percentage of electricity in each retail suppliers' portfolio be generated by renewable resources, governmental tendering, and financial and tax incentives aim to create a demand for wind power at the domestic level. Among these indirect support mechanisms a stable feed-in tariff has clearly proven to be one of the most successful mechanisms to date for promoting large-scale wind energy markets (Lewis and Wiser (2005: 20). Feed-in tariffs have the advantage of giving developers long-term stability and predictability.

10.5 Industry Support

The REFIT provides an initial catalyst to promote renewable energy industry growth throughout South Africa. The South African REFIT opens up the potential for the Western Cape Province to become a leader in both renewable energy project implementation and overall industry development. In order for the Western Cape Province to take the lead in developing the renewable energy industry it is important as part of the regulatory action plan to incorporate proactive support mechanisms. These support mechanisms should be targeted at developing all parts and aspects that make up a thriving renewable energy industry. The regulatory action plan should include support mechanisms that are aimed at both short and long-term goals.

Short-term goals would be to initially foster a high level take-up rate of new renewable energy projects. Because the Western Cape Province has abundant wind resources, the support mechanisms should initially focus on wind energy projects and the development of a wind industry. Long-term support mechanisms would aim to expand the business community which provides goods and services for renewable energy market.

As an initial focus, the Western Cape Government should implement actions which stimulate the renewable energy industry around project development through promoting international investment and capacity building for services and technical knowledge. This includes enterprise development, training, and skills development which are discussed in the next section.

The Western Cape Province has an abundance of wind resources which leads to wind power projects and the wind industry that should be the main area of focus for regulatory action. This section will primarily focus on the development of the wind industry; however some of the benefits and suggestions can easily be applied to other renewable energy technologies and projects.

Developing the wind industry in the Western Cape Province could take many different forms and include various stages of development. The Western Cape could promote the region to foreign investors and get leading international wind turbine manufacturers to establish a manufacturing presence in the local market. The foreign company could either manufacture components required for wind turbines or the entire turbine generator. This would be the easiest way to initially develop the industry in the Western Cape Province – by starting out with foreign partners assisting with international technology transfer, capacity building, and local job creation.

On the other hand, the Western Cape could implement local programmes and initiatives focused solely on developing a renewable energy industry domestically. Wind technology could be entirely developed locally through domestic innovation or research and development initiated by local firms or other domestic research institutes and universities.

A local Western Cape wind industry could focus on manufacturing complete wind turbine generator systems or manufacture certain components and rely on import partners for the others. However, for the Western Cape Province to gradually start out, it could serve as an assembly base for wind turbine components imported from abroad. This would create the maximum amount of local jobs while building upon international partners' expertise and knowledge base.

To begin developing the market, the Western Cape should focus on getting leading international wind turbine manufacturers to import turbine components and have assembly done at the local level. The second step would be for the Western Cape to begin manufacturing components as the industry develops, e.g. tubular towers, generators, blades, etc. Lastly, steps can be taken to provide all the equipment and knowledge to design and manufacture entire wind turbine generators.

In order develop a local market the Western Cape needs to implement a series of incentives and programmes. The market will take a while to develop, but one of the most important driving forces is demand. Supporting mechanisms for the renewable energy industry include, but are not limited to:

A variety of policy measures, some of which include:

- requirements of locally manufactured components;
- quality control and certification
- export credit agency support;
- research and development support;
- tax and other financial incentives; and
- favourable customs duties.

The most direct way to promote the development of a local renewable energy industry is to require certain components to be manufactured locally or imported in collaboration with local partners. This will immediately promote any international supplier who is looking to tap into South Africa's REFIT opportunities to shift their manufacturing to the Western Cape. Tax incentives and customs duties could help lower the tax exposure for local companies when compared to foreign ones, which in turn would provide an advantage for local businesses and job creation. Governments can support local renewable energy companies operating internationally through export credit agencies. In order to maintain top quality components and wind turbines, the Western Cape could implement quality certification standards and testing programmes to ensure any locally developed equipment meets international standards. Supporting research and development could help local companies and institutes secure intellectual property (IP) rights for new technologies which could then be exported and licensed internationally. Research and development support helps promote innovation and test performance and reliability of new technologies.

10.6 Training and Capacity Building

The South African REFIT has the opportunity to bring a new industry to South Africa. The REFIT along with a sound regulatory action plan has the potential to develop a thriving renewable energy industry to the Western Cape Province. The development of renewable energy projects is quite a new concept for the coal-dominated power sector of South Africa. Currently, due to the limited number of clean energy projects that have been implemented in South Africa, training and capacity building initiatives should be incorporated in a regulatory action plan.

There are many potential jobs which will be needed as the renewable energy industry develops within South Africa. The Western Cape with it's abundance of wind resource has the opportunity to be a leading province in South Africa for project development and also wind industry career training. As the market develops there is potential for the Western Cape Province to be an expert in project development throughout Southern Africa as other neighbouring countries, such as Botswana, Mozambique, Swaziland, etc take-up renewable energy project investment as well.

There are many training and capacity building activities the Western Cape could help support through a regulatory action plan. Some of these options available are the following:

- work with industry trade associations to hold workshops focused on renewable energy project development;
- assist with establishing trade associations related to wind power as well as other renewable energy industries;
- provide capacity building seminars for Western Cape Government employees to understand the details of the complicated approval, permitting, and licensing procedures associated with the REFIT and developing a renewable energy project; and
- support local technical institutes, universities, professional training institutions and organisations to develop curricular and implement courses on renewable energy projects, primarily wind.

The idea is to provide in depth training and capacity building focused around two important areas: 1) technical project development and implementation; and 2) local, provincial and national regulation and policies related to Eskom's licensing, NERSA requirements, spatial planning guidelines, zoning and local approval, and both EIA and SEA reporting.

This ensures knowledge building both on the technical side to assist with job creation and project construction as well as assist with updating and training for those working on the regulation and policy which oversees the market.

10.7 Summary and Conclusions

There are a number of successful international examples where the deployment of wind power was combined with the creation of manufacturing industries and job opportunities. A minimum size of the domestic wind power market combined with stable legal framework is important to attract investment into manufacturing and services.

The South African REFIT is a valuable policy instrument and it has the chance to stimulate a whole new clean energy industry. The Western Cape Province with the implementation of a regulatory action plan and access to a high wind resource has the potential to be market leader in the wind energy industry.

The Western Cape has the opportunity to become a major hub for wind energy project development expertise and manufacturing. The Province could engage in creating manufacturing clusters through zoning land for the establishment of factories and business complexes. For the Western Cape Province, there are particular sites such as old and outdated shipyards which may prove to be good areas for wind turbine storage facilities for equipment inspection as it is off-loaded from cargo ships. Alternatively the sites could be used as manufacturing facilities for local or foreign companies as the market develops. These sites are well-connected with roads inland and the port access would provide

an additional possibility to ship entire wind turbines or parts for assembly by local Western Cape based companies.

Through the establishment of a regulatory action plan the Western Cape Government could provide a series of policies to ensure the development of the wind industry in the Province. Some of these regulatory actions include passing requirements for the provision of locally sourced manufactured goods and services and favourable customs duties. Other measures for consideration is research and development support as well as quality certification to ensure the wind turbine components (or other renewable energy technologies), which are manufactured in the Western Cape are to international standards.

It is important the Western Cape includes training and capacity building in the regulatory action plan. Training and knowledge growth should be focused around two important areas:

1) Technical project development and implementation
2) Local, provincial and national regulation and policies related to Eskom's licensing, NERSA requirements, spatial planning guidelines, zoning and local approval, and both EIA and SEA reporting

Active regulatory action to provide capacity building will assist in fostering job creation and streamlining project development as there will be an increased number of people with a wide understanding of policy shaping the market and technical comprehension to engage in project development.

11 Pilot Small-Scale Feed-in Tariff

11.1 Introduction

In order to broaden the existing feed-in tariff and to further encourage the uptake of renewable energy in South Africa, it would be appropriate to offer households, community organisations and businesses an opportunity to generate their own renewable energy and supply it to the electricity grid.

South Africa will experience a growing demand in energy over the next couple of years, mainly due to population growth, rapid urbanisation and improvement in living standards. Further growth in energy demand is expected as individuals, communities and organisations strive to adapt to changing climatic conditions. Electricity infrastructure in the main urban centres and economic development hubs will be put under increasing pressure and in many cases the capacity to meet growing demands will be inadequate or non-existent (at least until the planned coal fired power stations come into operation).

It is therefore critical that any such demand in energy is met in a low carbon way. To achieve this, consumers need to be made part of any electricity management and efficiency programmes. One way is to encourage people to use less electricity and to use it differently; this is currently underway through the Demand Side Management programme run by Eskom. Another way is to offer households, community organisations and businesses an opportunity to generate their own renewable energy and supply it into the electricity grid. This could be done through the introduction of a small-scale feed-in tariff that would be administered by municipalities.

Within the national REFIT, only Eskom is permitted to purchase renewable energy under the Single Buyer Office, although it makes sense to also allow municipalities and Eskom Distribution to purchase power generated within their areas of jurisdiction. The additional cost for the purchase of this power can either be built into the overall end user tariff, or be paid as a per kilowatt-hour levy to willing end users. This would broaden the existing REFIT programme and further encourage the uptake of renewable energy in South Africa.

Grid-connected small-scale renewable energy is particularly appropriate for South Africa because of rising electricity prices, the cost and duration of building new coal fired power stations, the timeframes within which these will be completed and the resultant emissions. Furthermore, there are numerous socio-economic benefits inherent in renewable energy; some of these include:

- securing domestic energy supply;
- accelerating the transition to a low carbon energy system (in that there are more participants in renewable energy generation);
- creating new jobs and industries (of critical importance in the South African context where poverty alleviation, job creation and SMME development are key government priorities);
- guaranteeing investment security;
- driving technological and service innovation;
- providing fair market conditions; and
- driving deployment faster, more equitably and cheaply.

With improvements in renewable energy technology efficiency and the declining costs of renewable energy technologies, the cost of domestic-scale renewable electricity systems will eventually become

comparable with standard power supplied from the grid, this means that take-up may increase dramatically over the next few years. Cost increases in grid power will have an effect for example, on new housing stock. Changing buyer preferences and developer awareness means that a higher proportion of developments may have domestic renewable electricity installed in an integrated manner. Therefore the case for a small-scale feed-in tariff will become even stronger.

Even in light of the above, there is still some concern over the affordability of feed-in tariffs for consumers, however this view is very short-sighted as conventional electricity prices are going to continue to escalate every year and sooner, rather than later, the price of renewable energy will be comparable to that of conventional electricity. Evidence from other countries that are following and have followed this route shows a marked increase in renewable energy generation after a feed in tariff is implemented.

11.1.1 International Examples

The German Experience

Possibly the most famous, comprehensive and successful instance of feed-in laws internationally would be those introduced and modified in Germany over the past 16 years. In 1991 the German government introduced the Electricity Feed Act, legally regulating the feed-in to the grid of electricity generated from renewable resources. This act required utilities to purchase electricity generated from renewable resources at set rates.

This scheme was expanded and enhanced with the adoption of the Renewable Energy Sources Act of 2000, which has been responsible for the dramatic growth in Germany's renewable energy market and the solar photovoltaic industry in particular. The compensation to which suppliers are entitled is now geared to costs. The compensation rates differ between energy forms and also depend on the size of installations. In the five years from 2000, the quantity of electricity fed into the grid from eligible sources has more than doubled, with a seven-fold increase in installed solar photovoltaic (PV) capacity to over 1,500 MW by the end of 2005. By comparison, at the same time, in Australia, the market increased in the order of 7 MW of grid-connected solar PV, or less than 0.5 percent of Germany's capacity.

Victoria, Australia

The Victorian Department of Industry launched the start of their premium feed-in tariff programme for solar on 1 November 2009 to enable Victorians to install roof top solar panels and receive a premium rate for unused electricity they feed back into the state electricity grid. The premium feed-in tariff is available to households, community organisations and small businesses who consume less than 100 MWh of electricity a year and with solar PV systems up to 5 kW in size. The rate received under the premium feed-in tariff scheme is 60 cents per kilowatt hour for power fed back into the grid. This premium rate is about three times higher than the standard retail rate customers pay for electricity.

The premium feed-in tariff will be credited against a customer's electricity bill, by their electricity retailer, with each bill credit available for a maximum of 12 months (although some retailers may offer better terms). In other states, a cash payment is offered and in the ACT, a gross feed-in tariff is in operation that pays the premium rate on all electricity generated by a solar power system.

Additionally, the premium feed-in tariff will be available in Victoria for the next 15 years, for a total capacity of 100 MW of solar power across Victoria. The program will be offered by all electricity retailers who have more than 5,000 customers.

11.2 Key Challenges and Barriers to Uptake

11.2.1 Institutional Barriers

As described in an earlier section, the main requirements to support the implementation of a small scale REFIT are as follows:

- establishment of an appropriate technology specific tariff by NERSA;
- development of a framework to mitigate the requirement for all connections to the national grid to have a generation licence, which in its present form would be extremely onerous for potential suppliers and the regulator; and
- development of the framework for implementing and managing monitoring and payment.

11.2.2 Connection standards

At present, all embedded generators are subject to the same connection standard, *Distribution Standard for the Interconnection of Embedded Generation*, set by Eskom. While appropriate for many large scale embedded generators, such requirements are likely to be unduly onerous, and therefore hinder the installation of small-scale systems. The standards apply to systems where the generating plant may be paralleled with the Eskom Distribution network, either permanently, periodically or temporarily. The standard exempts generating plant that does not operate in parallel with the Eskom grid (e.g. own use customer generators or stand-by generators). Furthermore, the intention is that the standard, or one of broadly similar requirements, shall also apply to embedded generators connecting to municipal electricity networks which, in turn, are supplied by Eskom.

The current version of this standard does not apply to generator interconnections at low voltage, or generators of capacity less than 100 kW. It provides for any sources of generation that are not covered in the standard, seeking parallel connection to the distributor, to be subject to special application. The standard also provides for generic interconnection requirements and is applicable to all different types of generators. For renewable energy generators, the standards stipulate that it may be necessary to supplement the requirements of the standard with additional technology-specific requirements.

11.2.3 Metering standards

Consideration should be given to the adoption or creation of metering standards for small-scale embedded generation for all the measured quantities (demand, generation, import and export).

Although legislation and standards do exist for demand (consumption) meters, few requirements exist for embedded renewable energy generation.

11.2.4 Installer capacity and expertise

There are currently limited numbers of installers and installation expertise which can have a negative impact on the development of a small-scale feed-in tariff across a range of technologies.

This problem can be overcome by generous capital grants, which will help to bring installers into the market and by a programme of capacity building and training run under the auspices of a joint venture between the Department of Trade and Industry and renewable energy industry associations, e.g. South African Wind Energy Association (SAWEA) and Sustainable Energy Society of Southern Africa (SESSA) to help develop a home-grown industry for these technologies.

11.2.5 Awareness

Small-scale grid-connected generation is often provided by relatively new technologies and is, at present, relatively uncommon in South Africa. The combination of these factors means that potential users of the small-scale feed in tariff may not be aware of its potential. This is a circular effect, with limited market penetrations leading to low awareness and low awareness contributing to limited penetrations. In other countries, government-sponsored promotional campaigns, support mechanisms, purchasing programmes and targets, among others, have been used to overcome this cycle.

11.2.6 Social acceptance

For many renewable energy technologies, social acceptance is a key factor determining the maximum deployment. For small-scale technologies with low cumulative deployments, social acceptance is likely to increase at first as the public familiarity increases and misconceptions are overcome.

11.2.7 Market barriers

For renewable energy technologies entering the market place, there are usually high costs associated with their uptake due to immature supply chains and manufacturing processes. In South Africa in particular, the capacity of the supply chain is low since there is insufficient mass-market demand to justify large-scale investments in capacity. As technologies are taken up by early adopters, awareness and hence demand among mass-market consumers will increase. This in turn will drive increased capacity in the supply chain.

11.3 Net Metering versus Feed-in Tariff

The use of grid-connected renewable electricity systems requires either bi-directional meters or separate import/export meters, so that the electricity flowing in and out of a property can be measured. Most small-scale installations are expected to have an associated load, which gives rise to potentially greater complexities in terms of metering, billing and settlement. Implementation of the small-scale FIT program will be assisted by administrative arrangements that are as simple as possible. Standardisation of these arrangements, which affect both the distributor and the embedded generator, would be consistent with the standardised nature of the REFIT program.

In the case of a feed-in tariff, two meters will be required, one to measure consumption and the other to measure generation. However, the second meter allows different pricing for consumption and generation. The price a municipality would pay for the excess electricity would be determined, but a typical scheme follows a 20-year schedule that pays a pre-defined price that gradually reduces year-on-year for new connections, offering the homeowner an attractive rate of return without significantly raising the overall cost of electricity.

In net metering the meter simply “runs backwards” when a homeowner’s renewable energy system is producing more electricity than the property is using, sending the excess energy back through transmission lines to other energy consumers. With net metering, only one meter is required and usually, the existing meter can be utilised, but the price the utility pays for power is inherently the same as it sells it for. A wealth of additional local rules exist: utilities may cap the amount they will credit the homeowner, sometimes at zero. This is undesirable because it encourages homeowners to

only install small renewable energy generation systems to avoid producing more electricity than the property will use and thus “giving away” electricity. It also discourages energy efficiency.

There are currently no national standards for net metering in South Africa; however, the Department of Energy (DoE) has commissioned a study to investigate the use of net metering in the country. There is an ongoing debate however on whether net metering and feed-in tariffs can co-exist.

For homeowners or commercial building owners, net-metering is a viable solution because some technologies, e.g. solar PV cannot offset the full load of the building on an annual basis. Depending on a customer's electricity tariff, demand charges, site location, program incentive level, technology selected, etc. a net-metered system can create a financial win and support the growth of distributed generation.

By simply adding another utility meter to the site and setting the R/kWh incentive correctly, the same installation area, e.g. roof space, could be ideal candidates for a feed-in tariff system — an obvious solution particularly if the roof area can generate more power than the site requires, such as giant warehouses and parking facilities. Providing a feed-in tariff system for a roof installation also protects the system owner against a change in the building's use that might decrease the power consumed at the building, e.g. a manufacturing facility that changes to a distribution facility. In this scenario, using net-metering, the customer would receive a retail credit on his/her electricity bill, but not have enough load to use the credits before losing them at the end of the year. A feed-in tariff would simply pay the generator for the electricity sent to the grid. However it is noted that there are some feed-in tariffs that pay for the total power generated, with the aim of encouraging greater technology uptake.

For sites that have seasonal usage patterns or low on-site load, net-metering is not an option. Yet many of these sites have a significant potential for renewable energy generation and would ideally not face serious challenges with planning and other permitting requirements. By connecting feed-in tariffs systems where no on-site load exists, such as vacant fields, the benefits of renewable energy can be leveraged to deliver power to meet local loads or support load growth.

It would not be possible for a system owner to receive both a feed-in tariff and a net-metering incentive through a single electricity meter. A system owner would have to choose. This is not to say that the same owner could not own two systems: for example, one on a roof top that receives a net-metering incentive and one in a field that has a feed-in tariff system. A second utility meter would have to be installed and dedicated for the feed-in tariff system. However this arrangement would pose certain administrative difficulties and confusion.

The potential interplay between net-metering programs and feed-in tariff programs could lead to some confusion. It is therefore proposed that a small-scale feed-in tariff be put in place. In the absence of net-metering, the small-scale feed-in tariff would be more appropriate to implement and less complicated to administer.

In a recent (5 October 2009) online edition of Business Report in an article written by Ingi Salgado, the National Energy Regulator is quoted as saying that in the case “where small-scale applications do feed power into the grid, processes need to be established for on-grid net usage metering”.

In the event that net metering standards are put in place, both net-metering and a small-scale feed-in tariff could co-exist and the use of either programme would be based on the consumer’s choice and the type and size of installation in question.

For purposes of this report, it is recommended that a pilot small-scale feed-in tariff proposal be put forward to NERSA and be funded by the National Treasury through the 2c/kWh carbon tax.

11.4 Structure and Licensing

The proposed structure for a small-scale feed-in tariff would be very similar to the existing national REFIT with different tariffs for different technologies. Because of the volumes and the need for direct customer interface, it is proposed that the small scale feed-in tariff would be administered through electricity distributors (e.g. municipalities and Eskom Distribution) in contrast to the main REFIT which is implemented through the Single Buyer Office.

Municipalities would enter into a simplified power purchase agreement with individual small-scale renewable energy generators and on behalf of NERSA issue a simplified generation licence, which would be an abridged version of the current large-scale generation licence.

11.4.1 Technologies and tariffs

To be eligible for the small-scale feed-in tariff, a project must be a renewable energy generating facility which uses a renewable energy source that is included in the small scale feed-in tariff and must be located within the jurisdiction of the municipality where the application will be lodged. Installations should be up to a maximum of 1 MW to qualify for a small-scale feed-in tariff. The recommended technologies to kick start the programme are solar PV and wind power.

While the two technologies suggested will be somewhat effective in lowering consumption of conventional electricity and add to the renewable energy generation target of the Province, they will not lead to an increase in diversity of supply since the technologies deployed are the same as those installed under the REFIT, albeit in a different size range. Municipalities need to be made aware of the potential benefits of encouraging uptake of a wider range of technologies, including community and domestic-scale systems. These benefits include increased security of supply as well as less tangible benefits such as increasing energy awareness.

11.4.2 Licensing

In order to simplify the procedures for applications for small-scale renewable energy grid connections there are two alternatives:

a) Exemption:

The Electricity Regulation Act provides the basis for the regulation of the electricity supply industry, including the issuing of licenses for generation, transmission and distribution. The powers and functions of NERSA are also prescribed in the Act.

The Act makes clear that, without a valid licence issued by NERSA, no person or entity may:

- operate a generation, transmission or distribution facility;
- engage in the import or export of electricity; or
- engage in the buying and selling of electricity as a commercial activity.

However, under Schedule 2 of the Act, the need to obtain a licence is exempted in the following cases:

- any generation plant constructed and operated for demonstration purposes only and not connected to an inter-connected power supply;
- any generation plant constructed and operated for own use; or

- non-grid connected supply of electricity except for commercial use.

This means all renewable energy projects that are connected to the grid regardless of size require a generation licence. Generation and transmission licences are valid for a period of 15 years, unless a longer period is otherwise specified by the Regulator. Licences are renewable.

However, Section 9 of the Act does allow the Minster of Energy in consultation with NERSA and other stakeholders to exempt a particular activity from requiring a licence. Registration with NERSA may be required as part of the exemption process as prescribed in Section 10 of the Act.

This exemption may be appropriate for small-scale installations. However, it may take a number of years to carry out the necessary studies and consultation for the exemption notice to be prepared and gazetted. This route would also not enable the Department of Energy (DoE) and NERSA to keep track of the number of renewable energy systems connected to the grid and would not provide an accurate picture of the contribution of renewable energy to national targets.

In the short-term, a solution may be the establishment of a simplified small-scale generation licence that would still have registration requirements but be less onerous on the generator and NERSA.

b) Small-scale generation licence

NERSA can issue an abridged generation licence to municipalities which would assist NERSA to keep track of the number of approved grid connections across the country.

The abridged licence conditions could provide for aggregate interconnection, which allows an entire renewable energy generating community (e.g. a mixed use development precinct) to connect as a single customer and manage their own distribution; this however, would only be allowed for new customers. An abridged version of the generation licence is shown in Annex 4.

11.5 Management and Payment Pass Through

The management and payment pass through for a small-scale feed-in tariff would be a function of electricity distributors, in this case, Municipalities and Eskom Distribution. It is therefore important to examine the current role of municipalities and their constitutional and legislative mandate.

11.5.1 The Role of Municipalities

Electricity reticulation

In the electricity distribution sector, both Eskom and municipalities are active, with approximately 187 out of some 240 municipalities owning electricity assets and operating their own distribution undertakings.

In many of the municipalities, electricity distribution is divided between Eskom Distribution and the municipalities which would cover part of its areas of jurisdiction while Eskom's Distribution division services the remaining part.

Electricity revenues and surpluses form an important component of municipal finances for many of the municipalities that own and operate distribution assets and many municipalities rely on surpluses from their electricity distribution functions to support the general revenue base of the municipality. In some cases municipalities would have significant difficulty in retaining their financial viability without such income.

Many municipalities are also heavily reliant on the rolling cash flow that electricity reticulation guarantees them on an ongoing basis, with the bigger municipalities earning a sizeable interest on electricity revenue. In addition, the cash reserves made possible by electricity reticulation has a positive effect on the credit ratings of especially the metros and so-called secondary cities, and the loss of electricity revenue will negatively impact this situation.

Constitutional and legal framework

The South African Constitution establishes a governance structure consisting of areas of exclusive national competence, concurrent national and provincial competence, exclusive provincial competence and local government competence.

The Constitution allocates executive and legislative powers between national, provincial and local government on the basis of subject matter. Different "functional areas" are listed in schedules 4 and 5 of the Constitution and are thus allocated to the appropriate sphere of government, depending on where they are listed. Residual matters not listed in either schedule, for example foreign affairs, defence and energy, are reserved for national government.

A functional area of government competence should in principle be allocated to the sphere of government which is able to regulate that functional area most effectively and most appropriately. The Constitution makes an explicit allocation of executive and legislative authority over one aspect of the Electricity Supply Industry (ESI), in that schedule 4B of the Constitution allocates the function of 'electricity reticulation' to local government. The bulk of the ESI, in the form of the generation and transmission sectors, falls under the authority of national government.

The fact that municipalities have executive and legislative authority over electricity reticulation gives them certain constitutional rights and duties. Importantly, electricity reticulation is also, to use the language of the Municipal Systems Act[9] and Municipal Finance Management Act,[10] a *"municipal service"*. *A* "municipal service" is defined as a service which "a municipality, in terms of its powers and functions, provides or may provide to, or for the benefit of the local community irrespective of whether:

- such a service is provided, or to be provided, by the municipality through an internal mechanism or by engaging an external mechanism; and
- fees, charges or tariffs are levied in respect of such a service or not.

The major consequences of electricity reticulation being a clearly defined municipal competence are briefly summarised below.

- Each municipality is a service authority for the electricity reticulation function for the whole of its jurisdictional area. This means that they bear the responsibility to ensure that electricity reticulation services are provided to all consumers within their areas of jurisdiction.
- Each municipality has the right, in respect of its area of jurisdiction, to decide who will distribute electricity in its area, for example whether the municipality will do so itself, whether it will establish a municipal entity to do so or whether it will appoint an appropriately licensed third party to do so, such as Eskom.
- Each municipality has the right to pass by-laws relating to electricity reticulation in its area of jurisdiction.

[9] Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)
[10] Local Government: Municipal Finance Management Act, 2003 (Act No. 56 of 2003)

- Each municipality has the right to set tariffs in respect of electricity in its area of jurisdiction within certain guidelines. This has resulted in a wide range of tariffs across the country.
- Each municipality has the right within its area of jurisdiction to impose surcharges on fees for services provided by or on behalf of the municipality.[11] This could provide the scope for the imposition of cross subsidies to fund local feed-in-tariffs if so desired.
- Each municipality has the right within its area of jurisdiction to determine the conditions on which electricity is supplied and the circumstances in which the supply of electricity will be limited or discontinued.
- The electricity reticulation function will be an important component of a municipality's Integrated Development Plan and its budget.

Having discussed the role of municipalities and their constitutional mandate, it is clear that Municipalities would be highly cautious about implementing policies that would affect these revenue sources. This can easily apply to any renewable energy initiatives which undermine this revenue surplus.

The recent amendment to the Electricity Regulation Act provides for municipalities to be issued both a generation licence and a trading licence. This means that municipalities can also participate in the national REFIT programme by bundling the same type of small-scale renewable energy installations up to a quantity that would qualify on the REFIT. They would pay the small-scale system owners the same feed-in tariff as that offered in the REFIT and then recover the costs through the Single Buyer Office. The new licensing requirements would enable municipalities to enter into power purchase agreements with the Renewable Energy Purchasing Agency for different technology bundles. This means that a municipality could have 500 individual homes with mini wind turbines connected to their distribution network, each generating 5 kW of electricity. The individual system owners would be paid for the electricity they generate and they would be able to recover the costs of installing those systems. The municipality would in turn bundle that renewable energy generated, 2.5 MW and sell it back to the Single Buyer Office at the national REFIT price for wind energy, R1.25/kWh.

This would not only be a source of secure revenue for municipalities but would also assist in lowering the demand on electricity in the longer term.

11.5.2 Costs of a Feed-In Tariff

One of the attractions of a feed-in tariff to municipalities should be that it is cost-neutral, with the costs of paying the tariffs apportioned to electricity consumers. The size of the premium payment will depend on the type and amount of electricity produced by various small-scale renewable energy systems and their ratio to the average cost and traded amount of conventional electricity. When spread across a broad consumer base, this cost is reduced to a small portion of a customers total electricity bill, partially off-set by savings resulting from avoided network augmentation and reduced wholesale electricity prices.

In Germany, for all the additional investment and capacity resulting from the feed-in law, the raw cost to consumers is presently around 3 percent of the total retail cost of electricity, with electricity prices

[11] This power is conferred on municipalities by section 229 of the Constitution and may in terms of section 229(2)(b) be regulated by national legislation. Draft framework legislation – the Municipal Fiscal Powers and Functions Bill – was approved by Cabinet for public comment in October 2006. The Parliamentary Portfolio Committee on Finance held public hearings on the Bill in May 2007. Note that the power to impose surcharges on fees for services may not be exercised in a way which materially and unreasonably prejudices national economic policies, economic activities across municipal boundaries or the national mobility of goods, services, capital or labour (section 229(2)(a).

actually falling in real terms in the seven years from 1998 to 2005[12]. When considering the portion of this cost attributable to solar PV, the cost to consumers is less than 0.5 percent of a typical retail electricity bill, or about €0.02 per month. It should also be noted that this is in a market where the cost of a feed-in tariff has been applied only to residential and commercial consumers of electricity, with large industry and railways exempt from the levy.

For the electricity consumer, feed-in tariffs are therefore an insurance policy, where slight retail power price increases in the short term are rewarded with more affordable (and safer and greener) electricity in the long term.

11.6 Implementation Programme

The national, provincial and local governments are the biggest land and property owners in the country. They therefore have an obligation to lead by example and demonstrate best practice. The proposed small-scale feed-in tariff, to be administered by a municipality, can be kick-started through a pilot project where some Western Cape Provincial and Municipal government buildings are fitted with solar PV or wind energy systems. In addition, a certain number of potential small-scale generators could be identified and requested to participate in the pilot programme.

To begin with, a certain number of participants, for example 500, could be allowed to install systems on their premises and supply the power to the grid. Half the participants could be those who would like to install solar PV systems and the other half those who would like to install mini wind turbines. NERSA would be requested to assist in preparing guidelines for a small-scale feed-in tariff as well as setting provisional tariffs for solar PV and wind in for the Western Cape Province. A participating municipality would then be supported by NERSA to develop a simplified generation licence (see Annex 3) which the municipality would issue to the participants. In order to guarantee the purchase of the renewable energy produced by the small-scale generators, a municipality would enter into a basic contract of obligation to buy the renewable power at the provisional tariffs set out by NERSA. These could be aligned with the current national REFIT or those in Phase 2 of the REFIT, i.e. R1.25/kWh for wind and R3.94/kWh for solar PV.

[12] http://www.ata.org.au/wp-content/projects/fit_position_statement.pdf

Reference Scenario for Solar PV Systems Installed in High-Income Households

If, for instance, only 500 high income households install solar PV home systems of 2kW each, this would equate to 1MW of installed capacity. Assuming a 5.5 hour day of household solar energy generation, this would amount to 11kWh per household per day, 330kWh per household per month or 165MWh per month for all 500 households.

The average monthly conventional electricity consumption for residences in the highest income group is 750kWh[13]; therefore, installing a 2kW solar PV home system would displace 330kWh off the grid, per household, per month, which is a reduction of 44 percent per month off the grid. This equates to 4 MWh per annum for each household or 2GWh for all 500 households per annum.

A municipality would then be able to bundle these solar PV installations and recover the costs of administering a small-scale feed-in tariff through the Single Buyer Office. If, for instance a municipality gets paid R3.94/kWh of solar PV energy fed into the grid and the costs are spread across all electricity consumers in the country (equal to 215,000 GWh), it would add negligible amount to the average electricity price.

There would need to be some technical and operational requirements as well as interconnection guidelines set out to ensure that the system owners comply with good operating practices and grid connection standards, adhere to health and safety standards and that they operate and maintain their systems optimally.

The costs associated with connecting installations would be borne by the system owners, while the costs associated with upgrading the grid in order to connect new installations, would be borne by the grid operator. The costs for administering a pilot small-scale feed-in tariff would be funded through the National Treasury's 2c/kWh carbon tax. A municipality would make an application through NERSA for this funding.

Once lessons learnt and any flaws and technicalities with the pilot programme have been ironed out, it is proposed that a longer-term small-scale feed-in tariff be put in place in all municipalities across the country. The costs for administering the feed-in tariff would then be recovered through the bundling of the same type of technologies and the qualifying quantities, and municipalities would enter into power purchase agreements with the system operator once they have an indication of how many installations they are likely to connect to the network. The costs would then be spread across all electricity users in the country as is the case for the REFIT.

11.7 Summary and Way Forward

South Africa will experience a growing demand in energy over the next couple of years. It is therefore critical that any such demand in energy is met in a low carbon way. To achieve this, consumers need to be made part of any electricity management and efficiency programmes. One way is to encourage people to use less electricity and to use it differently. This can be done through demand side management programmes but also through the introduction of a small-scale renewable energy feed-in tariff that would offer households, community organisations and businesses an opportunity to generate their own renewable energy and supply it into the electricity grid.

[13] Eskom, 2008

It is proposed that a pilot small-scale feed-in tariff be implemented in the Western Cape Province and be administered through municipalities. Government owned buildings and willing consumers could be part of the pilot programme so that lessons can be documented and taken forward to a wider roll-out programme for the entire province.

Since Municipalities will be issued with both a generation and a trading licence under the amended Electricity Regulation Act, this means that they will be able to participate in the national REFIT programme by bundling the same type of small-scale renewable energy installations up to a quantity that would qualify for the REFIT

The costs associated with connecting installations would be borne by the system owners, while the costs associated with upgrading the grid in order to connect new installations, would be borne by the grid operator. The funding for the costs for administering a pilot small-scale feed-in tariff would need to identified, however it is proposed that this is passed on to energy consumers through the REPA as the overall cost will be minimal.

12 Summary, Conclusions and Way Forward

Overall, this study reviews the present framework for supporting and encouraging the development of renewable energy power projects nationally and in particular within the Western Cape. In particular, this is mainly within the scope and framework of the REFIT.

Although the REFIT has provided the main strategic foundation for supporting renewable energy projects, by providing financial security and bankability, there are still many barriers to the development and implementation of projects. These barriers include the uncertainties in the national implementing frameworks, but also the challenges of negotiating the complex and unfolding bureaucracy.

This Regional Regulatory Action Plan provides an overview of the key challenges and barriers to renewable energy project development in the Western Cape Province and highlights some of the priority actions that could be implemented to mitigate these challenges

Since many of the key challenges are of an institutional nature at a national level, the Western Cape Provincial Government has the opportunity to position itself to engage in the discussions and support and encourage the development of institutional mechanisms that are favourable to the development of the renewable energy sector, both nationally and in the region.

A foundation of the action plan and strategy is the development of a one-stop shop, potentially located within Wesgro, that would act as a focus point for investors and developers, providing information on the processes to be followed, and supporting developers and municipalities.

The study also reviewed some of the additional financing opportunities that could be available to developers and investors, identifying particular opportunities for accessing project development finance, soft loans and carbon finance.

In addition, the study identifies opportunities for improving infrastructure and planning and also opportunities for regional industry Development, training and capacity building, in particular in terms of enterprise development.

Finally, the study proposes the implementation of a small-scale feed-in tariff, initially through a small pilot project in the region in collaboration with NERSA.

Table 12.1 provides a summary of the key for D:EA&DP and other key stakeholders.

Table 12.1 Summary of Key Actions

Action	Sub-action	Key Stakeholders
INSTITUTIONAL		
Support NERSA in the development of comprehensive REFIT guidelines	Establish Grid connection and Licensing Procedures - Resolve issue on pre-qualification criteria - Ensure independence of Single Buyer Officer - Put in place Standardised Power Purchase Agreement - Clarify project size issues - Greater clarity on licensing procedures - Ensure grid connection for qualifying RE generators - Clarify process of establishing REFIT capacity limits	NERSA/ Eskom/ DoE
Support NERSA in further expansion of REFIT	Ensure other key technologies/ technology bands are included in REFIT Phase 3	NERSA
Support NERSA in the establishment of a small-scale REFIT	Assist in development of pilot programme	NERSA
Support DEA in streamlining EIA process and reducing delays	Support the establishment of EIA guidelines for renewable energy power projects	DEA
Removal of EIA basic assessment requirement for wind masts	Ensure that this requirement is removed to reduce costs and delays for developers	DEA
General national engagement	Overall national engagement to support the development of the necessary integrated regulatory frameworks across a wide range of institutions	DoE, DEA, DTI, Treasury, Eskom, NERSA,
Local institutional support	Support for the establishment or ongoing activities of organisations such as trade or industry associations, e.g. a Western Cape Renewable Energy Industry Association	Local RE industry
ONE STOP SHOP		
Confirm institution	Engage with Wesgro and key Provincial Departments to ensure that Wesgro is the most appropriate institution and that there is the willingness and capacity to support the programme	Department of Economic Planning
Develop mandate and objectives	Develop full programme, budgets and identify roles and responsibilities	Department of Economic Planning
Develop operational guidelines	Establish application processing, administering of incentive programmes	Department of Economic Planning
Establish website	Set up an information portal on their website, including links to relevant entities and the process map outlined in detail	

Action	Sub-action	Key Stakeholders
Staffing	Secure funding for at least two employees who will continually update the site and actively engage with project developers and market participants to address provincial and national barrier, i.e. Eskom's single buyer office, NERSA, Licensing, etc.	Department of Economic Planning
Review long-term institutional structure	Review options for establishment of provincial energy agency	
Process Map	Expand on and update process map	
FINANCIAL SUPPORT		
Monitor opportunities	Engage with relevant financial organisations to monitor financing opportunities and ensure up to date information is made available to developers and investors	Finance bodies
INFRASTRUCTURE AND PLANNING		
Spatial development plans and guidelines	Work with planning departments to regulate for spatial development plans (provincial level and local) to include guidelines for wind energy projects.	Municipalities/ Department of Local Government
Site identification	Identify appropriate sites and exclusion zones	
GIS Mapping	Develop comprehensive GIS mapping available to developers with resource date, environmental data, exclusion zones etc.	
Resource data	Improve data on renewable resources in the Province and make it easily available	
Planning process and infrastructure requirements	Work with planning departments and one-stop shop to establish clear and transparent decision-making process for planning approvals, as well as infrastructure investment and upgrade	Municipalities/ Department of Local Government
Wind turbine transport study	Assess port, road and rail capabilities and requirements for transporting turbine equipment in line with Strategic Infrastructure Plan	Dept of Economic Planning, Dept of Transport and Public Works
REGIONAL INDUSTRY DEVELOPMENT, TRAINING AND CAPACITY BUILDING		
Industry development	Development of policy measures and incentives to support local manufacturing	Dept of Economic Planning
Trade associations	Work with trade associations on the promotion of the REFIT and the potential wind energy market among market participants	Trade associations
Industrial Zone	Identify suitable areas; publish a call for tenders among municipalities; decide on industrial zone best suitable for wind power manufacturing; grant preferential rates for any new businesses for the first five years	WC Government

Action	Sub-action	Key Stakeholders
Training	Organise a row of training work shops for skills related to wind power plant manufacturing and operation	WC Government in conjunction with Chamber of Commerce
Tax and customs	Work with tax and customs office to implement favourable tax and customs incentives to develop the market and industry	Treasury/ SARS
PILOT SMALL SCALE FEED IN TARIFF		
Agree on SS-REFIT PRINCIPLES	Engage with key stakeholders on major issues	NERSA, DoE, Municipalities, Eskom
Establish tariffs	Engage with NERSA to establish pilot tariffs for solar and wind	NERSA
Establish small-scale generation licence	Engage with NERSA on the development of small scale generation licence	NERSA
Identify pilot municipality	Identify and engage with potential pilot municipality	Municipalities

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Annex 2: Acronyms and Abbreviations

AfriWEA	African Wind Energy Association
ASRERD	South Africa Renewable Energy Resource Database
BauGB	Baugestzbuch
BImschG	Bundes-Immissionsschutzgesetz
BImSchV	Bundes-Immissionschutzverordnung
BOP	Balance of Plant
BQ	Budget Quotation
BSH	Federal Maritime and Hydrographic Agency
BWE	Bundesverband Windenergie
BWEA	British Wind Energy Association
CCSE	California Centre for Sustainable Energy
CDM	Clean Development Mechanism
CDM-PoA-DD	Programme of Activities Design Document
CIECD	Clemson Institute for Economic and Community Development
CPA	CDM Project Activity
CPV	Concentrating Photovoltaics
CRLR	Commission on Restitution of Land Rights
CSIR	Council for Scientific and Industrial Research
CSP	Concentrating Solar Power
DANIDA	Danish International Development Agency
DBSA	Development Bank of Southern Africa
DEA	Department of Environmental Affairs (previously DEAT, including Tourism)
D:EA&DP	Department of Environmental Affairs and Development Planning
DoE	Department of Energy (previously DME, Department of Minerals and Energy)
DNA	Designated National Authority
DOE	Designated Operational Entities
DOT	Department of Transportation
DQ	Design Quotation
DSO	Distribution System Operator
DST	Distribution Standard
DSIRE	Database of Sate Incentives for Renewable and Efficiency
dti	Department of Trade and Industry
EB	Executive Board
EC	European Commission
EDC	Energy Development Corporation
EEG	Erneuerbare Energien Gesetz
EERE	Department of Energy's office of Energy Efficiency and Renewable Energy
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EIB	European Investment Bank

EREC	European Renewable Energy Council
ESI	Electricity Supply Industry
Eskom	South Africa's national electricity utility
EU	European Union
EWEA	European Wind Energy Association
EWT	Endangered Wildlife Trust
FQ	Feasibility Quotation
FIT	Feed-in Tariff
GEF	Global Environment Facility
GHG	Greenhouse Gas
GN	Government Notices
GW	Gigawatt
GWh	Gigawatt hour
IDZs	Industrial Development Zones
ICT	Information and Communication Technology
IFC	International Finance Corporation
IP	Intellectual Property
IPC	Infrastructure Planning Commission
ISO	Independent System Operator
IPPs	Independent Power Producers
kW	Kilowatt
kWh	Kilowatt hour
LED	Local Economic Development
LPAs	Local Planning Authorities
LTMS	Long Term Mitigation Scenarios
LUPO	Land Use Planning Ordinance
MEC	Member of the Executive Council
MEDEREC	Mediterranean Renewable Energy Centre
MTPP	Medium Term Power Purchase Programme
MW	Megawatt
NEMA	National Environmental Management Act
NERP	National Electricity Response Plan
NERSA	National Energy Regulator of South Africa
NGO	Non Governmental Organisation
NPDES	National Pollutant Discharge Elimination System
OME	Observatoire Méditerranéen de l'Energie
O&M	Operation and Maintenance
PCP	Power Conservation Programme
PGWC	Provincial Government Western Cape
PNCP	Pilot National Cogeneration Programme
POC	Point of Connection
PPA	Power Purchase Agreement
PPP	Public Private Partnership

PV	Photovoltaic
RE	Renewable Energy
RE4D	Renewable Energy for Devon
REC	Renewable Energy Certificate
REDs	Regional Electricity Distributors
REEEP	Renewable Energy and Energy Efficiency Partnership
REFIT	Renewable Energy Feed-in Tariff
REFSO	Renewable Energy Finance Subsidy Office
REMT	Renewable Energy Market Transformation
REPA	Renewable Energy Purchasing Agency
RES	Renewable Energy Source
RES-E	Electricity from Renewable Energy Sources
RRAP	Regional Regulatory Action Plan
SANERI	South African National Energy Research Institute
SAWEP	South African Wind Energy Programme
SCADA	Supervisory Control and Data Acquisition
SeeAnlV	Seeanlagenverordnung
SEED	Sustainable Energy for Environment and Development Programme
SESSA	Sustainable Energy Society of Southern Africa
SIP	Strategic Infrastructure Plan
SME	Small and Medium Enterprises
SWH	Solar Water Heaters
TA Lärm	Technische Anleitung zum Schutz gegen Lärm
TISA	Trade and Investment South Africa
TREC	Tradeable Renewable Energy Certificate
TSO	Transmission System Operator
TV	Television
UNEP	United Nation Environment Program
UNFCCC	United Nations Framework on Climate Change
UVPG	Gesetz über die Umweltverträglichkeitsprüfung
VDMA	Verband Deutscher Maschinen- und Anlagenbau
WCEA	Western Cape Energy Agency

Financial Incentives and Programme Funding

The introduction of the REFIT may impose some minor additional costs on those electricity end users. It will be comparatively low at the beginning, but in the unlikely situation of an exorbitant amount of new renewable energy power plants take advantage of the REFIT, it may increase costs for the end users of electricity as more funds will need to be distributed for REFIT payments. Feasible financial schemes should be implemented in case the possibility exists which would increase costs resulting from the feed-in tariff.

Programmatic Clean Development Mechanism

A suitable financing option to assist in financing renewable energy projects under the REFIT, both small and large-scale and even micro (hydro, PV, solar hot water, and other renewable energy technologies permitted by the REFIT guidelines) is to develop them as a Programme of Activity (PoA) under the Clean Development Mechanism (CDM). The basic idea is that these wind/hydro/PV/etc power plants remunerated trough the REFIT could be developed under the CDM allowing to gather Certified Emission Reductions (CERs) for these clean energy facilities connected to the grid. Using the REFIT as a government policy or programme, which supports and finances renewable energy projects, they could in turn be developed using PoA procedures developed by the UNFCCC.

In essence through for example, a wind power CDM PoA additional income would be generated by selling the CERs on the international carbon markets. Through this mechanism developed nations will finance the expansion of renewable energy in developing countries like South Africa. The additional income stream can be used in different ways which we will discuss later on. This is to be compared to the present situation where developers may submit individual projects for CDM approval.

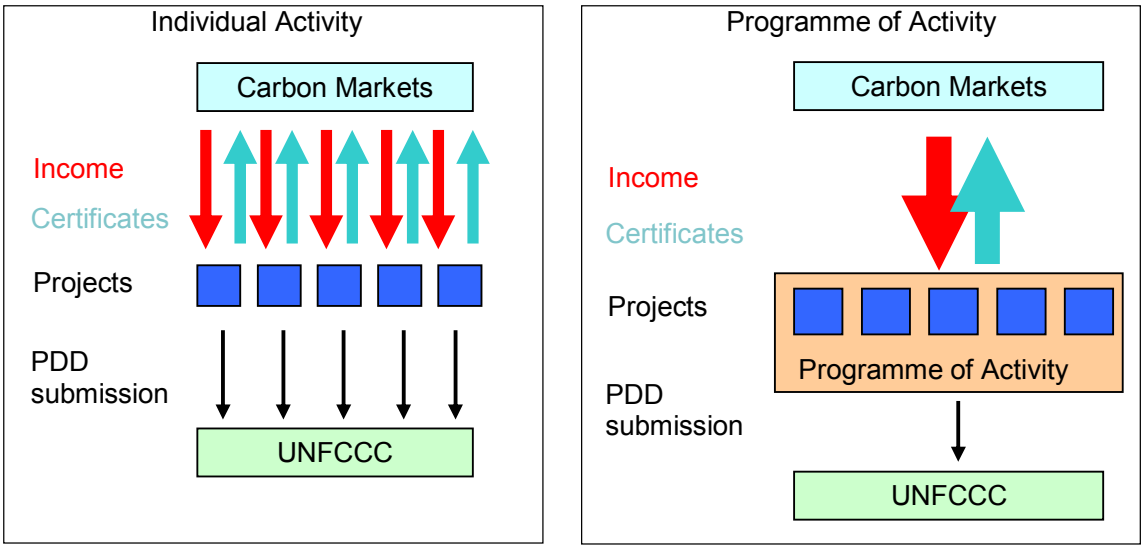

Figure A3.1: Comparison of individual submission of projects under CDM (left) vs. submission as a Programme of Activity (right).

Registration of the wind or other renewable power plants in the Western Cape Province as a PoA would result in several positive benefits for the country and further promote renewable energy developments.

The CERs revenues from a PoA would offer the opportunity for South Africa to cover its

additional cost resulting from the new REFIT implemented by the NERSA in March 2009. Primarily the final electricity customers are burdened with higher electricity prices resulting from the REFIT. In case the revenues accrue to the Renewable Energy Purchasing Agency (REPA) they could be used for additional measures to promote renewable energy. Moreover, lower energy consumption costs for the final consumer may result and new incentives for potential independent power producers might be offered in terms of saving CDM transaction costs.

Advantages of a PoA in contrast to conventional CDM projects are inter alia:

- A PoA can involve CDM Programme Activities (CPAs) being run in multiple countries.
- New projects can be added to a PoA without restarting the validation process.
- No registration fee is payable on projects under the PoA which are added after validation.
- Only one approved baseline and monitoring methodology for all projects under the PoA is required.
- A PoA reduces transaction costs (CDM registration, validation, monitoring etc) for the project developers

Discussions about Programmes of Activities usually assume the aggregation of many small-scale activities which are not viable to run as individual CDM projects (such as the installation of energy efficient light bulbs in residential houses etc). However, there is no technical restriction which prevents the creation of a PoA which includes as CPAs projects which would normally be registered as individual CDM projects (e.g. large scale projects like wind power plants). In fact, the UNFCCC Executive Board has clearly indicated that PoAs involving large-scale projects as CPAs are permitted by releasing versions of the Programme of Activities Design Document and CDM Programme Activity Design Document for both large-scale and small-scale projects (to be found on the UNFCCC website under Programme of Activities PoA Forms[14]).

In the following we will first discuss the requirements by the UNFCCC for submitting a PoA and some possible approaches how to submit wind power plants under the REFIT as a PoA. Possible approaches of how to organise the PoA process in the Western Cape Province of South Africa are also outlined e.g. which institution can act as managing entity or best practise for CERs use. Since experiences with PoAs in general are very limited and no large scale projects have been submitted as PoA in particular the ultimate feasibility of such approach could be only proven when – after consultation with the state authorities, the UNFCCC and other stakeholders – a PoA for the REFIT plants would be submitted. However, such an endeavour would put South Africa on the forefront of innovative mechanisms to transfer monies from the developed world to the developing world in large scale.

The Framework of Programme of Activities

In this section the fundamental basics of a CDM Programme of Activities are outlined. According to the Executive Board and under the Clean Development Mechanism is defined as follows:

"A Programme of Activities (PoA) is a voluntary coordinated action by a private or public entity which coordinates and implements any policy/measure or stated goal (i.e. incentive schemes and voluntary programmes), which leads to anthropogenic GHG emission reductions or net anthropogenic greenhouse gas removals by sinks that are additional to any that would occur in the absence of the PoA, via an unlimited number of CPAs." (UNFCCC07a)

[14] http://cdm.unfccc.int/Reference/PDDs_Forms/PoA/index.html

Project activities under a PoA can be registered as a single CDM project activity. A PoA is made up of CDM Programme Activities (CPAs). Multiple CPAs can be included under a PoA at the time of registration and additional CPAs can be added at any point in the life of the PoA.

A PoA is also entitled as Programmatic CDM. Programmatic CDM include so called CDM project bundling. Bundles are defined as the

"Bringing together of several small-scale CDM project activities, to form a single CDM project activity or portfolio without the loss of distinctive characteristics of each project activity." (UNFCCC05a)

The envisaged PoA is an action, which coordinates and implements wind power under the REFIT, i.e. the policy. The implementation of the REFIT reduces anthropogenic GHG emissions. It is unclear at this point to which extent the participation of the wind power projects needs to be voluntary. That touches the questions whether one can oblige wind power plant operators benefiting from the REFIT can be obliged to join into the PoA.

The UNFCCC has confirmed that large-scale projects are also eligible to be bundled. However a PoA is distinguished from CDM project bundling as shown in the following chart:

	Programme of Activity		**Bundle**
Sites	Exact sites of project activities may not be known in advance	↔	Ex ante identification of exact sites.
Project activities	The sum of all individual activities under the programme is the CDM project activity. At submission only targeted activities are identified, while actual activities are not confirmed until verification.	↔	Each activity in the bundle is an individual CDM project activity.
Project participants	Only the entity implementing the programme and not the individual project stakeholders represent the project activity as a CDM project participant	↔	Each single activity is represented by a CDM project participant.

Table A3.1: Comparison of Programme of Activities vs. bundling individual projects. (DEHST07)

Currently (August 2009) no Programme of Activity has been successfully registered thus far. However two PoA have asked for registration and are in the validation phase. These PoAs cover improved cooking stoves and biomass based heat generation

Although the projects are of small scale dimension they can be seen as a guideline for large scale projects concerning the structure of the documents needed for registration. In the following section the most important principles for PoA related to the UNFCCC publications is discussed.

Requirements for a Programme of Activities

The CDM PoA Lifecycle

A Programme of Activities must be directed at coordinating and implementing a policy/measure or stated goal. No clear definition is provided for these terms. However, the Executive Board has explicitly referred to incentive schemes and voluntary programmes in its definition of a Programme of Activities. In general, a PoA must demonstrate real, additional and measurable emission reductions or removals attributable to the PoA:

> "*The PoA shall demonstrate that net reductions in anthropogenic emissions or net anthropogenic greenhouse gas removals by sinks for each CPA under the PoA are real and measurable, are an accurate reflection of what has occurred within the project boundary, and are uniquely attributable to the PoA. The PoA shall therefore define at registration, the type of information which is to be provided for each CPA to ensure that leakage, additionality, establishment of the baseline, baseline emissions, eligibility and double counting are unambiguously defined for each CPA within the PoA"* (UNFCCC07a)

A coordinating/managing entity shall develop a Programme of Activities Design Document (CDM-PoA-DD) setting a framework for the implementation of the PoA and unambiguously defining a CPA under the PoA. Further the coordinating/managing entity must prepare the PoA specific CDM Programme Activity Design Document (CDM-CPA-DD) using the provisions of the proposed PoA. At the time of requesting registration the CDM-POA-DD must be accompanied by a CDM-CPA-DD from that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA that is added over time to the PoA must submit a completed CDM-CPA-DD. Eventually the following documents are needed:

<u>For a PoA registration:</u>

- A complete CDM-PoA-DD
- A PoA specific CDM-CPA-DD with generic information relevant to all CPAs (blueprint/template)
- A completed CDM-CPA-DD which is to be based on the application of the PoA to one real case

<u>For renewable of the crediting period of PoA:</u>

- A new CDM-PoA-DD
- A new PoA specific CDM-CPA-DD

<u>For renewable of the crediting period of CPA:</u>

- CDM-PoA-DD (to be compared with latest CDM-PoA-DD)

The role of the coordinating/managing entity

The rules for creating a Programme of Activities introduce a new concept into the CDM system: the so called coordinating or managing entity. This entity is responsible for proposing and overseeing the PoA.

A PoA shall be proposed by the coordinating or managing entity – the entity shall be a project participant authorized by all participating host country Designated National Authorities (DNAs) involved and identified in all correspondence as the entity which communicates with the Board, including on matters relating to the distribution of CERs .

There do not appear to be any restrictions on who can be a coordinating or managing entity beyond the requirement that they must be a project participant. The coordinating/managing entity can be a public or private entity. If the participation should be of financial or organisational kind is not stated.

The coordinating or managing entity has the task to check that none of the CPAs have been

registered as individual project activities already. The entity shall identify measures to ensure that all CPAs under its PoA are neither registered as an individual CDM project activity nor included in another registered PoA and that the CPA is subscribed to the PoA. These measures are to be validated and verified by a Designated Operational Entity (DOE).

In the so far submitted PoA asking for registration or correction the coordinating/managing entities are to mention but a few: Cool nrg, Carbon Investments Pty Ltd, TSESL India (a subsidiary company of Thermax Limited) and JPMorgan Ventures Energy Corporation which are all private companies. Moreover there is also a public coordinating/managing entity named Bureau of Energy Efficiency (BEE) which takes part in a compact fluorescent lamp (CFL) lightning scheme project in India.

Project participants in a Programme of Activities

Entities involved in implementing the PoA and listed on the Programme of Activities Design Document (CDM-PoA-DD) are project participants. Project participants are simply registered in relation to the PoA, and need not be involved in any CDM Programme Activity (CPA) within that PoA. Conversely, most of the entities involved in implementing an individual CPA will not be project participants in the PoA, and there is no requirement that they need to be project participants. This is only due to the_coordinating/managing entity. It is therefore possible for the coordinating or managing entity to be the only Project Participant in the Programme of Activities. There are no project participants registered for individual CPAs, although the entities responsible for the CPA are listed on the CDM-CPA-DD.

As with CDM project activities, the Executive Board leaves the relationship between the coordinating/managing entity and any other project participants as a matter to be determined between themselves, usually through contract. Project participants will negotiate with the coordinating/managing entity in relation to communications with the Executive Board and distribution of CERs.

Additionality

In the context of a Programme of Activities PoA, the requirement of additionality means that both the PoA itself and each CPA would not have been implemented, or would not have been implemented to the same extent, without registration under the CDM. Additionality must also be proven at the level of individual CPAs. The criteria for demonstration of additionality for each CPA must be outlined in both the Programme of Activities Design Document (CDM-PoA-DD) and the in the CPA Design Document (CDM-CPA-DD). Essentially, this is aimed at ensuring that each CPA will produce credible emission reductions or abatement. Evidence must be included within the PoA Design Document (CDM-PoA-DD) to show that all CPAs will produce net greenhouse gas emissions reductions or sequestration.

In South Africa it might be challenging to prove that a wind power project would not have occurred without the CDM as the REFIT is meant to make it financially attractive anyway. The CDM project managers may find it difficult to prove that they cannot get funding for the project from elsewhere. Whether the CDM executive board accepts the submitted CDM PoA PDD depends primarily on how the additionality of the project is shown.

However the UNFCCC has stated that perverse incentives should be avoided and that means all CDM projects are still additional as the REFIT should be disregarded from the baseline. This applies only to policies implemented after 2001 (UNFCCC04A). Therefore it can be assumed that additionality for a large scale wind power PoA in South Africa can be proven similar to CDM projects which generate electricity from renewables and taking place in countries without REFIT. Subsidies from the REFIT, Renewable Energy Finance and Subsidy Office (Refso) or tradable Renewable Energy Certificates (RECs) would be disregarded as these policies are implemented after 2001.

In relation to assessing additionality for a PoA, the coordinating/managing entity must demonstrate that in the absence of the PoA:

(1) the proposed voluntary measure would not be implemented, or

(2) the mandatory policy/regulation would be systematically not enforced and that noncompliance with those requirements is widespread in the country, or

(3) that the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation. This shall constitute the demonstration of additionality of the PoA as a whole. (UNFCC, C07e)

In the case of a wind power PoA in the Western Cape option 3 suits best to show the additionality of the PoA. As the REFIT can be considered as the existing regulation it must be proven that the PoA will lead to a greater enforcement of the REFIT. The more wind power plants are implemented the greater is the enforcement of the REFIT. Additionally, also (1) may apply as the installation of wind power plants can be regarded as voluntary measure which would not be implemented without the PoA. If one takes this path however revenues from CER marketing need to be used for promoting the respective wind power plants.

As the wind power plants in the Western Cape will deliver renewable energy to the national electricity grid the consolidated methodology for grid-connected electricity generation from renewable sources ACM0002 Version 10 applies to demonstrate the additionality of the PoA.

According to the ACM0002 methodology the additionality of the project activity shall be demonstrated and assessed using the latest version of the tool for the demonstration and assessment of additionality agreed by the CDM Executive Board. Hereafter additionality must be proven through four steps as presented in Table A3.2 below. If the project passes all steps shown above it is considered as additional.

Increasing the capacity of low carbon emission technologies which are more expensive than conventional fossil fuel-fired power generation, should be one of the main aims of the CDM, as it assists in meeting the objective of the Convention.In determining any new E+/E-policy[15], if necessary, the bigger picture should be taken into account regarding the potential negative impact of possible decisions on investment in low carbon technologies in non-Annex I countries, rather than just focusing on ensuring that no single project could ever be considered to be non-additional.

Using an E positive list-type approach for all new renewable energy technologies, such as wind, solar, geothermal, wave and tidal energy, without the need for an additionality assessment. This should be the case for technology types where the IPCC and/or IEA are clearly showing that these technologies are generally significantly more expensive than conventional power and will remain so for many years (e.g. over 4 years). A positive list approach, with perhaps a lower than average Emissions Factor being used, would dramatically reduce the amount of work needed, without loss of environmental integrity of the mechanisms.

In cases where lower emissions technology are receiving tariffs that are more than those received by conventional projects, the use of this tariff to demonstrate additionality would be justified and not questioned. There would be no justification for demanding the use of the highest historical tariff under any circumstance as each historical tariff may have been issued for legitimate reasons concerned with the specific technical nature of that project, for example. Any tariff used under the additionality assessment should be appropriate to the project at the time of making the assessment.

Only in cases where the technology was already mature previously could it be argued that the previous tariff levels issued be taken into account in assessing the additionality; however, this does depend on project specific circumstances. It would be important to determine whether a project with a higher tariff was issued when the technology was in a demonstration or early uptake phase in the country. Indeed, any project that received foreign subsidies should be excluded from the tariffs considered to be the highest issued. If the technology had

[15] For more information see UNFCCC Annex 3 **Clarifications on the treatment of national and/or sectoral policies and regulations EB16**

not attained greater than 5% penetration within the sector, for example, then the technology would not be considered to be mature and these higher tariffs could be ignored.

Step	Procedure	South Africa
1.) Identification of alternatives	Identification of alternatives to the project activity consistent with mandatory laws and regulations	Range of plausible technologies can be considered as alternative. Examples of such technologies in South Africa include coal-fired plants, nuclear power etc.
2.) Investment analysis (Note: project participants can choose between step 1 or step 2 or do both)	Determination of whether the proposed project activity is economically or financially less attractive than other alternatives without the revenue from sale of certified emission reduction.	The project internal rate of return (IRR) can be used as financial indicator to assess a wind power project
3.) Barrier analysis	(1) Is there at least one barrier preventing the implementation of the proposed project activity without the CDM, and (2) Is at least one alternative scenario, other than proposed CDM project activity, not prevented by any of the identified barriers?	- First o its kind: only one wind farm has been commissioned so far - Technology and technical Capacity: Wind power technology has to be imported - No skilled Workforce and operational Risk - Policy and Law: Legislation relating to renewable energy and wind power is still in its infancy - Energy Industry Framework: Sector is in change (e.g. REDs)
4.) Common practice analysis	(1) No similar activities can be observed? (2) If similar activities are observed, are there essential distinctions between the proposed CDM project activity and similar activities that can be explained reasonably?	Comparing the project with already implemented projects like the Darling wind farm

Table A3.2: Required steps to prove additionality

Regarding South Africa as a whole, wind power may fulfil the additionality criteria. Wind power generation competes with coal fired plants which generate at low costs due to the favourable conditions at coal mining in South Africa.

The Western Cape buys most of its electricity from Eskom, much of which comes from coal generated energy plants elsewhere in the country (predominantly from Mpumalanga). A portion of the electricity is generated locally and distributed nationally, including energy from

the Koeberg Nuclear Power Plant, the Acacia Gas Turbines, the Palmiet Pumped Storage Facility and a very small amount from the Darling Wind Farm. The City of Cape Town also produces a small amount of electricity through the Steenbras Pumped Storage facility and local gas turbines.

Duration

For non forestry projects the duration for a PoA is 28 years and 60 years for a PoA forestry project. The baseline has to be checked every 7 years and changes apply to all CPAs at first renewal. As CPAs can be added throughout the PoA lifetime, the crediting period for CPAs which are added in year 25 of the PoA will end with the PoA. (WB09).

Baseline

When it comes to the approval of the CDM PoA another crucial point is the determination of the baseline. There are many different baselines which could be developed for PoA projects. However, as the REFIT is only applicable to renewable energy (RE) projects connected to the electricity grid, the baseline discussion will be limited to grid-connected RE projects. A baseline is a hypothetical reference case, representing the volume of greenhouse gases that would have been emitted if a Programme of Activities (PoA) or CDM Programme Activity (CPA) had not been implemented. A baseline must be established for the PoA and all CPAs within the PoA. The Programme of Activities Design Document (PoA-DD) and corresponding design documents for other PoA types must include a justification of the choice of an approved baseline methodology and an application of this methodology to determine the baseline

For grid-connected renewable energies like wind power plants the approved consolidated methodology ACM0002 determines that renewable energy projects connected to an electricity grid are reducing CO_2 emissions in an electricity grid by displacing electricity which otherwise would have been generated by grid-connected fossil fuel power plants and by the addition of new generation sources. Thus, baseline emissions include only CO_2 emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity. The baseline emissions are calculated by multiplying the displaced electricity generation of connected fossil fuel power plants, which is equal to the electricity generation of the project activity, by the CO_2 emission factor of the electricity system. The grid emission factor is calculated according to the Tool to calculate the emission factor for an electricity system and determines how much CO_2 emissions are released into the atmosphere by a given electrical grid to produce 1 MWhe.

$BE_y = EG_{pjy} * EF_{grid\ CM\ y}$

Where

BE_y = Baseline emissions in year y (tCO_2/yr)

$EG_{PJ,y}$= Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year *y* (MWh/yr)

$EF_{grid,CM,y}$= Combined margin CO_2 emission factor of the electricity grid in year *y* (MWh/tCO_2)

The baseline and the emission reduction of a PoA changes constantly and has to be renewed after implementing new plants. There are several conceivable options for a sampling method. Yet there is no indication given by the Board of how to include new plants in an existing PoA. Therefore different possibilities are conceivable as shown below

- Bundle plants according to the vintage.
- Bundle plants according to their area they are implemented in.(spatial principle)

Calculation of Emission Reduction

Every project activity eligible under the CDM will lead to long-term emission reductions. The emission reduction of a project activity is related to a baseline which reflects the emissions that would occur in the absence of the project activity. The emission reduction depends further on the type of project and its calculation is depicted in each methodology. The amount of the emission reduction of the project activity is fully credited in the form of CERs. The amount of reduced emissions and consequently of CERs granted is based on the baseline scenario and on the project and leakage emissions. The difference between the baseline emissions and the project and leakage emissions is the project emission reduction. For grid-connected renewable power plants the following applies

$ER_Y = BE_y - PE_y - LE_y$

where

ER_y = Emission reduction in year *y* (tCO_2/yr)

BE_y = Baseline emissions in year *y* (tCO_2/yr)

PE_y = Project emissions in year *y* (tCO_2/yr)

LE_y = Leakage emissions in year *y* (tCO_2/yr)

As there are neither leakage and nor project emissions for a large scale wind power project under a CDM PoA it is easy to calculate the baseline and the emission reduction. However the fact that under a PoA additional CPAs can be added at any point in the life of the PoA makes the situation more complicated.

Conclusion:

There is a realistic option to implement wind power projects in the Western Cape Province as CDM PoA as the formal framework will not represent an obstacle. However several questions remain open when it comes to the final assembly.

Candidates for Managing/Coordinating entities

In the following we will review alternative options for what institutions would be feasible to take over the task of the managing/coordinating entity for a PoA in the Western Cape of South Africa. Since the suitability of institutions is very much linked with the question how the Certified Emission Reductions (CERs) are handled and how the additional income from CER should be used we will discuss these two issues in parallel. As there do not appear to be any UNFCCC restrictions on who can be a coordinating/managing entity beyond the requirement that they must be a project participant several scenarios are conceivable.

The entity being responsible for the PoA might be based on governmental level. Here three different options come under consideration: national, provincial or local level (Alternative 1.0 – alternative 1.5). Another option is to give the responsibility for the PoA to a newly established independent entity in form of a CDM Office/PoA Centre (Alternative 2).

There are three levels of Government in South Africa: Local, Provincial and National. The responsibilities of each level of Government are defined in the Constitution. The National government makes laws and sets policies for the whole country. For the purpose of administrating the REFIT the national government has commissioned ESKOM to run the Renewable Energy Purchasing Agency (NER09). Provincial government can make and administer provincial laws in its areas of jurisdiction. It shares certain areas with national government, such as health, education and social services. Local governments' role includes local service delivery, promoting a safe and healthy environment, and promoting development (CSA96). The White Paper on renewable energy released in 2003 requires that all three levels of government need to work together to reach the goal of 10 TWH renewable power by 2013. (DOME03)

Alternative 1.1

The National Government through the **Energy Development Cooperation** functions as managing/coordinating entity.

The National Government has several departments and entities dealing with energy matters (Energy Department, Department of Environmental Affairs, and National Committee on Climate Change). A possible institution to take charge of the PoAs on national level is the Energy Development Corporation (EDC). The EDC was established in January 2004 as a division of the Central Energy Fund of South Africa, the focus of this division is to invest in renewable energy and alternate energy fields. The EDC supports energy development through commercial, developmental and social projects. EDC focuses on a number of areas including inter alia wind energy. It supports energy development through commercial, developmental and social projects. EDC supports the development of an energy economy in which modern renewable energy provides affordable access to energy, thus contributing to sustainable development and environmental conservation. It targets market sectors where there is insufficient private sector activity as well as where the government, for strategic reasons, believes state investment is required. The EDC is also involved in sectors where renewable energy and energy efficiency requires catalysing and developing. EDC is a leader in taking higher risks to develop these sectors.

Pro	Contra
Good connection to other stakeholders within the energy sector.	In addition to renewable energy work, finance, market, and promote the acquisition of coal, the exploitation of coal deposits, the manufacture of liquid fuel, oil and other products from coal.
PoA implementation would be in line with CEF objectives to keep energy prices low for a competitive economy and to make electricity affordable for the poor.	As the state is not the only stakeholder of the CEF problems may arise when it comes to the distribution of the certificates generated by the PoA.
EDC focuses on a number of areas including solar energy, wind energy, hydro energy, biomass, biogas and low-smoke fuels.	Has staff with CDM experience but may lack staff who will be able to manage PoAs.

Alternative 1.2

The national government through the **EDI-Holdings** functions as managing/coordinating entity.

The South African government initiated privatization in the electricity sector by selling a 30 percent stake of Eskom. As a result, Eskom management proposed a plan to integrate companies and private sector firms into the electricity sector without privatizing Eskom itself. The outcome was the Electricity Distribution Industry Restructuring Bill, which aims to merge Eskom's distribution assets with the country's municipal distributors to form six regional electricity distributors (REDS). The REDs should come under the umbrella of a government-controlled holding structure called EDI Holdings (EDI). In July 2005, the first RED (RED 1), became operational. RED 1 controlled the electricity distribution previously controlled by the Cape Town municipal authorities and Eskom. However in December 2007 NERSA decided to revert the RED 1 Electricity Distribution Licence to the City of Cape Town as they were complaining about the cut off of a valuable stream of municipal revenue and municipal control. The ownership structure of the Reds was announced by Cabinet, which indicated that the Reds would be public entities, 51 percent owned by the State, and governed by national legislation. The balance will be owned collectively by the municipalities, which will continue to function as the service authority with the Reds as its service providers. Eskom will have a stake in the Reds for a limited period, and its shareholding will be reduced over time, to avoid entrenching vertical integration between generation, transmission, distribution and retailing.

At the moment the country is not divided into 6 REDs regions but the government still is in favour to do so. If the REDs will be in place in the future there will be the possibility to mandate the EDI-Holding to manage the PoAs within the country.

Pro	Contra
Merging different energy sector services within one institution.	The EDI-Holding got its mandate from the Department of Minerals and Energy but it is not to 100% owned by the state. Therefore the CERs revenues will eventually have to be distributed between the different stakeholders.
Enough financial resources existing if EDI Holding will intend to participate in the PoA in a financial way	The restructuring of the 188 electricity distributors into six REDS is an enormous task. The staffing of the REDs and the EDI-Holding is also a large process. Dealing with matters of a managing/coordinating entity means further complications.
	The REDs do not exist yet. Difficult to anticipate the date when they will be completely established

Alternative 1.3

ESKOM (Renewable Energy Purchasing Agency - REPA) as coordinating/managing entity

The REPA managed by ESKOM handles the day to day operations of the REFIT in terms of purchasing power, monitoring the performance for RE Generators and passing through the cost to the consumers. It is possible that the REPA widen its business field and function as managing entity as well. This means it would participate in the project and hand the PoA in for registration. Thus the REPA will receive the CERs issued by the CDM registry. The revenues created through the process of purchasing the CERs can be used by the REPA (ESKOM) for grid expansion and change the “dumb grid” to a “smart grid”, making it more efficient and changing the way utilities deliver services. Another option is to reduce the electricity price for the final consumers. Both options are inextricably linked to tackling poverty.

Pro	Contra
As the REPA pays the REFIT to independent power producers PoA project participation is already guaranteed through that mechanism	Eskom’s main focus is on coal. High purchase quantity means low prices. Thus ESKOM didn’t show interest in boosting sustainable energy in the past years.
ESKOM operates nationwide. One REPA means one coordinating/managing entity and thus in complex process.	Eskom and IPPs are competitors
As the REPA function as single buyer it knows all energy generation projects taking place in South Africa. Good understanding of the energy sector.	The REPA as managing/coordinating entity under Eskom’s roof diminish independence. The REPA in charge for PoAs would shift even more power to ESKOM
	Eskom’s main intention is to buy large amounts of electricity, no real interest in small re-projects.

Alternative 1.4

The **Provincial Government** through the **Department of Environmental Affairs and Development Planning** (D:EA&DP) functions as managing/coordinating entity.

The National Constitution permits each provincial legislature to adopt a constitution for its province. The provincial constitution must correspond with the national Constitution. The Provincial Government of the Western Cape works in co-operation with the National Government to create laws for and provide services to the people of the Western Cape.

The Provincial Government Western Cape (PGWC) consists of 12 Departments. The Department of Environmental Affairs and Development Planning is responsible for energy policies. Its focus is on sustainable environmental management and integrated development planning, the development of integrated, sustainable human settlements, and ensuring equal access and sustainable use of the province's natural resources, including energy.

Pro	Contra
D:EA&DP established a provincial Clean Development Mechanism Desk. Could additionally offer to manage the PoA in the whole Western Cape Province.	It will need a single managing entity for every of the 9 provinces.
The geographical area of the Western Cape Province is much bigger than that of a single municipality. Large radius of operation (129 386 km²)	How will the financial support by the national government look like if the D:EA&DP intends to participate in the PoA in a financial way.
D:EA&DP released the White Paper on sustainable energy for the WC province with a target of 15% renewables by 2014. PoAs would help to implement it.	
Personal resources available.	

Alternative 1.5

The **Municipality of Cape Town** preferable through the **Electricity Services Department** of Cape Town functions as managing/coordinating entity

The City's Electricity Services Department as part of Cape Town Metropolitan Council distributes electricity to residential, commercial and industrial customers situated largely within the southern part of Cape Town. In doing so, it provides the necessary link between the electricity supplier (Eskom) and the consumers that buy and use electricity. The department is inter alia responsible for municipality sustainability and financial viability, protection of the right to access free basic electricity and maintenance of Municipal obligation to current staff members.

The department is licensed by the National Energy Regulator of South Africa (NERSA) to undertake these functions. Under the NERSA licence, the standard of services provided must meet the requirements as set out in the national standards NRS047 and NRS048. The City is one of many electricity distributors that operate in South Africa, ranging from large metros like Cape Town to small municipalities.

Pro	Contra
Managing PoA fits well in the overall activity portfolio of the department which e.g. manages city-wide energy saving and demand management programmes, a climate change strategy and the development of opportunities for renewable (forms of energy.	The role of municipalities in future power supply is not clear with the REDs emerging.
The municipality has been actively involved in implementing and supporting renewable energy projects, e.g. a favourable Power Purchase Agreement with Darling wind farm and has a commitment to purchase 20% of its electricity demand from renewable sources by 2020.	The geographical area for what the Municipality of Cape Town is responsible for is quite small.

PoA income is a possible mean for municipality to square outstanding debts	The local government has not many financial resources as the provincial or national do.
Will contribute to the Sustainable Energy Strategy developed by the department of environmental affairs and development planning	In case the local government of Cape Town manages the PoA in a successful way other local governments will intend to do the same in their geographical area. One central entity in charge for the whole country will be easier to manage.
Already implement a CDM small scale project activity with NGO SouthSouthNorth in 2005 first African CDM Project. Solar Water Heaters: Kuyasa low-cost urban housing energy upgrade project, Khayelitsha. Programmatic CDM potential currently being investigated by the City of Cape Town	

Alternative 2

Implementation of a **new institution** responsible for the PoA (e.g. One-Stop Shop/Energy Agency or Centre/Office for CDM).

One single national Energy Agency or Centre could be established with the task to support and handle energy-related policies and programmes on all three governmental levels. This could also be the One-Stop Shop discussed previously in this report. It will need a clear outline of tasks. A possible task might be to run independent and economically viable projects such as PoA under the CDM. The institution might function as managing/coordinating entity. Potential tasks may also include information propagation, awareness and capacity building, project management, energy service delivery, organisational support for projects and programmes etc. Further a carefully drafted financial business plan is crucial for the success of such an institution (what CERs revenues can be gained and what is the forecast for salaries, rents and costs etc?). The agency might be set up as a limited company.

The shareholders of the centre for CDM would probably have a strong impact on its fields of activity. A diverse membership structure, preferably a public-private-partnership of up to ten partners is therefore important for independence, flexibility and development potentials. Funding needs are directly related to the chosen focus areas of the institution. An Energy Agency for CDM with the focus on information and motivation activities for independent power producers will need financial support from government or other sources, at least at the very beginning.

Pro	Contra
Would be practical to have one institution which merge all relevant energy topics including nationwide CDM management. Efficiency, competence gathering	Complicated/time-consuming process external/international support necessary
Proposed opportunities of a one-stop shop and/or an energy agency in previous section of this report.	No qualified staffing resources
Would have to work closely with provincial and national departments and organisations to address all barriers.	A very close relationship to government organisations bears the danger to get caught in their bureaucracy and being influenced by it to a high degree

Conclusion

Public/coordinating entity	Qualified staff / personal resources	National government acceptance	UNFCCC acceptance	Restructuring/ implementation process of PoAs	Knowledge of the Re-sector	CDM experiences	Sphere of influence	Future prospective	Possibility to cover the REFIT cost	Ranking
Energy Development Cooperation	●	●	●		●		●		●	**2**
EDI Holdings	●		●	●			●		●	**3**
Electricity Service Department of Cape Town	●		●			●	●	●	●	**5**
Department of Environmental Affairs and Development Planning	●		●				●		●	**4**
Renewable Energy Purchasing Agency		●	●	●	●		●	●	●	**1**
Energy Centre/Office for CDM			●	●		●		●		**4**

Note: ● poor ● good

Usage of PoA Revenues:

Two alternative scenarios for the South African State as managing entity for PoA are conceivable when it comes to the use of the revenues: Either financing projects in different business fields or in the energy sector only. There are no guidelines published by the UNFCCC indicating ways of how to use the CERs revenues.

Outside the energy sector, a national account for the earnings of the PoA CERs could be founded. A suitable usage for the money would be community projects (topics: fighting AIDS, poverty, crime) or environmental projects to get the link between different parts of the sustainable development within the country (social, economic and environmental aspects).

Within the energy sector, the revenues of the PoA could be used to reduce the burden from REFIT on power customers as with the revenues the extra costs resulting from the REFIT could be covered to some extend. This would help the ruling party to strengthen its support among the population. The manifest of the ANC 2009 and the Democratic Alliance's assertions on sustainably development on the Western Cape put the emphasis is on supporting cost-effective technology which increases sustainable jobs and improvement of the energy situation in South Africa. The conduction of PoAs and using the revenues out of it to lower the electricity costs would lead to credibility with the voters. Low electricity price means tackling poverty.

Alternatively, the revenues could be used to support additional new wind power plants to extend to existing wind farms. Through adding new CPAs to the PoA the CERs income would increase. Otherwise, the revenues could be used to provide the support for the plants (maintenance and repair, add new technique) which generated the CERs. Finally, the revenues could be used to finance supporting means for wind power development e.g. providing soft loans, grid planning, wind resource assessment, establishing natural standards.

Only the entity implementing the PoA and not the individual project stakeholders represents the project activity as a CDM project participant. Project stakeholders therefore won't have direct access to the CERs and depend on the managing entity.

International Acknowledgement of large scale PoAs under the CDM

Different stakeholders in international climate change negotiations have already expressed their views on Programme of Activities. This is important to know to assess the sustainability of such an approach on the medium and long run.

Nationally Appropriate Mitigation Actions

There are many new mechanisms that are being developed throughout the international climate change negotiations which hopefully will concretely be decided upon during the 15th Conference of the Parties (COP-15) in Copenhagen. One of these new mechanisms is the nationally appropriate mitigation actions. Nationally appropriate mitigation actions (NAMAs) established by developing country Parties may include a range of actions in the context of developing low carbon strategies applicable to both projects and programmes. These projects and programmes should be voluntary actions that are country-driven and importantly they should conform with the host country's sustainable national development priorities and poverty eradication.

NAMAs established by developing countries may comprise actions enabled and supported by finance, technology and capacity-building from developed countries, either through bilateral support, from the multilateral funding for climate change, or other international financial means. NAMAs are also actions

that are undertaken unilaterally by developing country through public funding domestically, which could include programmes such as a REFIT.

NAMAs could include many actions which support the reduction of GHGs. Some of these actions and programmes include, but are not limited to: sustainable development policies and measures; the CDM, programmatic CDM, technology deployment programmes or standards, energy efficiency programmes, energy pricing measures and renewable energy; cap-and-trade schemes and carbon taxes and the use of new and existing flexible carbon market mechanisms; development of national action plans; renewable energy strategies and plans; renewable energy policies and measures, including financial schemes; and diffusion of low greenhouse gas emitting technologies, just to name a few.

Overall NAMAs are aimed at addressing anthropogenic emissions of GHGs and to protect and enhance GHG sinks and reservoirs in a measurable way and should be quantified to the extent possible.

United Nations

As shown the United Nations (UN) published the necessary framework for the implementation of large scale PoAs under the CDM and indicates a raw guideline but leave the final implementation to the project developers.

China

China wants to encourage the domestic wind power industry. The government has issued a regulation stipulating that 70 percent of wind power equipment should be produced from domestic companies regardless of the source of funding. The Chinese government appears keen to synchronize growth with the development of its own domestic renewable industry. Many CDM projects already taking place in the people's republic of China and the state gain a lot of benefit thereof. Most of the wind power plants in China are registered under the CDM and the CERs have to be sold via one central national institution. If no foreign buyer is determined by the time a project is submitted for approval the emission reductions generated by the project will be transferred into China's national account in the CDM registry and can only be transferred out with the authorization of China's Designated National Authority for CDM. Further the Chinese government charge fees for the CERs which are used in supporting activities on climate change Hence the frameworks already correspond to the idea of the PoA. It can be assumed that China will have an open minded attitude towards PoAs ideas but always with the ulterior motive to boost its national production, and putting its interests ahead of other countries (DOCC05).

Greenpeace

Greenpeace propose a feed-in tariff system in developing countries financed by emissions trading from OECD countries. It is called Feed in Tariff Fund Emissions Trading model (FFET), a concept conceived by Greenpeace International. The aim is on the expansion of renewable energy in developing countries with financial support from industrialised nations. In a nutshell it should link the feed-in tariff system with emissions trading schemes such as in Europe through already established international funding channels. FFET concept consists of three elements – fixed feed-in tariffs, emissions trading and a funding arrangement.

The FFET fund will act as a buffer between fluctuating CO_2 emissions prices and stable long term feed-in tariffs. The fund will secure the payment of the required feed-in tariffs during the whole period (about 20 years) for each project. This fund could be managed by international financial institutions operating in Europe and Central Asia or by Multilateral Development Banks. Comparing the FFET

model with the concept of covering the REFIT costs through a PoA it becomes clear that basic idea is similar - expansion of renewable energy in developing countries with financial support from industrialised nations. However the FFET model considers funding from an international Fund whereas the PoA model aims on financial support from national managing entities.

WWF

The WWF is very concerned that the whole CDM system is being misused. For instance many projects being developed that do not fulfil the additionality criteria. That means that a lot of these projects would have been realised even without CDM financial support. If these CERs attaining the European emission trading system it will lead to a globally rise of emissions (ÖI07).

In case the envisaged PoA in the Western Cape would finally be implemented it would take place in an institutional framework which consists of the stakeholders shown in the following chart.

Stakeholder	Performance	Resources	Connections
Department of Minerals and Energy (DME)	Issue of the white paper 2003, South African Wind Energy Programme, promoting wind power project in Darling (staff)	information, political significance	Function as overall coordinator, therefore connections to all other players
National Energy Regulator South Africa (NERSA)	Implementation of the REFIT, regulation of the energy market	political significance	DME, ESKOM, Darling IPP
ESKOM	South African Wind Energy Programme, Renewable Energy Purchasing Agency	financial and personal resources	DME,NERSA, City of Cape Town, other energy suppliers, IPPs
City of Cape Town	Buyer of Darling electricity, CDM project participant	organisational resources	Cities for Climate Protection, Darling IPP
World Bank	Financing CDM Wind projects / Prototype Carbon Fund	financial resources	
Central Energy Fund/Energy Development Cooperation	Financing Pilot renewable Projects	financial resources	DME, GTZ,
Development Bank of Southern Africa	Loans for South African Wind Energy Programme, Loans for Solar Water Heater project in Durban	financial resources, informational resources	DME,
Global Environment Facility	Implemented renewable Energy project in South Africa already	financial resources	DME, Central Energy Fund, Development Bank of South Africa, UNEP
Independent Power Producers		organisational resources	DME, City of Cape Town, REPA

References	
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[UNFCCC 09b]	Procedures for review of erroneous inclusion of a PoA, 2009 (**EB47 Version 1 Annex 30**)
[UNFCCC 09c]	Procedures for approval of the application of multiple methodologies to a Programme of activities, 2009 (**EB47 Version 1 Annex 31**)
[UNFCCC 09d]	Guidance of determination the occurrence of de-bundling under a Programme of activities, 2009 (**EB 47 Annex 32**)
[UNFCCC 07a]	Guidance on the registration of a Programme of activities as a single CDM project activity, 2007 (**EB 32 Annex 38**
[UNFCCC 07b]	Eligibility of activities under the CDM, 2007 (**EB 33 Paragraph 30**)
[UNFCCC 07c]	Guidance on Programme of activities, 2007 (**EB 35 Paragraph 15)**
[UNFCCC 07d]	Payment of registration fee of a programme of activities, 2007 (**EB 33 Paragraph 60**)
[UNFCCC 07e]	Procedures for registration of a Programme of Activities as a single CDM project activity an issuance for certified emission reductions of activities, 2007 (**EB 32, Annex 39, paragraph 2(e)**)
[UNFCCC 05a]	General Principles for Bundling, 2005 (**EB 21, Annex 21, paragraph 3**)
[UNFCCC 04a]	Clarifications on the treatment of national and/or sectoral policies and regulations, 2004 (**EB 16 Annex 3**)
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[NER09]	**National Energy Regulator of South Africa (NERSA),** 2009, South African Renewable Energy Feed-In Tariff (REFIT) Regulatory Guidelines 26 March 2009
[DEHST07]	**German Emissions Trading Authority (DEHSt)** at the Federal Environment Agency, 2007, German CDM Manual Guidance for Applicants Version 1.0 2007

[ÖI07]	**Öko Institute**, 2007, Study reported to the WWF (http://assets.panda.org/downloads/oeko_institut__2007____is_the_cdm_fulfilling_its_environmental_and_sustainable_developme.pdf)
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[DOME03]	**Department of Minerals and Energy**, 2003 White Paper on Renewable Energy

Annex 4: Abridged Draft Generation Licence for Discussion

NATIONAL ENERGY REGULATOR
OF
SOUTH AFRICA

GENERATION LICENCE
issued to

_____

Erf. No. _____

1. DEFINITIONS AND INTERPRETATION

In this licence, words and phrases shall have the meaning ascribed to them in the definition section of the Electricity Regulation Act, 2006 (Act No. 4 of 2006) (hereinafter referred to as the Act), as well as the definition section of the Grid Code, insofar as it is applicable.

2. GRANT OF LICENCE

The National Energy Regulator, in exercise of the powers conferred by section 4 of the ERA, hereby licenses _____ to generate electricity on-site for the purpose of enabling a supply to be offered to the Distribution network subject to the conditions set out in this licence and the Act.

3. TERM OF LICENCE

This licence has come in force on 1 September 1995 and shall continue unless modified or revoked in accordance with the provisions of section 10 and 11 herein.

4. DUTIES OF LICENSEE

Not limiting the provisions of section 22 of the ERA, the following are the duties of the licensee:

4.1 The licensee shall offer all available units forming part of its generating stations to the Eskom Power Pool for dispatch by the national Licensed Transmitter.

4.2 The Licensee shall not effect any changes to the generation stations listed in schedule 1 with respect to the design, capacity, generating process or status of any generation station, without the approval of the National Energy Regulator.

4.3 The Licensee shall comply with any restrictions and conditions imposed by relevant environmental and safety agencies.

5. TARIFFS AND PRICES

The National Energy Regulator must determine the prices at which the licensee shall supply electricity.

6. COLLECTION OF INFORMATION

The National Energy Regulator shall be entitled to collect such information from the licensee or its consumers as it deems necessary.

7. SETTLEMENT OF DISPUTES

The National Energy Regulator shall be entitled to settle disputes between the licensee and any other supplier regarding -

1) the right to supply;
2) the quality of such supply and the provision of services in connection therewith;
3) the condition on and prices at which electricity is supplied;
4) the installation and functioning of meters;
5) the suitability of the equipment of the licensee;
6) delays in or refusal to supply by the licensee;
7) any other matter in respect of which the licensee or its consumers requests the National Energy Regulator to act as mediator.

Any decision of the regulator on a dispute as contemplated in section 8.1 above is binding on the parties to the dispute.

8. INSPECTIONS

The National Energy Regulator shall be entitled to perform inspections of the equipment of the licensee.

9. PROHIBITION OF TRANSFER OF RIGHT TO SUPPLY

This licence is not transferable without the approval of the National Energy Regulator.

10. MODIFICATION OF LICENCE

The conditions of this licence may be modified by the National Energy Regulator -

1) with the agreement of the licensee; or
2) failing such agreement, after 30 days due notice has been given to the licensee by the National Energy Regulator and after consideration of any representation or objections; or

3) after due consideration of any representations by the Licensee.

11. REVOCATION OF LICENCE

11.4 The National Energy Regulator may at any time agree with the licensee that this licence should be revoked, in which case the term of the licence ends on the day agreed.

11.5 The National Energy Regulator may at any time give notice of revocation to the licensee if the licensee does not comply with any of its duties and obligations, and the Minister determines that it is necessary or desirable to revoke this licence, in which case the term of this licence ends on the expiration of the period of the notice. The term of this licence does not end at the expiration of the period of a notice of revocation given under this paragraph if, before the expiration, the licensee complies with its duties or obligations.

12. POWERS OF ENTRY AND INSPECTION

The National Energy Regulator, or any person authorised by it in writing, may enter upon premises of the licensee and inspect any plant, machinery, books, accounts and other documents found there.

13. CONDITIONS OF SUPPLY

13.1 The licensee shall supply electricity subject to the prevailing supply contract.

13.2 The Licensee shall comply with the requirements of the Grid Code insofar as the Code applies to any of its operations, except where exemptions and derogations, have from time to time been approved by the National Energy Regulator. (See the Appendix to this licence).

14. QUALITY OF SUPPLY

The licensee shall supply electricity onto the interconnected power system, subject to the requirements of the Grid Code and other such quality criteria as the National Electricity Regulator, may from time to time prescribe.

SIGNED: _____

Municipal Manager

DATE: _____

camco

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