



environmental affairs

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Department:  
Environmental Affairs  
**REPUBLIC OF SOUTH AFRICA**

# **EIA GUIDELINE FOR RENEWABLE ENERGY PROJECTS**

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**TERMS AND ABBREVIATIONS**


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Term/ Abbreviation	Explanation
BA	Basic Assessment (See GNR 544 and GNR 546)
Bagasse	Sub-category of biomass derived from the remains of sorghum and sugarcane
Bio-fuel	Fuel derived from biomass (e.g. Bio-ethanol and bio-diesel)
Biogas	Gas typically produced from the biological breakdown of organic matter
Black liquor	Spent cooking liquor from the Kraft process (e.g. produced when digesting pulpwood into paper pulp)
BX	Biodiesel type (B) and percentage (X) of biodiesel in mixture (e.g. B20- 20% biodiesel to 80% standard diesel)
CA	Competent authority. In respect of a listed activity or specified activity (stipulated in an Act, e.g. NEMA), CA means the organ of state charged by this Act with evaluating the environmental impact of that activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Calorific value	Amount of heat released during the combustion of a material
Carbon Neutral	Having a net zero carbon footprint, may refer to achieving net zero carbon emissions by balancing a measured amount of carbon released with an equivalent amount sequestered or offset, or buying enough carbon credits to make up the difference
CER	Certified Emissions Reduction
Cetaceans	Aquatic mammals characterised by having streamlined body shapes and include Whales, Dolphins and Porpoises.
Cetane	A measure of the ignition value of diesel fuel
CH <sub>4</sub>	Methane
CHP	Combined Heat & Power
CO	Carbon Monoxide
CO <sub>2</sub>	Carbon Dioxide
CSIR	Centre for Scientific and Industrial Research
CSP	Concentrated Solar Power (also called

Term/ Abbreviation	Explanation
	concentrating solar power or concentrated solar thermal)
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFA	Development Facilitation Act (No. 67 of 1995)
DNA	Designated National Authority
DNR	Direct Normal Radiation
DoE	Department of Energy
EAP	Environmental Assessment Practitioner
EIA	Environmental impact assessment. Procedure which ensures that environmental consequences of projects are identified and assessed before authorisation is given (under NEMA)
Environmental authorisation	The Competent Authority's grant or denial of permission to undertake the proposed activity. Previously referred to as the Record of Decision (RoD)
Environmentally sustainable growth	Process of social, economic, and environmental (i.e. physical) development that provides a positive outcome for the living and non-living environment
ferrous	Relating to Iron
Fossil fuels	A hydrocarbon deposit, such as petroleum, coal, or natural gas, derived from living matter of a previous geologic time and used for fuel
GHG	Greenhouse Gas
GNR 543	Government Notice Report No. 543 (of the National Environmental Management Act). Details the procedure for applying for environmental authorisation
GNR 544	Government Notice Report No. 544 (of the National Environmental Management Act). Provides a list of activities that will require a Basic Assessment (BA) in order to apply for environmental authorisation
GNR 545	Government Notice Report No. 545 (of the National Environmental Management Act). Provides a list of activities that will require a Scoping and Environment Impact Report (S&EIR) in order to apply for environmental authorisation
GNR 546	Government Notice Report No. 546 (of the National Environmental Management Act). Provides a list of activities that will require a

Term/ Abbreviation	Explanation
	Basic Assessment (BA) in order to apply for environmental authorisation in a specific province (i.e. KwaZulu Natal)
GWh	Gigawatt hour
H <sub>2</sub> S	Hydrogen Sulphide
heliostat	Sun-tracking mirrors
HFC	Hydrofluorocarbon. Organic compounds that contain only one or a few fluorine atoms. Used as refrigerants in place of the older chlorofluorocarbons
HIA	Heritage Impact Assessment
Hydropower	Power derived from the energy of falling water
I&AP	Interested & Affected Parties: Individuals, groups or organisations that may have an interest in, be affected by, or affect an initiative (i.e. project or development)
IDC	Industrial development corporation
IDP	Integrated development plan
IPP	Independent power producer
IRP	Integrated Resource Plan
kW	Kilowatt
Kyoto Protocol	International treaty subsidiary to UNFCCC. Sets quantified emission limitation or reduction obligations (binding targets) for 38 industrialised countries and the European community (Annex B countries)
LDO	Land development objective
LFG	Landfill gas
lubricity	Ability to lubricate fuel pumps and fuel injectors
m	Meter
m/s	Meters per second
Macro	Large scale
MEC	Member of the Executive Council of a province who is responsible for the designated provincial lead agency in terms of a specified Act;
Micro-hydropower system	Typically produces < 100kW
Mtoe	Million Tonnes of Oil Equivalent. Unit of energy: the amount of energy released by burning one tonne of crude oil, approximately 42 GJ (note different crude oils have different calorific values)

Term/ Abbreviation	Explanation
Municipality	Metropolitan, district or local municipality established in terms of the Local Government: Municipal Structures Act, 1998 (Act No. 117 of 1998)
N <sub>2</sub> O	Nitrous Oxide
National environmental Management Act, 1998 (107 of 1998)	Defines environmental impact assessments. These are the procedure which ensures that environmental consequences of projects are identified and assessed before authorisation is given
National grid	Nationwide system of electric power transmission
NEMA	National Environmental Management Act, 1998 (107 of 1998, as amended in 2010)
NEMAQA	National Environmental Management Air Quality Act (No. 39 of 2004)
NEMBA	National Environmental Management Biodiversity Act (No. 10 of 2004)
NEMWA	National Environmental Management Waste Act (No. 59 of 2008)
NHRA	National Heritage Resource Act (No. 25 of 1999)
NO <sub>x</sub>	Generic term for mono-nitrogen oxides NO and NO <sub>2</sub> (nitric oxide and nitrogen dioxide)
NWA	National Water Act (No. 36 of 1998)
PDD	Project design document
Photovoltaic	Relates to cells made from semi-conductor materials that are able to release electrons when exposed to solar radiation (sunlight) by using the photo-electric effect.
Pico-hydropower system	Typically produces < 1kW
Policy	A proposed or adopted course or principle of action
Primary energy	Energy form found in nature that has not been subjected to any conversion or transformation process
Proponent	A person who puts forth a proposal or project
PV	Photovoltaic
QUELRO	Quantified emission limitation or reduction obligations
RBS	Revised balance Scenario
RE	Renewable Energy
Renewable energy	Energy that comes from sources that are continually replenished, such as sunlight, wind, rain, tides, waves, and geothermal heat

Term/ Abbreviation	Explanation
Role player	Party involved in a public participation process (e.g. government departments and the public)
RRDB	Renewable Resource Database (RRDB)
RSA	Republic of South Africa
S&EIR	Scoping and Environmental Impact Reporting process as contemplated in GNR 543, regulation 26-35 of NEMA (Act 107 of 1998, as amended in 2010)
SAHRA	South African Heritage Resource Authority
Secondary energy requirement	Energy transformed from primary energy into more convenient forms of energy (that can directly be used by society, e.g. electric or refined fuels)
SHW	Solar Hot Water
SO <sub>2</sub>	Sulphur Dioxide
Socio-economic growth	Process of social and economic development in a society.
Solar power	Conversion of sunlight into electricity, either directly using photovoltaics (PV), or indirectly using concentrated solar power (CSP).
Stakeholder	Individuals, groups and organisations that may have an interest in, be affected by, or affect an initiative (i.e. project or development)
ton	1000 kilograms
UNFCCC	United Nations Framework Convention on Climate Change
WASA	Wind Atlas of South Africa
Wave energy	Any process that derives power from the movement of waves on the surface of a body of water
Wh/m <sup>2</sup>	Watt per hour per meter squared (i.e. measure of expended energy over a specific area)
Wh	Unit of energy equivalent to one watt (1 W) of power expended for one hour (1 h) of time
White paper	Authoritative report or guide helping readers to understand an issue, solve a problem, or make a decision.
Wind power	Energy received from the movement of the wind across the earth

Disclaimer

This document is meant to serve as a guideline only. The activities and regulations listed herein are not exhaustive, and it is the sole responsibility of the developer, in consultation with the Environmental Assessment Practitioner (EAP), to investigate and confirm the specific applicable environmental authorisations required for each primary and secondary activity. This guideline carries no legal standing, and DEA is not liable for any decisions or activities informed by this guideline. End users are in no way absolved from all legal compliance or regulations that may not have been addressed in this guideline.

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## **1 INTRODUCTION**

The Department of Energy (DoE) gazetted its White Paper on Renewable Energy in 2003, and introduced it as a “policy that envisages a range of measures to bring about integration of renewable energies into the mainstream energy economy.” At that time the national target was fixed at 10 000GWh (0.8Mtoe) renewable energy contribution to final energy consumption by 2013. The White Paper proposed that this would be produced mainly from biomass, wind, solar and small-scale hydropower. It went on to recommend that this renewable energy should be utilised for power generation and non-electric technologies such as solar water heating and bio-fuels. Since the White Paper was gazetted, South Africa’s primary and secondary energy requirements have remained heavily fossil-fuel-dependant, both in terms of indigenous coal production and use, as well as the use of imported oil resources. Alongside this the projected electricity demand of the country has led the National utility, Eskom, to embark upon an intensive build programme to secure South Africa’s longer-term energy needs, together with an adequate reserve margin. Whilst the medium-term power generation mix will continue to lean heavily on the use of fossil fuels, the Revised Balanced Scenario (RBS) of the 2010 Integrated Resource Plan (IRP) includes for a total additional supply capacity of 17.8GWe from renewable sources by 2030.

In pursuit of promoting the country’s Renewable Energy development imperatives, the Government has been actively encouraging the role of Independent Power Producers (IPP) to feed into the national grid. Through its Renewable Energy IPP Procurement Programme the DoE has been engaging with the sector in order to strengthen the role of IPPs in renewable energy development. Launched during 2011, the IPP Procurement Programme is designed so as to contribute towards a target of 3 725MW and towards socio-economic and environmentally sustainable growth, as well as to further stimulate the renewable industry in South Africa.

In order to facilitate the development of IPPs in South Africa, these guidelines have been written to assist project planning, financing, permitting, and implementation for both developers and regulators. The purpose of these guidelines is not to provide an exhaustive checklist of requirements, but to promote efficient, effective, and expedited authorisation processes.

### **1.1 Need and desirability for this guideline**

The Renewable Energy sector has long indicated its interest and readiness to invest in renewable energy plants but conditions have sometimes not been favourable owing to internal as well as external barriers. Whilst internal barriers may largely be attributed to technical and contractual issues, the external barriers relate mainly to difficulties in obtaining approvals with respect to Environmental Impact Assessments (EIAs). The problem has been exacerbated by a lack of process co-ordination associated with authorities that have legislative powers over activities in the energy sector. This has sometimes led to an

unnecessary complication of the authorisation process and has thus stifled the Government's transition efforts to a low-carbon economy.

There is clearly a lack of understanding by business, industry and the public sector on the environmental approval aspects of on-site renewable energy projects. It is this lack of understanding that this Guideline seeks to redress. It is the belief of the Department of Environmental Affairs (DEA) that there is a latent demand for clarity on these issues that, once provided, will unlock project development and accelerate the delivery of these arrangements to truly deliver Renewable Energy projects and the associated carbon benefits.

## **1.2 About these guidelines**

### **1.2.1 Purpose and use of this guideline**

The purpose of this document is primarily to provide guidance on the environmental management legal framework applicable to renewable energy operations and all the role players in the sector. The guideline is principally intended for use by the following stakeholder groups:

- Public Sector Authorities (as regulator and/or competent authority);
- Joint public sector authorities and project funders, e.g., Eskom, IDC, etc.
- Private Sector Entities (as project funder/developer/consultant);
- Other interested and affected parties (as determined by the project location and/or scope).

The approach of this Guideline is to identify activities requiring environmental authorisation prior to commencement of that activity, and provide an interface between national EIA regulations and other legislative requirements of various authorities.

### **1.2.2 Type of projects addressed in these guidelines**

Construction, installation and/or development of the following renewable energy projects are covered in this guideline:

- Concentrating Solar Power Plant;
- Wind Turbine Farm;
- Hydropower Station; and
- Photovoltaic Power Plant.

### 1.2.3 Legal Status

In terms of Common Law, instruments such as Principles, Guidelines, Standard Rules and Recommendations have no binding legal effect. It should be highlighted, however, that such instruments by their nature do provide an implicit guiding force and practical direction to the proponents they are targeting. It is recommended that this Guideline is used primarily as an awareness-raising tool to streamline and plan authorisation for renewable energy projects. It is also recommended that this Guideline is used with discretion by all stakeholders whom it engages. Whilst Guidelines may play a legal role in the standardisation of procedures, they cannot be adopted in lieu of Governmental regulations and do not substitute or replace them.

### 1.2.4 How to use these Guidelines

The Guideline has been structured in a logical and systematic way that walks the reader through the processes, in a practical approach to the process of securing environmental approval for Renewable Energy projects, including:

- A review of Renewable Energy technologies;
- A summary of the impacts of each technology and associated authorisation processes required;
- An overview of some good industry practice mitigation practices that may be applicable to each technology;
- A concise review of the relevant National legislation associated with project development;
- A general schematic illustrating some primary components of a typical integrated NEMA approvals process; and
- A list of contact details for the competent authorities administering these legislations (**Appendix A**).

The guide is presented in four parts:

#### Part A: Review Technologies

This comprises a concise review of renewable energy technologies, limited to those identified within the 2003 Renewable Energy White Paper. Each technology is summarised in terms of its environmental impacts and the reader is referred to the relevant sections within Part B in regards to:

- Wind;
- Biomass and waste;

- Waves and ocean currents;
- Solar; and
- Small-scale Hydro.

#### Part B: Renewable Energy Authorisation Requirements

This section contains the necessary detail of policies and legislation related to the environmental approval process. The legislation covered includes the following:

- The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996);
- The National Environmental Management Act (Act 107 of 1998);
- The National Environmental Management: Waste Act (Act 59 of 2008);
- The National Environmental Management: Air Quality Act (Act 39 of 2004);
- The National Water Act (Act 73 of 1998);
- The Water Services Act (Act 108 of 1997);
- The Occupational Health and Safety Act (Act 85 of 1993);
- The Hazardous Substances Act (Act 15 of 1973);
- The Physical Planning Act (Act 125 of 1999);
- The Development Facilitation Act (Act 67 of 1995);
- The Municipal Systems Act (Act 32 of 2000);
- Conservation of Agricultural Resources Act (No. 43 of 1983);
- Mineral and Petroleum Resource Development Act (No. 28 of 2002);
- Road Traffic Management Corporation Act (No. 20 OF 1999);
- National Roads Act (No. 93 OF 1996); and
- Spatial Planning and Land Use Management Bill (SPLUMB) [B14 – 2012].

#### Part C: Stakeholder Roles and Responsibilities

This section provides a quick-reference table for each of the stakeholder target groups, indicating what roles and responsibilities would be expected at each phase of the project development cycle. These are inclusive of mandatory requirements as well as participatory/non-mandatory activities.

PART D: NEMA Approval Process Schematics

This section offers schematics illustrating, in general terms, the typical basic assessment and environmental impact assessment integrated processes in terms of NEMA. This is to serve as an informational guideline and is not authoritative, as the nature and location of each project will ultimately determine the requirements.

## 2 PART A: REVIEW TECHNOLOGIES

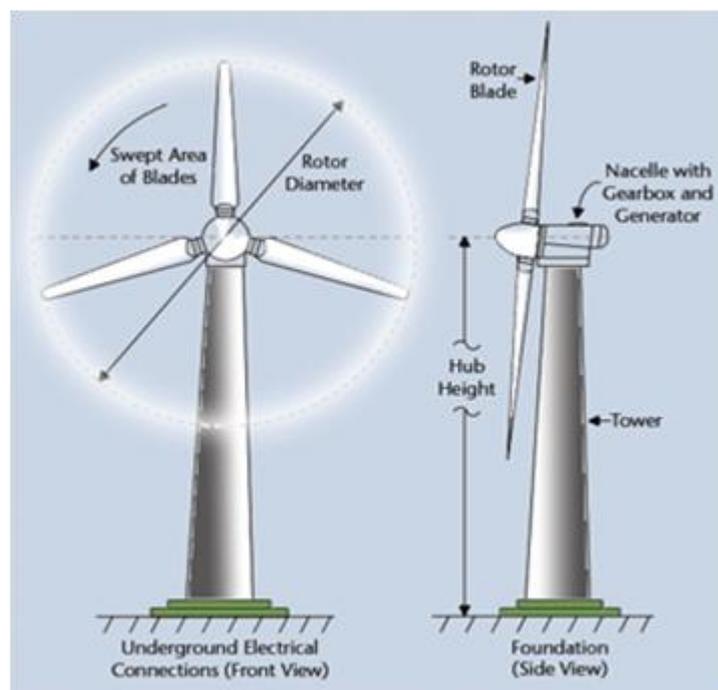
Renewable energy is energy that comes from sources that are continually replenished, such as sunlight, wind, rain, tides, waves, and geothermal heat.

Associated with each renewable energy technology discussed below, developers must consider secondary development impacts as applicable. These may include roads, transmission lines, energy storage facilities, etc. Such associated developments are not the focus of these guidelines.

### 2.1 A1: Wind Energy

#### Technology Overview

Wind energy technology is the most commonly used and commercially developed renewable energy technology worldwide. Wind turbines are used to generate energy and they produce power over a wide range of wind speeds. Essentially, the turbine blades are designed to capture the kinetic energy in wind. When the turbine blades capture wind energy and start moving, they spin a shaft that leads from the hub of the rotor to a generator. The generator turns that rotational energy into electricity. Today, turbine propeller diameters have grown from 30m to 90m, tower heights from 30m to over 110m, and power outputs from 200kW to 5,000kW.



**Figure 1: Wind energy infrastructure (ESN)**

In addition to project and technology factors, the economic feasibility of a wind project is very dependent on the wind speed. The higher the average wind speed, the more electricity can be produced and the faster the investment will pay back. For example, a turbine at a

location with twice the average wind speed of another location will produce four times the amount of electricity. The Wind Atlas of South Africa<sup>1</sup> (WASA) is hosted by the South African National Energy Development Institute (SANEDI) and contains generalised wind atlas data sets for tens of thousands of model grid points in the WASA domain. It should be noted that the WASA is a theoretical tool and, as for any mapping system, cannot be guaranteed in its accuracy. The DEA SEA study which uses the WASA high-resolution wind resource maps (2013) traceable to physical wind measurements (2010 to 2013), provides an approximation of nationwide wind generation capacity of 70GW.

### Environmental Impacts

Wind is clean, free, indigenous, and inexhaustible. Wind turbines do not need any type of fuel, so there are no environmental risks or degradation from the exploration, extraction, transport, shipment, processing or disposal of fuel. Not only is generation produced with zero emissions of carbon dioxide (during the operational phase) but it also does not release toxic pollutants (for example mercury) or conventional air pollutants (for example smog-forming nitrogen dioxide and acid rain-forming sulphur dioxide). Furthermore, the adverse impacts caused by the mining of coal, including acid mine drainage and land subsidence are avoided, and the negative effects of nuclear power, including radioactive waste disposal, security risks, and nuclear proliferation risks, are not created. Finally, wind power can have a long-term positive impact on biodiversity by reducing the threat of Climate Change, which is generally accepted as representing the greatest threat to biodiversity.

At the same time, however, the construction and operation of wind turbines may possibly lead to unfavourable local environmental impacts on birds, bats and cetaceans, landscapes, sustainable land use (including protected areas), and the marine environment. In addition to species disturbance and mortality, the issues of habitat loss and fragmentation need to be considered. The negative environmental impacts from wind energy installations are much lower in intensity than those produced by conventional energies, but they still have to be assessed and mitigated when necessary.

The National Environmental Management Act (Act 107 of 1998; as amended in 2010 NEMA) defines the environmental impact assessment (EIA) as the procedure which ensures that environmental consequences of projects are identified and assessed before authorisation is given. The main objective is to avoid or minimise negative effects from the beginning of a project rather than trying to counteract them later. Thus, the best environmental policy consists of preventing pollution or nuisances at source so the environment is not damaged.

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<sup>1</sup> [http://wasadata.csir.co.za/wasa1/NWA\\_downloads.html](http://wasadata.csir.co.za/wasa1/NWA_downloads.html)

The following **Table 1** indicates the potential Environmental impacts associated with wind energy and wind farm development, together with the applicable and relevant legislation and its reference location within Part B of this Guideline.

**Table 1: Potential Environmental Impacts of Wind Energy Projects**

Impact Description	Relevant Legislation	Reference (Part B)
Visual Impact	NEMA	B2
Noise Impact	NEMA, NEMBA, Health Act	B2
Land Use	NEMA, NEMBA, NEMICMA, NEMPA, NWA	B2, B5, B6, B10
Impacts on Biodiversity	NEMA, NEMBA, NEMPAA	B2, B3, B6
Electromagnetic Interference	NEMA, NEMBA	B2
Impacts on Marine Organisms	NEMA, NEMBA, NEMICMA	B2, B3, B5
Impacts on Cultural Heritage	NEMA, NHRA	B2, B11

*NB: The constitution is couched within all South African legislation and will apply to any activity related to renewable energy (See B1 below).*

### Impacts Mitigation

Assuming an IPP project triggers the need for Basic Assessment (BA) or an Environmental Impact Assessment (EIA) under the National Environmental Management Act (NEMA, see section B2), included in the assessment process is the preparation of an environmental management plan (EMP). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Should an environmental assessment practitioner be employed, they can prepare the BA, S&EIR, and EMP to applicable standards. Possible mitigation measures associated with wind energy installations include but are not limited to:

- Minimising the project footprint by utilising existing roads and disturbed areas as much as practicable;
- Implementing adequate dust, visual disturbance, erosion control, and noise reduction measures such as careful project siting, tarring or spraying water, planting trees, and constructing berms;
- Site developments outside of bird and bat migratory, nesting, and hunting corridors, as well as fog and mist-prone areas;
- Locating developments outside of important habitats for bird species, in particular those species which are threatened or have restricted ranges and are prone to colliding with wind turbines. Also those species which are particularly prone to disturbance;
- Develop and implement a site specific spill management plan;

- Conduct pre-disturbance environmental and social surveys as appropriate to assess presence of sensitive resources, receptors, habitats and species; bury electrical transmission infrastructure;
- Configure turbines and re-vegetation planning to avoid landscape features particularly attractive to nesting raptors or other species prone to colliding with turbines;
- Minimise development lighting in order to minimise light pollution, disturbance to visible communities, and attraction of insects, birds, and animals at night;
- Schedule activities to avoid operations at night and during breeding seasons; and
- Install raptor-proof poles or similar measures on appropriate infrastructure to deter nesting, hunting, and migrating birds.

## **2.2 A2: Residual Biomass & Biofuels**

### Definitions

Residual biomass energy is generally derived from renewable sources of organic matter and can be used to provide heat, make liquid fuels (Bio-fuels) or to generate electricity. It should be borne in mind that in South Africa, fuelwood is the largest source of non-residual biomass energy and is generally gathered from unsustainable sources such as indigenous woodlands and forests. Fuelwood derived in this way cannot be properly defined as renewable. Other types of biomass include plants, residues from agriculture or forestry, and organic components in municipal and industrial wastes<sup>2</sup>.

Bio-fuels in liquid form are produced from the conversion of biomass and, when correctly utilised, can be substituted for fossil-fuel derived fuel oils. Typical applications include transportation use and the generation of power via internal combustion engines. The two most commonly encountered bio-fuels are bio-ethanol and bio-diesel. Bio-ethanol is produced through a fermentation process, whereas bio-diesel is manufactured using the chemical reactions trans-esterification and esterification. The bio-diesel manufacturing process involves vegetable or animal fats and oils being reacted with short-chain alcohols (typically methanol or ethanol).

Whilst landfill gas and bio-gas may be considered to be biomass sources, these are dealt with separately within Section A7, Energy from Waste.

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<sup>2</sup> <http://www.altenergy.org/renewables/biomass.html>

### Technology Overview: Bagasse

Bagasse is a sub-category of residual biomass derived from the remains of sorghum and sugarcane, and is proven to be a good renewable alternative for producing electrical power and heat. In South Africa bagasse is extensively used within the sugar-milling industry to generate process power and heat. The mills use the sugar and juices for their products and then retain the crushed stalks which are then stored in wet conditions. Because of the decomposition of the stalks, the pile starts to dry and becomes highly combustible and ready for burning. For every 100 tonnes of sugar cane harvested and milled, 10 tonnes of sugar is produced together with some 28 tonnes of solid waste in the form of bagasse. Typically, the mill uses a portion of the bagasse in a low efficiency steam cycle to produce the electricity and steam which it needs for its own use.

With sugar mills currently generating a significant amount of power for own use and even limited export, bagasse offers some of the best potential for IPPs in South Africa using renewable resources. It is estimated that an energy conversion rate of 120kWh/ton can be achieved using conventional steam plants running at higher pressures. Using integrated combined cycle combustion technologies the yield per ton of bagasse can be increased to 200kWh/ton. Purely through increased efficiency and new technologies the potential of this resource can be increased from the current 210GWh to 1 400GWh per annum<sup>3</sup>.

### Technology Overview: Fuelwood, wood residues and wood pellets

Wood-derived heating and Combined Heat & Power (CHP) are essentially carbon neutral technologies, since almost all of the carbon dioxide released is reabsorbed by crops or trees that have replaced the fuel being burnt. The only net increases in carbon dioxide are caused by the energy used in building the equipment used in energy conversion and vehicle emissions during processing and transport of the fuel and during disposal of wastes. Conservatively, biomass energy systems can attain >90% carbon neutrality.

The Renewable Resource Database (RRDB) describes the following as fuelwood biomass resources:

- Commercial plantations;
- Indigenous woodlands;
- Alien vegetation;
- Deciduous fruit tree off-cuts from pruning;

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<sup>3</sup> 2003 Renewable Energy White Paper

- Sawmills (primary processing) mostly woodchips, sawdust and bark, as well as wood pellets; and
- Pulp mills: boiler ash, sludge, sawdust and black liquor.

The viability of wood as an energy source suitable for electricity generation lies primarily within the wood, pulp and paper industries. In these industries there is already significant heat and power generation taking place, with possible potential for upgrading and expansion. The sector consists of two main components: the production of timber and the production of wood pulp for paper and board manufacturing.

Wood pellets, made from compressed woody biomass by-products, are not widely used in RSA, but are also a viable form of biomass heating fuel. However, the combined wood residue and sludge generated at the mill are insufficient to meet the balance of energy demand, because of their low heating values resulting from high moisture and ash content. In order to enhance the boiler output, fossil fuels are co-fired with wood wastes.

Greenhouse gas (GHG) emissions from biomass burning are CO<sub>2</sub>, CH<sub>4</sub> and N<sub>2</sub>O. The latter two are negligible when compared to CO<sub>2</sub> and, indeed, some inventory protocols do not include them. Other important atmospheric emissions in the pulp and paper industry include SO<sub>2</sub>, H<sub>2</sub>S, NO<sub>x</sub> and CO generated in the lime kiln (furnace) and recovery boiler. Bark combustion produces SO<sub>2</sub>, NO<sub>2</sub> and CO in small quantities.

#### Technology Overview: Bio-diesel

Generally speaking, biodiesel is an alternative or additive to standard diesel fuel that is made from biological ingredients instead of petroleum (or crude oil). Biodiesel is usually made from plant oils or animal fat through a series of chemical reactions. It is both non-toxic and renewable. Because biodiesel essentially comes from plants and animals, the sources can be replenished through farming and recycling.

Biodiesel can be used in standard diesel reciprocating engines with little or no modification needed. Although biodiesel can be used in its pure form, it is usually blended with standard diesel fuel. The most common blend is B20, or 20% biodiesel to 80% standard diesel. Similarly, B100 refers to pure biodiesel.

B20 and lower-level blends generally do not require engine modifications.

B100 has a solvent effect and it can clean an engine's fuel system and release deposits accumulated from previous petroleum diesel use.

The following **Table 2** indicates the potential Environmental impacts associated with biomass energy and biofuel usage, together with the applicable and relevant legislation and its reference location within Part B of this Guideline. It is stipulated that these are (under

normal circumstances) the main impacts, but other impacts maybe relevant depending on project specifics.

**Table 2: Potential Environmental Impacts of Biomass Energy Projects**

Impact Description	Relevant Legislation	Reference (Part B)
Visual Impact	NEMA	B2
Noise Impact	NEMA	B2
Odour emissions	NEMA, NEMAQA, NEMWA	B2, B4
Land Use Transformation	NEMA, NEMBA, NEMICMA, NEMPAA, NWA, NHRA	B2, B3, B5, B6, B9, B11
Deforestation	NEMA, NEMPAA	B2, B6
Raw Materials Transportation	NEMA, NEMAQA, NEMWA, HSA	B2, B4, B7, B8
Impacts on Cultural Heritage	NEMA, NHA	B2, B11
Impacts on Water Resources	NEMA, NWA, NEMICMA, NEMBA	B2, B9, B10
Industrial/Process Effluent	NEMA	B2, B5, B7, B9, B10
Atmospheric (Combustion) Emissions	NEMA	B2, B4
Hazardous Materials Storage	NEMA	B2, B7, B8, B12, B14, B15

*NB: The constitution is couched within all South African legislation and will apply to any activity related to renewable energy (See B1 below).*

### Impacts Mitigation

Assuming an IPP project triggers the need for Basic Assessment (BA) or an Environmental Impact Assessment (EIA) under the National Environmental Management Act (NEMA, see section B2), included in the assessment process is the preparation of an environmental management plan (EMP). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Should an environmental assessment practitioner be employed, they can prepare the BA, S&EIR, and EMP to applicable standards.

Possible mitigation measures associated with biomass and biofuels include but are not limited to:

- Implement measures to reduce fugitive dust emissions, sediment run-off, air pollutant release, and water discharge such as tarring or spraying roads, building berms and drainage infrastructure, capturing or limiting process emissions, and covering bare soils;
- Analyse water source use and abstraction processes to maximise efficiency (reduce required volume and recycle process water) and potentially utilise grey-water (recycled) sources;

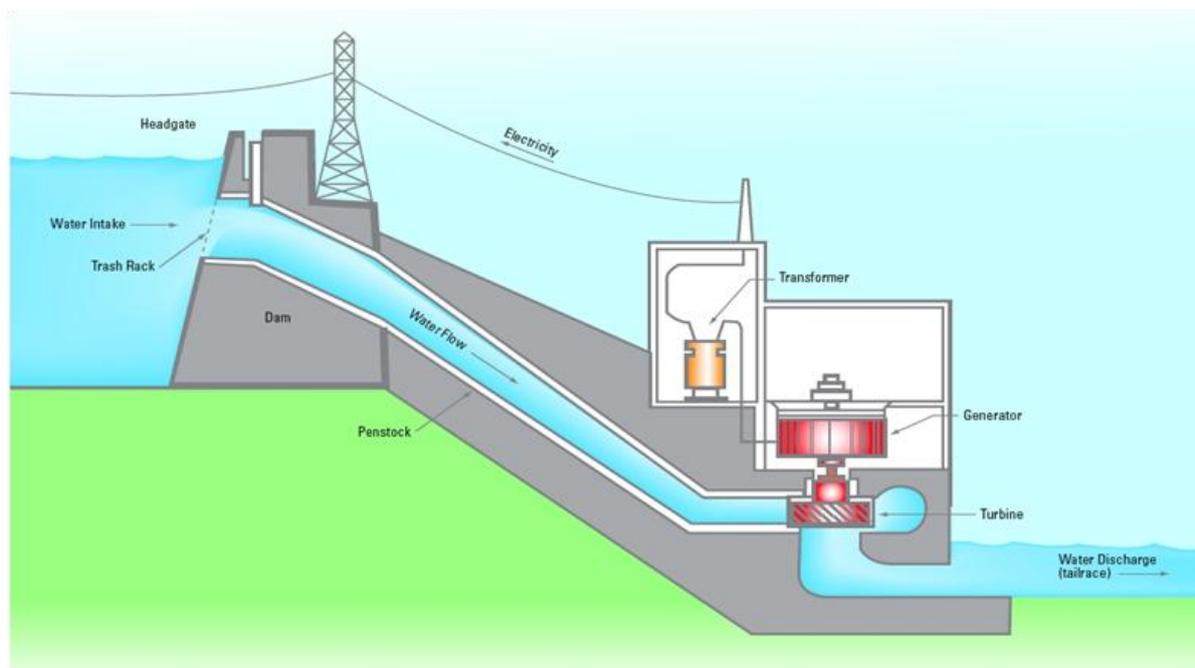
- Appropriate biofuels species selection to maximise efficiency, minimise labour and chemical inputs, and prevent erosion and surface run-off;
- Intercrop biofuels plants with an indigenous ground cover plant to prevent bare soils, dust, and erosion;
- Site developments in existing disturbed locations for production (agricultural lands) and processing (industrial sites) rather than pristine areas;
- Utilise existing access and servitudes in order to minimise the disturbance footprint;
- Develop and implement a site-specific spill management plan;
- Conduct pre-disturbance surveys as appropriate to assess presence of sensitive resources, receptors, habitats and species; and
- Fence sites as appropriate to ensure safe and authorised access, as well as reduce the potential for alien species migration on or off sites.

### **2.3 A3: Hydropower**

Small-scale hydropower exploits the potential of falling water, converting it into mechanical power by flowing water through a turbine and generating electrical energy by means of a generator. Most people are familiar with large-scale hydropower involving large dams, reservoirs, much civil engineering and substantial generating facilities. Small-scale hydropower systems, however, are less well known but still capable of producing sufficient power for industrial use or in commercial buildings. A micro-hydropower system is generally classified as having a generating capacity of less than 100kW. A pico-hydropower system is generally classified as a system that has a generating capacity of less than 1kW.

Micro-hydro systems generally have the following components:

- A water turbine that converts the energy of flowing or falling water into mechanical energy that drives an electrical generator;
- A control mechanism to provide stable electrical power; and
- Electrical transmission lines and grid connection equipment to deliver the power to the user.



**Figure 2: Typical components of a hydropower scheme**

According to the 2003 Renewable Energy White Paper, there exists a significant potential for development of all categories of hydropower in the short- and medium-term in specific areas of South Africa. The Eastern Cape and KwaZulu-Natal provinces are endowed with the best potential for the development of small hydropower plants. One of the advantages of these small hydropower plants is their flexibility in operation as either stand-alone plant or in hybrid configuration with other renewable energy sources. The Eastern Cape is potentially the most productive area for macro hydropower with particular emphasis on the Lower Orange River.

Irrespective of the size of installation, any hydropower development does require authorisation in terms of the National Water Act (DWA, 2003). Furthermore, pressure regarding the environmental impact and displacement of settlements by large storage dams may limit the exploitation of hydropower on a large scale.

The following **Table 3** indicates the potential Environmental impacts associated with hydropower energy development, together with the applicable and relevant legislation and its reference location within Part B of this Guideline. It is stipulated that these are (under normal circumstances) the main impacts, but other impacts maybe relevant depending on project specifics.

**Table 3: Potential Environmental Impacts of Hydropower Energy Projects**

Impact Description	Relevant Legislation	Reference (Part B)
Visual Impact	NEMA	B1, B2
Land Use Transformation	NEMA, NEMBA, NEMICMA, NWA, NHRA	B1, B2
Impacts on Cultural Heritage	NEMA, NHRA	B1, B2, B11
Displacement of Communities	NEMA, NHRA, PPA, MSA	B1, B2, B3, B14, B15
Impacts on Water Resource Use	NEMA, NWA, WSA	B1, B2, B9, B10
Impacts on upstream/downstream watercourse (i.e. erosion)	NEMA, NEMBA, NEMICMA, NWA	B1, B2, B9
Impacts on Biodiversity	NEMA, NEMBA, NEMICMA	B1, B2, B3
Electromagnetic Interference	NEMA, PPA, MSA	B1, B2

*NB: The constitution is couched within all South African legislation and will apply to any activity related to renewable energy (See B1 below).*

### Impacts Mitigation

Assuming an IPP project triggers the need for Basic Assessment (BA) or an Environmental Impact Assessment (EIA) under the National Environmental Management Act (NEMA, see section B2), included in the assessment process is the preparation of an environmental management plan (EMP). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Should an environmental assessment practitioner be employed, they can prepare the BA, S&EIR, and EMP to applicable standards.

Potential mitigation measures for hydropower energy projects include are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess presence of sensitive resources, receptors, habitats and species;
- Protect wetlands and watercourses as applicable by avoiding or protecting them;
- Minimise erosion and sediment loading;
- Minimise stream crossings and reduce stream bank cutting to reduce erosion and reduction in aquatic habitat quality;
- Develop and implement a spill management plan;
- Plan re-vegetation with appropriate indigenous plants to prevent erosion introduction of alien species;
- Trash rack design to minimise entrapment of fish and other aquatic species at intake points; and

- Fence sites as appropriate to ensure safe restricted access and limit alien species being transported on or off site.

## **2.4 A4: Solar Energy**

South Africa experiences some of the highest levels of solar radiation in the world (between 4.5 and 6.5kWh/m<sup>2</sup>) and possesses, therefore, considerable solar resource potential for solar water heating applications, solar photovoltaic and concentrated solar power (CSP) generation. The potential uses and applications include:

- Active solar thermal water heating for domestic, commercial and industrial applications. This is considered a Demand Side Management intervention and is excluded from the scope of this guideline;
- Electricity (photovoltaic and solar thermal) generation, ranging from small/medium-scale stand-alone applications to large-scale grid-connected applications; and
- Solar/Heat Pump hybrid systems for water heating, space heating and cooling.

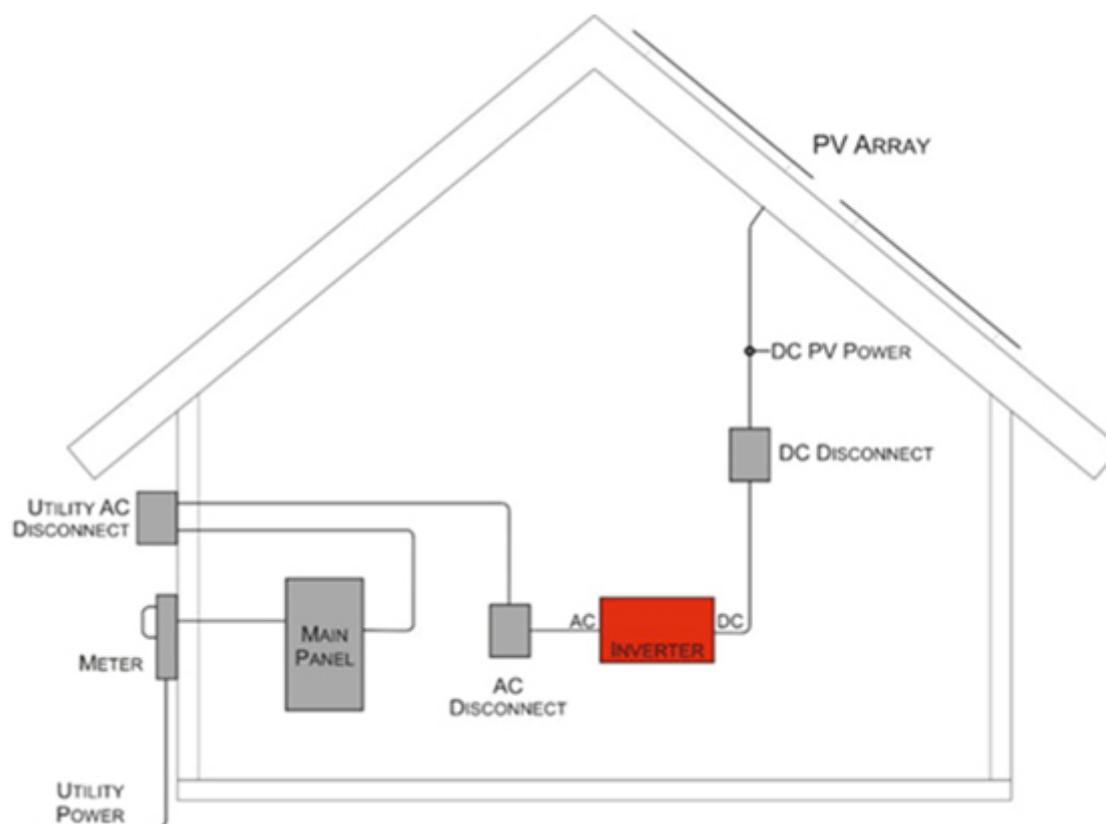
There also exists significant potential for Solar Passive building design practice for residential, commercial and industrial buildings to minimise thermal energy consumed. Furthermore, Solar Cookers have been demonstrated as an alternative to cooking with fuelwood in rural areas throughout the continent.

### Technology Overview: Photovoltaic Systems

Photovoltaic (PV) systems are widely applied in South Africa for powering professional niche applications such as telecommunications, microwave links, navigational aids and meteorology stations, where PV is well established as the best practical option. PV is also applied in small-scale remote power supplies for domestic use, game farms and community water pumping schemes.

PV cells are made from semi-conductor materials that are able to release electrons when exposed to solar radiation by using the photo-electric effect. Electrons from several PV cells are gathered together through conductors to make up the generation capacity of one module and many modules can be connected together to produce power in large quantities.

Internationally, PV is the fastest-growing power generation technology and between 2000 and 2009 the installed capacity globally grew on average by 60% per year. Worldwide more than 35GW of PVs are installed and operating, and in South Africa as much as 8GW PV could potentially be installed by 2020.



**Figure 3: Schematic of a residential grid-tied PV installation**

### Technology Overview: Concentrated Solar Power

Concentrated solar power (also called concentrating solar power, concentrated solar thermal or CSP) systems use mirrors or lenses to concentrate a large area of sunlight, or solar thermal energy, onto a small area. Electrical power is produced when the concentrated light is converted to heat, which drives a heat engine, usually a steam turbine, connected to an electrical power generator. The minimum Direct Normal Radiation (DNR) to justify a CSP plant is 1 800 kWh/m<sup>2</sup> per year. According to the South African RRDB, the area exceeding the minimum required DNR in South Africa covers approximately 194 000km<sup>2</sup>. The 2003 Renewable Energy White Paper calculates that South Africa may have a CSP potential of some 65GW, capable of providing 36 000 GWh/year.

### Environmental Impacts

The potential environmental impacts associated with solar power (land use and habitat loss, water use, and the use of hazardous materials in manufacturing) vary greatly depending on the technology to be used. In broad terms the range of potential impacts could include:

- Land use: Depending on their location, larger utility-scale solar facilities can raise concerns about land degradation and habitat loss. Total land area requirements

estimates for utility-scale PV systems range from 1.5 to 4 ha per megawatt, while estimates for CSP facilities are between 1.6 and 6.7 acres per megawatt<sup>4</sup> ;

- Water use: Solar PV cells do not use water for generating electricity. However, as in all manufacturing processes, some water is used to manufacture solar PV components. CSP, in common with all thermal electric plants, require water for cooling. Water use depends on the plant design, plant location, and the type of cooling system;
- Hazardous materials: The PV cell manufacturing process includes a number of hazardous materials, most of which are used to clean and purify the semiconductor surface. These chemicals (similar to those used in the general semiconductor industry) include hydrochloric acid, sulphuric acid, nitric acid, hydrogen fluoride, 1,1,1-trichloroethane, and acetone. The amount and type of chemicals used depends on the type of cell, the amount of cleaning that is needed, and the size of silicon wafer;
- Other impacts in terms of noise, visual issues, electromagnetics and aircraft interference.

The following **Table 4** indicates the potential Environmental impacts associated with the full range of solar energy project development, together with the applicable and relevant legislation and its reference location within Part B of this Guideline. It is stipulated that these are (under normal circumstances) the main impacts, but other impacts maybe relevant depending on project specifics.

**Table 4: Potential Environmental Impacts of Solar Energy Projects**

Impact Description	Relevant Legislation	Reference (Part B)
Visual Impact	NEMA	B1, B2
Noise Impact (CSP)	NEMA	B1, B2
Land Use Transformation	NEMA, NEMPAA, NHRA, DFA, PPA	B1, B2, B6, B11, B12, B14
Impacts on Cultural Heritage	NEMA, NHRA	B1, B2, B11
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	B1, B2, B9, B10
Hazardous Waste Generation (CSP and PV)	NEMA, NEMWA, HAS	B1, B2, B7, B8
Electromagnetic Interference	NEMA,	B1, B2

<sup>4</sup> [www.ucsus.org](http://www.ucsus.org)

Impact Description	Relevant Legislation	Reference (Part B)
Aircraft Interference	NEMA, PPA, MSA	B1, B2

*NB: The constitution is couched within all South African legislation and will apply to any activity related to renewable energy (See B1 below).*

### Impacts Mitigation

Assuming an IPP project triggers the need for Basic Assessment (BA) or an Environmental Impact Assessment (EIA) under the National Environmental Management Act (NEMA, see section B2), included in the assessment process is the preparation of an environmental management plan (EMP). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Should an environmental assessment practitioner be employed, they can prepare the BA, S&EIR, and EMP to applicable standards.

Potential mitigation measures for solar energy projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess presence of sensitive resources, receptors, habitats and species;
- Plan visual impact reduction measures such as natural (vegetation and topography) and engineered (berms, fences, and shades, etc.) screens and buffers;
- Utilise existing roads and servitudes as much as possible to minimise project footprint;
- Site projects to avoid construction too near pristine natural areas and communities;
- Fence sites as appropriate to ensure safe restricted access and limit alien species being transported on or off site;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species to prevent dust and erosion, as well as establishment of alien species.

## **2.5 A5: Wave Energy**

### Technology Overview: Wave Energy

Wave energy refers to any process that derives power from the movement of waves on the surface of a body of water. In order to harness the power of the waves, an object must be placed in the ocean that is capable of movement as the waves pass. As each wave pounds into the object, it rises and falls in a somewhat elliptical pattern generating power in the process. The amount of power generated from wave power is determined by the height of the waves, how fast the waves move, the length of the waves, and the density of the water where the power generating objects are positioned.

Some designs incorporate parabolic reflectors as a means of increasing the wave energy at the point of capture. Once the wave energy is captured at a wave source, power must be carried to the point of use or to a connection point with the national electricity grid.

Wave energy does pose a potential impact on the marine environment. Noise pollution, for example, could have negative impact if not monitored, although the noise and visible impact of each design varies greatly. Other biophysical impacts (flora and fauna, sediment regimes and water column structure and flows) of scaling up the technology are being studied. In terms of socio-economic challenges, wave farms can result in the displacement of commercial and recreational fishermen from productive fishing grounds, can change the pattern of beach sand nourishment, and may represent hazards to safe navigation.

#### Outlook:

The 2004 RE White Paper states the following in connection with Wave Energy potential in South Africa:

Wave potential along the Cape coastline is estimated as significant, but no exploitation is taking place to date. A mean annual power level of about 40 kW/m wave crest is typical offshore at the Cape Peninsula. An estimated total average power of 56 800 MW is available along the entire coast. However, it is doubtful whether any of this potential energy could be realised on a large scale in the medium-term due to cost considerations (DME, DANCED, 2001). Wave technology is still at an early stage of development. Many small-scale experimental devices are being tested and several prototype devices are now producing electricity for consumption (Cavanagh et al, 1993).

The technology of Wave Energy is therefore excluded from the present version of this Guideline, with an option to include it at a later stage.

## **2.6 A6: Ocean Currents**

### Technology Overview:

Ocean currents comprise an indirect source of solar energy since they are linked to wind and surface heating processes. Harnessing the energy from open-ocean currents requires the use of turbine-driven generators anchored in place in the ocean current streams. In one concept, large turbine blades would be driven by the moving water, similar to windmill blades being moved by the wind; and the blades used to turn the generators harness the energy of the water flow. Another concept uses a barge moored in the ocean current stream fitted with a cable loop to which “parachutes” are fastened. The current acting against the open parachutes develops continuous movement of the cable which could be used to drive a generator to produce electricity.

### Outlook:

The 2004 RE White Paper states the following in connection with Ocean Current Energy potential in South Africa:

Preliminary investigation has revealed considerable potential in the Agulhas Current, one of the strongest currents in the World. The current originates in the Indian Ocean and passes down South Africa's eastern seaboard. It is about 150 km wide and flows at 6 metres/sec, and is estimated to be able to produce some 2 000 MW. At present the technology that employs turbines for electricity production in marine environments is being utilised in several pilot sites across the World. The advantages of ocean currents are that, since water is a dense medium, turbines can be small, flow is predictable, and forecasting is easier. Further assessments are required to establish whether the Agulhas Current is a suitable candidate for this technology, but if so, it could be regarded as a long-term prospect.

The technology of Ocean Current Energy is therefore excluded from the present version of this Guideline, with an option to include it at a later date.

## **2.7 A7: Energy from Waste**

### Technology Overview: Landfill Gas

As waste in landfills decomposes, different gases are continuously produced in varying proportions. Landfill gas (LFG) comprises approximately 50% CH<sub>4</sub>, 40% CO<sub>2</sub>, small quantities of oxygen and nitrogen, and over 100 other trace gases, including CO and H<sub>2</sub>S. Whilst CO<sub>2</sub> is found in much greater quantities in the atmosphere, CH<sub>4</sub> is a potent greenhouse gas that is a key contributor to global climate change (over 21 times more potent than CO<sub>2</sub>). In addition, typical LFG, if permitted to accumulate in low lying or enclosed or confined spaces (such as buildings and houses next to a landfill), may produce an atmosphere that is both explosive and hazardous to life.

The extraction of LFG can take place once landfill cells reach capacity, at which point the landfill is covered, extraction equipment and collection pipe networks set in place, and the process of extracting the LFG can begin. In addition, the installation of LFG extraction systems can be incorporated in the landfilling process, enabling the extraction of LFG much earlier and prior to the completion of individual landfill cells. LFG is converted into electricity through the following process:

- LFG is extracted from the landfill via extraction wells and a centrifugal blower;
- Gas collection pipes collect and transport the LFG from the wells to an extraction plant;
- At the extraction plant the LFG is burned. The burning of the CH<sub>4</sub> component drives a generator that produces electricity. Any surplus is flared via flare units;
- The resulting electricity is then fed into the regional grid.

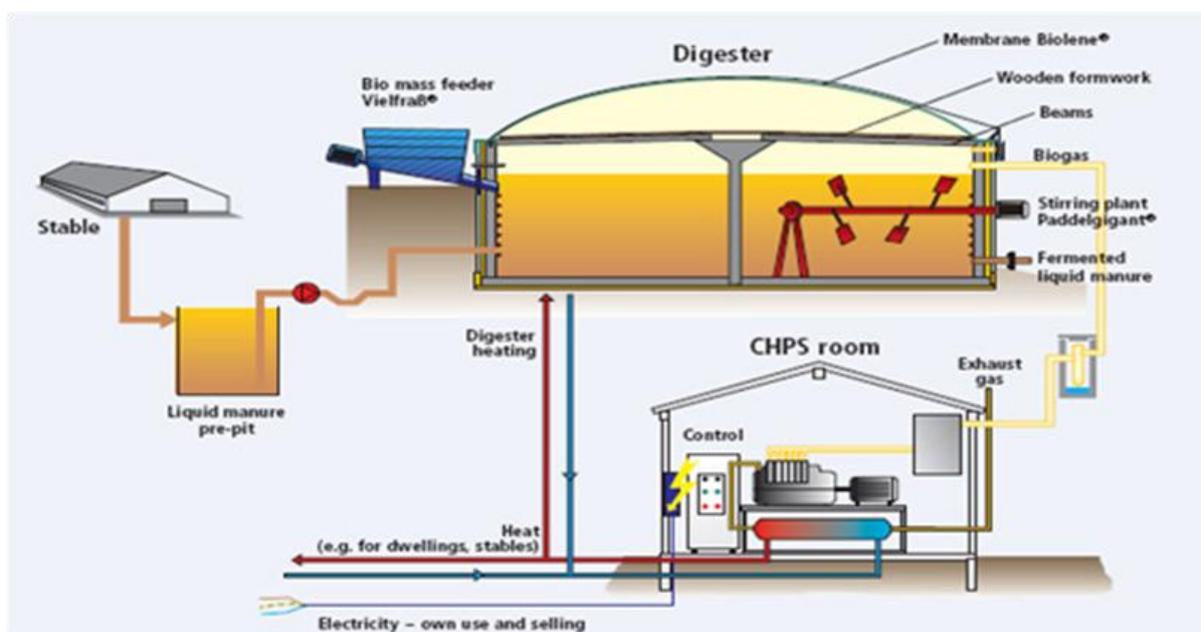
## Technology Overview: Biogas

Biogas typically refers to the gas which is produced by the biological breakdown of organic matter. Organic waste-streams such as animal manure and municipal wastewater (sewerage) can be converted into biogas using anaerobic digestion systems. Biogas consists mainly of CH<sub>4</sub> and carbon dioxide CO<sub>2</sub>. Biogas can be used as fuel for cooking, lighting, water heating as well as being able to run biogas generators to produce electricity.

In industrialised countries, power generation is the main purpose of biogas plants where the conversion of biogas to electricity has become a standard technology. In most cases, biogas is used as a fuel for combustion engines linked to a standard power generation arrangement. Frequently the waste heat from the engine cooling system is utilised within the digester or another local heat-sink, as illustrated in **Figure 4** below.

For use within gas or diesel engines, biogas must fulfil certain requirements:

- The methane content should be as high as possible as this is the main combustible part of the gas;
- The water vapour and CO<sub>2</sub> content should be as low as possible, as they reduce calorific value of the gas; and
- The sulphur content (mainly in form of H<sub>2</sub>S) must be low as it is converted to corrosion-causing acids by condensation and combustion. The percentage of hydrogen sulphide content in the biogas can be addressed via a range of gas scrubbing methods.



**Figure 4: Biogas energy plant**

The following **Table 5** indicates the potential Environmental impacts associated with LFG and biogas project development, together with the applicable and relevant legislation and its reference location within Part B of this Guideline. It is stipulated that these are (under normal circumstances) the main impacts, but other impacts maybe relevant depending on project specifics.

**Table 5: Potential Environmental Impacts of LFG and Biogas Projects**

Impact Description	Relevant Legislation	Reference (Part B)
Visual Impact	NEMA	B1, B2
Noise Impact	NEMA	B1, B2
Odour Emissions	NEMA, NEMAQA	B1, B2, B4
Land Use Transformation	NEMA, NEMPAA, DFA, PPA	B1, B2, B6, B11, B12, B14
Impacts on Cultural Heritage	NEMA, NHRA	B1, B2, B11
Impacts on Water Resources	NEMA, NEMICMA, NWA, WSA	B1, B2, B3, B7, B8, B9, B10
Hazardous Waste Storage and Generation	NEMA, NEMWA	B1, B2, B3, B7, B8, B12, B14, B15
Waste Transportation	NEMA, HSA	B1, B2, B7, B8
Electromagnetic Interference	NEMA, PPA, MSA	B1, B2
Sub-surface LFG Migration	NEMA, NEMWA, NWA	B1, B2, B3, B7, B9
Surface emissions of LFG	NEMA, NEMAQA	B1, B2, B4
Atmospheric (Combustion) Emissions	NEMA, NEMAQA	B1, B2, B4

*NB: The constitution is couched within all South African legislation and will apply to any activity related to renewable energy (See B1 below).*

### Impacts Mitigation

Assuming an IPP project triggers the need for Basic Assessment (BA) or an Environmental Impact Assessment (EIA) under the National Environmental Management Act (NEMA, see section B2), included in the assessment process is the preparation of an environmental management plan (EMP). Project-specific measures designed to mitigate negative impacts and enhance positive impacts should be informed by good industry practice and are to be included in the EMP. Should an environmental assessment practitioner be employed, they can prepare the BA, S&EIR, and EMP to applicable standards.

Potential mitigation measures for LFG and biogas projects include but are not limited to:

- Conduct pre-disturbance surveys as appropriate to assess presence of sensitive resources, habitats and species;
- Protect wetlands and watercourses as applicable;
- Plan visual and noise impact reduction measures such as natural and engineered screens and buffers;
- Plan emissions reduction or sequestration as appropriate;
- Develop and implement waste management plan;
- Develop and implement spill prevention plan;
- Develop and implement waste management plan; and
- Re-vegetation with appropriate indigenous species.

### **3 CLIMATE CHANGE AND RENEWABLE ENERGY**

Greenhouse gases (GHG), including CO<sub>2</sub> emissions, are associated with the conventional provision of energy services and are a major cause of climate change. Globally, coal is the second largest primary energy source used worldwide (preceded by oil), and the first source for power generation. In terms of electricity generation or supply, South Africa is highly dependent on coal-fired power plants and therefore energy supply is carbon dioxide-intensive. Studies conducted on coal usage indicated that household coal burning contributed the largest percentage followed by industrial and commercial usage. Based on 2008 fossil-fuel CO<sub>2</sub> emissions, South Africa was rated the 13th largest emitting country in the world and the largest emitting country on the continent of Africa.

Monitoring and reporting of GHG emissions is done by defining the specific carbon footprint, expressed in carbon dioxide equivalent (CO<sub>2</sub>e), of an activity, site, or operation. GHG emissions reporting is not currently mandatory in South Africa, however, industry and regulators broadly anticipate increasing implementation of regional and international carbon reporting and reduction requirements through various means, including mandatory reporting, carbon pricing, caps, taxes, and trading. A growing number of energy producers today anticipate a future regulatory mandate for GHG emissions reporting by participating in voluntary corporate reporting. Many companies and cities participate in the voluntary reporting initiative, the not-for-profit Carbon Disclosure Project (CDP), the only global system to measure, disclose, manage and share vital environmental information. The CDP holds the largest collection of primary climate change, water and forest-risk information in the world, and use this information to assist industries and governments to collaboratively manage environmental risk ([www.cdproject.net](http://www.cdproject.net)). This risk can be managed, in part, by increasing renewable energy sources and reducing reliance on carbon-intensive energy provision services.

Renewable energy sources play a role in providing energy services in a sustainable manner and, in particular, in mitigating climate change. Eskom, South Africa's largest energy generating services has a comprehensive climate change strategy which is based on six pillars:

- Diversification of the generation mix to lower carbon emitting technologies;
- Energy efficiency measures to reduce demand and greenhouse gas and other emissions;
- Adaptation to the negative impacts of climate change;
- Innovation through research, demonstration and development;
- Investment through carbon market mechanisms; and
- Progress through advocacy, partnerships and collaboration.

Increasing the share of renewables in the energy industry is an effective way of making our energy supply more environmentally friendly, diversifying energy sources, reducing the effects of climate change as well as contributing to sustainable development.

## **4 SUSTAINABLE DEVELOPMENT**

Sustainable energy can be defined as energy which provides affordable, accessible and reliable energy services that meet economic, social and environmental needs within the overall developmental context of society, while recognising equitable distribution in meeting those needs. Sustainable energy is an element of sustainable development which is defined as development that meets the present needs and goals of the population without compromising the ability of future generations to meet theirs. On the overall sustainable development is underpinned by economic development (growth efficiency), social development (culture, heritage, poverty, and empowerment) and environmental development (pollution and natural resources).

The government of South Africa considers the use of renewable energy as a contribution to sustainable development. Most renewable energy sources are indigenous and naturally available, and the use of renewables therefore strengthens energy security because it is not subject to disruption by international crisis. Fuel wood, charcoal, coal and kerosene (paraffin) in the rural and peri-urban South Africa is the primary source of energy for cooking and heating. Sustainable development implies replacing firewood and charcoal with more modern energy sources, while at the same time introducing technological innovations to improve the efficiency and environmental problems associated with coal and kerosene. Sustainable development also implies the provision of electricity and other modern fuels to the commercial and industrial sectors to promote their economic competitiveness and future prosperity.

## **5 PART B: RENEWABLE ENERGY AUTHORISATION REQUIREMENTS**

### **5.1 B1: Constitution of the Republic Of South Africa (No. 108 of 1996)**

The Constitution of the Republic of South Africa is the supreme law of the country and underpins all environmental legislation. As such, any law or conduct that is inconsistent with the Constitution is invalid (Constitution, 1996). The Constitutional environmental right (section 24 of the constitution) not only affords every person the entitlement to enjoy a right to an environment which is not harmful to their health and well-being, but also places a constitutional mandate on government to protect the environment through reasonable legislative and other measures that:

- Prevent pollution and ecological degradation;
- Promote conservation; and
- Secure ecological sustainable development and the use of natural resources while promoting justifiable economic and social development.

The constitution also requires that all spheres of Government and all organs of state within each sphere must:

- respect the constitutional status, institutions, powers and functions of government in the other spheres;
- not assume any power or function except those conferred on them in terms of the Constitution;
- exercise their powers and perform their functions in a manner that does not encroach on the geographical, functional or institutional integrity of government in another sphere; and
- co-operate with one another in mutual trust and good faith by:
  - fostering friendly relations;
  - (assisting and supporting one another;
  - (informing one another of, and consulting one another on, matters of common interest;
  - co-ordinating their actions and legislation with one another;
  - adhering to agreed procedures; and
  - avoiding legal proceedings against one another.

The Constitution of the Republic of South Africa forms the foundation of all environmental principles and management in the country and it is enshrined in all legislation. Such legislation is discussed below with specific reference to the environment.

## 5.2 B2: The National Environmental Management Act (No. 107 of 1998)

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended in 2010) gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment<sup>5</sup>. In summary, chapter one of the “Act” outlines national environmental management principles that must be incorporated into all decisions regarding the environment, throughout the country, by all organs of state. Central to these principles is the concept of sustainability, which entails meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. Chapters two to four of the NEMA outline government and non-government institutions and their responsibilities for ensuring co-operative governance and making decisions. Contact details for the administering departments and authorities at the national and provincial levels (as of June 2013) are listed in **Appendix A**.

Chapter 5 of NEMA provides for integrated environmental management. The purpose of this Chapter is to promote the application of appropriate environmental management tools in order to ensure the integrated environmental management of activities. The general objective of integrated environmental management is to:

- (a) promote the integration of the principles of environmental management set out in Section 2 of the Act into the making of all decisions which may have a significant effect on the environment;
- (b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in Section 2;
- (c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them;
- (d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.

NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in Environmental Impact Assessment Regulations Listing Notices:

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<sup>5</sup> The term environment does not pertain exclusively to natural or non-human surroundings, but also includes social, economic and physical aspects of a particular location or setting

- GNR 544 (Listing Notice 1) lists activities that require a Basic Assessment (BA);
- GNR 545 (Listing Notice 2) lists activities that require a Scoping/Environmental Impact Report (EIR); and
- GNR 546 (Listing Notice 3) lists activities and sensitive areas per province, or other specified geographical area, for which a 'regional' Basic Assessment process must be conducted. Please note that assessments required by either listing notice 1 or 3 are referred to as 'Basic Assessments'. The term 'regional' is only used here for ease of reference and is not a term used by authorities.

The purpose of these regulations is to avoid negative impacts on the environment or, where they cannot be avoided, ensure mitigation and management of the impacts to acceptable levels, while optimising positive environmental impacts.

Examples of listed activities that require a BA (GNR 544), S&EIR (GNR 545), and 'regional' BA (GNR 546) are listed in **Table 6**, **Table 7**, and **Table 8** respectively. The competent authority (CA) in respect of the activities listed in these tables is the environmental authority in the province in which the activity is to be undertaken. The typical CA for the respective provinces listed below. Please note that under NEMA (section 42) the CA may be changed at the discretion of the Minister).

#### Provincial Competent Authority

NEMA competent authorities (CAs) are specific to their provincial location and environmental authorisation issued by each provincial department listed below.

- 1) **Limpopo Province:** Department of Economic Development, Environment and Tourism (L:DEDET)
- 2) **Mpumalanga Province:** Mpumalanga Department of Economic Development, Environment and Tourism (M:DEDET)
- 3) **Gauteng Province:** Gauteng Department of Agriculture and Rural Development (G:DARD)
- 4) **Northwest Province:** Department of Agriculture and Rural development (NW:DARD)
- 5) **KwaZulu Natal Province:** Department of Agriculture and Environmental Affairs, KwaZulu-Natal (KZN DAEA);
- 6) **Free State Province:** Free State Department of Economic Development, Tourism and Environmental Affairs (FS:DETEA);

- 7) **Northern Cape Province:** Northern Cape Department of Environmental Affairs and Development Planning (NC:DEADP)
- 8) **Eastern Cape Province:** Eastern Cape Department of Economic Development and Environment Affairs (EC:DEDEA)
- 9) **Western Cape Province:** Western Cape Department of Environmental Affairs And Development Planning (WC: DEADP)

**Table 6: Possible Renewable Energy Basic Assessment Requirements under GNR 544**

GNR544 Listing Notice 1 (requires basic assessment)	Primarily applicable to:
<p><b>Activity 1:</b> The construction of facilities or infrastructure for the generation of electricity where:</p> <p>i) the electricity output is more than 10MW but less than 20MW; or the output is 10MW or less but the total extent of the facility covers an area in excess of 1 hectare.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 9:</b> The construction of facilities or infrastructure exceeding 1000m in length for the bulk transportation of water, sewage or storm water -</p> <p>i) with an internal diameter of 0,36m or more; or</p> <p>ii) with a peak throughput of 120l/s or more,</p> <p>excluding where:</p> <p>a) such facilities or infrastructure are for bulk transportation of water, sewage or storm water or storm water drainage inside a road reserve; or</p> <p>b) where such construction will occur within urban areas but further than 32 metres from a watercourse, measured from the edge of the watercourse.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<p><b>Activity 10:</b> The construction of facilities or infrastructure for the transmission and distribution of electricity:</p> <p>i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> </ul>

<b>GNR544 Listing Notice 1 (requires basic assessment)</b>	<b>Primarily applicable to:</b>
ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	<ul style="list-style-type: none"> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 13:</b></p> <p>The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500m<sup>3</sup>.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 16:</b></p> <p>Construction or earth moving activities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater, in respect of –</p> <p>fixed or floating jetties and slipways; tidal pools;</p> <p>iv) embankments;</p> <p>v) rock revetments or stabilising structures including stabilising walls;</p> <p>vi) buildings of 50 square metres or more; or</p> <p>vii) infrastructure covering 50 square metres or more –</p> <p>but excluding</p> <p>if such construction or earth moving activities will occur behind a development setback line; or</p> <p>c) where such construction or earth moving activities will occur within existing ports or harbours and the construction or earth moving activities will not increase the development footprint or throughput capacity of the port or harbour;</p> <p>d) where such construction or earth moving activities is undertaken for purposes of maintenance of the facilities mentioned in (i)-(vi) above; or</p> <p>e) where such construction or earth moving activities is related to the construction of a port or harbour, in which case activity 24 of Notice 545 of 2010 applies.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Wave; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 17:</b></p> <p>The planting of vegetation or placing of any material on dunes and exposed sand surfaces, within the littoral active zone for the purpose of preventing the free movement of sand, erosion or</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind; and</li> <li>• Wave.</li> </ul>

<b>GNR544 Listing Notice 1 (requires basic assessment)</b>	<b>Primarily applicable to:</b>
accretion, excluding where the planting of vegetation or placement of material relates to restoration and maintenance of indigenous coastal vegetation or where such planting of vegetation or placing of material will occur behind a development setback line.	
<p><b>Activity 22:</b> The construction of a road, outside urban areas,</p> <ul style="list-style-type: none"> <li>i) with a reserve wider than 13.5m or</li> <li>ii) where no reserve exists where the road is wider than 8m.</li> <li>iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.</li> </ul>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 23:</b> The transformation of undeveloped, vacant or derelict land to:</p> <ul style="list-style-type: none"> <li>i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or</li> <li>ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares;</li> </ul> <p>Except where such transformation takes place for linear activities.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 24:</b> The transformation of land bigger than 1 000m<sup>2</sup> in size, to residential, retail, commercial, industrial or institutional use, where, as the time of the coming into effect of the schedule such land was zoned open space, conservation or had an equivalent zoning.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 27:</b> The decommissioning of existing facilities or infrastructure, for -</p> <ul style="list-style-type: none"> <li>i) electricity generation with a threshold of more than 10MW;</li> <li>ii) electricity transmission and distribution with a threshold of more than 132kV;</li> </ul>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> </ul>

<b>GNR544 Listing Notice 1 (requires basic assessment)</b>	<b>Primarily applicable to:</b>
<p>iii) storage, or storage and handling, of dangerous goods of more than 80 cubic metres;</p> <p>but excluding any facilities or infrastructure that commenced under an environmental authorisation issued in terms of the Environmental Impact Assessment Regulations, 2006 made under section 24(5) of the Act and published in Government Notice No. R. 385 of 2006, or Notice No. 543 of 2010.</p>	<ul style="list-style-type: none"> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 29:</b></p> <p>The expansion of facilities for the generation of electricity where:</p> <p>i) the electricity output will be increased by 10MW or more, excluding where such expansion takes place on the original development footprint; or</p> <p>ii) regardless the increased output of the facility, the development footprint will be expanded by 1 hectare or more.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 38:</b></p> <p>The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 41:</b></p> <p>The expansion of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, where the combined capacity will be increased by 50 000m<sup>3</sup> or more.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<p><b>Activity 43:</b></p> <p>The expansion of structures in the coastal public property where the development footprint will be increased by more than 50 square metres, excluding such expansions within existing ports or harbours where there would be no increase in the development</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Wave; and</li> <li>• Ocean currents</li> </ul>

<b>GNR544 Listing Notice 1 (requires basic assessment)</b>	<b>Primarily applicable to:</b>
footprint or throughput capacity of the port or harbour.	
<p><b>Activity 45:</b></p> <p>The expansion of facilities in the sea, an estuary, or within the littoral active zone or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever is the greater, for –</p> <ul style="list-style-type: none"> <li>(i) fixed or floating jetties and slipways;</li> <li>(ii) tidal pools;</li> <li>(iii) embankments;</li> <li>(iv) rock revetments or stabilising structures including stabilising walls;</li> <li>(v) buildings by more than 50 square metres;</li> <li>(vi) infrastructure by more than 50 square metres;</li> <li>(vii) facilities associated with the arrival and departure of vessels and the handling of cargo;</li> <li>(viii) piers;</li> <li>(ix) inter- and sub-tidal structures for entrapment of sand;</li> <li>(x) breakwater structures;</li> <li>(xiv) tunnels; or</li> <li>(xv) underwater channels –</li> </ul> <p>where such expansion will result in an increase in the development footprint of such facilities</p> <p>but excluding where such expansion occurs:</p> <ul style="list-style-type: none"> <li>a) behind a development setback line; or</li> <li>b) within existing ports or harbours where there will be no increase in the development footprint or throughput capacity of the port or harbour.</li> </ul>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Wave; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 47:</b></p> <p>The widening of a road by more than 6m, or the lengthening of a road by more than 1km:</p> <ul style="list-style-type: none"> <li>iii) where the existing reserve is wider than 13,5m; or</li> <li>iv) where no reserve exists, where the existing road is wider than 8m.</li> </ul>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> </ul>

GNR544 Listing Notice 1 (requires basic assessment)	Primarily applicable to:
	<ul style="list-style-type: none"> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 54:</b> The expansion of an island, anchored platform or any other permanent structure on or along the sea bed, where the expansion will constitute an increased development footprint.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Wave; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 56:</b> Phased activities for all activities listed in this Schedule, which commenced on or after the effective date of this Schedule, where any one phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold; -  excluding the following activities listed in this Schedule:  16(i)-(iv);  17;  27(iii) &amp; (iv);  45(i)-(iv) &amp; (vii)-(xv);  51; and  54.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>

**Table 7: Possible Renewable Energy Scoping and EIR Requirements under GNR 545**

GNR545 Listing Notice 2 (requires scoping and EIR)	Primarily applicable to:
<p><b>Activity 1:</b> The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20MW or more.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp;</li> </ul>

<b>GNR545 Listing Notice 2 (requires scoping and EIR)</b>	<b>Primarily applicable to:</b>
	Biofuel; <ul style="list-style-type: none"> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 8:</b>          The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p>	Technologies of: <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
<p><b>Activity 10:</b>          The construction of facilities or infrastructure for the transfer of 50 000m<sup>3</sup> or more water per day, from and to or between any combination of the following:</p> <ul style="list-style-type: none"> <li>i) water catchments,</li> <li>viii) water treatment works; or</li> <li>ix) impoundments,</li> </ul> <p>Excluding treatment works where water is to be treated for drinking purposes.</p>	Technologies of: <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<p><b>Activity 15:</b>          Physical alteration of undeveloped vacant or derelict land for residential retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such</p>	Technologies of: <ul style="list-style-type: none"> <li>• Wind;</li> </ul>

<b>GNR545 Listing Notice 2 (requires scoping and EIR)</b>	<b>Primarily applicable to:</b>
physical alteration takes place for: i) linear development activities; or ii) agriculture or afforestation where activity 16 in this schedule will apply.	<ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<b>Activity 19:</b> 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.	Technologies of: <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<b>Activity 26:</b> Commencing of an activity, which requires an atmospheric emission license in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), except where Activity 28 in Notice No. R. 544 of 2010 applies.	Technologies of: <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>

**Table 8: Possible Renewable Energy Basic Assessment Requirements under GNR 546**

<b>GNR546 Listing Notice 3</b>	<b>Primarily applicable to:</b>
<b>Activity 2:</b> The construction of reservoirs for bulk water supply with a capacity of more than 250 cubic meters. (Provincial/geographical qualifications apply based on environmental attributes)	Technologies of: <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<b>Activity 4:</b> The construction of a road wider than 4m with a reserve less than 13.5m. (Provincial/geographical qualifications apply based on environmental attributes)	Technologies of: <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>

<p><b>Activity 10:</b> The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 m<sup>3</sup>. (Provincial/geographical qualifications apply based on environmental attributes)</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 12:</b> The clearance of an area of 300m<sup>2</sup> or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (Provincial/geographical qualifications apply based on environmental attributes)</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 13:</b> The clearance of an area of 1 ha or more of vegetation where 75% or more of vegetative cover constitutes indigenous vegetation. (Provincial/geographical qualifications apply based on environmental attributes)</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 14:</b> The clearance of an area of 5 ha or more of vegetation where 75% or more of vegetative cover constitutes indigenous vegetation. (Provincial/geographical qualifications apply based on environmental attributes)</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and</li> <li>• Waste.</li> </ul>
<p><b>Activity 16:</b> The construction of:  iii) jetties exceeding 10 square metres in size;</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Waves; and</li> <li>• Ocean</li> </ul>

<p>x) slipways exceeding 10 square metres in size;</p> <p>xi) buildings with a footprint exceeding 10 square metres in size; or</p> <p>xii) infrastructure covering 10 square metres or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>currents.</p>
<p><b>Activity 17:</b> The expansion of reservoirs for bulk water supply where the capacity will be increased by more than 250 cubic metres.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Hydropower.</li> </ul>
<p><b>Activity 19:</b> The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (Provincial/geographical qualifications apply based on environmental attributes)</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> <li>• Solar; and Waste.</li> </ul>
<p><b>Activity 24:</b> The expansion of:</p> <p>a) jetties where the jetty will be expanded by 10 square metres in size or more;</p> <p>f) slipways where the slipway will be expanded by 10 square metres or more;</p> <p>g) buildings where the buildings will be expanded by 10 square metres or more in size; or</p> <p>h) infrastructure where the infrastructure will be expanded by 10 square metres or more</p> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Waves; and</li> <li>• Ocean currents.</li> </ul>
<p><b>Activity 26:</b> Phased activities for all activities listed in this Schedule and as it applies to a specific geographical area, which commenced on or after the effective date of this Schedule, where any phase of the activity may be below a threshold but where a combination of the phases, including expansions or extensions, will exceed a specified threshold.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Wind;</li> <li>• Biomass &amp; Biofuel;</li> <li>• Hydropower;</li> </ul>

	<ul style="list-style-type: none"> <li>• Solar;</li> <li>• Wave;</li> <li>• Waste; and</li> <li>• Ocean currents</li> </ul>
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Environmental authorisation for any given activity may only be issued by the competent authority (CA) after the developer has complied with the procedural requirements as set out in the EIA regulations of NEMA (GNR 543). With regard to NEMA GNR 543, these requirements summarily entail:

- The appointment of an independent and competent Environmental Assessment Practitioner (EAP);
- EAP must determine which application process (BA or S&EIR) is applicable:
  - Regulation 22 lists the minimum requirements of a BA;
  - Regulation 28 lists the minimum requirements of a Scoping Report; and
  - Regulation 31 lists the minimum requirements of the subsequent EIA which is informed by the scoping report;
- Authorisations can be amended or suspended (Regulation 38);
- Public participation (PP) whereby interested and affected parties (I&APs) are entitled to be kept informed and involved in either the BA or the S&EIR process and have an opportunity to comment on any draft or final report before it is submitted (Regulation 56);
- Appeals require a notice of intent within 20 days of the CA decision, and the appeal must be lodged within 30 days of the end of the 20 day period (Regulations 60 and 62).

Scoping is a short-term process that provides an overview of the issues involved with a proposed activity. Amongst other things, it identifies the geographical and time scales of a proposed project and provides an indication of potential positive and negative impacts associated with the project. Scoping is useful for determining the scope of a project and planning.

Public Participation (PP) is not only a legal requirement (Chapter 6), but also a vital component of any environmental authorisation process. Guidelines specify public review periods of 40 days and emphasise the importance of due process in involving previously disadvantaged communities. This is done by providing documentation in local languages and giving sufficient opportunity for rural communities to be involved in the BA or S&EIR process. The objectives of the Public Participation Process are:

- To provide stakeholders with information on the proposed project and opportunities to comment;
- To ensure that stakeholders have the opportunity to raise issues of concern and suggestions for enhanced benefits;
- To ensure that stakeholders have the opportunity to comment on the technical and public participation processes of the BA; and
- To ensure that stakeholders have the opportunity to comment on the findings of the BA or S&EIR.

An Environmental Management Programme (EMP) is a requirement of both the BA and S&EIR processes and essentially:

- Transforms mitigation measures identified in the BA or S&EIR into legal requirements that must be carried out by specified responsible persons or parties;
- Provides goals and targets for environmental planning and regulation;
- Ensures that 'Conditions of Approval' are implemented and that there is a basis for monitoring compliance; and
- Provides a site management tool for the developer or site/ operations manager.

The NEMA EIA regulations (GNR 543) stipulate that where various activities require authorisation in respect of a single project, of which some require a BA and others a S& EIR; S& EIR should be conducted in respect of all activities in an integrated application process.

It is important to note that the S&EIR or BA will not only address triggered listed activities in a narrow sense, but will assess potential impacts associated with the project as a whole, including transport, water supply, etc. as well as cumulative impacts of the construction and operation over its lifetime.

**Table 6 to Table 8** list activities from GNR 544, GNR545 and GNR546 which would probably or possibly require environmental authorisation before renewable energy development activities (e.g. site preparation, construction and operation) can commence. The list of activities outlined in this guideline is not exhaustive; there could be many other secondary activities that may be listed and which require environmental authorisation. It is the responsibility of developer, with the assistance of an EAP to fully investigate all activities applicable to a particular project.

### **5.3 B3: National Environmental Management: Biodiversity Act (Act 10 of 2004)**

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) ("NEMBA") aims to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA, the protection of species and ecosystems

that warrant national protection, the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources. The Act places severe restrictions on activities that could have adverse effects on threatened or protected species.

The purpose of the NEMBA includes:

- the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998;
- the protection of species and ecosystems that warrant national protection; and
- the sustainable use of indigenous biological resources and the fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources.

Chapter 3 of the NEMBA provides an overview on Biodiversity Planning and Monitoring; provides for the preparation and adoption of the National Biodiversity Framework, the determination of bioregions and the publication of bioregional plans. The NEMBA also enables the adoption, coordination and alignment of biodiversity plans and biodiversity management agreements, amongst others. Any existing statutory instruments for biodiversity protection and management which may have been adopted in terms of this chapter must be taken into account during the implementation of any development activities as well as during assessments for authorisations in terms of additional legislation such as, for instance, environmental authorisations in terms of the NEMA.

Further provision is made for protection of threatened or protected ecosystems and species as well as provisions guarding against the introduction of alien and invasive species. The Act identifies restricted activities involving listed threatened, protected or alien species. These activities include picking parts of, or cutting, chopping off, uprooting, damaging or destroying, any specimen of a listed threatened or protected species. As stipulated in Section 57 of the Act, a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7. Lists of critically endangered, endangered, vulnerable and protected species have been published in GNR 151 of 23 February 2007. Regulations have also been promulgated on Threatened and Protected Species in GNR 152 of 23 February 2007. These lists and associated restricted activities as well as the regulations need to be taken into account during the implementation of any renewable energy development activities as well as during assessments for authorisations associated with these activities in terms of other legislation.

Application may be made for a permit to engage in restricted activities, which application may be subject to various stringent requirements as set out in Section 88 of the NEMBA. The CA responsible for administering the NEMBA is dependent on the province in which the activity is taking place (see section B2; contact details for relevant CAs are listed in **(Appendix A)**).

#### 5.4 B4: National Environmental Management: Air Quality Act (Act 39 of 2004)

The National Environment Management: Air Quality Act (NEMAQA) serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965) and various other laws dealing with air pollution.

According to the Act, the DEA, the provincial environmental departments and local authorities are separately and jointly responsible for the implementation and enforcement of various aspects of the Air Quality Act. Each of these spheres of government is obliged to appoint an air quality manager and to co-operate with each other and co-ordinate their activities through mechanisms provided for in the National Environmental Management Act.

The purpose of the Act is to set norms and standards that relate to:

- Institutional frameworks, roles and responsibilities;
- Air quality management planning;
- Air quality monitoring and information management;
- Air quality management measures;
- General compliance and enforcement.

The Act provides for the identification of priority pollutants and the setting of ambient standards with respect to these pollutants. The Act provides for the establishment of a multi-stakeholder National Air Quality Committee, which will advise the Minister on the implementation of the Act.

The Act ensures that air quality planning is integrated with existing activities. The implications of this are that plans that are required in terms of the NEMA must incorporate consideration of air quality. In addition, integrated development plans, developed by municipalities, also have to take air quality into account.

The Act describes various regulatory tools that should be developed to ensure the implementation and enforcement of air quality management plans. These include a schedule of Listed Activities which require an Atmospheric Emission license. GNR 964 (2012) Part 3 stipulates minimum emissions standards from solid biomass combustion installations as shown below in **Table 9**.

**Table 9: Minimum emissions standards for solid biomass combustion installations**

<b>Description</b>	Solid biomass fuel combustion installations used primarily for steam raising or electricity generation.		
<b>Application</b>	All installations with design capacity equal to or greater than 50 MW heat input per unit, based on the lower calorific value of the fuel used.		
<b>Substance or mixture of substances</b>		<b>Plant Status</b>	<b>Mg/Nm<sup>3</sup> under normal conditions of the 10% O<sub>2</sub>, 273 Kelvin and 101.3kPa.</b>
<b>Common name</b>	<b>Chemical Symbol</b>		
Particular matter	N/A	New	50
		Existing	100
Sulphur dioxide	SO <sub>2</sub>	New	500
		Existing	3 500
Oxides of Nitrogen	NO <sub>x</sub> expressed as NO <sub>2</sub>	New	750
		Existing	1 100

The CA responsible for administering the NEMAQA is dependent on the province in which the activity is taking place (see section B2; contact details for relevant CAs are listed in **Appendix A**).

#### **5.5 B5: The National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008)**

The Integrated Coastal Management Act (NEMICMA or ICMA) sets out an approach to managing the nation's coastal resources to promote social equity and make best economic use of coastal resources, whilst protecting the natural environment.

Through the ICMA, the constitution empowers the state to manage the coast on behalf of its citizens. The NEMICMA applies specifically to South Africa's internal waters, territorial waters, exclusive economic zone, and the continental shelf, as well as the Prince Edward Islands (including Marion Island). The various spatial aspects of the Coastal Zone that the NEMICMA covers include:

- **Coastal Public Property.** Comprises coastal waters, land submerged by coastal waters, islands in coastal water, seashore, Admiralty Reserve, State land declared as coastal public property, and natural resources (Section 7 of NEMICMA)
- **Coastal protection zone.** A continuous strip of land from the high water mark to 100m inland of an Urban zone and 1000m inland of a Rural zone (Section 16 of NEMICMA).
- **Coastal access land.** Land that ensures the public has access to coastal public property (Section 18 of NEMICMA).

- **Coastal waters.** Essentially all waters influenced by tides (e.g. bays, estuaries, and harbours) and the waters extending from the shoreline of South Africa to its territorial water limit of (12 nautical miles offshore).
- **Coastal protected areas.** Any area protected under the National Environmental Management Protected Areas Act (No. 57 of 2003) or specified under section 16 of the NEMICMA; and
- **Special management areas.** Areas declared by the minister that prohibit certain activities from taking place (Section 23 of NEMICMA); and
- **Coastal set-back lines.** Lines that prohibit or restrict the construction, extension, or repair of structures that is either wholly or partly seaward of the line (Section 25 of NEMICMA). Set-back lines are ultimately the responsibility of the provincial authority.

#### Assessing, avoiding and minimising adverse effects

In order to avoid negative impacts on the coastal environment, the NEMICMA applies the NEMA (section 28) to anyone who has caused or may cause significant pollution or degradation of the coastal environment.

If an activity is perceived by the minister to potentially have an adverse effect on the coastal environment, notices may be issued that include the following instructions:

- Build, maintain or demolish and works specified;
- Prohibition of the activity in question; or
- Remove the structure from the coastal zone within a certain period.

Non-compliance with these notices may result in external entities carrying out the instructions at the developers cost.

#### Environmental Authorisations

The NEMICMA does not include separate environmental assessment procedures to those provided in chapter 5 of NEMA, as any activity conducted in the coastal zone will require an environmental authorisation under the NEMA. In addition to the NEMA requirements and criteria for environmental authorisations, the NEMICMA provides (in section 63) additional criteria that must be considered by the relevant competent authority when evaluating an application for an activity in the coastal zone.

#### Coastal leases and concessions on coastal public property

While coastal public property is managed in the interests of the general public, the minister may grant a coastal lease or concession to allow for some activities to take place on a coastal public property. The NEMICMA specifies that no person may occupy any part of, or

site, construction or erect any building, road, barrier, or structure on or in a coastal public property unless under the authority of a coastal lease or concession.

A lessee or concessionaire is still obliged to obtain any other authorisations that may be required in terms of the NEMICMA or other legislation, and comply with any other legislation.

No person may claim exclusive rights (private rights) to use any coastal resource that is part of, or derives from coastal public property, unless such a person:

- Is empowered to do so by South African legislation;
- Is authorised to do so in terms of a coastal concession awarded by the minister; or
- Is authorised to do so in terms of an authorisation issued under the Living Resource Act (No. 18 of 1998).

A coastal lease or concession may not be awarded for a period longer than 20 years is subject to case specific conditions. If a coastal lease or concession applies to land that is partially submerged by coastal waters, then the lease may allow exclusive use of the water should it be required.

#### General provisions

Subject to the conditions of the Expropriation Act (No. 63 of 1975), land within the coastal zone may be temporarily occupied (i.e. material can be removed or deposited, and temporary works constructed) if it is necessary to:

- Build, maintain, or undertake repair works to implement a coastal management plan; or
- Respond to pollution or emergency incidents.

The CA responsible for administrating the NEMICMA is dependent on the province in which the activity is taking place (see section B2; contact details for relevant CAs are listed in **Appendix A**).

#### **5.6 B6: National Environmental Management: Protected Areas Act**

The objectives of the National Environmental Management: Protected Areas Act 2003 (Act 57 OF 2003) (NEMPAA) as amended by the National Environmental Management: Protected Areas Amendment Act 31 of 2004, are to:

- provide for the declaration and management of protected areas;
- provide for co-operative governance in the declaration and management of protected areas;

- effect a national system of protected areas in South Africa as part of a strategy to manage and conserve its biodiversity;
- provide for a representative network of protected areas on state land, private land and communal land;
- promote sustainable utilisation of protected areas for the benefit of people, in a manner that would preserve the ecological character of such areas;
- promote participation of local communities in the management of protected areas, where appropriate; and
- provide for the continued existence of South African National Parks.

The Act also provides for the maintenance and monitoring of declared protected areas. The CA responsible for administering the NEMPAA is dependent on the province in which the activity is taking place (see section B2; contact details for relevant CAs are listed in **Appendix A**).

#### **5.7 B7: National Environmental Management: Waste Act (Act 59 of 2008)**

The National Environmental Management: Waste Act (NEMWA) came into effect on 1 July 2009. Section 19 of the NEMWA provides for listed waste management activities and states in Section 19(1) that the Minister may publish a list of waste management activities that have, or are likely to have a detrimental effect on the environment. Such a list was published in GN 718 of 03 July 2009 (GN 718) identifying those waste management activities that require a Waste Management Licence in terms of the Act. Activities are defined within Category A (non-hazardous) and Category B (hazardous) wastes. From a renewable energy perspective, only Category A is considered here. The activities listed under Category B are equivalent to those that require an EIA process stipulated in the EIA regulations made under section 24(5) of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The licensing procedures in terms of the NEMWA once again makes use of the procedural provisions as set out in GNR 543 of 18 June 2010 in terms of the NEMA, procedural regulations regarding environmental impact assessments. For Category A, a Basic Assessment is required, as stipulated under section 24(5) of the NEMA is required.

Before any development activities which may generate waste commence, an assessment as to the applicability of the relevant provisions of the NEMWA will need be made and if so required, any requisite waste management licenses applied for and procured prior to the commencement of any waste management activity which requires licensing. The CA responsible for administering the NEMWA is dependent on the province in which the activity is taking place (see section B2; contact details for relevant CAs are listed in **Appendix A**).

**Table 10** lists relevant activities which would require the Waste Management Licence application process to be undertaken before renewable energy development activities could commence.

**Table 10: Activities requiring a waste management license**

<b>NEMWA Activity Listing Category A (relevant to Renewable Energy)</b>	<b>Primarily applicable to:</b>
<p><b>Storage of waste:</b></p> <p>6) The storage, including the temporary storage, of general waste at a facility that has the capacity to store in excess of 100m<sup>3</sup> of general waste at any one time, excluding the storage of waste in lagoons.</p> <p>7) The storage including the temporary storage of general waste in lagoons.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>
<p><b>Reuse, recycling and recovery:</b></p> <p>1) The sorting, shredding, grinding or bailing of general waste at a facility that has the capacity to process in excess of one ton of general waste per day.</p> <p>8) The recovery of waste including the refining, utilisation, or co-processing of the waste at a facility that has the capacity to process in excess of three tons of general waste or less than 500kg of hazardous waste per day, excluding recovery that takes place as an integral part of an internal manufacturing process within the same premises.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>
<p><b>Treatment of Waste:</b></p> <p>The biological, physical or physiochemical treatment of general waste at a facility that has the capacity to process in excess of 10 tons of general waste per day.</p> <p>8) The processing of waste at biogas installations with a capacity to process in excess of 5 tons per day bio-degradable waste.</p> <p>9) The treatment of effluent, wastewater or sewage with an annual throughput capacity of more than 2 000m<sup>3</sup> but less than 15 000m<sup>3</sup>.</p> <p>The extraction, recovery or flaring of landfill gas.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>
<p><b>Storage, treatment and processing of animal waste</b></p> <p>1) The storage, treatment or processing of animal manure at a facility with a capacity to process in excess of one ton per day.</p>	<p>Technologies of:</p> <ul style="list-style-type: none"> <li>• Biomass &amp; Biofuel; and</li> <li>• Waste.</li> </ul>

## 5.8 B8: The Hazardous Substances Act (No. 15 of 1973)

The hazardous Substances Act (HAS, No. 15 of 1973) was promulgated to provide for the control of substances which may cause injury, ill-health or death. Substances are defined as hazardous if their inherent nature is: toxic, corrosive, irritant; strongly sensitising, flammable and pressure generating (under certain circumstances) which may injure cause ill-health, or death in humans. The CA responsible for administrating the HSA is the Department of Environmental Affairs (DEA) and the provincial CA (see section B2; contact details for relevant CAs are listed in **Appendix A**).

The Hazardous Substances Act also provides for matters concerning the division of such substances or products into four groups in relation to the degree of danger, the prohibition and control of the importation, manufacture, sale, use, operation, application and disposal of such substances.

- Group 1 substances include all hazardous substances (as defined above);
- Group 2 substances include mixtures of Group 1 substances;
- Group 3 substances include substances found in certain electronic products (i.e. product with an electronic circuit); and
- Group 4 substances include all radioactive substances

### Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste<sup>6</sup>

Under the South African National Standards (SANS), hazardous substances are given an identification number and are classified into nine classes (Table 11). Minimum requirements for dealing with these substances are provided in **Table 12** below.

**Table 11: Classes of Dangerous goods as defined by DWAF (2005)**

Class	Description
Class 1	<b>Explosives</b>
Class 2	<b>Gases: compressed, liquefied or dissolved under pressure</b>
2.1	Flammable Gases
2.2	Non-flammable, non-toxic gases
2.3	Toxic gases
Class 3	<b>Flammable Liquids</b>
3.1	Low flashpoints group of liquids; flashpoints below -18°C c.c.*
3.2	Intermediate flashpoint group of liquids; flashpoint of - 18°C up to, but not

<sup>6</sup> Department of Water Affairs & Forestry (2005); *Minimum Requirements for the Handling, Classification and Disposal of Hazardous Waste*; Waste Management Series

Class	Description
3.3	including 23°C c.c.* High flashpoint group of liquids flashpoint of 23°C up to, and including, 61°C c.c.
Class 4	<b>Flammable Solids or substances</b>
4.1	Flammable solids
4.2	Flammable solids liable to spontaneous combustion
4.3	Flammable solids which emit flammable gases when in contact with water
Class 5	<b>Oxidising substances and organic peroxides</b>
5.1	Oxidising substances
5.2	Organic peroxides
5.3	
Class 6	<b>Toxic and infectious substances</b>
6.1	Toxic substances
6.2	Infectious material
Class 7	<b>Radioactive substances</b>
Class 8	<b>Corrosive substances</b>
Class 9	Other <b>miscellaneous dangerous substances</b> , that is any other substance which experience has shown, or may show, to be of such dangerous character that the provisions of this Section should apply to it.

**Table 12: Minimum requirements of dealing with hazardous waste**

Subject	Minimum Requirement
Classification	In accordance with its properties and characteristics, a Hazardous Waste must be placed in a SANS 10228 class.
Unlisted compounds	Should a Hazardous Waste contain compounds NOT listed in SANS 10228, the Competent Authority must be consulted before classification is attempted.
Class 1	Direct disposal of Class 1 wastes is PROHIBITED. Class 1 wastes to be pre-treated (destroyed)
Class 2	Flammable gases to be thermally destroyed. Non-flammable gases to be released to atmosphere, unless in contravention with the National Environment Management: Air Quality Act (Act 39 of 2004) and the Montreal Protocol. Controlled destruction of poisonous gases.
Class 3	Landfilling of flammable liquids, flashpoint <61°C is PROHIBITED . Flammable liquids to be treated to flashpoint >61°C .
Class 4	Landfilling of flammable solids is PROHIBITED Flammable solids to be treated to non-flammability.
Class 5	Landfill of Oxidising Substances and Organic Peroxides is PROHIBITED. Treatment to neutralize oxidation potential.
Class 6	Infectious Substances to be sterilised. Residue of Infectious Substances to be Hazard Rated. Toxic Substance, Hazard Rating 3 or 4, to be disposed of at H:H or H:h sites, to have EEC multiplied factor approved by the Competent Authority.

Subject	Minimum Requirement
	Toxic Substance, Hazard Rating 1 or 2, to be disposed at permitted H:H sites to have EEC multiplied by a factor approved by the Competent Authority.
Class 7	Radioactive Substance with specific activity < 100 Bq/g, total activity <4KBq, to be incinerated or landfilled. Disposal of Radioactive Substance with specific activity >100 Bq/g, total activity >4kBq, is PROHIBITED. Consult Department of Health.
Class 8	Disposal of Corrosive Substance, Ph <6 and/or Ph> 12, by landfill is PROHIBITED. Corrosive Substance to be treated to Ph 6-12.
Class 9	Competent Authority to be notified is a compound contains substances listed in Class 9 and written approval must be obtained before disposal. Competent Authority to be notified if a compound contains substances <b>NOT listed</b> in Class 9

### 5.9 B9: National Water Act (Act 36 of 1998)

The National Water Act (NWA) includes provisions requiring that a water use license be issued by the Department of Water Affairs (DWA) before a project developer engages in any activity defined as a water use in terms of the NWA. Water use definitions considered probably or possibly relevant to Renewable Energy projects in terms of the NWA, section 21, includes:

- Taking of water from a water resource;
- Storing of water;
- Impeding or diverting the flow of water in a water course;
- Engaging in a stream flow reduction activity;
- Engaging in a controlled activity (this includes the use of water for power generation purposes);
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Altering the bed, banks, course, or characteristics of a watercourse. This includes altering the course of a watercourse (previously referred to as a river diversion).

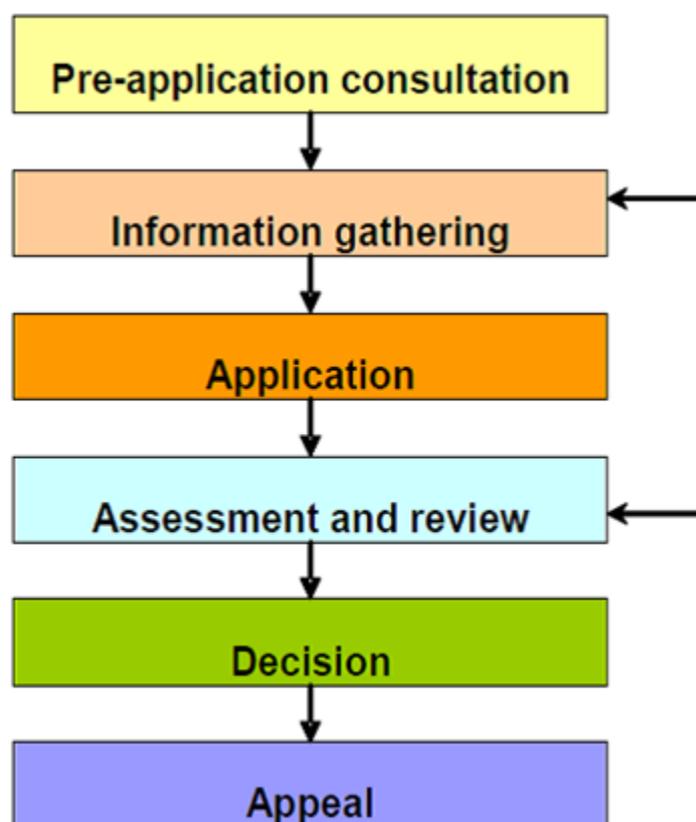
A guideline<sup>7</sup> has been produced by the DWA which provides direction and assistance to applicants and stakeholders and water users on the following:

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<sup>7</sup> <http://www.dwaf.gov.za/Documents/Section21/eggeneric.pdf>

- The various water uses that require authorisation;
- Necessary consultative processes;
- The departmental requirements for the specific water uses;
- The evaluation and assessment process;
- Information on the decision-making process
- The appeal process.

The guideline covers all water use authorisation mechanisms through all stages of the authorisation process, providing an overview of the water uses, contact details of relevant officials, details of the information required during the licence application process, and an overview of the process leading to the issuing of a water use authorisation (see Figure 5 below). The CA responsible for administering the NWA is the DWA regional office, dependent on the province in which the activity is taking place. Please note that the appeal process is only initiated as and when required (after the EA has been granted or denied).



**Figure 5: Water Use Authorisation Process (DWA 2007)**

Schedule 1 of the NWA outlines permissible use of water where a licence is not required. The types of activities outlined in Schedule 1 are activities that have a very small impact on the water resource. In relation to renewable energies, some of these activities (subject to the Act) include:

- Taking water directly from any water resource for reasonable domestic use in a household if the household has lawful access to that water;
- Storing and using run-off water from a roof; and
- Using water for emergencies for example for human consumption or fire-fighting.

#### **5.10 B10: The Water Services Act (No. 108 of 1998)**

The Water Services Act (WSA, No. 108 of 1998) regulates the right of access to basic water supply and basic sanitation as well as other related matters, typically at a municipal level. The WSA is different from the NWA in that the Constitution allocates the management of water resources to National Government under the NWA and the management of water and sanitation services for all citizens to municipalities (local government) under the WSA. The NWA thus deals with sources of water at a national level while the WSA deals with water services at a local level.

The Water Services Act deals mainly with water services or potable (drinkable) water and sanitation services supplied by municipalities to households and other municipal water users. It contains rules about how municipalities should provide water supply and sanitation services. Although the WSA was enacted to deal with matters such as providing for the rights of access to basic water supply, basic sanitation, and the setting of national standards and norms for tariffs, the NWA is the primary legislation pertaining to the regulation of water in South Africa. Accordingly the NWA will typically take precedence over the WSA, and the CA responsible for administering the WSA is dependent on the municipality in which the activity is taking place.

#### **5.11 B11: National Heritage Resources Act (No. 25 of 1999)**

National Heritage Sites in South Africa are places that are of historic or cultural importance and which are for this reason declared in terms of Section 27 of the National Heritage Resources Act (NHRA). The designation was a new one that came into effect with the introduction of the Act on 1 April 2000 when all former National Monuments declared by the former National Monuments Council and its predecessors became provincial heritage sites as provided for in Section 58 of the Act.

Both national and provincial heritage sites are protected under the terms of Section 27 of the NHRA and a permit is required to work on them. National Heritage Sites are declared and administered by the national Heritage Resources Authority, SAHRA whilst provincial heritage sites fall within the domain of the various provincial heritage resources authorities. Heritage resources are protected by the Act and may not be disturbed in any way without a permit issued by the South African Heritage Resources Agency or the relevant Provincial Heritage Resources Authority. Section 38(1) of the NHRA stipulates the triggers which would require a Heritage Impact Assessment (HIA) to become part of an EIA submitted for consideration by the relevant state department.

## 5.12 B12: Development Facilitation Act (No. 67 of 1995)

The Development Facilitation Act (DFA) provides for general principles governing land development throughout the Republic. The general principles for land development state that policy, administrative practice and law should promote both efficient and integrated land development by:

- Encouraging environmentally sustainable land development practices and processes;
- Sustainable land development at the required scale by encouraging the sustained protection of the environment;
- In setting land development objectives the sustained utilization of the environment must be taken into account

The only post-1994 planning law enacted by parliament is the Development Facilitation Act. The DFA was promulgated as an interim measure to bridge the gap between the old apartheid era planning laws and a new planning system reflecting the needs and priorities of the democratic South Africa.

The key features of the DFA are:

### 1) General principles for land development:

- These principles reject low-density, segregated, fragmented and mono-functional development, and rather embrace compact, integrated and mixed-use settlements;
- Includes the encouragement of environmentally sustainable land development practices and processes.

### 2) Land Development Objectives (LDOs):

- The DFA requires that every municipality establishes LDOs, which are effectively local land-use plans that take into account the need to plan for land use in an integrated and strategic manner;
- The intention of the White Paper on Spatial Planning and Land Use Management is to absorb the LDO concept into the IDP process required by the Municipal Systems Act.

### 3) Development Tribunals:

- In order to provide a speedy route for the consideration of land use change and land development applications the DFA provides for a development tribunal to be established in each province;
- The tribunals will be retained under the new planning law, but they will be focused on dealing with certain types of application only;

- The Tribunal may impose amongst others conditions of establishment relating to the environment or environmental evaluations;
- Environmental evaluations in this case means an evaluation of the environmental impact of a proposed land development, conducted in accordance with the integrated environmental management guidelines which are from time to time issued or amended by the Department of Environmental Affairs (DEA).

The CA responsible for administrating the DFA is dependent on the municipality in which the activity is taking place.

### **5.13 B13: Electricity Regulation 2006 (No. 4 of 2006) as amended by the ERAA in 2007)**

The Electricity Regulation Act (No 47 of 1999, as amended in 2007; RGA) provides a national regulatory framework for the electricity supply industry and makes the National Energy Regulator of South Africa the overseer and enforcer of the framework. The act requires registration and licensing of anyone wanting to generate, transmit, reticulate (i.e. network), distribute, trade, or import and export electricity. In addition, the act regulates the reticulation of electricity by municipalities<sup>8</sup>.

In order to become registered, the applicant must:

- Submit an application for registration accompanied by a prescribed registration fee.
- In order to obtain a license, the applicant must provide:
- A prescribed application fee;
- Description of the applicant, including vertical and horizontal relationships with other persons engaged in the operation of generation, transmission and distribution facilities, the import or export of electricity, trading or any other prescribed activity relating thereto;
- Documented evidence of the administrative, financial and technical abilities of the applicant as may be required by the Regulator;
- A description of the proposed generation, transmission or distribution facility to be constructed or operated or the proposed service in relation to electricity to be provided, including maps and diagrams where appropriate;
- A general description of the type of customer to be served and the tariff and price policies to be applied;

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<sup>8</sup> Compendium of South African Environmental Legislation (2010); van der Linde, M., and Feris, L., (editors); 2<sup>nd</sup> edition; Pretoria University Law Press

- The plans and the ability of the applicant to comply with applicable labour, health, safety and environmental legislation, subordinate legislation and such other requirements as may be applicable;
- A detailed specification of the services that will be rendered under the licence; and
- Evidence of compliance with any integrated resource plan applicable at that point in time or provide reasons for any deviation for the approval of the Minister.

#### **5.14 B14: The Physical Planning Act (No.125 of 1999)**

The Physical Planning Act (No. 125 of 1999; PPA) promotes the structured physical development of South Africa on a regional scale. In order to do this, the Act divides the country into regions, for the preparation of national development plans, regional development plans, regional structure plans and urban structure plans by the various authorities responsible for physical planning, and for matters connected therewith.

The particular CA responsible for administering the PPA is dependent on the municipality in which the activity is taking place. IPPs will need to consult with the various relevant regional authorities and development plans as applicable to each specific project design and location.

#### **5.15 B15: Municipal Systems Act (No. 32 of 2000)**

The Municipal Systems Act (No. 32 of 2000, MSA) concerns itself with the internal systems and administration of municipalities. The Act requires that the constitution and other national level acts (e.g. NEMA) be incorporated into strategic planning at a municipal level. The CA responsible for administering the MSA is dependent on the municipality in which the activity is taking place.

Development at a local level is the primary focus as the act separates the responsibility of a service authority with that of a service provider; sets out the roles of officials and councillors, and provides for a range of requirements; including Integrated Development Plans (IDPs), performance management and tariff setting. The Act accordingly regulates municipal service delivery and provides a comprehensive range of service delivery mechanisms through which municipalities may provide municipal services. It explains the process to be applied and the criteria to be considered in reviewing and selecting municipal service delivery mechanisms.

Under the Act, every municipal council must adopt a single, inclusive and strategic plan (i.e. IDP) for the development of the municipality which amongst others:

- links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality; and
- aligns the resources and capacity of the municipality with the implementation of the plan;

At a municipal level, these plans may call for the implementation of renewable energy projects and should be referenced in applications to motivate for relevant environmental authorisations.

IPPs will need to consult with the various relevant municipal authorities and development plans as applicable to each specific project design and location.

#### **5.16 B16: Conservation and Agricultural Resources Act (Act No 43 of 1983)**

The mandate of the Conservation and Agricultural Resources Act 1983 (Act No 43 of 1983) (CARA) is to conserve “natural agricultural resources” (the soil, the water sources and the vegetation, excluding weeds and invader plants) through production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.

Section 6 of the Act concerns the control measures which the following may be applicable to IPPs (subsections (2) (f), (g) and (o)):

- the regulating of the flow pattern of run-off water;
- the utilization and protection of the vegetation; and
- the construction, maintenance, alteration or removal of soil conservation works or other structures on land.

Regulation 8 regulating the flow pattern of run-off water states that no land user shall in any manner whatsoever divert any run-off water from a water course on his farm unit to any other water course, except on authority of a written permission by the executive officer. No land user shall effect an obstruction that will disturb the natural flow pattern of run-off water on his farm unit or permit the creation of such obstruction unless the provision for the collection, passing through and flowing away of run-off water through, around or along that obstruction is sufficient to ensure that it will not be a cause for excessive soil loss due to erosion through the action of water or the deterioration of the natural agricultural resources.

Regulations 15 and 16 under this Act, which concern problem plants (known as weeds or invaders), were amended during March 2001 and make provision for four categories of problem plants:

- Category 1: Prohibited plants which must be controlled, or eradicated where possible (except in bio-control reserves, which are areas designated for the breeding of bio-control agents)
- Category 2: Mainly commercial plantation spp. but also plants for woodlots, animal fodder, soil stabilisation etc.; allowed only in demarcated areas (by permit) under controlled conditions and in bio-control reserves

- Category 3: Mainly ornamental spp., no further planting allowed (except with special written permission), nor trade in propagative material. Existing plants may \*remain but must be prevented from spreading. (\* except those within the flood line of watercourses or wetlands or as directed by the executive officer)
- Bush encroachers: indigenous woody spp. which requires sound management practices to prevent them from becoming a problem.

CARA is administered by the National Department of Agriculture (DoA), through its Directorate: Land Use and Soil Management (D: LUSM).

#### **5.17 B18: Mineral and Petroleum Resource Development Act (MPRDA) (Act No. 28 of 2002)**

This act makes provisions for equitable access to and sustainable development of South Africa's mineral and petroleum resources.

A key definition relevant to this guideline is "Petroleum" which means any liquid, solid hydrocarbon or combustible gas existing in a natural condition in the earth's crust and includes any such liquid or solid hydrocarbon or combustible gas, which gas has in any manner been returned to such a natural condition, but does not include coal, bituminous shale or other stratified deposits from which oil can be obtained by destructive distillation or gas arising from a marsh or other surface deposits"

Section 39 (2) stipulates that any person who applies for a reconnaissance permission, prospecting right or mining permit must submit an environmental management plan as prescribed.

Sections 37 to 42 of the Act make provision for environmental management in prospecting and mining operations. This provision indicates that the Act embraces the guiding sustainable development principles set out in the NEMA and making them applicable to the mining industry.

#### **5.18 B19: Road Traffic Management Corporation Act (No. 20 OF 1999) and National Roads Act (No. 93 OF 1996)**

This Act provide for co-operative and co-ordinated strategic planning, regulation, facilitation and law enforcement in respect of road traffic matters by the national, provincial and local spheres of government. Some of the objectives of this act are as follows:

- to enhance the overall quality of road traffic service provision and, in particular, to ensure safety, security, order, discipline and mobility on the roads;
- to protect road infrastructure and the environment through the adoption of innovative practices and implementation of innovative technology;

- to phase out, where appropriate, public funding and phase in private sector investment in road traffic on a competitive basis; and
- to introduce commercial management principles to inform and guide road traffic governance and decision-making in the interest of enhanced service provision.

The National Roads Act 93 OF 1996 makes provision for regulating the transportation of dangerous goods and substances by road. Section 275 states that, no person shall operate on a public road any vehicle in or on which dangerous goods is transported, unless such dangerous goods is transported in accordance with Chapter VIII of the Act. Chapter VIII also incorporates the SABS standard specifications relating the transportation of dangerous goods and substances. Section 279 indicates the availability of an authority for classification and certification of dangerous goods should there be any doubt as to the appropriate classification of dangerous goods.

### **5.19 B20: Spatial Planning and Land Use Management Bill (SPLUMB) [B14 – 2012]**

SPLUMB aims to confirm and regulate the role of municipalities in land-use planning and land-use management. Two of the most relevant objectives of the SPLUMB are to ensure that the system of spatial planning and land use management promotes social and economic inclusion and to provide for the sustainable and efficient use of land.

The Bill provides that spatial planning consists of:

- Spatial development frameworks adopted at each level of government;
- Development principles, norms and standards;
- The management and facilitation of land use through land-use schemes; and
- Procedures to deal with and decide on development applications provided for in national and provincial legislation.

The Bill contains a list of development principles which apply to a municipality when it compiles its spatial development framework or zoning scheme or when it decides on an application. The Bill further instructs the national, provincial and local governments to adopt spatial development frameworks (SDFs). SDFs must 'guide planning and development decisions across all sectors'. At different levels of government the SDFs intended to guide some of the following:

- National Spatial Development Framework (NSDF) - must indicate the desired patterns of land use in South Africa;
- Provincial Spatial Development Framework (PSDF) - must provide a spatial representation of the province's land development policies, strategies and objectives and must indicate desired and intended patterns of land use and, importantly, delineate areas in which development would not be appropriate;

- Regional Spatial Development Framework (RSDF) – will be imposed if when a municipality fails to adopt or amend an MSDF the Minister may step in, declare a region and adopt an RSDF for that region and when it is ‘necessary to give effect to national land-use policies or priorities’ the Minister may do the same; and
- Municipal Spatial Development Framework (MSDF) - identify current and future significant structuring and restructuring elements of the spatial form of the municipality, including development corridors, activity spines and economic nodes where public and private investment will be prioritised and facilitated.

## **5.20 B21: Astronomy Geographic Advantage Act (AGAA)**

In February 2010, the Minister of Science and Technology declared all land in the Northern Cape Province situated 250km from the centre of the South African Large Telescope dome as an astronomy advantage area for optical astronomy purposes and the whole of the territory of the Northern Cape Province, excluding Kimberly, as an astronomy advantage area for radio astronomy purposes.

Furthermore, those parts of the Northern Cape which are to contain the SALT dome, the MeerKAT radio telescope and the multi-billion rand Square Kilometre Array (SKA) have been declared as core astronomy advantage areas. While all land within a 3km radius of the centre of the SALT dome falls under the Sutherland Core Astronomy Advantage Area, sections of the Kareeberg and Karoo Hoogland municipal areas, consisting of three sections of farming land, constitute the Karoo Core Astronomy Advantage Area.

The minister has also notified the public of an intention to declare portions of the established astronomy advantage areas as either central or coordinated astronomy advantage areas.

From a renewable energy perspective, one activity which may potentially be at odds with the objects of the Act is that of the use of wind turbines. There is a possibility that the power generation equipment used in harnessing wind energy may result in electromagnetic interference with radio astronomy observations. In addition, there is a possibility that the turbine blades will reflect distant radio signals from other transmitters onto the radio telescopes and act as secondary transmitters. This may result in detrimental effects to any radio astronomy facilities. The extensive power requirements of the SKA and the MeerKAT radio telescope are likely to play a prominent role in determining the extent to which the generation of electrical energy through the establishment of wind and solar power projects is to be permitted in the Northern Cape.

## 6 PART C: STAKEHOLDER ROLES AND RESPONSIBILITIES

In relation to the assessment of an environmental impact of a listed activity or related activity (discussed above), NEMA (section 24, 4 a and v), defines I&APs as:

- any person, group of persons or organisation interested in or affected by such operation or activity; and
- any organ of state that may have jurisdiction over any aspect of the operation or activity.

Stakeholders, for the purpose of this report, are synonymous with I&APs. The outcome of an activity or initiative may affect stakeholders directly or indirectly. Directly affected stakeholders are the primary stakeholders who stand to benefit or lose from an intervention. Indirectly affected stakeholders are only incidentally interested or affected due to their expertise or interest or link to those who are directly affected.

The term Role-players refers to all parties involved in a public participation process. Role-players involved in public participation include the public, government department(s), public participation facilitators, technical specialists and the project proponent. A typical listing of role-players is shown in **Table 13** below, together with anticipated roles and level of responsibility.

**Table 13: Stakeholder Roles and Responsibilities**

	Inform	Partner	Support	Legislate
<b>C</b>	Indirect interest, or not applicable			
<b>B</b>	Secondary role/responsibility			
<b>A</b>	Primary role/engagement			
<b>Government and Public Sector</b>				
National Government Departments	C	C	C	A
Provincial Government	C	C	C	A
District Municipality Councils	B	C	C	A
Traditional Authorities	A	C	C	C
<b>Parastatal and Utility Sector</b>				
Utility Boards	B	A	B	C
Utility User Associations	B	B	A	C
Provincial development councils	B	A	B	C
Conservation bodies	A	C	C	C
Research organisations	A	B	C	C
<b>Private Sector</b>				
Individual corporations	C	A	C	C
Chamber of Commerce	B	C	A	C
Agricultural business	B	A	C	C
Farmers' associations	B	C	A	C
Forestry organisations	B	C	A	C

Mines & Industry	B	A	C	C
<b>Civil Society</b>				
NGOs	A	C	B	C
Other interest groups and associations	A	C	B	C
Affected communities and groups	A	C	B	C
Trade unions	A	C	B	C

## 6.1 C1: Public Participation Process

NEMA (section 2: 4f) requires that the participation of all interested and affected parties in environmental governance must be promoted. People must also have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation.

Certain legislation and policy oblige government to engage in public participation processes. From a renewable energy perspective the most significant of these are:

- The National Water Act (Act No. 36 of 1998);
- The White Paper on Water Policy (30 April 1997);
- The National Environmental Management Act (NEMA) (Act No. 107 of 1998);
- The Environment Conservation Act (Act No. 73 of 1989).

A public participation process may be divided into three broad phases, comprising various aspects, as shown in **Table 14** below:

**Table 14: Generic Public Participation Phases**

Phase	Key Aspects
Planning	Decision analysis Participation planning Implementation planning
Participation	Informing stakeholders Meeting stakeholders Feedback to and from stakeholders Monitoring and Evaluation (M&E)
Exit	Ensuring that all goals have been reached Officially ending the process

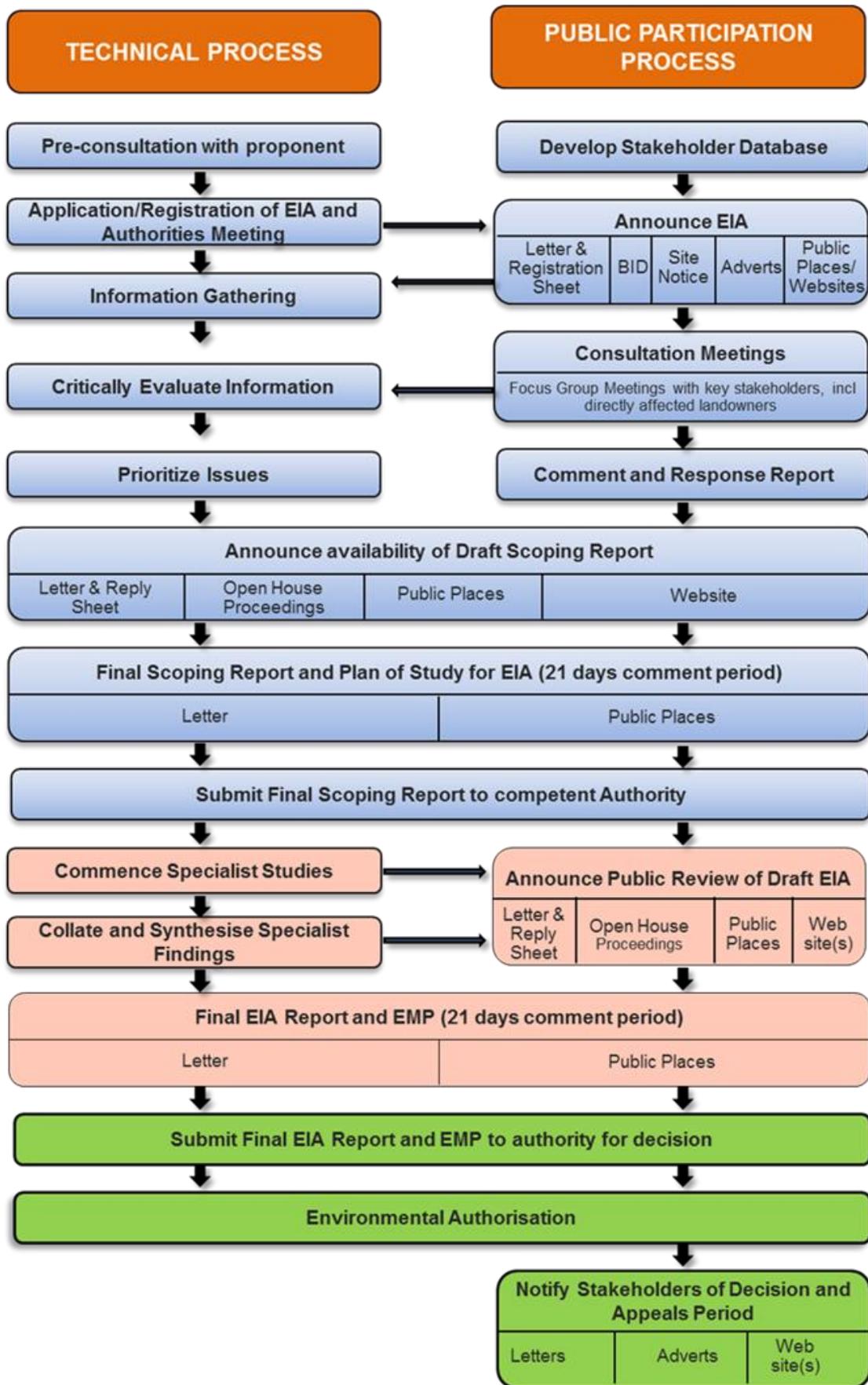


Figure 6: Generic EIA and Public Participation Process

## 7 PART D: INTERGRATED ENVIRONMENTAL APPLICATION PROCESS

This section aims to illustrate how the above-mentioned licenses can be integrated into an environmental authorisation process. The generic EIA and public participation process flow diagram is shown in **Figure 6**. This includes the detailed EIA technical process as well as public participation. **Figure 7** and **Figure 8** illustrate the EIA process as a basis for other environmental authorisations. DEA is the CA for issuing all the energy related EIA authorisation. Contact details for DEA are provided in **Appendix A**.

Other authorisations included in **Figure 7** and **Figure 8** are:

- Atmospheric Emissions License (AEL) – issued by the AEL Authority located at the district municipality;
- Waste License Application – issued by the National Department of Environmental Affairs (DEA) as the competent authority;
- Biodiversity authorisation – issued by the DEA and Department of Agriculture, Forestry and Fisheries (DAFF); and
- Water Use License (WUL) – issued by the Department of Water Affairs.

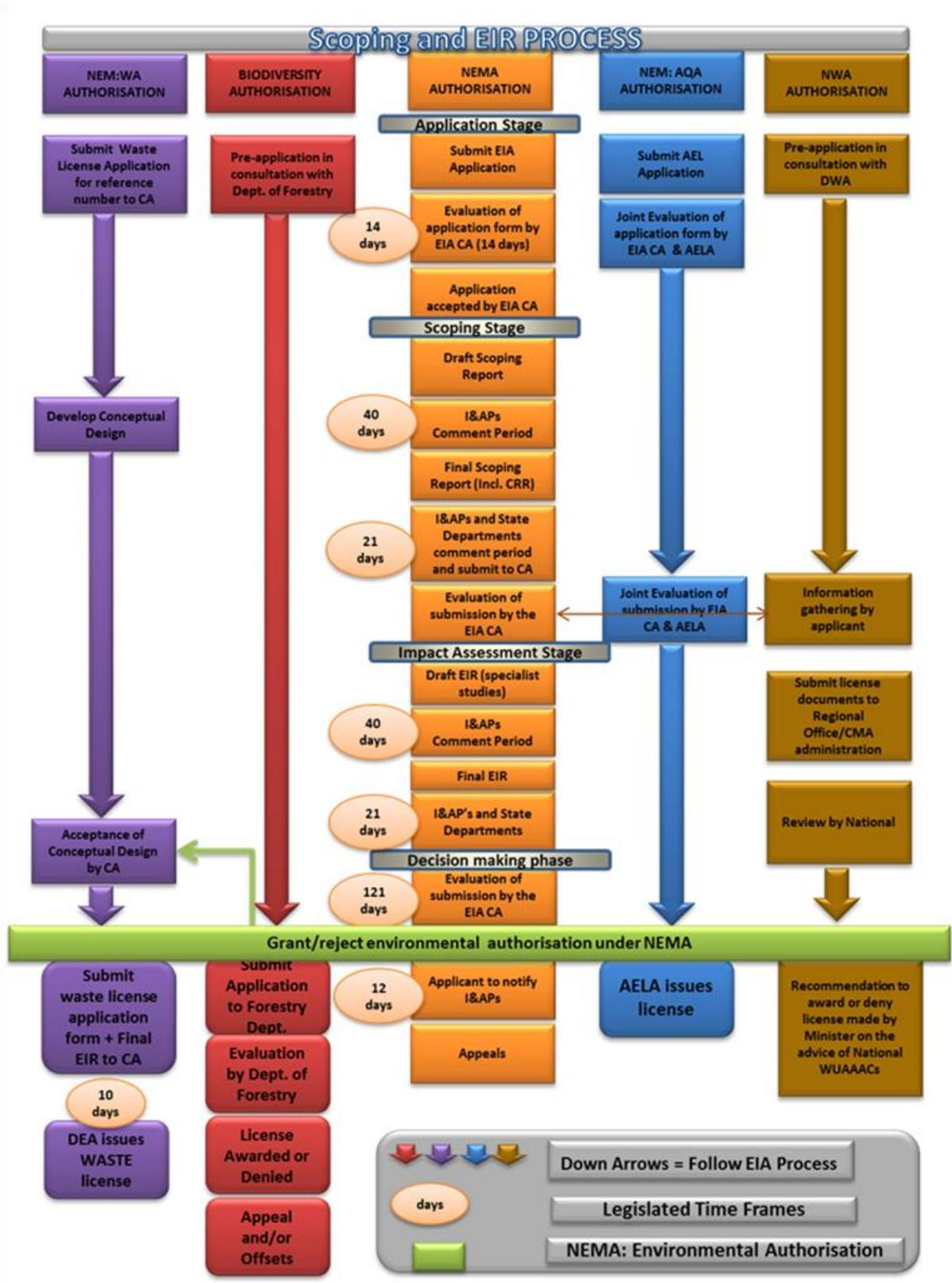
Renewable Energy projects with low impact activities, as identified in Listing Notice 1 (section B2) are carried out through the Basic Assessment (BA) Process. The process flow diagram for a BA is shown in **Figure 7**. However, if the impacts are expected to be high then the Scoping and Environmental Impact Reporting (SR&EIR) Process is applicable. The process flow diagram for the S&EIR is shown in **Figure 8**. Both diagrams include the maximum timeframes included in the EIA regulations for the processing of applications and the minimum timeframes for public participation. It is important to note that, in practice, time frames can be extended for reasons such as delays in specialist delivery times, public holidays and school holidays are excluded from the public comment period and if there any appeals from I&APs.

**Figure 7** and **Figure 8** should be read in conjunction with **Table 15** and **Table 16**.



**Figure 7: Integrated authorisation through a Basic Assessment Process.**

Please note that timeframes presented above are indicative of NEMA authorisation and represent a guide only. Timeframes can vary between authorities on a project by project basis and commenting periods are extended to 60 days if a water or air license is required.



**Figure 8: Integrated authorisation through a full scoping and EIA process.**

Please note that timeframes presented above are indicative of NEMA authorisation and represent a guide only. Timeframes can vary between authorities on a project by project basis and commenting periods are extended to 60 days if a water or air license is required.

The following **Table 15** indicates the minimum requirements at different stages of the authorisation process.

**Table 15: Minimum requirements in the NEMA, NEMWA, NEM:AQA, NWA and Biodiversity authorisation process**

Type of authorisation	Requirements
<b>NEMA</b>	
Scoping phase	Appointment of EIA consultant
	Scoping Report
	Plan of study for Environmental Impact Report
	Identify required specialist studies
EIA Phase	Environmental Impact Assessment
	Environmental Management Plan
	Conduct Specialist Studies
<b>Waste Management License</b>	
Post NEMA authorisation	Environmental Impact Assessment Report
	Waste Management License Application Additional Information Annexure
	Specialist reports and processes
	Google Earth and Topographical maps
	Site drawn to scale
	Waste hierarchy implementation plan
	Emergency Preparedness Plan
Security and access aspects of the site	
<b>Atmospheric Emission License Application</b>	
Scoping phase	Scoping Report
	Plan of study for Environmental Impact Report
	Identify required specialist studies
Submission to AELA	Scoping Report
	Plan of Study
EIA Phase	Environmental Impact Assessment
	Environmental Management Plan
	Conduct Specialist Studies
<b>Biodiversity Authorisation</b>	
Post NEMA Authorisation	Depart of Forestry Application Form
	EIA Report
	Biodiversity Specialist Report
	Environmental Management Plan
	Scoping Report
<b>Water Use License</b>	
Prior NEMA Authorisation	Completed Application Form
	Proof of payment license application fee
	Certified copy of ID

Type of authorisation	Requirements
	Certified copy of title deed
	Map
	Proof of public consultation
	EIA documentation
	Final Application Report

**Table 16: Legal EIA time frames. Note these timeframes represent a generic guide specific to NEMA authorisation and can vary on a project to project basis.**

BASIC ASSESSMENT PROCESS	S&EIR PROCESS
Submit Application form to CA	Submit Application form to CA
CA acknowledges and accepts application form within <b>14</b> days	CA acknowledges and accepts application form within <b>14</b> days
Public participation process commences, which includes providing I&AP's <b>30</b> days to register	Public participation process commences, which includes providing I&AP's <b>30</b> days to register
Submit draft Basic Assessment Report (BAR) to CA	Submit draft Scoping Report (SR) to CA
Submit draft BAR to I&AP's and State Departments & provide <b>40</b> days for comment (30 for I&AP's)	Submit draft SR to I&AP's and State Departments & provide <b>40</b> days for comment (30 for I&AP's)
Compile final BAR after receipt of comments	Compile final SR after receipt of comments
Provide I&AP's and State Departments with <b>21</b> days to comment on final BAR	Provide I&AP's and State Departments with <b>21</b> days to comment on final SR
Submit final BAR with comments received to CA	Submit final SR with comments received to CA
CA acknowledges receipt of final BAR within <b>14</b> days	CA acknowledges receipt of final SR within <b>14</b> days
Within <b>30</b> days of acknowledging receipt of BAR, CA to accept or reject the report, or request additional information	Within <b>30</b> days of acknowledging receipt of SR, CA to accept or reject the report, or request additional information
Within <b>30</b> days of accepting the BAR, CA to grant or refuse authorisation	On acceptance of the final SR, the draft Environmental Impact Assessment Report (EIAR) is compiled and submitted to CA
On reaching a decision, the CA must, within <b>2</b> days notify the applicant of the decision.	Provide draft EIAR to I&AP's and State Departments & provide <b>40</b> days for comment (30 for I&AP's)
The applicant must, within 12 days of the date of the decision, notify I&AP's of the decision and publish a notice	Compile final EIA after receipt of comments
	Provide final EIAR to I&AP's and State Departments & provide <b>21</b> days for comment
	Submit final EIAR with comments received to CA
	CA acknowledges receipt of final EIAR

BASIC ASSESSMENT PROCESS	S&EIR PROCESS
	within <b>14</b> days
	Within <b>60</b> days of acknowledging receipt of EIAR, CA to accept or reject the report, or request additional information
	Within <b>45</b> days of accepting the EIAR, CA to grant or refuse authorisation
	On reaching a decision, the CA must, within <b>2</b> days notify the applicant of the decision.
	The applicant must, within 12 days of the date of the decision, notify I&AP's of the decision and publish a notice

1) **Highlighted rows** refer to compulsory minimum time frames for public participation. The time frames are legislated and cannot be reduced.

2) Public participation minimum timeframe for BAR process = 91 days (3 months).

3) Public participation minimum timeframe for S&EIR process = 152 days (5 months).

4) Where reports are required to be amended, additional public review periods may be required.

## 7.1 BRIEF DESCRIPTIONS OF NEMA RELATED AUTHORISATIONS

### Waste Management License

Waste Management Activities have two categories, A and B. Category A activities listed in the NEM:WA regulations (Section B7) are those that require a BA in terms of NEMA regulations. Category B activities, on the other hand, require a SR&EIR. RE projects that may require waste license include:

- Biomass and biogas project - would likely require waste licensing as they tend to use forms of waste as fuel inputs.
- Concentrated solar thermal projects – if they treat or dispose of wastes from wastewater from the thermal cycle or store waste heat transfer fluid on site.
- Landfill gas to energy – waste licensing required for the extraction, recovery or flaring of landfill gas.

In cases where both EIA activities as well as Waste Management Activities are involved, an application for both must be submitted. A single EIA process is then followed, but both an environmental authorisation and waste management licence is issued.

Generally, the National DEA issues a waste license and the provincial CA issues an environmental authorisation. However, for renewable energy it will be the opposite i.e. waste licenses will be issued by the provincial CA and the environmental authorisation by the National DEA. The National and provincial DEA have, however, reached an agreement that EIA officials who receive such documents forward them to relevant waste application officials for processing and issuing of the license. It is also possible that the waste license is issued

by the competent authority dealing with EIA authorisations. However, these are on a project basis.

### Atmospheric Emission License

The NEMAQA has reviewed, categorised and documented all industrial processes that have an adverse impact on ambient air quality and categorised them as Listed Activities. They are all captured in Section 21 of the NEMAQA (commonly referred to as the “Section 21 Listed Activities”).

Projects that will have some combustion emission such biogas, biomass, landfill gas and concentrated solar thermal projects will require an AEL. The metropolitan or district municipality is the Atmospheric Emission Licensing Authority (AELA) unless the municipality has delegated the licensing function to the province or the province has intervened in terms of section 139 of the Constitution.

According to the DEA (2010) there are three main principles which underpin the relationship between the EIA and AEL processes.

- Firstly, the EIA process must proceed and inform the AEL process. This is a logical sequence for various reasons:
- the EIA process considers all potential environmental impacts and this could result in the environmental authorisation being refused by the competent authority and thus no need to issue an AEL;
- the EIA process may require the submission of a specialist air quality impact assessment study which should comply with the requirements of the AQA, and will provide the AEL licensing authority with all the critical information needed when assessing the AEL application;
- the EIA process will require public participation and input which will also contribute to the understanding of public concerns and comments on the atmospheric impacts of the proposed development or activity.
- Secondly, there must only be one information gathering process for the two processes. Thus all information required for the AEL process must be gathered through the EIA process to avoid duplication of effort
- Thirdly, there should be a joint review of information related to atmospheric impacts by the EIA competent authority and the AEL licensing authority. This is a legal requirement from the National Framework for Air Quality Management, and is one which may strengthen the effectiveness of the EIA-AEL procedural relationship and may promote good cooperative governance relations

### Biodiversity Authorisation

A biodiversity authorisation can be required if site affects declared conservation areas, areas containing sensitive ecological habitats or areas containing rare or threatened ecological types. Also, where there are specific species of conservation importance, such as the Red List categorization of species managed by the SA National Botanical Institute an authorisation may be required.

Another form of conservation management is through what is called a “biodiversity offset” - conservation actions intended to compensate for the residual, unavoidable harm to biodiversity caused by development projects, so as to aspire to no net loss of biodiversity. Offsets should be last resorts after the developer has attempted to avoid and mitigate for impacts on biodiversity. There are no clear guidelines as yet but the Provincial Government of Western Cape has published the ‘Provincial Guideline on Biodiversity Offsets’ in 2006 and provides possible processes that can be followed.

The need for this authorisation should become apparent during the scoping phase of the EIA process. Therefore the information required for this authorisation is largely dependent on the ecological specialist study conducted during the EIA process. The application process for this authorisation seems relatively straightforward with the relevant regional Department of Agriculture, Forestry and Fisheries (specifically the Forestry Division) involved in the issuing process.

### Water Use License (WUL)

Water use licenses will be required for renewable energy projects such as hydropower and concentrated solar thermal projects with high water requirement for the steam cycle and cooling (if evaporative cooling is being used).

The WUL process seems slightly complicated than other authorisations discussed above. It takes into consideration the following:

- water quantities available and how best to balance a scarce water resource amongst competing users including the environment itself
- water quality and the interaction between water use, discharge and water quality
- general water resource protection, such as stream-flow disturbance, river-bank maintenance and so forth

WUL application does not necessarily require NEMA authorisations therefore it can be viewed as an independent application process. However, most of the information required for the WUL is drawn from the EIA. The WUL application should be submitted prior to the submission of the EIA, but typically is not finalized until after the EIA has been approved. NWA does not appear to require a specific public consultation process, but rather a

demonstration by the applicant that such a process has occurred effectively during the license application process. The comments and responses collected from the I&APs during the EIA process can be utilised if managed correctly.

## 8 REFERENCES

Palmer Development Group (2012). Mapping Authorisation processes for renewable energy projects. Final Draft (internal version).

Balmer M., (2007). Household coal use in an urban township in South Africa. Journal of Energy in Southern Africa • Vol 18 No 3.

CDIAC - [http://cdiac.ornl.gov/trends/emis/tre\\_saf.html](http://cdiac.ornl.gov/trends/emis/tre_saf.html)

Energy Research Centre, University of Cape Town (2006). Energy Policies for Sustainable Development in South Africa. - [www.erc.uct.ac.za](http://www.erc.uct.ac.za)

Eskom - ([http://financialresults.co.za/2012/eskom\\_ar2012/divisional-report/climate-change-and-renewable-energy.php](http://financialresults.co.za/2012/eskom_ar2012/divisional-report/climate-change-and-renewable-energy.php))

## **Appendix A: NEMA Competent Authorities: Provincial and National**

The information below was current at the preparation of this document, and is not intended to be definitive or exhaustive. Subsequent changes to personnel or contact information will not be reflected below.

National Authorities	Contact person	Postal Address	Contact Numbers	Email
Department of Environmental Affairs (DEA)	Mr Lucas Mahlangu (Deputy Director)	Private Bag X447 Pretoria 0001	Tel 012 310 3536 Tel 012 310 3911 Fax 012 320 1167 Cell 084 694 6115	lmahlangu@deat.gov.za
Department of Water Affairs (DWA)	Ms Petunia Ramunenyiwa (Acting Chief Director: Regional Coordination)	Pretoria Private Bag X313 0001	Tel 043 604 5406 Tel 012 336 8387 Fax 012 326 3348	paa@dwa.gov.za

Provincial Authority	Contact person	Postal Address	Contact Numbers	Email
KwaZulu Natal Department of Agriculture and Environmental Affairs(DAEA)	Shawn Janneker (Environmental Officer)	KwaZulu-Natal Private Bag X9059 Pietermaritzburg 3200	Tel 031 302 2861 Cell 074 833 4331 Fax 031 302 2824	Shawn.Janneker@kzndae.gov.za
	Mr Malcolm Moses (Assistant Manager: Impact Assessment)		Tel 031 302 2872 Cell 082 461 8303 Fax 031 302 2888	malcolm.moses@kzndae.gov.za
Mpumalanga Department of Economic Development, Environment and Tourism (DEDET)	Mr S Maluleka Chief Director of Environmental Services	Mpumalanga Private Bag X7255 eMalahleni 1035	Tel 013 766 4581 Cell 082 776 1784 Fax 013 766 4614	smaluleka@mpg.gov.za
	Ms Martha Seshweni (Environmental Impact Assessment Co-ordinator)		Tel 013 692 7934 Fax 086 695 3228 Cell 073 211 3915	mmseshweni@mpg.gov.za
Free State Department of Economic Development, Tourism and Environmental Affairs (DETEA)	Ms Grace Mkhosana (Environmental Impact Management: Deputy Director)	Free State Private Bag X20801 BLOEMFONTEIN 9300	Tel 051 400 4812 Tel 051 400 4817/19 Fax 051 400 4842	mkhosana@detea.fs.gov.za
Northern Cape Department of Environment and Nature Conservation (DTEC)	Mr Sibonelo Mbanjwa (Deputy Director)	Northern Cape Private Bag X6120 Kimberley 8300	Tel 053 807 7300 Fax 053 807 7328	NA
Western Cape Department of Environmental Affairs and Development Planning (DEADP)	Mr Paul Hardcastle (Deputy Director)	Western Cape Private Bag X9086 Cape Town 8000	Tel 021 483 5687 Tel 021 483 4091 Fax 021 483 4372	phardcas@pgwc.gov.za

Provincial Authority	Contact person	Postal Address	Contact Numbers	Email
	Ms Melanese Schippers (Case Officer)		Tel 021 483 8349/2 Tel 021 483 4091 Fax 021 483 4527	meschipp@pgwc.gov.za
Gauteng Department of Agriculture and Rural Development (GDARD)	Nhlanhla Makhathini (	Gauteng P O Box 8769 Johannesburg 2000	Tell 011 240-2500 (Reception)	Makhathini@gauteng.gov.za
	Faith Mlambo (Environmental Assessment Co-ordinator)			faith.mlambo@gauteng.gov.za
Limpopo Department of Economic Development, Environment and Tourism (DEDET)	Mr Victor Mongwe (Director: Environmental Impact Management)	Limpopo Private Bag X9484 Polokwane 0700	Tel 015 290 7000 Cell 071 874 8514 Fax 015 295 5015	mongwev@ledet.gov.za letsoalomj@ledet.gov.za
	Mr Sam Thobakgale		Tel 015 293 8561	ThobakgaleMS@ledet.gov.za
	Mr Rhulani Mthombeni		Tel 015 290 7000 Cell 071 874 8514	mthombenirv@ledet.gov.za
North West Department of Agriculture, Conservation, Environmental and Rural Development (DACERD)	Ms Basadi Moselakgomo (Manager)	North West Province Private Bag X65 Mmabatho 2735	Tel 018 389 5091 Fax 018 389 5006 Cell 072 240 5551	bmoselakgomo@nwpg.gov.za
	Ms Boitumelo Pholoholo (Manager)		Tel 018 389 5141 Cell 073 758 5082 Fax 018 389 5006	bpholoholo@nwpg.gov.za
	Mrs Keneilwe Ntuane (Senior Environmental Officer)		Tel 014 597 3597 Cell 083 439 7288 Fax 014 592 3553	ntuanek@nwpg.gov.za
Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT)	Mr. Albert Mfenyana (Environmental Management: General Manager)	P/Bag X0054 Bhisho 5605	Tel 0 43 605 7011 Fax 043 605 7300 / 043 642 2137 Cell 082 332 0089	albert.mfenyana@deaet.ecape.gov.za
	Mr. Gerry Pienaar (Environmental Management Impact: Senior Manager)		Tel 043 605 7051 Fax 043 605 7300 Cell 082 458 4593	gerry.pienaar@deaet.ecape.gov.za