ENVIRONMENTAL IMPACT ASSESSMENT PROCESS FOR THE PROPOSED up to 2000MW COMBINED CYCLE GAS TO POWER FACILITY OF PHAKWE RICHARDS BAY GAS POWER 3PHAKWE RICHARDS BAY GAS POWER 3 (PTY) LTD AND ASSOCIATED INFRASTRUCTURE IN RICHARDS BAY, KWAZULU-NATAL PROVINCE

Socio-Economic Impact Assessment
Scoping Report
November 2021

Prepared for:

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ABBREVIATIONS

BOG	Boil-Off Gas
CCGE	Closed Cycle Gas Engines
CCGT	Combined Cycle Gas Turbine
CO2	Carbon dioxide
CO	Carbon monoxide
COx	Carbon oxides
CAGR	Compounded Average Growth Rate
DM	District Municipality
DoE	Department of Energy
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
GDP	Gross Domestic Product
GDP-R	Gross Domestic Product per Region
Ha	Hectare
I&AP	Interested and Affected Parties
ICE	Internal Combustion Engines
IDZ	Industrial Development Zone
IPP	Independent Power Producer
IPAP	Industrial Policy Action Plan
IRP	Integrated Resource Plan
LM	Local Municipality
LNG	Liquid Natural Gas
LPG	Liquid Petroleum Gas
MW	Mega Watt
NDCs	Nationally Determined Contributions
NDP	National Development Plan
NEMA	National Environmental Management Act
NEA	Not Economically Active
NGPF	New Growth Path Framework
NOx	Nitrogen oxides
NPA	National Port Authority
PGDP	Provincial Growth and Development Plan
PSEDS	Provincial Socio-Economic Development Strategy
RBIDZ	Richards Bay Industrial Development Zone
SCGPP	Simple Cycle Gas Power Plant
SDF	Spatial Development Framework

DETAILS OF THE ECONOMIC ASSESSMENT PRACTITIONER (EAP)

Company Name:	Urban-Econ Development Economists (Pty)Ltd
Company Profile:	URBAN-ECON Development Economists (Pty) Ltd is a professional consultancy firm specialising in the field of development economics. Development economics. Development economics refers to the field of research where spatial-economic principles are applied in a social and socio-economic context.
Economic Assessment Practitioner Managing the Report	Eugene de Beer Cell: +27 82 779 3821 Email: eugene@urban-econ.com Position: Director Qualification: MA (Business Leadership); BSc (Town and Regional Planning) Experience: 35 Years Brief Profile: Eugene de Beer has been a Director of Urban-Econ since 1989 and has been with the company since 1986. The combination of town and regional planning and business economics led him to gain experience in a wide spectrum of areas. Eugene specializes in economic development and socio-economic within urban and rural areas, business planning and strategy formulation, cost benefit analysis, policy and strategic planning, market feasibility studies including baseline surveys, market surveys, and land/property economics, business plans and local economic development. Eugene project managed a number of economic development-related projects. Eugene is a skilled workshop facilitator and manages consultation processes as part of the economic development project and impact assessments.

EXECUTIVE SUMMARY

Introduction

- The proposed Combined Cycle Gas Power Plant (CCCGPP) and associated infrastructure is a project aimed at supplying natural gas-based electricity generation
- The aim of the scoping report is to:
    - Identify the relevant policies and legislation
    - Motivate the need and desirability of the proposed activity
    - Identify and confirm the preferred activity through an identification of impacts and risks and ranking process of such impacts and risks;
    - Identify and confirm the preferred site
    - Identify the key issues to be addressed in the assessment phase;
    - Agree on the level of assessment to be undertaken, including the methodology to be applied;
    - Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

Detailed Project Overview

Phakwe Richards Bay Gas Power 3 (Pty) Ltd (PRBGP3) intend on developing a combined cycle (CC) gas to power plant, with a capacity of up to 2,000MW, located on various erven within the Richards Bay IDZ phase 1F, Richards Bay, KwaZulu Natal.

The power plant will operate at mid-merit or baseload duty and will include the following main infrastructure:

- A number of gas turbines for the generation of electricity through the use of natural gas (liquid or gas forms), or a mixture of Natural gas and Hydrogen (in a proportion scaling up from 30% H2) as fuel source, operating all turbines at mid-merit or baseload (estimated 16 to 24 hours daily operation).
- Exhaust stacks associated with each gas turbine.
- A number of Heat Recovery Steam Generator (HRSG to generate steam by capturing the heat from the turbine exhaust.
- A number of steam turbines to generate additional electricity by means of the steam generated by the HRSG.
- The water treatment plant will demineralise incoming water from municipal or similar supply, to the gas turbine and steam cycle requirements. The water treatment plant will produce two parts demineralised water and reject one-part brine, which will be discharged to the R IDZ stormwater system.
- Steam turbine water system will be a closed cycle with air cooled condensers. Make-up water will be required to replace blow down.
- Air cooled condensers to condensate used steam from the steam turbine.
- Compressed air station to supply service and process air.
- Water pipelines and water tanks for storage and distributing of process water. (Potential sourcing of alternative water outside RB IDZ supply (Municipality))
- Water retention pond
- Closed Fin-fan coolers to cool lubrication oil for the gas turbines
- Gas generator Lubrication Oil System.
- Gas pipeline supply conditioning process facility. Please note, gas supply will be via dedicated pipeline from the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed) or, alternatively directly from the Regasification facilities at RB Harbour. The gas pipeline will be separately authorized.
- Site water facilities including potable water, storm water, waste water
- Fire water (FW) storage and FW system

- Diesel emergency generator for start-up operation.
- Onsite fuel conditioning including heating system.
- All underground services: This includes stormwater and wastewater.
- Ancillary infrastructure including:
    - Roads (access and internal);
    - Warehousing and buildings;
    - Workshop building;
    - Fire water pump building;
    - Administration and Control Building;
    - Ablution facilities;
    - Storage facilities;
    - Guard House;
    - Fencing;
    - Maintenance and cleaning area;
    - Operational and maintenance control centre;
- Electrical facilities including:
    - Power evacuation including GCBs, GSU transformers, MV busbar, HV cabling and 1x275kV or 400kV GIS Power Plant substation.
    - Generators and auxiliaries;
    - Subject to a separate environmental authorisation application:
        - Eskom 275 or 400kV GIS interface Substation
        - Underground 275 or 400kV power cabling connecting Power Plant GIS substation and Eskom GIS Interface substation.
        - an overhead 275kV or 400kV power line connecting the ESKOM interface substation to the selected Eskom grid connection point;

Service infrastructure including:

- Stormwater channels;
- Water pipelines
- Temporary work areas during the construction phase (laydown areas)

Fuel supply

- A dedicated pipeline to connect into an on-site gas receiving and conditioning station will provide the natural gas or the mixture of natural gas and Hydrogen. The pipeline will be connected to the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed), or it will extend directly to the Regasification facilities in the RB Harbour
- The dedicated pipeline will be separately environmentally authorized.

The development is proposed on erven 16820, 16819,1/16674 and a subdivision of erf 17442 , and will occupy approximately 11ha, situated within Phase 1F of the Richards Bay Industrial Development Zone (RIDZ) located approximately 5km north east of Richards Bay and 1km north of the suburb of Alton.

The project site is situated in the City of uMhlathuze Local Municipality which falls within jurisdiction of the King Cetshwayo District Municipality, KwaZulu-Natal Province. The site has been zoned for IDZ Industrial development as part of the planning for this IDZ area.

- Combined Cycle

<u>Needs and Desirability</u>

- ESKOM currently operates 29 power stations with a total nominal capacity of 44 134MW, comprising 36 441MW of coal-fired stations, 1 860MW of nuclear power, 2 409MW of gas-fired, 600MW hydro and

2 724MW pumped storage stations, as well as the recently commissioned 100MW Sere Wind Farm

- The RSA government has embarked upon an Integrated Energy Plan ("IEP") which seeks to reduce the enormous carbon footprint of the existing fleet of thermal power stations, by introducing new, solar, photo voltaic, wind and concentrated solar, Independent Power Producers (IPPs) into the energy generation mix
- To date, the Renewable Energy Independent Power Producer (REIPP) programme has procured around 6 400 MW of energy from 106 IPP projects, with about 4 000 MW already in commercial operation
- South Africa's current energy mix is highly carbon intensive as greater than 80% of the electricity generation is coal based. As more cyclical renewable energy supply is added to the electricity generation mix, gas would be able to provide readily dispatchable, lower carbon supply capacity.
- The single most viable technology to materially improve the current power crisis in the shortest possible timeline is Combined Cycle Gas Turbine (SCGT) fuelled by Liquefied Petroleum Gas (LPG) or Liquefied Natural Gas (LNG). Eskom uses combined cycle gas turbines as peaking plants (emergency supplies of electricity during peak demand) but fired them using uneconomic diesel as fuel source
- The green stimulus programme has funding of up to $83 Billion (R1,44 Trillion at as at 03/08/2020 dollar/ rand exchange rate of $1=R17,33) available for green projects.

Policy Overview

- Overview of Environmental Legislation in South Africa:
    - Environment Conservation Act, 1989 (Act No.73 of 1989);
    - National Water Act, 1998 (Act No. 36 of 1998);
    - National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
    - National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
    - National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
    - National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008); and
    - National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008).
    - National Energy Act, 2008 (Act No. 34 of 2008) (NEA)
    - White Paper on the Energy Policy, December 1998
    - Integrated Energy Plan (IEP)
    - Integrated Resource Plan (IRP) 2019
    - 2035 KZN Provincial Growth and Development Strategy (2016)
    - King Cetshwayo District Municipality Integrated Development Plan (2019/20 – 2021/22)
    - City of uMhlathuze Final IDP Review 2019/2020 (2nd Review of the 2017/2022 IDP)
    - City of uMhlathuze Spatial Development Framework 2017/2018 – 2021/2022 (May 2017)

Social and Economic Context

- As per the 2016 Community based Survey, the population within the uMhlathuze LM is 410,456 persons. This represents an annual increase of 1.5% between the recorded figures from 2001 to 2016 National Census.
- Between 2001 and 2016, there has been a significant decrease in the percentage of the population over the age of 20 within the uMhlathuze LM reporting no access to formal education, with the figure dropping from 18% to 7%
- Unemployment within the uMhlathuze LM remains high at 30%; however, this is below the level of unemployment reported for the KCDM (34%) and KwaZulu-Natal (33%) according to the national census.
- The GVA of City of uMhlathuze LM was valued to be R36 122 million in 2018 current prices as shown in the table below. This is equal to a GDP per capita of R102 152 which is significantly higher than the national and provincial economies with a GDP-R per capita of R75 205 and R61 174 respectively.
- High levels of South African unemployment continue to be one of the key risks to social and economic stability in South Africa. The recorded South African unemployment stats indicate that the country's

level of unemployment rate is approximately 6 times higher than the global average. With the risk posed by the COVID-19 pandemic, the levels of unemployment in South Africa will like increase for the next few years as many industry and company try to weather the storm by cutting costs which, in some cases, means that companies have to retrench employees.

Identification of Socio-Economic Issues and Potential Impacts

- Summary of Identified Impacts

Plan of Study for Socio-Economic Impact Assessment

- A note on cumulative impacts
- Description of Socio-Economic Impact methodology
- Identification of I&APs

1 INTRODUCTION

1.1 BACKGROUND OVERVIEW

From 2008 when demand for electricity in South Africa began to outstrip supply requiring the introduction of load shedding, the South African economy has laboured. Multiple interventions to address the supply shortfall have not yet yielded a cessation of load-shedding and electricity supply in the country remains 'severely constrained'. At the same time the high dependence on coal as an energy source has attracted growing criticism due to greenhouse gas emissions principally but also due to other coal combustion emissions such as Particulate Matter (PM) Nitrous Oxides (NOx) and Sulphur Oxides (SOx). Greenhouse gas emissions contribute significantly to climate change while the other emissions have a strongly negative impact on air quality in the areas in which the coal-fired power stations operate. Apart from Kusile Power station, which is currently under construction, none of the power stations are able to comply with published Minimum Emissions Standards (MES) and have been forced to apply for postponement of the compliance time frames to enable continued legal operation. On top of all of this the generation fleet is aging and will see the decommissioning of power stations towards the end of the 2020s.

There is an urgent need to diversify electricity generation in making up the existing and future shortfall in supply. To some extent the shortfall and diversification has been made up through the Independent Power Producers (IPP) programme and especially the renewable energy projects but there remains a need for much more non- coal supply capacity. In 2018 the CSIR published a study that showed that South Africa's entire electricity demand could be met through renewables provided that there was some baseload, which they argued could come from natural gas fired power plants. The proposed Combined Cycle Gas Power Plant (CCCGPP) and associated infrastructure is a project aimed at supplying natural gas-based electricity generation. The gas (either natural gas or a mixture of natural gas and hydrogen) will be transported to the site from the terminal through a gas pipeline.

Urban-Econ was appointed by Savannah Environmental (Pty) Ltd as the independent Socio-Economic Assessment Practitioner (SEAP), to undertake the required socio-economic impact assessment for the proposed Combined Cycle Gas Power Plant (CCGPP), in Richards Bay, KwaZulu-Natal.

1.2 PURPOSE OF THE STUDY

The main aim of the Scoping Process, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and associated 2014 Environmental Impact Assessment (EIA) Regulations, as amended, is to:

- Identify the relevant policies and legislation relevant to the activity;
- Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;
- Identify and confirm the preferred site, through a process, which includes an identification of impacts and risks inclusive of identification of cumulative impacts and ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
- Identify the key issues to be addressed in the assessment phase;
- Agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including

the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and,

- Identify suitable measures to avoid, manage or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

1.3 INFORMATION AND DATA SOURCES

In completing the Socio-Economic Impact Assessment Scoping Report, various primary and secondary data sources have been used. These include:

- City of uMhlathuze Local Municipality Draft IDP Review 2018/2019.
- Council for Scientific and Industrial Research (CSIR)
- ESKOM State Owned Company (SOC)
- King Cetshwayo District Municipality IDP 2019/2020.
- Quantec Regional Economic Dataset.
- RBIDZ Annual Report 2018/2019
- Transnet National Ports Authority (TNPA).

1.4 REPORT OUTLINE

The successful completion of the report entails the following outlined sections:

- Section 1: Introduction
- Section 2: Detailed Project Overview
- Section 3: Needs and Desirability
- Section 4: Policy Overview
- Section 5: Social and Economic Context
- Section 6: Identification of Socio-Economic Issues and Potential Impacts
- Section 7: Conclusion of Socio-Economic Scoping.
- Section 8: Annexure

2 DETAILED PROJECT OVERVIEW

2.1 LOCALITY

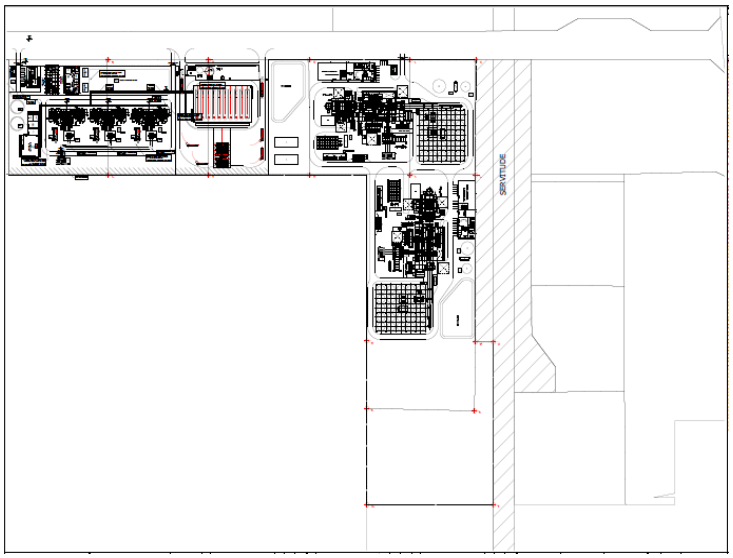
The site on which the project is located is approximately 5km north east of Richards Bay and 1km north of the suburb of Alton. The site within which the proposed CCGPP will be located is depicted in figure 1 below. The CCGPP development and associated infrastructure falls within the Richards Bay Industrial Development Zone (IDZ) Phase 1F and will occupy the sites, namely:

Surveyor General Erf No.	SG 21-digit ID	RBIDZ plot allocation	Extent
16674	N0GV04210001667400000	Erf 16674	4,981ha
9042	N0GV04210000904200000	Service infrastructure (water servitude)	-
8822	N0GV04210000882200000	Erf 16819	2,418ha
8821	N0GV04210000882100000	Erf 16820	2,337ha
8820	N0GV04210000882000000	Erf 17442	2,338ha

Figure 1: Locality Map for the study area within which the proposed CCGPP and associated infrastructure will be located.

The Liquid Natural Gas/Liquid Petroleum Gas storage tanks can, should the need arise, be located at the adjacent site Erf No. 17443 (2,338ha), within the uMhlathuze Local Municipality and King Cetshwayo District Municipality. The land is zoned as “General Industrial”.

Figure 2: The proposed plant development



2.2 PROJECT DETAILS

Phakwe Richards Bay Gas Power 3 (Pty) Ltd intend on developing a combined cycle gas to power plant, of up to 2000 MW, located on various erven within the Richards Bay IDZ phase 1F, Richards Bay, KwaZulu Natal. The power plant will be made up of several units (combination of gas turbines and steam turbine), each with power generation capacity that may reach up to 900MW which will operate at mid-merit to baseload duty and will include the following main infrastructure:

- A number of gas turbines for the generation of electricity through the use of natural gas (liquid or gas forms), or a mixture of Natural gas and Hydrogen (in a proportion scaling up from 30% H2) as fuel source, operating all turbines at mid-merit or baseload (estimated 16 to 24 hours daily operation).
- Exhaust stacks associated with each gas turbine.
- A number of Heat Recovery Steam Generator (HRSG to generate steam by capturing the heat from the turbine exhaust.
- A number of steam turbines to generate additional electricity by means of the steam generated by the HRSG.
- The water treatment plant will demineralise incoming water from municipal or similar supply, to the gas turbine and steam cycle requirements. The water treatment plant will produce two parts demineralised water and reject one-part brine, which will be discharged to the R IDZ stormwater system.
- Steam turbine water system will be a closed cycle with air cooled condensers. Make-up water will be required to replace blow down.
- Air cooled condensers to condensate used steam from the steam turbine.
- Compressed air station to supply service and process air.
- Water pipelines and water tanks for storage and distributing of process water. (Potential sourcing of alternative water outside RB IDZ supply (Municipality))
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- Gas pipeline supply conditioning process facility. Please note, gas supply will be via dedicated pipeline from the proposed Transnet supply pipeline network of Richards Bay (the location of this network has not yet been confirmed) or, alternatively directly from the Regasification facilities at RB Harbour. The gas pipeline will be separately authorized.
- Site water facilities including potable water, storm water, waste water
- Fire water (FW) storage and FW system
- Diesel emergency generator
- Onsite fuel conditioning including heating system.
- All underground services: This includes stormwater and waste water.
- Ancillary infrastructure including:

- Roads (access and internal);
- Warehousing and buildings;
- Workshop building;
- Fire water pump building;
- Administration and Control Building;
- Ablution facilities;
- Storage facilities;
- Guard House;
- Fencing;
- Maintenance and cleaning area;
- Operational and maintenance control centre;

» Electrical facilities including:
- Power evacuation including GCBs, GSU transformers, MV busbar, HV cabling and 1x275kV or 400kV GIS Power Plant substation.
- Generators and auxiliaries;
- Subject to a separate environmental authorisation application:
  - Eskom 275 or 400kV GIS interface Substation
  - Underground 275 or 400kV power cabling connecting Power Plant GIS substation and Eskom GIS Interface substation.
  - an overhead 275kV or 400kV power line connecting the ESKOM interface substation to the selected Eskom grid connection point;

» Service infrastructure including:
- Stormwater channels;
- Water pipelines

» Temporary work areas during the construction phase (laydown areas).

It should be noted that the grid connection to the property is part of the project but the route and grid corridorsitself are not part of the assessment. It is only where it connects within the property and as it pertains to the on-site substation and necessary infrastructure that forms part of this project. Similarly, the gas pipeline for LNG isincluded in the project description and study in so much as it is part of the infrastructure part of the power station (gas conditioning station, incoming connections), however the actual route beyond the project property is not part of this assessment.

COMBINED CYCLE GAS POWER PLANT (CCGPP)

The proposed concept of the Combined Cycle Gas Power Plant (CCGPP) is to construct a phased approach utility scale power plant, of up to 2000MW situated at phase 1F of the Richard's Bay IDZ which will constitute of several separate units with capacity of up to 900MW each. The turbines would be fuelled by either natural gas or a mixture of natural gas and hydrogen from a terminal situated in the Richards Bay Harbour and transported to the proposed power plant via a gas pipeline.

Power generated from the facility would be evacuated from the facility by means of new overhead transmission lines connected into the ESKOM primary sub-stations at Athene, uMfolozi, Impala and Invubu. The Project would have the ability to operate efficiently as Mid-Merit and Baseload Power Plant.

- **Mid-merit power plants** operate between base load and peak load. Eskom's pumped storage schemes are mid merit stations. Historically the cost of electricity from mid merit stations was more expensive than base load but cheaper than peaking.

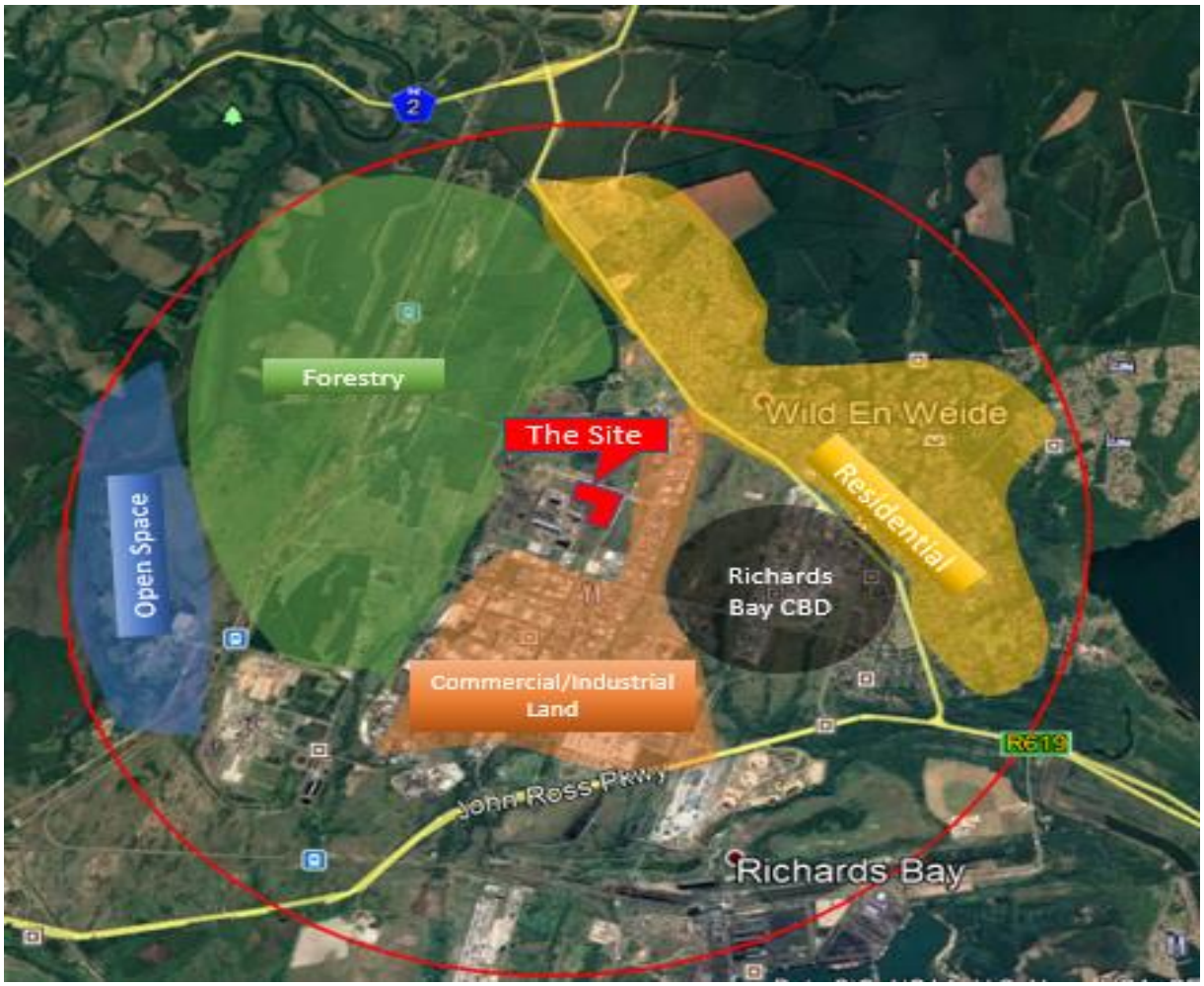
- **Baseload power plants** refers to the minimum amount of electric power needed to be supplied to the electrical grid at any given time.

2.3 CONCLUSION

Phase 1F of the industrial development zone is managed by the Richards Bay Industrial Development Zone Company, a company controlled and owned by the state. The surrounding land use of the site comprises of industrial and commercial property due to the zoning plan of the phase 1F development. Further around the site, within a 5km radius, the land is split as follows as can be seen in figure 3:

- **North Area**: To the north of the proposed development, within a radius of 5km, there are residential settlements.
- **East Area**: The area towards the east of the proposed site is mainly commercial developments and this is where the Richards Bay Central Business District is located.
- **South Area**: The area towards the south of the site is also made up of commercial property developments.
- **West Area**: Most of the land to the west is agricultural land with little development.

Figure 3: Land use around the proposed site (5 Kilometre radius)



Source: Urban-Econ, 2020.

3 NEED AND DESIRABILITY

3.1 GROWTH IN DEMAND FOR ELECTRICITY

Although the Republic of South Africa (RSA) is ranked as possibly one of the richest countries in the world, in terms of its natural mineral resources, its ability to meet the needs of the Country by generating cost effective electrical power from its remaining enormous and still vast coal resources, is severely constrained. A sharp increase in the demand for electricity at the turn of the 20th century, saw ESKOM in 2003 re-commission three power stations: Camden, Grootvlei and Komati which had been mothballed in the late 1980s and early 1990s. The growth in the demand for electricity culminated in demand exceeding supply in 2008 and the onset of rolling blackouts as a function of load shedding required to prevent the collapse of the entire national electricity network.

3.2 CURRENT ELECTRICITY SUPPLY

ESKOM currently operates 29 power stations with a total nominal capacity of 44 134MW, comprising 36 441MW of coal-fired stations, 1 860MW of nuclear power, 2 409MW of gas-fired, 600MW hydro and 2 724MW pumped storage stations, as well as the recently commissioned 100MW Sere Wind Farm. All four units of Ingula (pumped storage), with a nominal capacity of 331MW each, were commissioned during 2016, supplementing the capacity added by Unit 6 of Medupi Power Station, commissioned in the previous year[1].

As of February 2020, 5 units at Medupi are in commercial operation with unit 6 currently being commissioned and 2 units in operation at Kusile with 1 unit being commissioned. Neither station is yet operating at nameplate capacity for the operational units. There is very modest hydro capacity in two dams located on the Orange River as well as three pumped storage schemes, two in the Drakensberg (including Ingula) and the other on the Palmiet River in the Western Cape. Municipalities own 22 small power stations and back-up gas turbines, but these total only 4% of national generation capacity and generally run at low load factors. Private generators comprise the remaining 1% of capacity.

3.3 THE NATIONAL ENERGY ACT, 2008 (ACT NO. 34 OF 2008) (NEA)

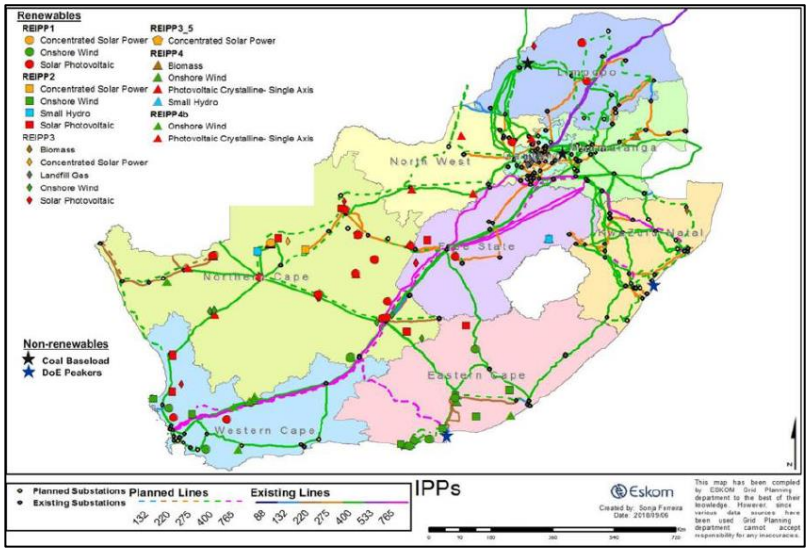
The NEA requires that diverse energy resources are available in sustainable quantities and at affordable prices in South Africa. In addition, the Act provides for the increased use of renewable energy, contingency energy supplies, the holding of strategic energy feedstock and carriers, and adequate investment in energy infrastructure. At the same time economically viable coal reserves at the existing large base load power stations are being rapidly depleted and the development of new replacement power stations, underpinned by coal reserves elsewhere, are encountering severe opposition from environmental activists. The Country also has international greenhouse gas emission reduction commitments that it needs to honour.

3.4 THE INTEGRATED ENERGY PLAN

The RSA government has embarked upon an Integrated Energy Plan (“IEP”) which seeks to reduce the enormous carbon footprint of the existing fleet of thermal power stations, by introducing new, solar, photo voltaic, wind and concentrated solar, Independent Power Producers (IPPs) into the energy generation mix. Despite power demand being concentrated in Gauteng and along the coast where the Country’s major cities are located, of necessity renewable projects are far removed from these demand centres. Solar and concentrated solar have been developed in the hinterland of the Northern Cape and wind projects being primarily located on and close to the coast of the Eastern and Western Cape (Figure 4).

[1] South African Energy Report, 2018.

Figure 4: Approved IPP Projects in terms of the Renewable Energy Independent Power Producer (REIPP) Programme



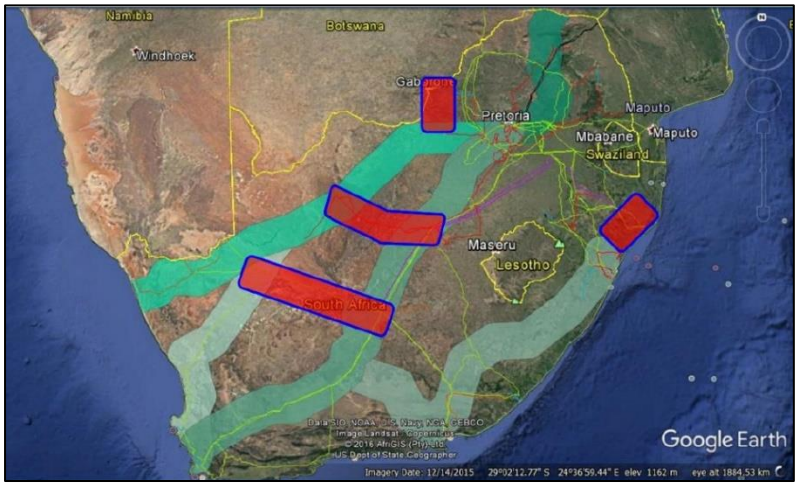
Source: ESKOM SOC, 2020

3.5 RENEWABLE ENERGY INDEPENDENT POWER PRODUCER PROGRAMME

To date, the Renewable Energy Independent Power Producer (REIPP) programme has procured around 6 400 MW of energy from 106 IPP projects, with about 4 000 MW already in commercial operation. There are severe constraints to the further development of the REIPP programme where ESKOM is required, in terms of the programme, to finance and develop major new integration corridors (

Figure 5), primarily in the Northern Cape to access the renewable projects at a time when ESKOM itself is struggling with ballooning costs and declining revenue.

Figure 5: Transmission Network Corridors Required to Integrate IPPs



Source: ESKOM SOC, 2020

3.6 GAS INTERVENTION IN SOUTH AFRICAN ENERGY SUPPLY

South Africa's top 10 Industrial Gas Users generate approximately R150 Billion in taxable revenues per annum. South Africa's current energy mix is highly carbon intensive as greater than 80% of the electricity generation is coal based. As more cyclical renewable energy supply is added to the electricity generation mix, gas would be able to provide readily dispatchable, lower carbon supply capacity.

3.7 COMBINED CYCLE GAS TURBINE TECHNOLOGY

The single most viable technology to materially improve the current power crisis in the shortest possible timeline is Combined Cycle Gas Turbine (CCGT) fuelled by Liquefied Petroleum Gas (LPG) or Liquefied Natural Gas (LNG). Eskom has always used combines cycle gas turbines as peaking plants (emergency supplies of electricity during peak demand) but fired them using uneconomic diesel as fuel source.

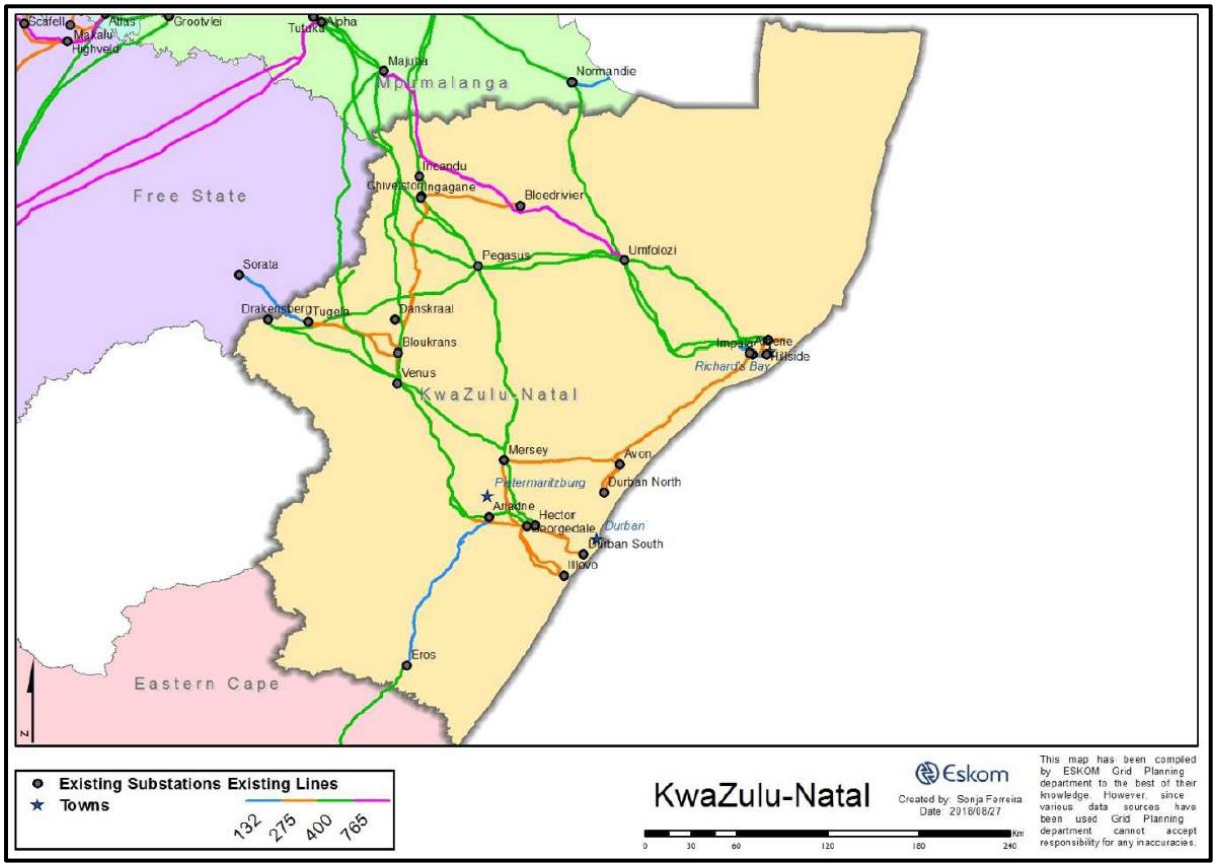
3.8 THE NEED FOR UTILITY SCALE POWER GENERATION PROJECTS IN RSA

When considering the geographic extent of the country and the distances between generation infrastructure and load centres as well as the complexity, of the transmission networks, it becomes apparent that there is an important role for independent utility scale generation power projects. Such generation projects would benefit from being close to transmission infrastructure or load demand centres. The proposed project has the potential to bring highly efficient, decentralized electrical power to the South African grid within a relatively short space of time and at an affordable tariff. In addition, there is no requirement for Eskom to foot the capital investment required for this project.

3.9 THE KZN TRANSMISSION NETWORK

KwaZulu-Natal has a transmission network with a radial pattern. With only two pumped storage peaking facilities in the Northern Drakensberg and an Open Cycle Gas Turbine (OCGT) peaking station at Avon on the coast, the entire 6 280 Mw requirement of KZN is supplied via two HVAC lines originating at Majuba and Camden in Mpumalanga, some 600km distant (Figure 6).

Figure 6: KwaZulu-Natal Sub-Stations and Power lines



Source: ESKOM SOC, 2020

The economic mix in KwaZulu-Natal comprises redistributors, commercial customers, and industrial customers. The demand in the province is forecast to grow steadily at about 2% annually, from 6 281 MW in 2018 to 7 562 MW by 2028 (

Figure 7). The highest growth in demand is expected in the Pinetown and Empangeni Customer Load Network areas due to industrial, commercial, and residential developments in those areas. The SCGPP's electricity generating capability in Richards Bay, will reduce the current scale of line losses and provide a completely new source of power capable of supplying significant energy demand of KZN. As such KZN's demand of electricity

from the national grid will be greatly reduces, and this would free up energy for other provinces/regions who are experiencing a shortage of electricity supply.

3.9.1 Strengthening electrical supply networks in KZN

The major interventions for KwaZulu-Natal which have been undertaken by ESKOM or which could be undertaken or completed in terms of the proposed power generation project include:

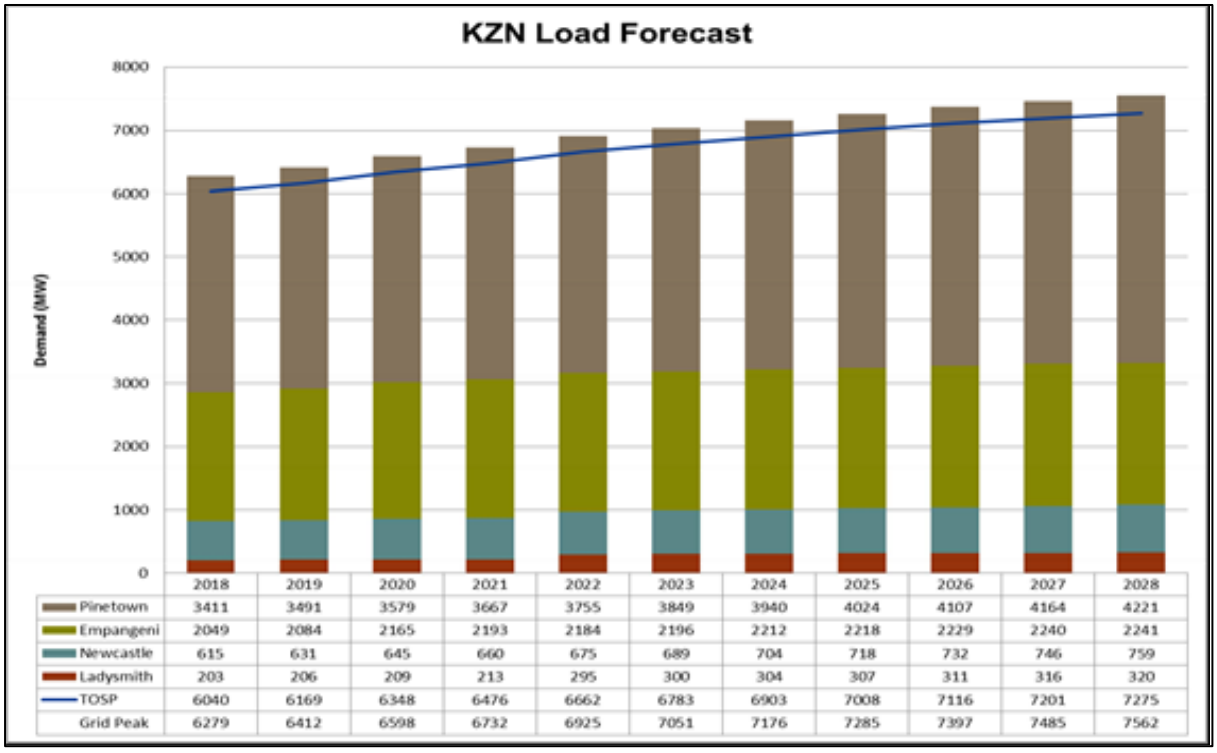
3.9.1.1 KZN 765 kV strengthening

The KZN 765 kV strengthening project entails establishing 765 kV in the Pinetown and Empangeni areas, which will run from the power pool in the north and integrate it, with the 400kV network, in both areas. The Pinetown and Empangeni 765 kV networks will also be linked via two 400 kV lines. The project will be implemented in various stages.

3.9.1.2 NKZN strengthening: Iphiva 2 x 500 MVA 400/132 kV Substation

This project involves the establishment of Iphiva 400/132 kV Substation around Candover- Mkuze to address supply constraints around Pongola, Makhatini Flats, and iSimangaliso (Greater St. Lucia) Wetland Park. Two 400 kV lines, namely Normandie-Iphiva and Duma-Iphiva 400 kV lines will supply the planned Iphiva Substation. The Duma Substation is part of the planned Ermelo-Richards Bay coal link upgrade.

Figure 7: KwaZulu-Natal Load Forecast



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Pinetown	3411	3491	3579	3667	3755	3849	3940	4024	4107	4164	4221
Empangeni	2049	2084	2165	2193	2184	2196	2212	2218	2229	2240	2241
Newcastle	615	631	645	660	675	689	704	718	732	746	759
Ladysmith	203	206	209	213	295	300	304	307	311	316	320
TOSP	6040	6169	6348	6476	6662	6783	6903	7008	7116	7201	7275
Grid Peak	6279	6412	6598	6732	6925	7051	7176	7285	7397	7485	7562

Source: ESKOM SOC, 2020

3.9.2 CCGPP Role in KwaZulu-Natal

The schemes mentioned above could be integrated into the proposed CCGPP in Richards Bay thereby, without burdening Eskom:

- Strengthening the National Transmission Network;
- Improving power reticulation in KZN; and,
- Securing financial capital to implement the schemes.

The technology proposed has the twofold benefit of not only providing quick to market electricity desperately needed to meet the power demands in the RSA but secondly, in assisting with the stabilisation of the national grid by virtue of the rapid response time to surge demand provided by turbine technology.

3.10 THE NATIONAL DEVELOPMENT PLAN

The NDP envisages that, by 2030, South Africa will have an energy sector that provides reliable and efficient energy service at competitive rates; that is socially equitable through expanded access to energy at affordable tariffs; and that is environmentally sustainable through reduced emissions and pollution.

3.11 GREEN STIMULUS FUNDING

The green stimulus programme has funding of up to $83 Billion (R1,44 Trillion at as at 03/08/2020 dollar/ rand exchange rate of $1=R17,33) available for green projects. Green stimulus funding refers to short-run fiscal stimuli that also serve a "green" or environmental purpose in a situation of "crisis" characterized by temporary under-employment. To qualify for such funding, the project has to meet at least one of the following six goals:

1. climate change mitigation,
2. climate change adaptation,
3. sustainable use and protection of water and marine resources,
4. transition to a circular economy,
5. waste prevention and recycling,
6. pollution prevention and control or protection of healthy ecosystems.

3.12 THE PARIS AGREEMENT

South Africa is a signatory to the Paris Agreement on Climate Change and has ratified the agreement. In line with NDCs (Nationally Determined Contributions) submitted to the UNFCCC in November 2016, South Africa's emissions are expected to peak, plateau and from year 2025 decline. The energy sector contributes close to 80% towards the country's total greenhouse gas emissions of which 50% are from electricity generation and liquid fuel production alone. There is action to reduce emissions with investment already in renewable energy, energy efficiency and public transport but much more is needed to make such commitments a reality. Therefore, the proposed CCGPP would contribute to the objectives of the Paris Agreement, while at the same time will potentially facilitating the economic growth so desperately needed by the country.

4 POLICY REVIEW

4.1 OVERVIEW OF ENVIRONMENTAL LEGISLATION IN SOUTH AFRICA

Section 24 of the Constitution of the Republic of South Africa of 1996 guarantees everyone has a right to an environment that is not harmful to their health and well-being and to have the environment protected for the benefit of present and future generations. In order to give effect to this right, the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) was promulgated.

NEMA is the overarching environmental legislation in the country. Chapter 1 of NEMA lists the national environmental management principles (NEMA Principles) that should be the point of departure for environmental management within the country. The following two principles reflect the core of NEMA:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable.

Several sector Specific Environmental Management Acts (SEMAs) have been promulgated and all fall under the umbrella of NEMA, these are:

- Environment Conservation Act, 1989 (Act No.73 of 1989);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004);
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008); and
- National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008).

4.1.1 National Energy Act, 2008 (Act No. 34 of 2008) (NEA)

The Act requires that diverse energy resources are available in sustainable quantities and at affordable prices in South Africa. In addition, the Act provides for the increased use of renewable energies, contingency energy supplies, the holding of strategic energy feedstock and carriers, and adequate investment in energy infrastructure.

4.2 RELEVANT SOUTH AFRICAN POLICIES, PROGRAMMES, PLANS AND GUIDELINES

4.2.1 White Paper on the Energy Policy, December 1998

The White Paper was developed so as to clarify government policy regarding the supply and consumption of energy for the next decade. It was intended to address all elements of the energy sector as practically as it could. This White Paper gives an overview of the South African energy sector's contribution to GDP, employment, taxes and the balance of payments. It concludes, that the sector can greatly contribute to a successful and sustainable national growth and development strategy. The main objectives of the White Paper are the following:

- Increasing access to affordable energy services;
- Improving energy governance;
- Stimulating economic development;
- Managing energy-related environmental impacts; and,
- Securing supply through diversity.

The proposed CCGPP will address and positively contribute to all of the main objectives listed above, refer to Section 3: Need and Desirability for more details.

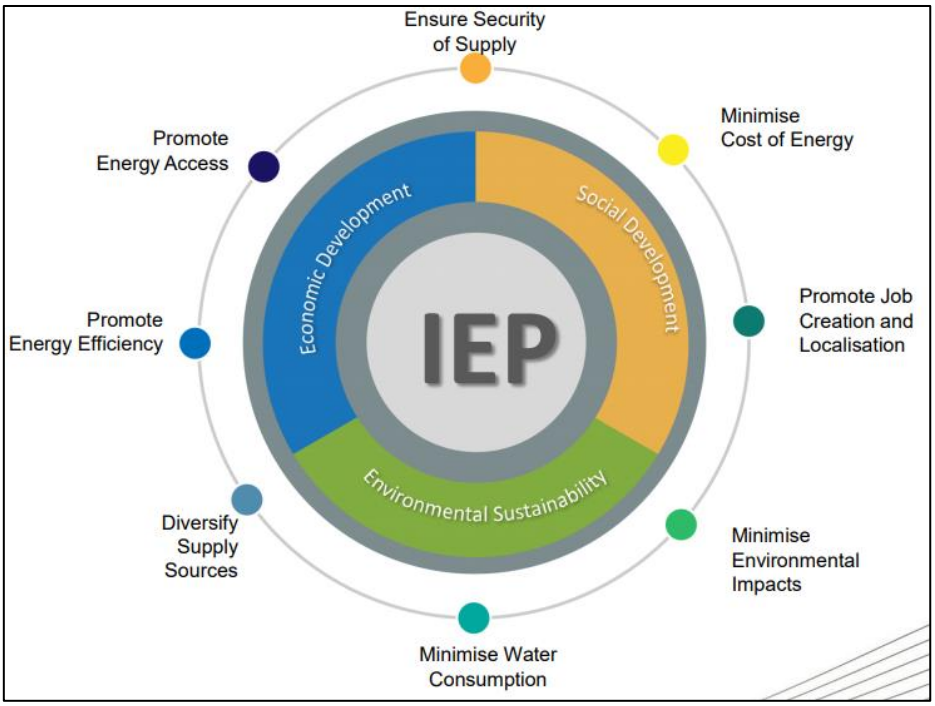
4.2.2 Integrated Energy Plan (IEP)

The IEP is a multi-faceted, long-term energy framework which takes into consideration the crucial role that energy plays in the entire economy and is informed by the output of analyses founded on a solid fact base. The IEP was undertaken to determine the best way to meet current and future energy service needs in the most efficient and socially beneficial manner. The IEP has multiple objectives, some of which include:

- To guide the development of energy policies and, where relevant, set the framework for regulations in the energy sector;
- To guide the selection of appropriate technologies to meet energy demand (i.e. the types and sizes of new power plants and refineries to be built and the prices that should be charged for fuels);
- To guide investment and the development of energy infrastructure in South Africa; and,
- To propose alternative energy strategies which are informed by testing the potential impacts of various factors, such as proposed policies, introduction of new technologies, and effects of exogenous macro-economic factors.

The proposed CCGPP will address and contribute to all of the 8 key energy planning objectives as reflected in Figure 8, refer to Section 3: Need and Desirability for more details.

Figure 8: 8 key energy planning objectives as highlighted in the Integrated Energy Plan (2016)



4.2.3 Integrated Resource Plan (IRP) 2019

The IRP is an electricity infrastructure development plan based on least cost supply and demand balance considering security of supply and the environment (minimize negative emissions and water usage). The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and

regional development. Following the promulgation of the IRP 2010–2030, implementation followed in line with Ministerial Determinations issued under Section 34 of the Electricity Regulation Act, 2006 (Act No. 4 of 2006). The Ministerial Determinations give effect to planned infrastructure by facilitating the procurement of the required electricity capacity. Since the promulgated IRP 2010–2030, the following capacity developments have taken place:

- A total 6 422 MW under the Renewable Energy Independent Power Producers Programme (REIPPP) has been procured, with 3 876 MW operational and made available to the grid.
- In addition, IPPs have commissioned 1 005 MW from two Open Cycle Gas Turbine (OCGT) peaking plants.
- Under the Eskom build programme, the following capacity has been commissioned:
    - 1 332 MW of Ingula pumped storage;
    - 1 588 MW of Medupi, 800 MW of Kusile; and,
    - 100 MW of Sere Wind Farm.
- In total, 18 000MW of new generation capacity has been committed to.

Besides capacity additions, a number of assumptions have changed since the promulgation of IRP 2010–2030. Key assumptions that changed include the electricity demand projection, Eskom's existing plant performance, as well as new technology costs. These changes necessitated the review and update of the IRP. In the period prior to 2030, the system requirements are largely for incremental capacity addition (modular) and flexible technology, to complement the existing installed inflexible capacity (refer to Table 1 for timelines).

Coal: Beyond Medupi and Kusile, coal will continue to play a significant role in electricity generation in South Africa in the foreseeable future as it is the largest base of the installed generation capacity, and it makes up the largest share of energy generated.

Nuclear: Koeberg Power Station reaches end of design life in 2024. The development of small nuclear units elsewhere in the world is therefore particularly interesting for South Africa, and upfront planning with regard to additional nuclear capacity is requisite, given the >10-year lead time, for timely decision making and implementation.

Natural Gas: Gas to power technologies in the form of Combined Cycle Gas Turbines (CCGT), Closed Cycle Gas Engines (CCGE) or Internal Combustion Engines (ICE) provide the flexibility required to complement renewable energy. While in the short term the opportunity is to pursue gas import options, local and regional gas resources will allow for scaling up within manageable risk levels. Exploration to assess the magnitude of local recoverable shale and coastal gas are being pursued and must be accelerated.

Renewable Energy: Solar PV, wind and Concentrated Solar Power with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.

Hydroelectricity: South Africa's rivers carry potential for run-off river hydro projects.

Energy Storage: The traditional power delivery model is being disrupted by technological developments related to energy storage, and more renewable energy can be harnessed despite the reality that the timing of its production might be during low-demand periods. Storage technologies including battery systems, compressed air energy storage, flywheel energy storage, hydrogen fuel cells etc. are developments which can address this issue, especially in the South African context where over 6 GW of renewable energy has been introduced, yet the power system does not have the requisite storage capacity or flexibility.

4.2.3.1 Key considerations and actions from the IRP 2019 which are relevant in terms of the proposed CCGPP

Decision 1: Undertake a power purchase programme to assist with the acquisition of capacity needed to supplement Eskom's declining plant performance and to reduce the extensive utilisation of diesel peaking generators in the immediate to medium term. Lead-time is therefore key.

Decision 7: To support the development of gas infrastructure and in addition to the new gas to power capacity, convert existing diesel-fired power plants (Peakers) to gas.

Decision 9: In support of regional electricity interconnection including hydropower and gas, South Africa will participate in strategic power projects that enable the development of crossborder infrastructure needed for the regional energy trading.

Table 1: IRP 2019

	Coal	Coal (Decommissioning)	Nuclear	Hydro	Storage	PV	Wind	CSP	Gas & Diesel	Other (Distributed Generation, CoGen, Biomass, Landfill)
Current Base	37 149		1 860	2 100	2 912	1 474	1 980	300	3 830	499
2019	2 155	-2373					244	300		Allocation to the extent of the short term capacity and energy gap.
2020	1 433	-557				114	300			
2021	1 433	-1403				300	818			
2022	711	-844			513	400 1000	1600			
2023	750	-555				1000	1600			500
2024			1860				1600		1000	500
2025						1000	1600			500
2026		-1219					1600			500
2027	750	-847					1 600		2000	500
2028		-475				1000	1 600			500
2029		-1694			1575	1000	1 600			500
2030		-1050		2 500		1 000	1 600			500
TOTAL INSTALLED CAPACITY by 2030 (MW)	33364		1860	4600	5000	8288	17742	600	6380	
% Total Installed Capacity (% of MW)	43		2.36	5.84	6.35	10.52	22.53	0.76	8.1	
% Annual Energy Contribution (% of MWh)	58.8		4.5	8.4	1.2*	6.3	17.8	0.6	1.3	

Installed Capacity
Committed / Already Contracted Capacity
Capacity Decommissioned
New Additional Capacity
Extension of Koeberg Plant Design Life
Includes Distributed Generation Capacity for own use

- 2030 Coal Installed Capacity is less capacity decommissioned between years 2020 and 2030
- Koeberg power station rated / installed capacity will revert to 1926 MW (original design capacity) following design life extension work.
- Other / Distributed generation includes all generation facilities in circumstances in which the facility is operated solely to supply electricity to an end-use customer within the same property with the facility
- Short term capacity gap is estimated at 2000 MW

The model is unable to deploy gas to complement renewables as it is assumed gas will only be available from year 2024.

Risk and mitigation considerations within the IRP as they pertain to gas

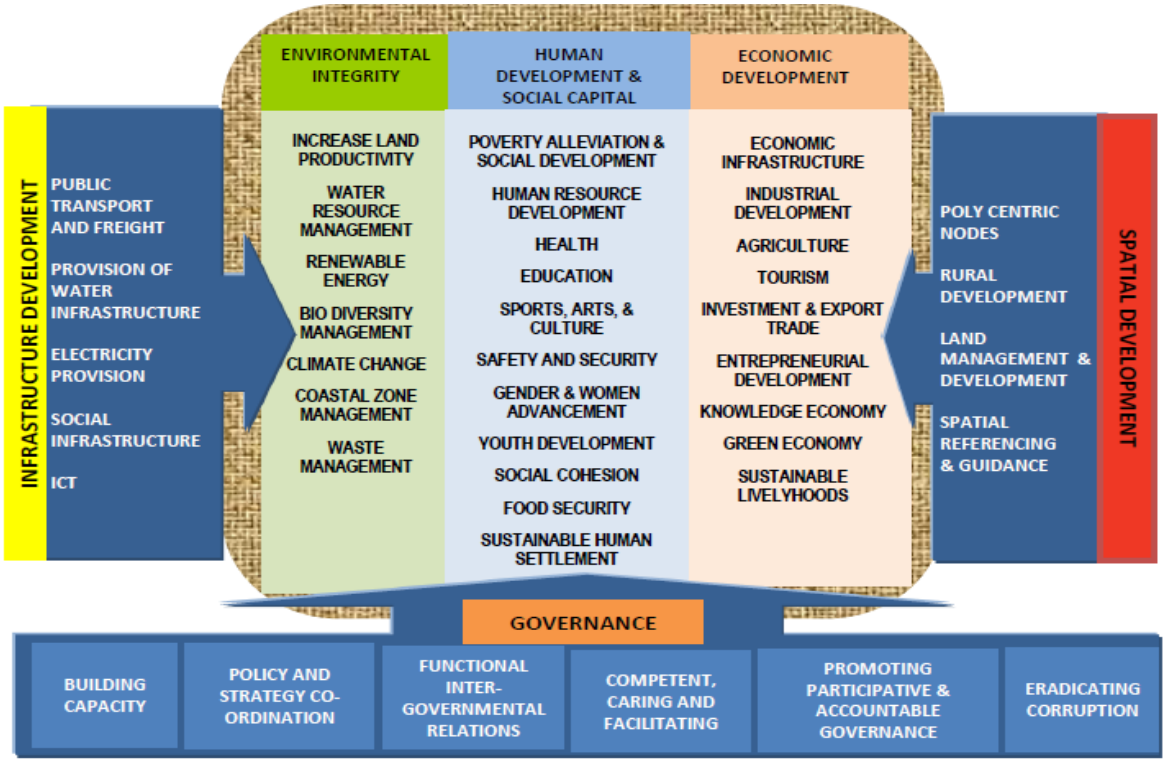
Gas	The availability of gas in the short to medium term is a risk as South Africa does not currently have gas resources. There is also a supply and foreign exchange risk associated with likely increase in gas volumes depending on the energy mix adopted post 2030 when a large number of coal fired power stations are decommissioned.	• For the period up to 2030 gas to power capacity in the IRP has realistically taken into account the infrastructure and logistics required around ports/pipelines, electricity transmission infrastructure. The IRP has therefore adjusted the lead times. • As proposed in the draft IRP update, work to firm up on the gas supply options post 2030 is ongoing. This work will inform in detail the next iteration of the IRP.

The proposed CCGPP will significantly contribute to the Natural Gas component of the energy mix as well as assist with key decisions 1, 7 and 9 as listed above. Refer to Section 3: Need and Desirability for more details.

4.2.4 2035 KZN Provincial Growth and Development Strategy (2016)

The KZN's Provincial Growth and Development Strategy (PGDS) is concisely summarised in the figure below. Of particular relevance to this project is "***Strategic Objective 4.5: Ensure access to affordable, reliable, sustainable and modern energy for all. Sufficient electricity is available for the growth and development needs of KZN***". The PGDS states that energy supply in the province, and country, is becoming increasingly expensive for both domestic and business/industrial consumers, and this is exacerbated by the lack of investment in electricity infrastructure (new and maintenance of existing infrastructure). It highlights that the province must prioritise alternative energy projects and/or programmes as a reliable supply of energy. Alternative energy supply or the green economy must become measurable within the Provincial Growth and Development Plan.

Figure 9: KZN Provincial Growth and Development Strategy



The CCGPP will significantly contribute to the overall sustainability and security of electricity within the KZN province. Refer to Section 3: Need and Desirability for more details.

4.2.5 King Cetshwayo District Municipality Integrated Development Plan (2019/20 – 2021/22)

The KCDM IDP's Vision is "*By 2035 King Cetshwayo District Municipality will be cohesive; economically viable district, with sustainable strategic infrastructure; supporting job creation through radical economic transformation rural development and promotion of our heritage*".

KCDM's mission is that it will serve its communities to create a prosperous district through:

- Provision of sustainable; quality water and sanitation services;
- Developing the economy through radical economic transformation and job creation;
- Promoting rural development; agrarian reform and food security;
- Co-ordinate planning, spatial equity and environmental sustainability; and,
- Promoting heritage, community participation, nation building and good governance.

The articulated vision of the KCDM is as follows:
By 2035, King Cetshwayo district is renowned for the vastly improved socio-economic status of its residents resulting from 15 years of sustained economic growth. The district is internationally recognized as a world leader in innovative and sustainable manufacturing based on the successful implementation of the RBIDZ initiative. This economic growth, together with the district rural development programme resulted in the creation of decent employment opportunities leading to the fastest growing household and individual income levels in the province and reducing the unemployment rate of the youth in the district by more than 50%. It also resulted in a significant decrease in the economic dependency ratio and improving the overall quality of life in the district. The economic growth is underpinned by a vastly improved information and telecommunication infrastructure network with the entire district having access to a wireless broadband service, all businesses, and more than 50% of households with access to a computer and internet service. By 2035, the district is characterised by a high-quality infrastructure network supporting both household needs and economic growth. All households are provided with access to appropriate water infrastructure, adequate sanitation, and sustainable energy sources. Improved access to health facilities and quality of health services provided resulted in continually improving health indictors in the district. The quality of the output from the primary and secondary education system has improved dramatically and all learners have access to fully equipped primary and secondary education facilities. Sustainable and coherent spatial development patterns have been successfully implemented through innovative spatial planning frameworks an effective land use management system implemented by highly skilled officials. Improved public sector management and skills levels resulted in sound local governance and financial management.

The KCDM IDP specifically emphasises that the national energy crises has far reaching implication on the supply and maintenance of infrastructure services to the district, notable the cost for stand by generators at pump stations as well as the running costs of such generators. The environmental costs of increased combustion into the atmosphere as a result of generator operations was also highlighted as a risk to be considered.

The proposed CCGPP will contribute to the 2035 vision of the District Municipality through the provision of sustainable and assured supply of electricity for supporting households and economic growth envisioned. Refer to Section 3: Need and Desirability for more details.

4.2.6 City of uMhlathuze Final IDP Review 2019/2020 (2nd Review of the 2017/2022 IDP)

The City of uMhlathuze has produced the Integrated Development Plan (IDP), in order to further their vision: "The Port City of uMhlathuze offering improved quality of life for all its citizens through sustainable development." The IDP review highlights the Sustainable Development Goals (SDG) offer major improvements on the Millennium Development Goals (MDGs). The SDG framework addresses key systemic barriers to sustainable development such as inequality, unsustainable consumption patterns, weak institutional capacity, and environmental degradation that the MDGs neglected. As such, the City of uMhlathuze have outlined how their interventions will align with the SDGs. The following is of relevance to this proposed project:

Table 2: Extracts from the table within the IDP review that highlights the alignment between the SDGs and the City of uMhlathuze's Strategic Framework.

7.	Ensure access to affordable, reliable and modern energy for all.		• Energy Master Plan • Target reduction of 30% of coal powered stations by 2030 • 2000MW Gas to Power • Renewable Energy Efficiency initiatives • Waste to Energy Project • Energy infrastructure upgrade
13.	Take urgent action to combat climate change and its impacts.	Optimal management of natural resources and commitment to sustainable environmental management.	• Climate Change Action Plan • International Partnerships and collaborations (ICELI) • Adaptation and Mitigation Programme • Accelerating low emission development • Responding with adaption initiatives • Urban Air Quality Management • Signed Global Compact of Mayors • Gas to Power Project • Waste Water Reuse

The proposed CCGPP will assist in meeting the gas to power target of 2000MW, which in addition may also lead to a reduced dependence on electricity from the Highveld coal powered stations. LNG is also known to be a cleaner and more environmentally friendly alternative to coal and other fossil fuels. The option to include Hydrogen, once hydrogen is commercially available, in the gas mixture used as fuel will further reduce the carbon emissions of the CCGPP. This will also assist with reducing air quality and knock-on climate change impacts. Refer to Section 3: Need and Desirability for more details.

4.2.7 City of uMhlathuze Spatial Development Framework 2017/2018 – 2021/2022 (May 2017)

There are a number of existing natural and man-made phenomenon that have shaped and continue to shape the uMhlathuze Municipality spatial landscape. The area to the east of the Municipality is inundated with a system of wetlands and natural water features such as Lakes Cubhu, Mzingazi, Nsezi and Nhlabane. Major rivers include the Mhlathuze and Nsezi. The main access into the municipal area is via the N2 in a north south direction and in an east west direction the R34. Other significant roads in the area include the MR431 (that provides a northerly entry into Richards Bay from the N2) as well as the Old Main Road that straddles the N2 on its inland. Railway lines are prevalent in the municipal area but do not provide a passenger service, only a commercial/ industrial service is provided. The municipality has the benefit of about 45km of coastline of which about 80% is in its natural state. Linked to its coastal locality is the Richards Bay deep-water port that has been instrumental in the spatial development of the area in the past and will impact on the areas the municipal area.

Figure 10: Extract from the Environmentally Sensitive Areas map within the uMhlathuze SDF (May 2017), depicting the area to the north-west of the port as "areas of biodiversity significance".

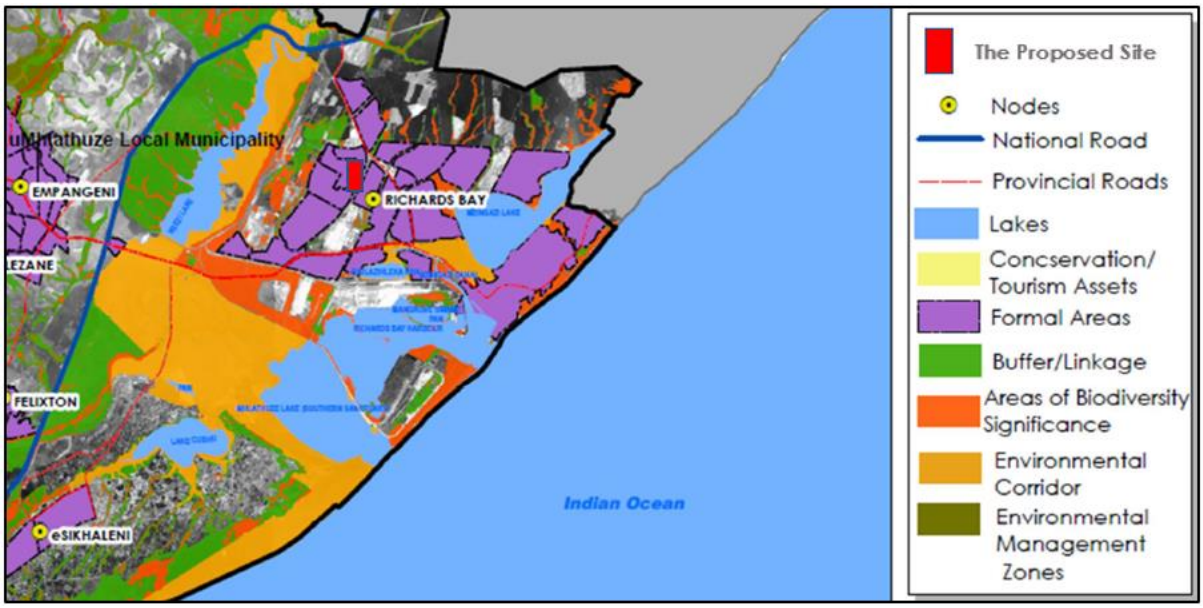
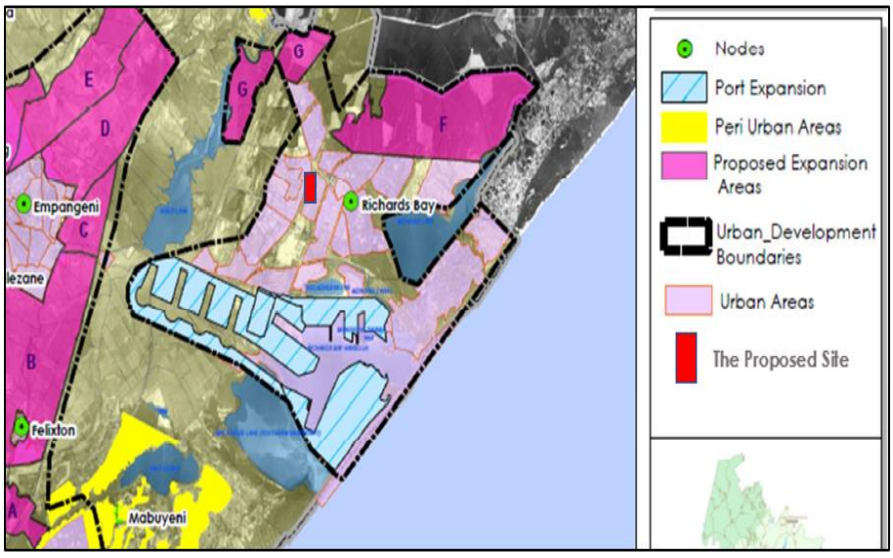


Figure 11: Extract from the Urban Development Plan map within the uMhlathuze SDF (May 2027), depicting the study are for this proposed development to be completely within the urban edge.



The SDF confirms that the proposed CCGPP and associated infrastructure falls within the urban development boundary of Richards Bay. There are identified areas of biodiversity significance that will be impacted on by the proposed project, however these impacts will be assessed through the EIA process as associated specialist studies.

4.3 CONCLUSION

From the above reviewed national, regional and local legislation, it is clear that government is moving more toward the supporting and promotion of more sustainable cleaner energy production when compared to coal which is in line with the proposed Combined Cycle Gas Power Plant. Encouraging cleaner energy sources reduces harm to the environment and hence improves the living standard of the population. The proposed power plant will further address government plans and policies through employment creation and contribute to social and economic advancement with the national, provincial and local uMhlathuze economy.

5 SOCIAL AND ECONOMIC CONTEXT

Having an understanding of the receiving environment is crucial as this highlights how possible impacts will manifest. This section therefore provides a brief overview of the existing social and economic context within the area of influence of the proposed Combined Cycle Gas Power Plant (CCGPP) and associated infrastructure.

5.1 SOCIO-ECONOMIC ENVIRONMENT

5.1.1 Demographics

5.1.1.1 Population

As per the 2016 Community based Survey, the population within the uMhlathuze LM is 410,456 persons. This represents an annual increase of 1.5% between the recorded figures from 2001 to 2016 National Census (StatsSA, 2016). This growth rate is higher than that experienced by the KCDM (0.2%) and the province (0.7%) (StatsSA, 2016).

In 2016, 69% of the population in the uMhlathuze LM were reported to be between the ages of 15 and 64, which is noticeably higher than the KCDM and the province which reported 62% and 64% in this age category, respectively. In addition, between 1996 and 2016 there has been a continuous increase in the percentage of the population within this age category while there has been a decrease in the population below the age of 15 (Table 3) (StatsSA, 2016).

Table 3: Breakdown of the population by age group, 1996 to 2016

	KZN				KCDM				uMhlathuze			
	1996	2001	2011	2016	1996	2001	2011	2016	1996	2001	2011	2016
0-14	36%	35%	32%	32%	41%	39%	34%	33%	34%	33%	29%	27%
15-64	59%	60%	63%	64%	55%	57%	61%	62%	63%	64%	67%	69%
65+	5%	5%	5%	4%	4%	4%	5%	5%	3%	3%	4%	4%

Source: Quantec Data, 2020

An increase in the population within the ages of 15 – 64 can be seen as a positive development on a provincial, district and municipal level. This is because it indicates that there are a higher number of people within the potentially economically active sector of the population, which should reduce the level of dependency.

5.1.1.2 Education

Between 2001 and 2016, there has been a significant decrease in the percentage of the population over the age of 20 within the uMhlathuze LM reporting no access to formal education, with the figure dropping from 18% to 7% (Table 4). These figures are better than those reported for both the KCDM and KwaZulu-Natal, with 14% and 8%, respectively (StatsSA, 2016) (Table 4). The trend of better access to education within the uMhlathuze LM compared to the KCDM and province is also evident in the percentage of the population over the age of 20 reporting to have a Grade 12 level of education and some form of tertiary education, 39% and 15% in uMhlathuze, 30% and 9% in KCDM and 31% and 9% in KwaZulu-Natal, respectively (Stats SA, 2016) (Table 4).

Despite improvements to education levels, school attendance by females between the ages of five and twenty remains below that of males within the LM, KCDM and on a provincial level (despite school attendance improving between 2001 and 2016, there has been little improvement in the disparity between school attendance between males and females).

Table 4: Highest level of education population over the age of 20, 2001 to 2011

	uMhlathuze			KCDM			KZN		
	2001	2011	2016	2001	2011	2016	2001	2011	2016
No Schooling	18%	8%	7%	32%	16%	14%	22%	11%	8%
Grade 12	25%	39%	41%	17%	30%	32%	20%	31%	35%
Higher	11%	15%	15%	6%	9%	10%	7%	9%	12%

Source: Quantec Data, 2020

5.1.1.3 Unemployment

Unemployment levels are an important indicator of socio-economic well-being as formal employment indicates access to an income and the ability to provide for basic needs. Despite improvements between 2001 and 2016, unemployment within the uMhlathuze LM remains high at 30%; however, this is below the level of unemployment reported for the KCDM (34%) and KwaZulu-Natal (33%) (StatsSA, 2016). The levels of unemployment reported within the LM, DM and province are all higher than the national average of 29% (StasSA, 2016). Unemployment is reported to be highest in the municipal wards which encompass those areas which are developing on the urban periphery of Esikhaleni and Nseleni, while employment levels are highest in the urban areas of Richards Bay and Empangeni (uMhlathuze IDP, 2019-2020).

5.1.2 Economic Indicators

5.1.2.1 Income and expenditure patterns

There is a direct linkage between household expenditure and economic growth. Increase in household expenditure means a greater demand for goods and services, which implies an increase in production and a positive change in the size of an economy. Therefore, knowledge of the volume of the disposable income and the expenditure patterns of households can provide insight into the sectors that are most dependent on household income, thereby being most affected in the case of a change in household income. Household income levels are shown in Table 5.

Table 5: Household income distribution

Income category	South Africa	KwaZulu-Natal	KCDM	uMhlathuze LM	Richards Bay
No Income	14.9%	15.1%	13.5%	15.2%	11.9%
R 1 – R 4,800	4.5%	4.9%	4.8%	4.4%	1.4%
R 4,801 – R 9,600	7.4%	8.6%	9.2%	8.0%	2.8%
R 9,601 – R 19,200	17.1%	19.4%	20.2%	13.7%	5.6%
R 19,201 – R 38,400	19.0%	19.8%	21.1%	15.5%	6.6%
R 38,401 – R 76,801	13.1%	11.9%	11.5%	11.9%	9.1%
R 76,801 – R 153,600	9.3%	8.3%	8.0%	11.1%	13.9%
R 153,601 – R 307,200	7.2%	6.3%	6.0%	10.1%	20.9%
R 307,201 – R 614,400	4.7%	3.9%	4.1%	7.2%	18.8%
R 614,401 – R 1,228,800	1.9%	1.2%	1.2%	2.2%	7.0%
R 1,228,801 – R 2.457,600	0.6%	0.4%	0.3%	0.5%	1.2%
R 2,457,601 and above	0.3%	0.2%	0.2%	0.3%	0.8%
Average monthly income (2011)	R 8,696	R 7,100	R 6,935	R 10,502	R 23,130
Less than R3,200 pm.	62.9%	67.8%	68.8%	56.69%	28.2%

Source: Quantec Data, 2020

In South Africa, the average monthly household income was R 8,696 in 2011. Richards Bay had an average monthly income of R 23,130 with a significantly smaller portion of households living on less than R 3,200 per

month compared to the rest of the study areas. The relatively high average income is likely attributable to the high level of industrialisation in Richards Bay. The highest number of households living on less than R 3,200 per month is observed in the uThungulu DM, with 69% of its households considered to be living in extreme poverty. This comparison with the district could be seen as an indication of the relative economic importance and the size of the development that has taken place in Richards Bay.

5.1.2.2 The economy and its structure

Analysis of the structure of the economy and the structure of its employment provides insight into the scale of reliance of an area on a specific sector(s) and, thus, the sensitivity of the area to changes in different sectors of global and regional markets.

Economic production and Gross Domestic product per Region

The GVA[2] of City of uMhlathuze LM was valued to be R36 122 million in 2018 current prices as shown in the table below. This is equal to a GDP per capita of R102 152 which is significantly higher than the national and provincial economies with a GDP-R per capita of R75 205 and R61 174 respectively. This is detailed in the table below.

Table 6: GVA and GDP-R figures for the local, regional and national economy

	GVA (R Millions)	GDP R Per Capita (R)
South Africa	R4 341 282	R75 205
KwaZulu-Natal	R696 458	R61 174
King Cetshwayo DM	R52 031	R53 145
City of uMhlathuze LM	R36 122	R102 152

Source: Quantec data, 2020, Urban-Econ Calculations, 2020

An additional and important indicator of the well-being of a region's economy is the rate at which it is growing. Within City of uMhlathuze LM the importance of the manufacturing industry is evident as this sector comprises more than 20% of the LMs economy. However, the manufacturing sector's growth in the LM is lower than the growth recorded in both the DM and the province between 2008 and 2018. The lower-than-average growth of this sector could be seen as an indication that the secondary sector within the City of uMhlathuze LM is experiencing pressure as a result of the relatively slow growth experienced by the local economy as a whole.

Considering the structure of the economy in nominal terms, it becomes evident that the national economy is predominantly a service economy. The tertiary sector comprised nearly 70% of the national economy in 2018 and grew by 7.8%. The primary sector that includes agriculture and mining, contributes the smallest amount to the national economy. These sectors are, however, strategically important for food security and job creation. The mining and agricultural sectors experienced the lowest growth rates nationally. This could indicate potential job losses for individuals who are typically low to semi-skilled, with a specific skill set. The major drivers of the 7.3% national growth rate were the electricity, gas and water sector, wholesale and retail trade, catering and accommodation sectors as well as the general government sector.

[2] Gross Value Added (GVA) is a measurement of Gross Domestic Product (GDP), with the relationship defined as: GDP = GVA + Taxes – Subsidies. As the total aggregates of taxes and subsidies on products are only available at the level of the whole economy, GVA is used for measuring Gross Geographic Product (GGP) and other measures of the output of entities smaller than a whole economy.

In KwaZulu-Natal, the primary sector is significantly smaller than at national level, with agriculture comprising 3.8% of the province's primary economy as opposed to mining, which is the dominant primary sector at national level. Another notable difference between the province and the country is that the manufacturing industry is bigger within the provincial economy, suggesting that although the manufacturing industry grew by just over 5% in both regions, the impact is more significant in KwaZulu-Natal.

Within the primary study area, the importance of the manufacturing industry is evident in that this sector comprises more than 20% of the LM's economy. However, the manufacturing sector's growth in the LM (2.5% per annum) is below the growth recorded in the wider study area, 3.3% on a district level and just over 5% provincially and nationally per year between 2008 and 2018. The lower-than-average growth of this sector could be seen as an indication that the secondary sector within the uMhlathuze LM is experiencing pressure as a result of the relatively slow growth experienced by the local economy. A breakdown of the structure of the study areas' economies is shown in Table 7.

Table 7: Structure of the study areas' economies (nominal 2018 prices) and Compound Annual Growth Rate (2008-2018)

	South Africa		KwaZulu-Natal		King Cetshwayo		City of uMhlathuze	
	Nominal	CAGR [3](08-18)[4]	Nominal	CAGR (08-18)	Nominal	CAGR (08-18)	Nominal	CAGR (08-18)
Total	**100.0%**	***7.3%***	**100.0%**	***7.0%***	**100.0%**	***6.3%***	**100.0%**	***6.0%***
Primary sector	**10.5%**	***5.6%***	**5.4%**	***4.2%***	**8.8%**	***2.0%***	**5.8%**	***1.1%***
Agriculture, forestry and fishing	2.4%	*4.6%*	3.8%	*4.1%*	5.6%	*3.5%*	2.1%	*4.2%*
Mining and quarrying	8.1%	*5.9%*	1.6%	*4.5%*	3.2%	*-0.2%*	3.7%	*-0.2%*
Secondary sector	**20.9%**	***6.8%***	**25.9%**	***6.8%***	**28.1%**	***4.9%***	**31.3%**	***4.1%***
Manufacturing	13.2%	*5.3%*	17.5%	*5.5%*	19.8%	*3.3%*	22.7%	*2.5%*
Electricity, gas and water	3.8%	*16.0%*	4.0%	*16.5%*	3.7%	*16.3%*	3.9%	*16.2%*
Construction	3.9%	*6.2%*	4.4%	*7.0%*	4.6%	*7.3%*	4.6%	*7.1%*
Tertiary sector	**68.5%**	***7.8%***	**68.7%**	***7.3%***	**63.1%**	***7.9%***	**62.9%**	***7.7%***
Wholesale and retail trade, catering and accommodation	15.0%	*8.2%*	15.2%	*5.7%*	13.4%	*6.4%*	14.1%	*6.6%*
Transport, storage and communication	9.8%	*6.8%*	13.2%	*7.1%*	14.7%	*7.6%*	16.3%	*7.8%*
Finance, insurance, real estate and business services	19.7%	*6.7%*	16.9%	*6.4%*	13.1%	*7.8%*	13.8%	*7.5%*
General government	18.1%	*9.8%*	17.2%	*9.9%*	15.9%	*9.8%*	13.4%	*9.3%*
Community, social and personal services	5.9%	*7.5%*	6.2%	*7.7%*	6.0%	*7.6%*	5.3%	*7.6%*

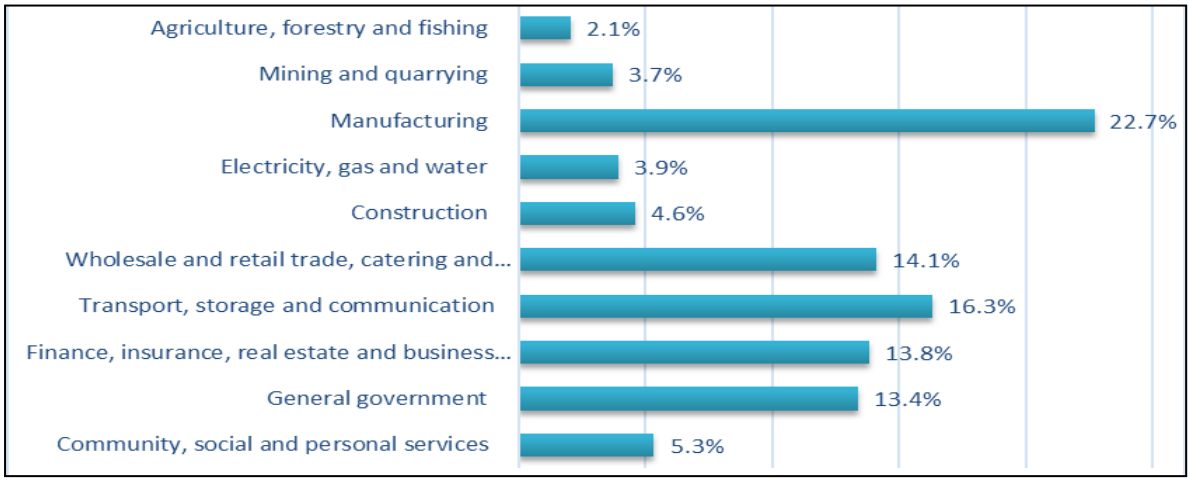
Source: Quantec, 2020, Urban-Econ Calculations, 2020

[3] CAGR: Compound Annual Growth Rate - a measure of average year on year change expressed as a percentage. A negative number indicates a retraction and a positive number indicating growth.

[4] CAGR is calculated for a 10 year period from 2008 - 2018

The figure below illustrates the economic profile of the City of uMhlathuze LM in terms of GVA per sector.

Figure 12: City of uMhlathuze Local Municipality GVA Contribution by Sector, 2018



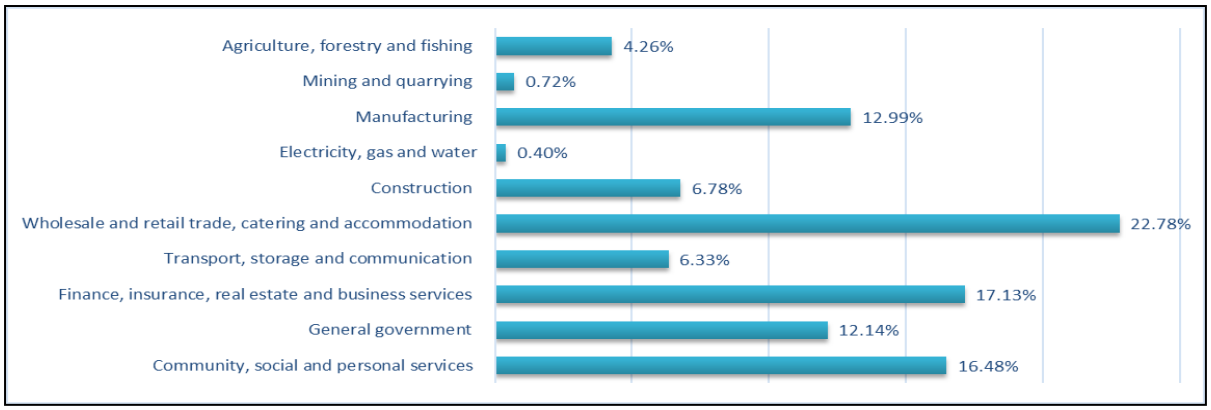
Source: Quantec Research, Urban-Econ Calculations, 2020

As illustrated, the economy of the City of uMhlathuze LM is dominated by manufacturing, which accounts for about a fifth of the economy (22%). This is indicative of the high concentration of industrial activity in Richards Bay, with the Port of Richards Bay, the RBIDZ and associated industries playing a significant economic role.

Transport storage and communication is the next highest contributor (16%), followed by wholesale and retail trade sector contributing 14%. Finance, insurance and business services and General government sectors each contribute about 13%. These sectors are typically associated with the provision of services to industry. General government contributes 13%, which is to be expected given that Richards Bay is home to both the DM and LM governments, as well as several satellite provincial departments which service the north of KwaZulu-Natal (KZN). The remaining 20% is made of the agriculture, mining, construction, and social and personal services sectors.

The sectoral employment pattern of City of uMhlathuze LM show that the largest sector is the Wholesale and retail trade sector with about 22% of total employment. This is followed by the Finance insurance real estate and business services and the Community and social services sectors. The figure below illustrates the employment per sector profile of the City of uMhlathuze LM.

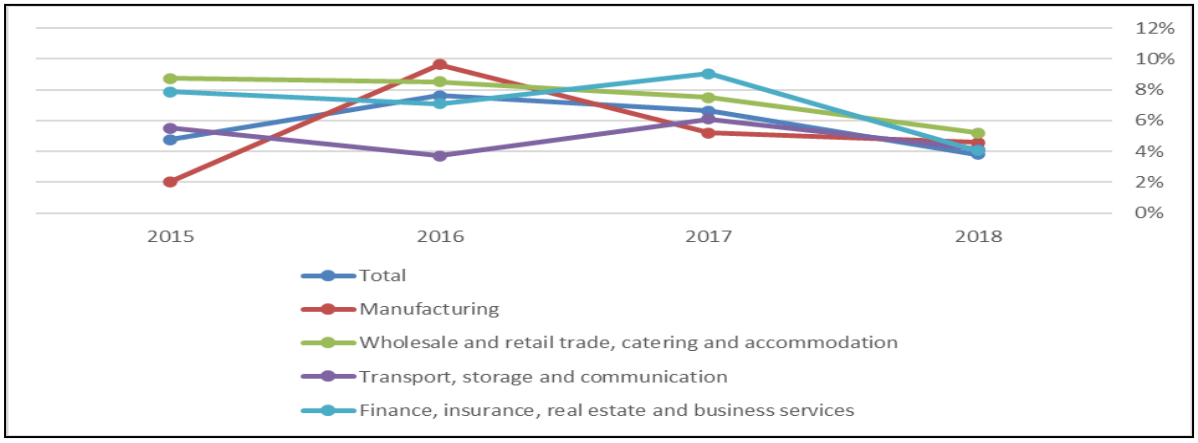
Figure 13: City of uMhlathuze LM Employment per sector 2018



Source: Quantec, 2020, Urban-Econ Calculations, 2020

The figure below illustrates the year-on-year Gross Value Add (GVA) growth for the City of uMhlathuze LM, as well as for the key sectors of the economy, which are linked to industrial activity in Richards Bay, in part supported by the Port of Richards Bay, viz. manufacturing; transport, storage and communication; and finance, insurance, real estate and business services, over the period 2015 - 2018.

Figure 14: Year-on-year Gross Value Add (GVA) growth for the City of uMhlathuze LM 2015 - 2018



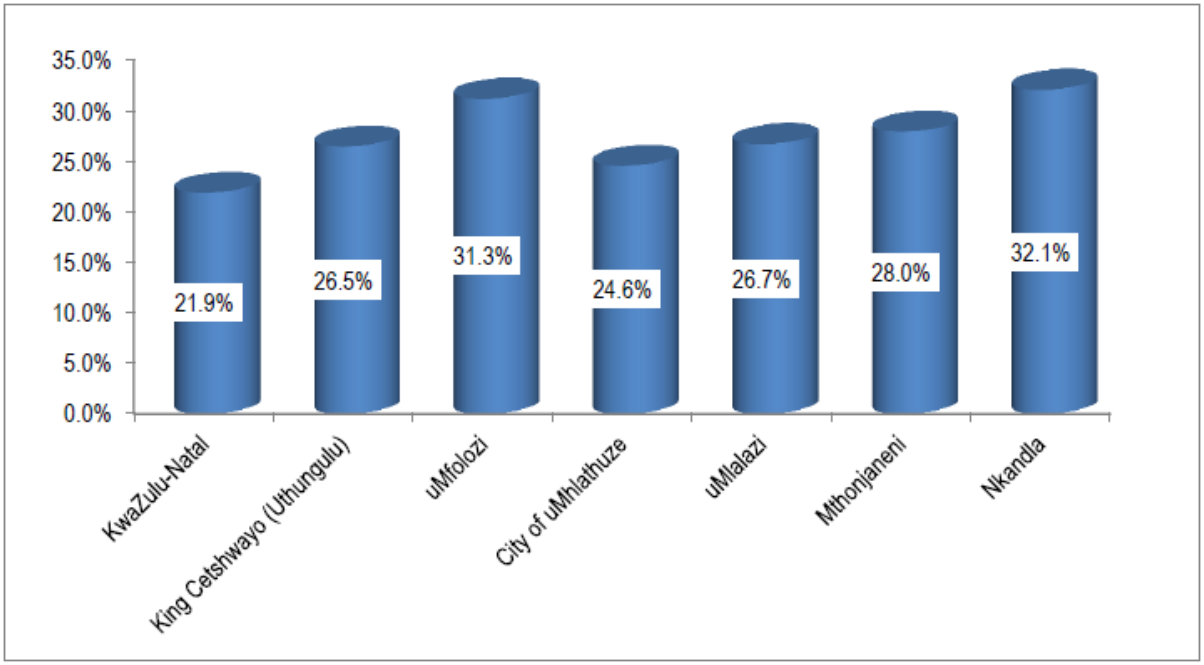
Source: Quantec, 2020, Urban-Econ Calculations, 2020

The significant role played by the manufacturing sector is evident as a large annual decline in this sector in 2009, during the height of the global financial crisis, heavily weighed on the LM's entire economy, resulting in a year-on-year contraction of 8%. It also weighed heavily on the sectors which are largely dependent on the manufacturing sector, although they narrowly avoided moving into negative territory. Post-2009, there has been a general economic recovery in the LM, although GVA growth has stagnated between 2013 and 2016, again, the significant role of the manufacturing sector is evident, as it experienced contraction during this period, falling to a post-2009 low of -2.4% year-on-year. Stimulating the manufacturing sector in the LM, by encouraging investment in industrial activity in the Port of Richards Bay, the RBIDZ, and associated industries in Richards Bay, is likely to pull the entire LM economy higher.

Of particular concern, however, is that none of the sectors have yet recovered to pre-2009 levels, indicating that there has been a 'levelling-out' within the local economy, which is reflective of the state of the national economy. Coupled with this, considering that one of the major attractions for industrial development in Richards Bay was cheap electricity, which is no longer available (resulting in the closure of some industries), one needs to consider the growth prospects for the local economy and whether the demand projections provided by Transnet are an accurate reflection of potential future throughput of the port.

High unemployment undermines the equitable distribution of income and underpins poverty. The figure below indicates percentage of unemployment in King Cetshwayo District. The City of uMhlathuze is seating at 24.6% with regards to unemployment as per the recent Global insight statistics. There are 102 700 employed people in the City of uMhlathuze local municipality. The picture is better if compared with other municipalities within the region; however, it is still relatively high when compared with 21. 9 % of the province.

Figure 15: Local and regional unemployment rates 2018



Source: City of uMhlathuze Local Municipality IDP, 2019/20

5.1.3 Infrastructure and Services

5.1.3.1 Water Supply

The EMF for the Richards Bay Port and IDZ indicates that the available water resources within the Richards Bay are fully utilised. Water is supplied through a piped network to the various users, as well as through direct abstraction from boreholes. As the population grows within the region, as well as the expansion of economic and industrial activities, the water demand is likely to increase. Concern has been raised regarding the volumes of water that will be available to service natural ecological processes. In particular, water is required for recharge to maintain the lake and estuarial ecosystems. The fear is that there will not be enough water to flush out the estuaries in the area, and the subsequent maintaining of ecosystem balances.

Access to piped water improved significantly within the uMhlathuze LM between 2001 and 2016, with 94% of all households (Table 8) reported to have access to piped water either within their household or within their yard (StatsSA, 2016). The improvement in access to water is also seen in the reduction of people without access to piped water declining from 12% to 2% (Table 8) (StatsSA, 2016).

Table 8: Access to piped water

	uMhlathuze			KCDM			KZN		
	2001	2011	2016	2001	2011	2016	2001	2011	2016
Piped water inside dwelling/yard	68%	92%	94%	38%	65%	71%	49%	64%	69%
Communal standpipe	20%	5%	4%	17%	19%	18%	24%	22%	20%
No access to piped water	12%	3%	2%	45%	16%	11%	27%	14%	11%

Source: Quantec Data, 2020

5.1.3.2 Sewerage and Sanitation

Effluent emanating from the City of uMhlathuze is managed through different systems, the infrastructure network of the Richards Bay area can be explained as follows:

- A sea outfall pumping scheme, which deals with sewerage that originates from the various urban areas, as well as industrial zones, within Richards Bay;
- Sludge sewerage treatment plants (particularly for urban areas effluent); and
- Pit latrines found in rural areas.

Improvements to sanitation have been experienced by households throughout KZN, within the KCDM and within the uMhlathuze LM. This is evident in the reduction in the number of households without access (16% to 5% (KZN), 30% to 11% (uThungulu) and 9% to 3% (uMhlathuze)) (StatsSA, 2016) (Table 9). As is the case with access to water, access to sanitation within the uMhlathuze LM is above both the district and provincial averages.

Access to flush/chemical toilets has also improved, with access in the uMhlathuze LM higher than in the district and province (Table 9). Of concern is that there has been an increase in the number of households reporting to make use of the bucket system (Table 9).

Table 9: Access to sanitation between 2001 and 2016

	uMhlathuze			KCDM			KZN		
	2001	2011	2016	2001	2011	2016	2001	2011	2016
Flush or chemical toilet	53%	65%	70%	32%	43%	47%	46%	54%	59%
Pit latrine	37%	28%	25%	36%	41%	40%	37%	36%	34%
Bucket latrine	1%	3%	2%	2%	3%	2%	1%	3%	2%
None	9%	4%	3%	30%	13%	11%	16%	7%	5%

Source: Quantec Data, 2020

5.1.3.3 Electricity

Access to electricity for lighting (the most basic level of access) within the uMhlathuze LM is better than access on a district and provincial level (Table 10). However, noticeable improvements have been seen throughout KZN between 2001 and 2011 (Table 10) (StatsSA, 2011).

Table 10: Access to electricity for lighting

	Access to Electricity for Lighting		
	2001	2011	2016
uMhlathuze LM	86%	94%	96%
uThungulu DM	53%	76%	79%
KZN	61%	78%	81%

Source: Quantec Data, 2020

5.1.3.4 Healthcare

Primary healthcare within the LM is provided from two main clinics, one in Richards Bay and one in Empangeni, supported by satellite clinics. The main healthcare conditions reported are hypertension, diabetes and tuberculosis. Sexually transmitted infections are reported to remain a growing concern within the municipality (uMhlathuze IDP, 2019-2020).

5.1.3.5 Road Infrastructure and Traffic

Road infrastructure in the region is dominated by the N2 National Highway, which runs in a north to south direction, to the far west of the Port of Richards Bay. The main feeder route from the N2 to the Port is the R34, which runs east to west, just to the north of the site.

5.2 CONCLUSION

High levels of South African unemployment continue to be one of the key risks to social and economic stability in South Africa. The recorded South African unemployment stats indicate that the country's level of unemployment rate is approximately 6 times higher than the global average. With the risk posed by the COVID-19 pandemic, the levels of unemployment in South Africa will like increase for the next few years as many industries and companies try to weather the storm by cutting costs which, in some cases, means that companies have to retrench employees. The employment opportunities to be created by the development of the Combined Cycle Gas Power Plant will be crucial towards contributing to employment in uMhlathuze. The operation of the CCGPP will also have positive fiscal impacts through tax contributions.

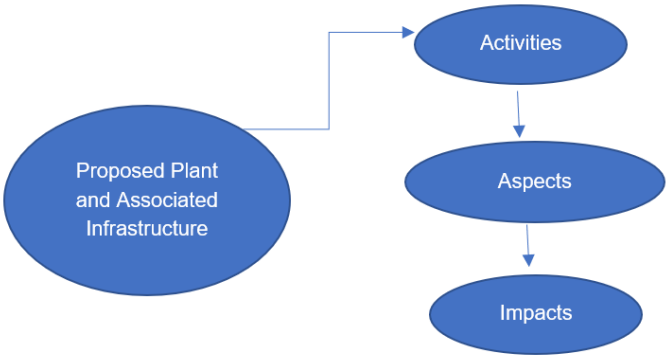
Importantly the environment and society can never be understood as a series of discrete, unrelated components, but rather should be viewed as a system. The receiving environment is now and will always be a dynamic system where change is the only constant. The socio-economic components of this step would include:

- Socio-Economic Environment:
    - Load shedding in terms of electricity supply is a reality within the KZN province and greater Country.
    - High levels of unemployment within the Local and District Municipalities at 31% and 34.7%, respectively.
    - Richards Bay had an average monthly income of R 23,130 with a significantly smaller portion of households living on less than R 3,200 per month. The relatively high average income is likely attributable to the high level of industrialisation in Richards Bay.

6 IDENTIFICATION OF SOCIO-ECONOMIC ISSUES AND POTENTIAL IMPACTS

The following are the components of identifying the main impacts aspects:

Figure 16: Illustration of the process of identifying potential impacts that may occur as a result of the proposed CCGPP and associated infrastructure.



Activities

Activities are the physical activities that typically unfold over the full product lifecycle. In the case of this application the activities are limited to decommissioning, which includes remediating the smelter site where this may be required.

Aspects

Environmental and social aspects are defined as 'an element of an organisation's activities, products or services that can interact with the environment.' For example, wastewater discharge from washing buildings/ structures.

Impacts

Environmental and social impacts are defined as "any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services". For example, water quality changes that could occur as a result of the uncontrolled discharge of wash water.

The magnitude of the impact will be a function of the receiving environment. For example, the impacts of a water demanding activity in the south-eastern parts of KwaZulu-Natal would mean very different impacts to establishing the self-same activity in the Limpopo Province. As such, it is necessary to be able to provide an effective indication of the likely sensitivities or vulnerabilities of the receiving environment to provide for a proper assessment of the scale and severity of the impacts.

6.1 IDENTIFIED PROJECT ACTIVITIES AND IMPACTS DURING CONSTRUCTION AND OPERATION

Based on the project description provided in Section 2 the following project activities have been identified.

Step 1: Identifying Activities

Construction Phase:

- Construction trucks and machinery moving in and out of the IDZ's Phase 1F Zone.
- Installing of LNG & Power Storage Units and associated infrastructure
- Evacuation of Electricity (overhead transmission powerlines):

- Clearing of vegetation for overhead powerline tower
- Erection of powerline towers and stringing power cables; and
- Construction of the new substation and switching yard and connection to the local ESKOM grid.

- Evacuation of Electricity (underground gas-insulated transmission line (GIL))
  - Clearing of vegetation;
  - Excavation of soil for the pipe trench;
  - Construction of the new substation and switching yard and connection to the local ESKOM grid;
  - Off-site transport of spoil material from vegetation clearing;

Operational Phase:

- Delivery of Natural Gas:
- Power generation:
  - Operation of the Combined Cycle gas turbine power plant;
- On site handling and temporary storage of waste materials;
- Off-site transport and disposal of waste materials;
- On site management of stormwater;
- On-going maintenance of the infrastructure.

Step 2: Identifying Impacts

- For each of the identified activities in step 1, it is necessary to list the impacts associated with the development of the power plant and its infrastructure. These identified impacts can be grouped as follow:

Table 11: Demographic Impacts during construction and operation

Impact Demographic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Size and composition of the resident population during construction and operation stages	Direct impacts: » None Indirect impacts: » The proposed development could result in increased population sizes of communities close to the development. This would be experienced during the construction stage (as people seek job opportunities) and during the development's operational stage as people anticipate that there might be job opportunities during the operational lifecycle of the plant.	Municipal	None identified at this stage
Changes in Household numbers	Direct impacts: » None Indirect impacts: With increased number of people moving close to the development there would also be an increase in the number of households in the area.	Regional	None identified at this stage
Standard of living	Direct impacts: » None Indirect impacts:	Municipal	None identified at this stage

Impact Demographic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	» With increased population and household numbers within the area, the standard of living could be negatively impacted as some people would not have the financial means to maintain a good standard of living.		
Description of expected significance of impact The proposed development site is located in an industrial area which is an Industrial Development Zone (IDZ). This therefore means that there a number of large scale current and planned projects in the area. There are currently many heavy vehicles travelling in the area and the construction and operation of the proposed power plant will not result in significant changes to the current activity in the area. It's also important to note that there would be some minor negative impacts as listed in the table above and these impacts can be minimised through the implementation of appropriate mitigation measures.			
Gaps in knowledge & recommendations for further study » The development of the plant could result in an increase in the number of households as well as the population number in the area. » With increase in population numbers and lack of service delivery to serve the increase in the population and household numbers, the standard of living in the area might be negatively impacted. » Assessing the current living standards of the communities surrounding the site. » The increase in population and household sizes could lead to increased levels of crime as some people who fail to find employment in the area could resort to crime as a way of survival. » For the above listed demographic impacts, the construction and operational phases are expected to result in similar impacts.			

Table 12: Community Impacts during construction and operation

Impact Community Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Infrastructure development	Direct impacts: » The proposed project will result in infrastructure development in the area since the development will comprise of various infrastructure units. Indirect impacts: » None	Municipal	None identified at this stage
Pressure on basic services during operational stage	Direct impacts: » None Indirect impacts: » The development of the project and increased population and household numbers linked to the project will likely result in added pressure on the supply of basic services.	Regional	None identified at this stage
Ambient particulate concentrations and dustfall rates during operational stage	Direct impacts: » Potentially elevated ambient particulate concentrations that may have human health impacts. » Potentially elevated nuisance dustfall rates.	Local	None identified at this stage

Impact Community Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	Indirect impacts: » Low probability of impacts to vegetation as a result of particulate deposition		
Ambient gaseous pollutant concentrations during operational stage	Direct impacts: » Potentially elevated ambient gaseous pollutant concentrations, that may have human health impacts, as a result of vehicle exhaust emissions. Indirect impacts: » Low probability of impacts to vegetation as a result of pollutant exposure	Local	None identified at this stage
Ambient air pollutant concentrations during operational stage	Direct impacts: » Potentially elevated ambient gaseous pollutant concentrations, that may have human health impacts, as a result of gas combustion in turbines. » Low probability of elevated ambient particulate concentrations that may have human health impacts, due to gas combustion in turbines. Indirect impacts: » Low probability of impacts to vegetation as a result of pollutant exposure and particulate deposition.	Local	None identified at this stage
Increased noise levels during construction stage	Direct impact » The construction of the plant can be expected to result in increased noise levels to surrounding communities. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified at this stage
Increased noise levels during operational stage	Direct impact » The construction of the plant can be expected to result in increased noise levels to surrounding communities within 2000m of the site. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified at this stage

Impact Community Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Improved energy generation during operational stage	Direct impacts: » The development of the proposed project will result in improved electricity generation Indirect impacts: » The electricity generated from the plant will improve the national energy supply and release pressure from Eskom.	National	None identified at this stage
Description of expected significance of impact The proposed development site is located in an industrial area which is considered to be an IDZ. This therefore means that the area has a number of large scale current and planned projects in the area.. There are currently many heavy vehicles travelling in the area and the construction and operation of the proposed power plant will not result in significant changes to the current activity in the area. It's also important to note that there would be some minor negative impacts as listed in the table above and these impacts can be minimised through the implementation of appropriate mitigation measures. The area of Wild En Weide is the closest residential establishment to the site and some of the above listed impacts will affect these residents.			
Gaps in knowledge & recommendations for further study » Carefully assess the proximity of the nearest residential establishments to see if these could be impacted by the power plant development. » Mapping of all affected communities and organisations concern within the development footprint. » Mapping of known and potential business establishments which might be affected by the development of the project on the identified site. » Indication of the potential resistance from neighbouring organisations about the proposed development site. » Assessment of the extent to which the air and noise pollution will impact/affect the surrounding communities of Wild En Weide.			

Table 13: Economic and Socio-Economic Impacts during construction and operation

Impact Economic and Socio-Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Production during construction and operational stage.	Direct impacts: » None Indirect impacts: » With improved electricity generation and reduced power-cuts, the level of production can be expected to increase.	National	None identified at this stage
Economic Value (GDP)	Direct impacts: » None Indirect impacts: » Through improved energy supply and production, GDP is expected to be positively impacted by the project.	National	None identified at this stage
Tax Revenue	Direct impacts: » The revenue generated at the operational stage of the plant will incur tax.	National	None identified at this stage

Impact Economic and Socio-Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	Indirect impacts: » This will improve government revenue and hence resources that can be allocated for service delivery.		
Household Income	Direct impacts: » None Indirect impacts: » Through income earned by employee at the plant as well as improved economic activity as a result of the power plant, household incomes of can be expected to increase.	National	None identified at this stage
Skills Development	Direct impacts: » Skills development in the form of training employees on how to operate the gas power plant will be transferred. Indirect impacts: » None	Regional	None identified at this stage
Property Prices	Direct impacts: » None Indirect impacts: » The impact on property prices will be minimal since the site in located in an IDZ location.	Regional	None identified at this stage
Employment Creation during construction and operational stages.	Direct impacts: » The project will result in direct employment creation. Indirect impacts: » Through improved productivity levels in the area, more employment can be created in other sectors.	National	None identified at this stage
Description of expected significance of impact The given the nature of the development, relatively more jobs can be expected to be created during the construction stage when the various plant units are being installed as compared to the operational stage. The plant is not expected to be a significant job creator in the region as few employees would be required to monitor it's operation once all components are installed. The electricity produced in this plant will assist in reducing the pressure on Eskom's energy demand and hence play a critical part in reducing the risk of loadshedding. This will in turn assist in reducing disturbances on economic activity caused by loadshedding.			
Gaps in knowledge & recommendations for further study » Mapping of known and potential business establishments which might be affected by the development of the project on the identified site.			

7 CONCLUSION OF SOCIO-ECONOMIC SCOPING

The scoping report aims to provide a detailed overview of the socio-economic environment which will be impacted by the proposed CCGPP development and associated infrastructure. The report has clearly outlined the methodology to be used in assessing the significance of impacts which will arise as a result of the proposed development of the gas power plant. This report will play an important role in feeding into the next phase which is the socio-economic impact assessment report completion.

Further investigations are required to fully characterise the receiving environment well as to investigate the potential negative and positive impacts associated with the proposed development. These investigations will be part of the overall assessment that is used to decide on the acceptability of the proposed CCGPP and associated infrastructure within Phase 1F of the Richards Bay Industrial Development Zone. After client and stakeholder consultation as well as reviewing of this report, this Scoping Report will then be updated so as to ensure that the report is ready for submission to authorities for the approval of the proposed development.

ANNEXURE: PLAN OF STUDY FOR SOCIO-ECONOMIC IMPACT ASSESSMENT

During the socio-economic impact assessment (SEIA) Phase the potentially significant impacts identified during the Scoping Phase will be further investigated and assessed. This Plan of Study details the approach and methodology for the detailed assessment of potential impacts in order to ensure that the Competent Authority will have sufficient information on which to base the decision of whether or not the proposed development and associated activities may proceed.

APPROACH TO ASCRIBING SIGNIFICANCE FOR DECISION-MAKING

The best way of expressing the cost-benefit implications for decision-making is to present them as risks. Risk is defined as the consequence (implication) of an event multiplied by the probability (likelihood) of that event. Many risks are accepted or tolerated on a daily basis, because even if the consequence of the event is serious, the likelihood that the event will occur is low. A practical example is the consequence of a parachute not opening, which is potentially death, but the likelihood of such an event happening is so low that parachutists are prepared to take that risk. The risk is low because the likelihood of the consequence is low even if the consequence is potentially severe.

It is also necessary to distinguish between the event itself (as the cause) and the consequence. Again, using the parachute example, the consequence of concern in the event that the parachute does not open is serious injury or death, but it does not necessarily follow that if a parachute does not open that the parachutist will die. Various contingencies are provided to minimise the likelihood of the consequence (serious injury or death) in the event of the parachute not opening, such as a reserve parachute. In risk terms, this means distinguishing between the **inherent risk** (the risk that a parachutist will die if the parachute does not open) and the **residual risk** (the risk that the parachutist will die if the parachute does not open, but with the contingency of a reserve parachute) i.e. the risk before and after mitigation.

Cumulative impacts

Impacts cannot be assessed in isolation and an integrated approach requires that cumulative impacts will be included in the assessment of individual impacts. The nature of the impact will be described in such a way as to detail the potential cumulative impact of the activity, if there is indeed a cumulative impact. Once all the impacts have been assessed and significance ratings allocated, the socio-economic specialists will assess the project on a holistic basis to determine the overall project socio-economic impact on the receiving environment. This will be a function of the individual impacts as well as the cumulative nature of combining all those impacts within a single context/ project.

Description of Socio-Economic Impact methodology

Direct, indirect and cumulative impacts of the issues identified through the SEIA process, as well as all other issues identified due to the amendment must be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5;
- The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be reversed.
- the degree to which the impact may cause irreplaceable loss of resources.
- the *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:
S = (E+D+M) P
S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts must be summarised in the following table format. The rating values as per the above criteria must also be included. The table must be completed and associated ratings for **each** impact identified during the assessment should also be included.

Example of Impact table summarising the significance of impacts (with and without mitigation):

Nature: **[Outline and describe fully the impact anticipated as per the assessment undertaken]**		
	Without mitigation	**With mitigation**
Extent	High (3)	Low (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Low (24)**
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	Yes
Mitigation: "Mitigation", means to anticipate and prevent negative impacts and risks, then to minimise them, rehabilitate or repair impacts to the extent feasible. Provide a description of how these mitigation measures will be undertaken keeping the above definition in mind.		
Cumulative impacts: "Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities[5].		
Residual Risks: "Residual Risk", means the risk that will remain after all the recommended measures have been undertaken to mitigate the impact associated with the activity (Green Leaves III, 2014).		

[5] Unless otherwise stated, all definitions are from the 2014 EIA Regulations (as amended on 07 April 2017), GNR 326.