SOCIO-ECONOMIC IMPACT ASSESSMENT REPORT FOR THE PROPOSED UP TO 2000MW COMBINED CYCLE GAS-TO-POWER FACILITY OF PHAKWE RICHARDS BAY

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Prepared for:

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ABBREVIATIONS

BOG	Boil-Off Gas
CCGE	Closed Cycle Gas Engines
CCGPP	Combined Cycle Gas Power Plant
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
PRBGP3	Phakwe Richards Bay Gas-to-Power 3
PSEDS	Provincial Socio-Economic Development Strategy
RBIDZ	Richards Bay Industrial Development Zone
SCGPP	Simple Cycle Gas Power Plant
SEZ	Special Economic Zone
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.

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 (CSIR, 2018). The proposed Combined Cycle Gas Power Plant (CCGPP) 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 SEIA 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.
- 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 SEIA Report, 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).
- Phakwe Gas Power Plant Scoping Report.
- Interested and Affected Parties (I&APs) Stakeholder Interviews.

The comments and concerns raised during the scoping phase and consultation stage of the project have been addressed as far as possible in this socio-economic impact assessment report. The table below identifies key I&APs which have been engaged during the EIA process.

Table 1: Identified Interested and Affected Parties (I&APs)

No.	Organisation/ Individual
1	Eskom Transmission Division
2	City of uMhlathuze[1]
3	Department of Forestry, Fisheries and the Environment (DFFE)
4	KZN Economic Development, Tourism and Environmental Affairs (KZN EDTEA)
5	KZN Department of Agriculture and Rural Development (KZN DARD)
6	Richards Bay Industrial Development Zone (KZN IDZ)
7	Centre for Environmental Rights
8	South Durban Community Environmental Alliance
9	GroundWork
10	KZN Department of Cooperative Governance and Traditional Affairs (KZN CoGTA)
11	Tribal authorities and communities of Dube and Mkhwanazi areas
12	Little Junior School

[1] Concerns about the impacts which might affect the closest residential area to the site, Wilde-en-Weide community, were addresses as part of the concerns raised by the City of uMhlathuze.

No.	Organisation/ Individual
13	Batesda Primary School[2]
14	Department of Water and Sanitation,
15	Ezemvelo KZN Wildlife,
16	AMAFA,
17	SANRAL,
18	Transnet,
19	King Cetshwayo District Municipality

1.4 METHODOLOGY

The following methodology was followed in completing the study: The methodology followed in completing this report entailed six stages as is discussed below.

Orientation: The study started with gaining an understanding of the proposed project during various stages of its lifecycle and potentially affected environment. Review of various data and maps provided for the project, as well as discussions with the project team, informed the delineation of the potential zone of influence associated with each component of the project. The delineated zone of influence defined the spatial boundaries of the area to be included in the assessment and assisted in identifying likely impacted and beneficiary communities and economic activities, as well as other stakeholders of the project.

Policy alignment review: Relevant government policies and other strategic documents were gathered and reviewed to determine the alignment of the proposed project with the strategic plans of various government spheres and highlight any potential red flags, if such exist.

Baseline profiling: Following policy review, primary and secondary data were gathered to create the socio-economic profile of the delineated zone of influence. The baseline profile assisted in gaining an understanding of the communities and economic activities to be likely affected or benefit from the proposed project. This included description of the study area's composition and locational factors, economic and labour profiles, way of life of communities located within the zone of influence, their demographic trends and cultural references, their health and wellbeing, and their living environment. Specific attention was paid to the socio-economic composition of the area affected by the project's footprint and its potential environmental effects, i.e. visual, noise, air pollution, etc.

Impact analysis and evaluation: Derived from the review of the project and the feedback received from various parties during data collection, a list of various negative and positive socio-economic impacts that can ensue as a result of the proposed activity during various stages of its life cycle was drawn up and analysed. All of the identified socio-economic impacts were assessed and categorised in line with the rating provided by the environmental specialist.

Formulation of mitigation and enhancement measures: Following the analysis and ranking of impacts, mitigation and enhancement measures, where applicable, were formulated whereby recommendations to

[2] Batesda High School is no longer operational, and this was confirmed by the management of Batesda Primary School. Other schools identified are situated in the designated residential areas of Richards Bay and engagements with these schools formed part of the engagements with these residential areas.

reduce or eliminate the potential negative effects on the affected parties and enhance positive impacts were provided

Need and desirability assessment: Given the knowledge of the project and the profile of the area and the proposed location of the project, the need and desirability of the project from a locational perspective was investigated. It involved the assessment of the project's alignment with the interests and needs of the broader public and the suitability and necessity of the project considering the chosen time and place.

1.5 REPORT OUTLINE

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

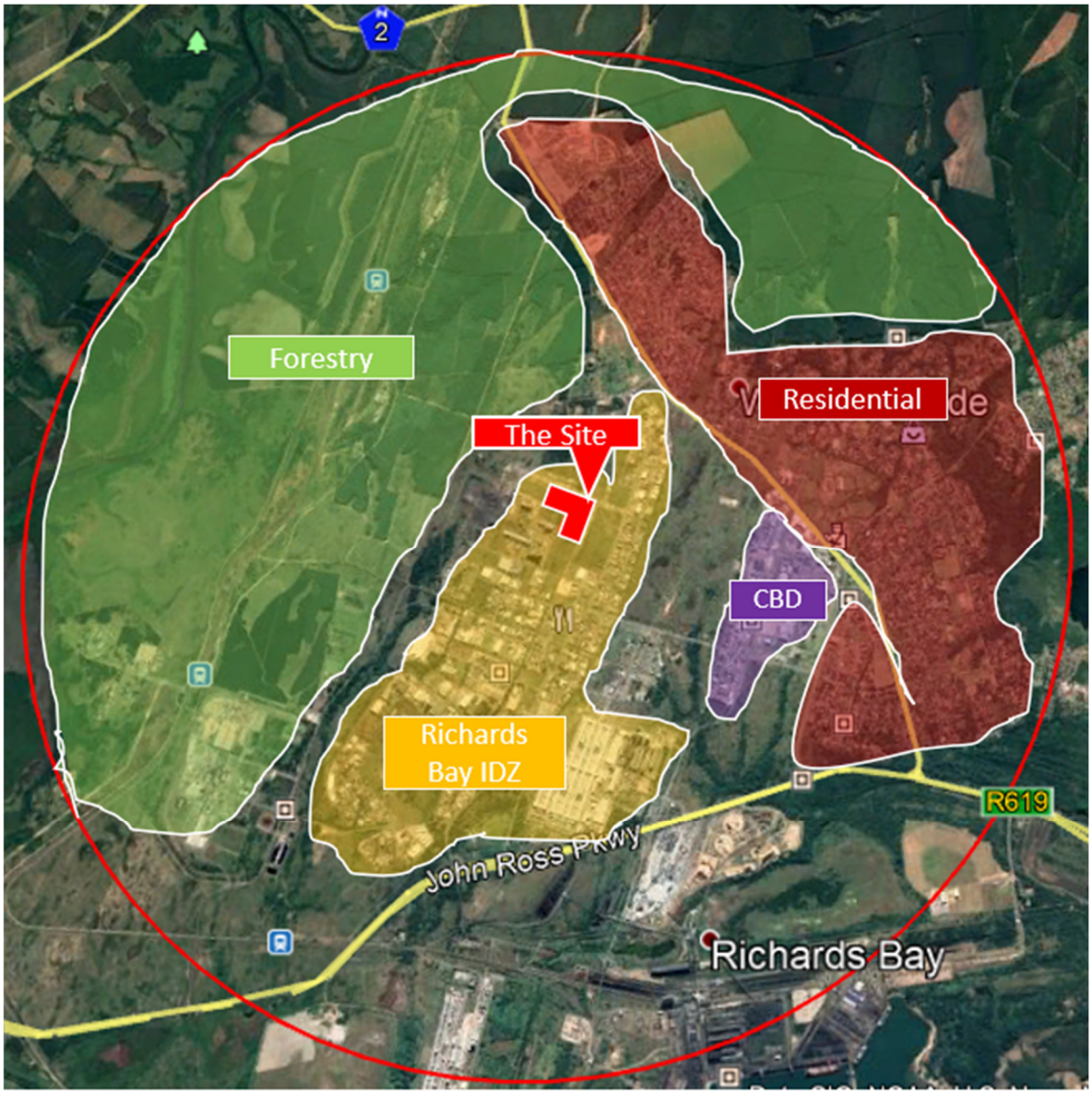
- Section 1: Introduction
- Section 2: Description of the Project
- Section 3: Policy Overview
- Section 4: Social and Economic Profile of the Receiving Environment
- Section 5: Social Impacts Identification
- Section 6: Economic Impacts Assessment
- Section 7: Impact Assessment and Mitigation
- Section 8: Needs and Desirability: Socio-Economic Impact Assessment
- Section 9: Conclusion
- Section 10: References

2 DESCRIPTION OF THE PROJECT

2.1 STUDY AREA

The proposed development is to be located in Richards Bay's IDZ and is potentially an important development due to the impact it is expected to have on the South African economy. The industrial development zone is managed by the Richards Bay Industrial Development Zone Company, a company controlled and owned by the state. The immediate 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 3km radius, the land is split as follows as can be seen in figure 1:

Figure 1: Land use around the proposed site (**3** Kilometre radius)



Source: Urban-Econ, 2020.

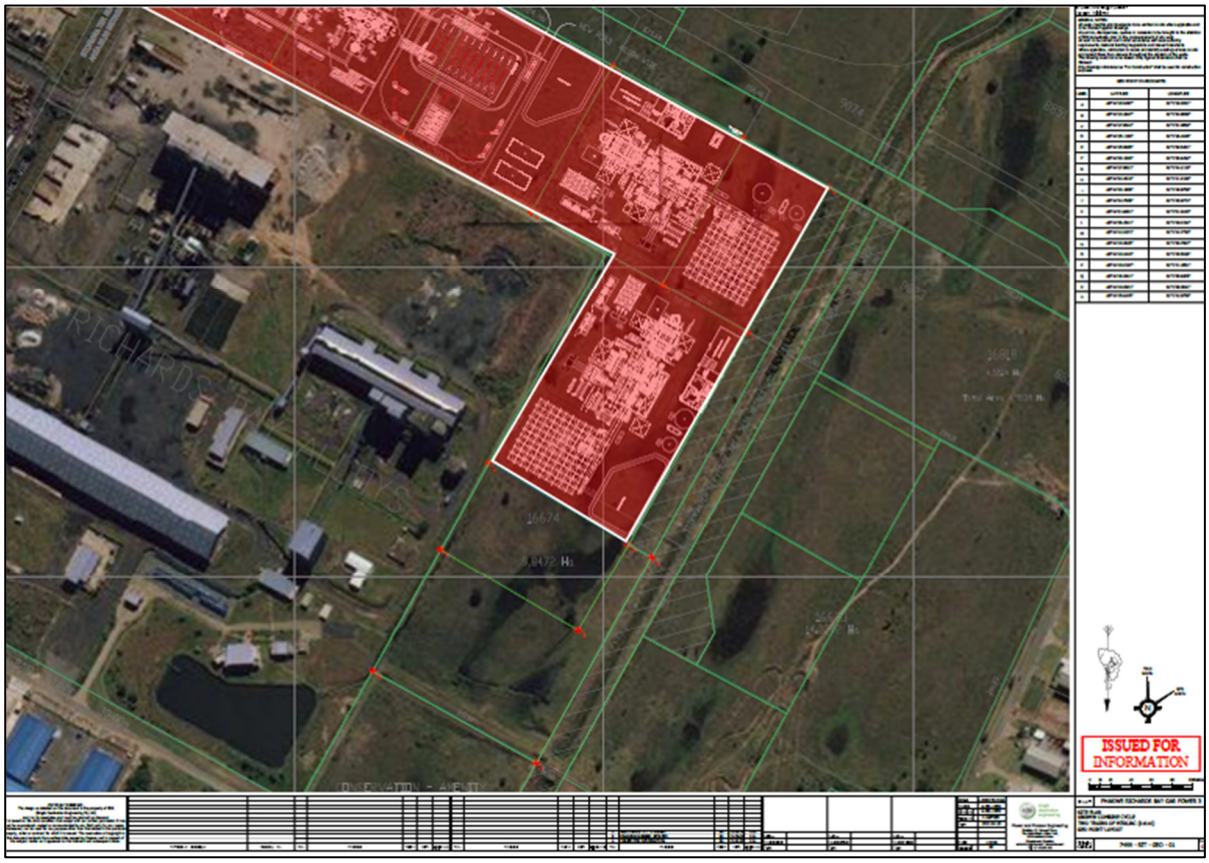
Area	Description
Richards Bay IDZ	The proposed development is to be located within the identified industrial development zone of Richards Bay IDZ Zone 1F. This area mainly comprises of industrial and commercial establishments.
Richards Bay Forestry	A significant portion of the land to the west of the site, towards the N2, is largely made up of green forestry land. This includes both natural green land as well as timber plantation.
Richards Bay CBD	The central business district (CBD) of Richards Bay is also within a 3 km radius. The CBD is located east from the site.
Richards Bay Residential Areas	There are several residential areas which are within a 5 km radius from the site, and these include Aquadene, Arboretum, Birdwood, Brackenham, Veld En Vlei and Wild En Weide.

2.2 THE SITE

The site within which the proposed PRBGP3 will be located is depicted in figure 2 below. The PRBGP3 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 2: Locality Map for the study area within which the proposed PRBGP3 and associated infrastructure will be located.



The Liquid Natural Gas (LNG) storage tanks[3] 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".

2.3 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))
- 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, wastewater
- Fire water (FW) storage and FW system
- Diesel emergency generator
- 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;

[3] The plan is to eventually use Hydrogen. Any mixture of natural gas and hydrogen in the fuel will be done outside of the plant. Fuel mixture will arrive to the plant through the pipeline already mixed.

- 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.

2.4 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 Imvubu. 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.

2.5 CONCLUSION

From the above discussion, it is clear that the proposed development is to be located in an industrial area. Given the industrial nature of the proposed development, it is likely that there would not be major negative impacts on the surrounding environment as it is in an industrial development zone. The proposed plant will constitute of several separate units with capacity of up to 900MW. The combined MW capacity of the establishment will reach 2000MW. 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. The Richards Bay CBD is also not far from the site. With this being said, it is still important to ensure that all establishments close to the site are carefully assessed and their concerns about the development are documented and, where necessary, impact mitigation measures are in place.

3 POLICY REVIEW

This section identifies and provides a brief description of South African policies and legislation which is relevant to the proposed development.

3.1 RELEVANT SOUTH AFRICAN POLICIES, PROGRAMMES, PLANS AND GUIDELINES

3.1.1 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.
- Securing supply through diversity.

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

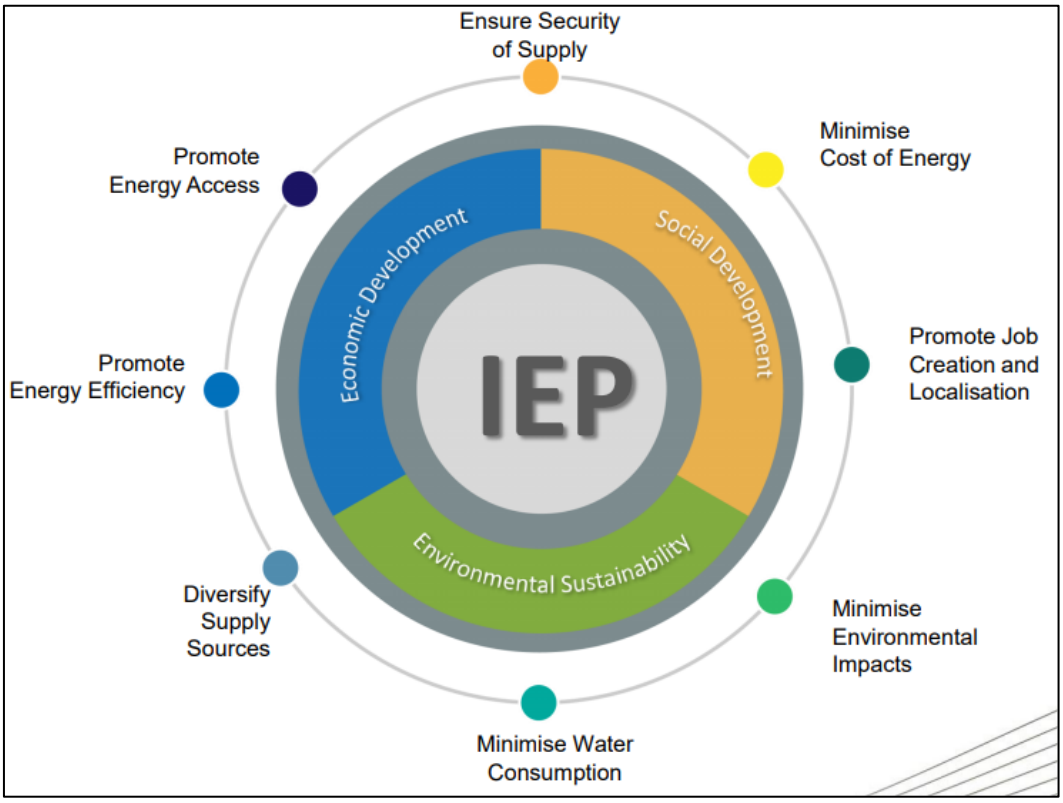
3.1.2 Integrated Energy Plan (IEP)

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.

Figure 3: 8 key energy planning objectives as highlighted in the Integrated Energy Plan (2016)



3.1.3 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, several 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 2 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.

3.1.3.1 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 2: 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

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

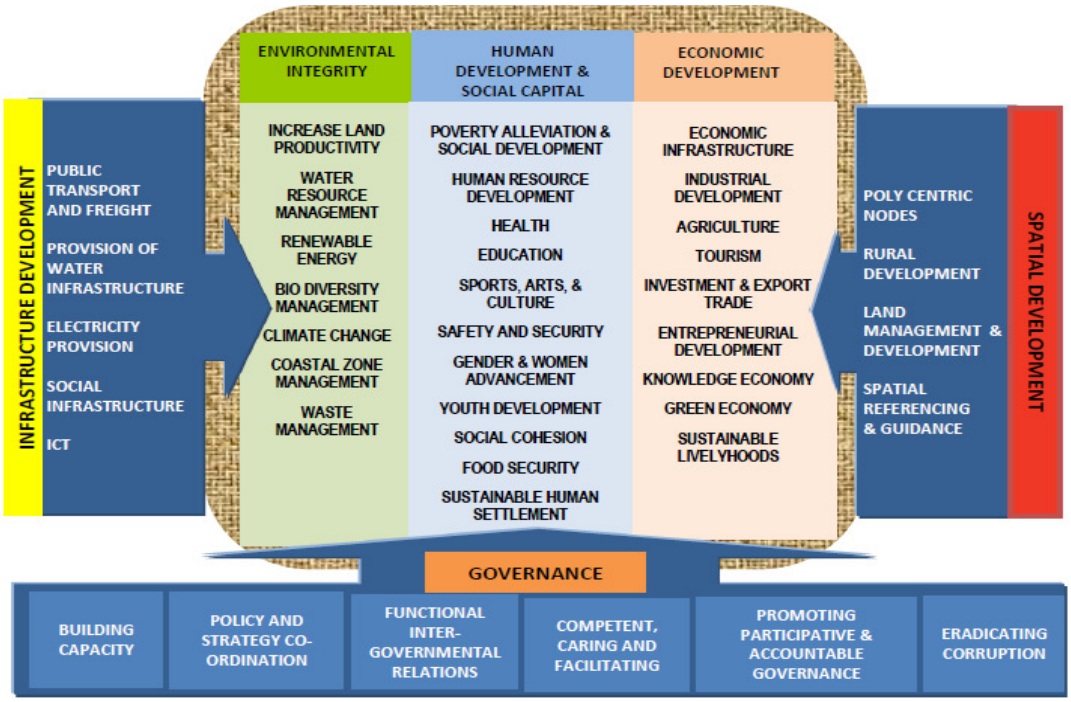
Gas	The availability of gas in the short to medium term is a risk as South Africa does not currently have gas resources. There is also a supply and foreign exchange risk associated with likely increase in gas volumes depending on the energy mix adopted post 2030 when a large number of coal fired power 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.

3.1.4 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 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 4: 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.

3.1.5 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 a 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.
- 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 and effective land use management systems implemented by skilled officials. Improved public sector management and skills levels resulted in sound local governance and financial management.

The KCDM IDP specifically emphasise that the national energy crises have far reaching implications 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 because 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.

3.1.6 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), 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 3: 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 the Need and Desirability section for more details.

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

There are several existing natural and man-made phenomena 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 5: 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".

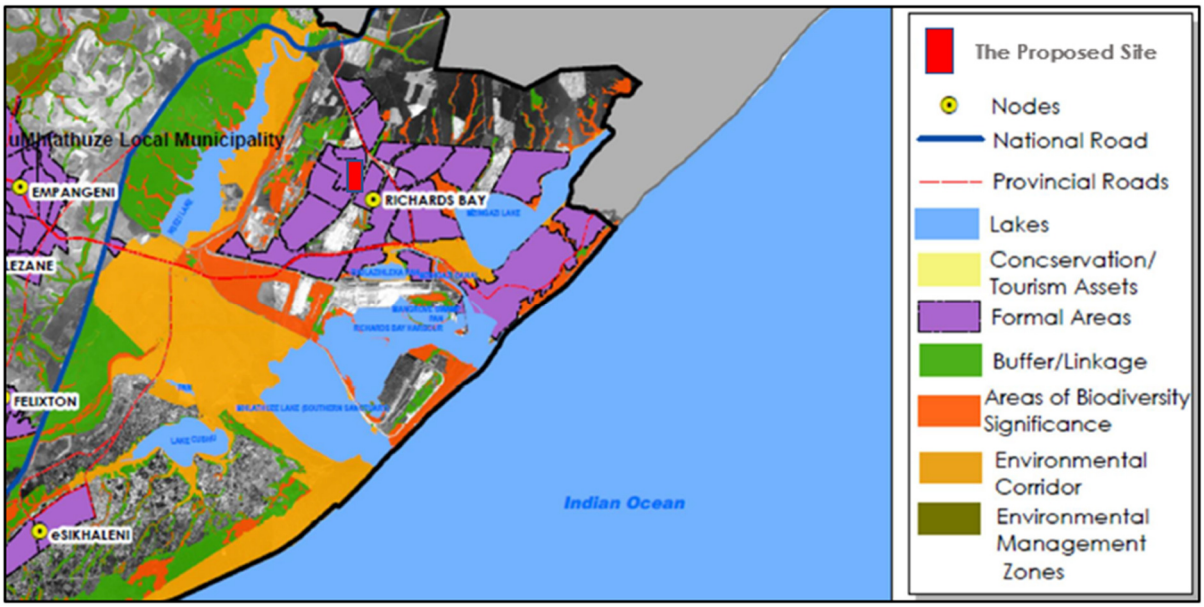
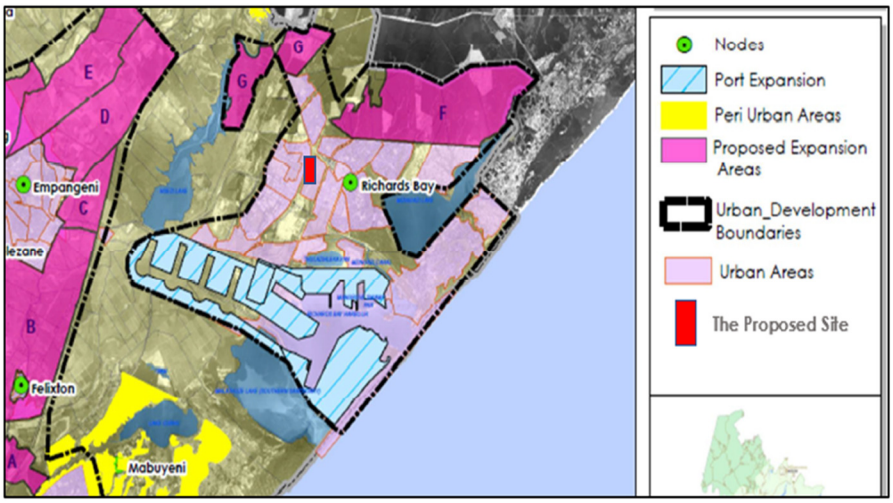


Figure 6: Extract from the Urban Development Plan map within the uMhlathuze SDF (May 2017), depicting the study are for this proposed development to be completely within the urban edge.



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.

3.2 CONCLUSION

From the above reviewed national, regional and local legislation, it is clear that government is moving toward the supporting and promotion of green energy production. It should be noted that gas is not a renewable source of energy. Gas does however support the introduction of renewable energy into the electricity mix as gas plants are able to be started at short notice when renewable energy is not available. The above policy documents also provide a view that there is an urgent need to diversify electricity generation in making up the existing and future shortfall in supply. The IPP Programme aims to reduce the shortfall which currently exists in energy supply. A study published by the CSIR in 2018 illustrated that South Africa's entire electricity demand could be met through renewables provided there was some baseload, which the report argued could come from natural gas fired power plants. The proposed power plant will further address government plans and policies through employment creation and contribute to social and economic advancement of the national, provincial, and local uMhlathuze economy.

4 SOCIAL AND ECONOMIC PROFILE OF RECEIVING ENVIRONMENT

This section provides an overview of the existing social and economic context of the area of influence of the proposed Phakwe Richards Bay Gas-to-Power3 plant (PRBGP3) and associated infrastructure.

4.1 SOCIO-ECONOMIC ENVIRONMENT

4.1.1 Demographics

4.1.1.1 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 4) (StatsSA, 2016).

Table 4: 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.

Race and Language

The area of impact within a 5km radius is made up of six residential suburbs namely; Aquadene, Arboretum, Birdwood, Brackenham, Veld En Vlei and Wild En Weide. The race group split within this area of impact is as follows:

- Africans (34%)
- White (33%)
- Coloureds (4%)
- Indians/Asians and Other (29%).

The dominate languages spoken in the area of impact is English (44%) and Afrikaans (24%) with 26% of the population speaking isiZulu as a first home language.

4.1.1.2 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 5). These figures are better than those reported for both the KCDM and KwaZulu-Natal, with 14% and 8%, respectively (StatsSA, 2016) (table 5). 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 5).

Table 5: 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

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).

4.1.1.3 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 Local Municipality, District Municipality 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).

4.1.2 Economic Indicators

4.1.2.1 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 6.

Table 6: 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.

4.1.2.2 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[4] 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 7: 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 because of the relatively slow growth experienced by the local economy.

Considering the structure of the economy, 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.

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.

[4] 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.

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 8.

Table 8: 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 [5](08-18)[6]	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%*

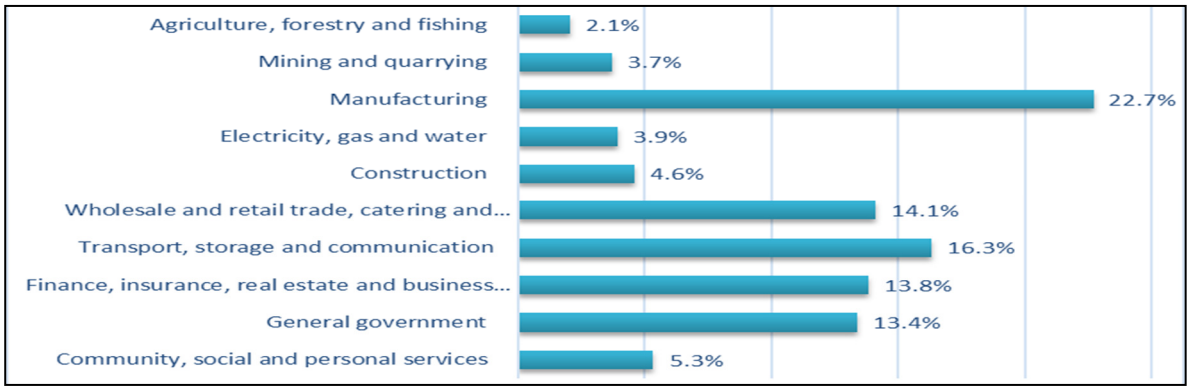
Source: Quantec, 2020, Urban-Econ Calculations, 2020

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

[5] 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.

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

Figure 7: City of uMhlathuze Local Municipality GVA Contribution by Sector, 2018



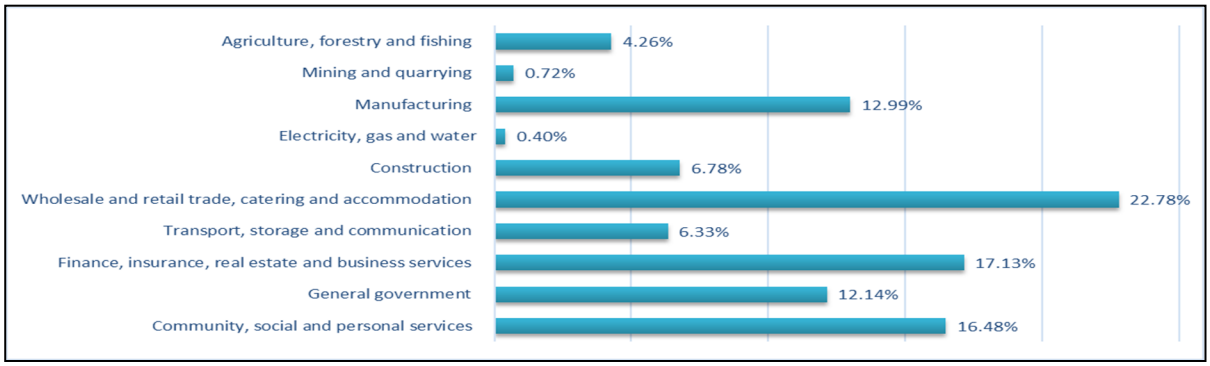
Source: Quantec Research, Urban-Econ Calculations, 2020

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 a number of 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.

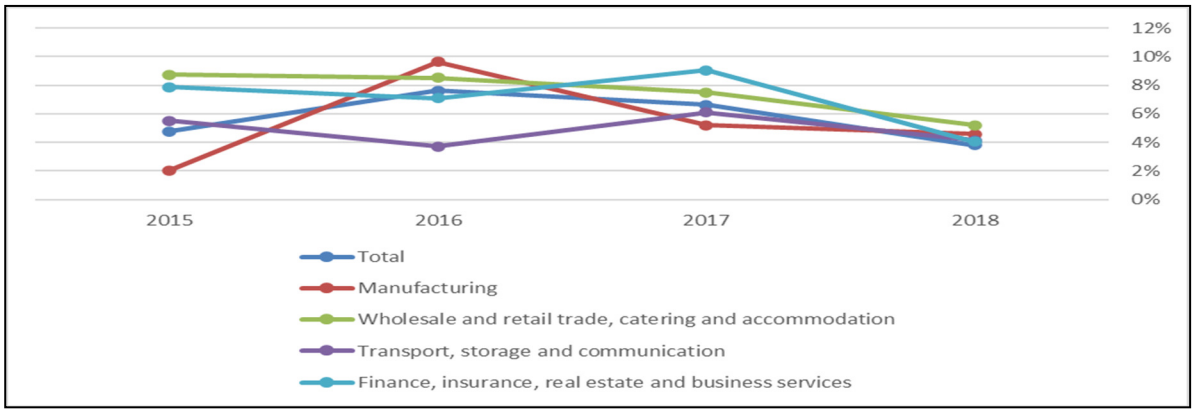
Figure 8: City of uMhlathuze LM Employment per sector 2018



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 a whole, 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 9: Year-on-year Gross Value Add (GVA) growth for the City of uMhlathuze LM 2015 - 2018



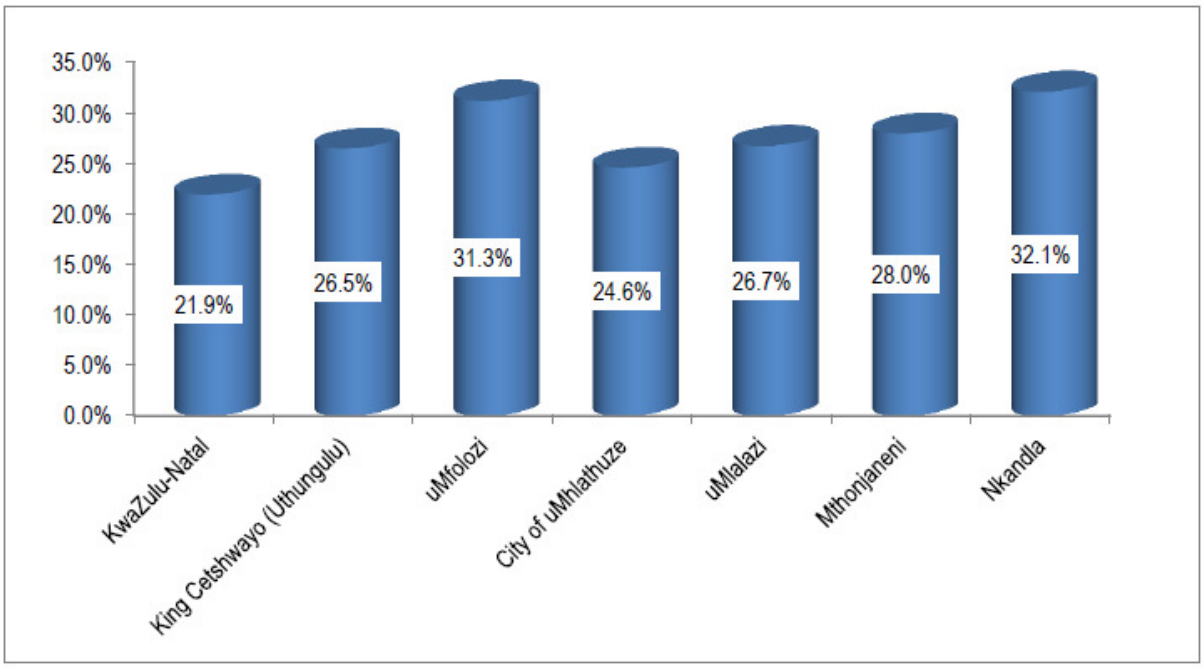
Source: Quantec, 2020, Urban-Econ Calculations, 2020

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 10: Local and regional unemployment rates 2018



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

4.1.3 Infrastructure and Services

4.1.3.1 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 9) 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 9) (StatsSA, 2016).

Table 9: 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

4.1.3.2 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 10). 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 10). Of concern is that there has been an increase in the number of households reporting to make use of the bucket system (Table 10).

Table 10: 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

4.1.3.3 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 11). However, noticeable improvements have been seen throughout KZN between 2001 and 2011 (Table 11) (StatsSA, 2011).

Table 11: 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

4.1.3.4 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).

4.1.3.5 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.

4.2 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 at over 30% as at 2022. With the risk posed by the COVID- 19 pandemic, the levels of unemployment in South Africa is likely to increase for the next few quarters as many industries and companies try to weather the storm by cutting costs which, in some cases, this 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 PRBGP3 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. When compared to the KZN Province as well as the KCDM, uMhlathuze has a higher average of the working population (aged between 15-64 years) as well as higher average monthly income to that of South Africa. The city also has a good service delivery coverage on basic amenities like electricity, water and sanitation. These findings assist in establishing whether or not the identified site location has adequate infrastructure to attract additional development. From the above discussions it can be said that uMhlathuze can provide basic infrastructure to the proposed development as well as the labour capital which might be required during the construction and operational phases of the plant.

5 SOCIAL IMPACT IDENTIFICATION

Social impacts refer to the impact that the construction and operational phases of the proposed development will have on the local population and the social circumstances of the local communities within which the plant is located. The impacts are divided between the construction and operational phase impacts as well as between positive and negative impacts to the receiving socio-economic environment. The impact component of the impact assessment is derived by identifying and assessing the impact of the development on the people, households, communities, businesses, and other stakeholders in the impact area. Detailed analyses of social impacts are also found on the other specialist studies forming part of the project's Environmental Impact Assessment (EIA) Report.

5.1 COMMUNITY IMPACTS

A community's sense of place is developed over time as it embraces the surrounding environment. The people of the area become familiar with its natural characteristics and physical properties and therefore create an attachment to the environment. The sense of place is created through the interaction of a number of different factors such as the areas visual resources, its aesthetics, climate, culture and heritage as well as the lifestyle of individuals that live in and visit the area. Most importantly, it is a highly subjective matter and dependent on the demographics of the population that reside in the area and their individual perceptions. For example, a

community living in poverty is generally more likely to be accepting of industrial development that promises employment opportunities while a more affluent residential area is more likely to oppose such a development on the grounds that the development is likely to have an adverse impact on property values.

5.1.1 VISUAL IMPACT[7]

The proposed PRBGP3 development is unlikely to significantly alter the visual resources in the area that define the areas sense of place since the proposed development is going to be taking place in an industrial development zone area. However, there are a few residential establishments in close proximity to the proposed development, and this has the potential to affect the aesthetic value of the natural landscape of the area especially in the construction phase.

The visual impact assessment specialists report highlights that the power plant buildings and exhaust stacks would theoretically be visible from large parts of the study area, especially within a 1-3km radius of the structures. These exposed areas include sections of the R619 main road and the south-western outlying areas of the Brachenham and Wilde-en-Weide residential areas.

5.1.2 AIR QUALITY IMPACT

The PRBGP3 involves the installation and operation of gas turbine units for a total generating capacity of up to 2 000 MW. The power plant will include several gas- and steam turbine pairs for the generation of electricity through the use of natural gas (liquid or gas forms) or a mixture of natural gas and hydrogen (in proportion scaling up from 30% H_2) as fuel source, operating all turbines at mid-merit to baseload duty (12 to 24 hours daily operation). No Diesel (other than for plant start-up), Heavy Fuel Oil (HFO) and Light Fuel Oil (LFO) will be used, due to their high emissions.

The combustion of natural gas (with the possible inclusion of hydrogen) is likely to result in local impacts, with possible non-compliance with the NAAQS near site within the industrial area and possibly within suburbs and at sensitive receptors. The pollutants of concern include CO, NO_2 and (to a lesser extent) SO_2, PM_{10}, PM_{25} and VOCs. The impact is likely to be long-term in nature and requires effective mitigation measures.

5.1.3 TRAFFIC[8] AND NOISE[9] IMPACT

During construction, there will be an increase in noise which is likely to develop into a nuisance for people working and residing within the AOI. The nature of the noise is likely to be elevated with likely sources including construction machinery. Medium noise levels are, therefore, likely to occur during the construction of the proposed gas power plant. During construction, it is also likely that there will be an increase in the number of vehicles, in particularly heavy-duty vehicle travelling to the site. The increase in heavy duty vehicles may place increased pressure on the existing road infrastructure. Low to medium traffic volumes are anticipated within the AOI during the construction phase of the proposed plant. The fact that the site is located in an IDZ is an indication that the noise levels might not be of great concern since there are many industrial development and heavy duty trucks operating in this area. The visual and aesthetic environment may also be negatively impacted due to the temporary increase in construction vehicles, workers, dust, noise and traffic.

[7] Lourens du Plessis (GPr GISc) t/a LOGIS. Visual Impact Assessment. Phakwe Richards Bay Gas Power 3 (Pty) Ltd. April 2022

[8] JG Afrika (PTY) LTD. Transport Impact Assessment, April 2022

[9] Enviro Acoustic Research. Noise Study For Environmental Impact Assessment, April 2022.

The noise impact assessment illustrates that there is a risk of a noise impact during the construction and operational phases due to the proximity of noise-sensitive receptors to the project site where noise generating activities may take place. However, this noise impact is expected to be of low significance. The following table illustrates the acceptable zone sound levels for noise in districts.

Table 12: Acceptable Zone Sound Levels for noise in districts

1	2	3	4	5	6	7
Type of district	**Equivalent continuous rating level ($L_{Req.T}$) for noise** dBA					
	Outdoors			**Indoors, with open windows**		
	Day/night $L_{R,dn}$ [a]	**Daytime** $L_{Req,d}$ [b]	**Night-time** $L_{Req,n}$ [b]	**Day/night** $L_{R,dn}$ [a]	**Daytime** $L_{Req,d}$ [b]	**Night-time** $L_{Req,n}$ [b]
a) Rural districts	45	45	35	35	35	25
b) Suburban districts with little road traffic	50	50	40	40	40	30
c) Urban districts	55	55	45	45	45	35
d) Urban districts with one or more of the following: workshops; business premises; and main roads	60	60	50	50	50	40
e) Central business districts	65	65	55	55	55	45
f) Industrial districts	70	70	60	60	60	50

Source: Noise Scoping Study, 2022.

5.2 DEMOGRAPHIC AND GENDER IMPACTS

Proposed projects need be assessed on its demographic impacts such as number of people, location and population density. Large scale projects are likely to increase employment opportunities in a region which subsequently impacts the demographic profile in a region. The proposed development of the PRBGP3 is also expected to result in increased employment opportunities and therefore have an impact on the demographic profile of the region. This impact on the demographic make-up of the region is expected to be very minor as was indicated in the preceding sections dealing with the number of employment opportunities expected from the construction of the plant.

5.3 CRIME IMPACT

The construction of the proposed project may alter the community's perceptions about their safety. The residential units are an estimated 3km from the intended project site. This means that the residents are unlikely to experience construction workers on/near their property during the construction period. As such, the construction of the plant might not have an impact on residents' privacy.

Despite the region's potential to supply the required workforce for the construction of the proposed PRBGP3 development, workers may also potentially be drawn from the surrounding areas. Workers involved in the construction of the proposed plant development will, therefore, be traveling to the site daily. The presence of construction workers working in the area could result in social conflicts between the local population, existing

construction workers currently operating in the area and the new workforce. Likewise, the flow of people into the area, could potentially lead to a temporary increase in the level of crime, illicit activity, waste and possibly a deterioration of the health of the local community through the spread of infectious diseases. This, however, could be minimised through use of local employment.

PREVIOUS ***SECTION 5.4 (HEALTH, MENTAL HEALTH AND PSYCHOLOGICAL IMPACTS)*** HAS BEEN DELETED

5.4 IMPACTS ON SOCIAL AND HUMAN CAPITAL

The job creation during the construction phase may have positive spill overs to skills development and human capital in the region. Skilled labour if not available locally may be sourced from other regions and therefore has the potential to inject expertise and knowledge locally.

5.5 INFRASTRUCTURAL IMPACTS

An overhead electrical power line runs adjacent and to the east of the proposed project site. In addition, a railway line runs north and east of the site. The proposed extension will not remove or alter these structures and therefore will not negative impact the supply of electricity and transport.

In addition, the proposed project is likely to have a positive impact on infrastructure in uMhlathuze due to the current constraints of electricity supply in the region and across South Africa. Existing roads and other services may also subsequently improve due to this development.

5.6 NATURAL RESOURCES AND OTHER COMMUNITY ENVIRONMENTAL FACTORS.

The proposed project is a low impact project which is unlikely to put a strain on natural resources in the region. The proposed development has no impact on people's access to natural resources i.e. wood, water and medicinal plants.

5.7 POLITICAL IMPACTS (HUMAN RIGHTS, GOVERNANCE, DEMOCRATISATION ETC)

The proposed is unlikely to have any political implications but enhances the economic performance of the country as it adds much needed energy onto the grid.

5.8 POVERTY

The proposed project is likely to create jobs and therefore improve the livelihoods and therefore reduce poverty. Employment equity of vulnerable groups may be improved through this proposed development.

5.9 LAND USE IMPACT

The proposed site for the development is mostly surrounded by industrial establishments. The proposed site is therefore located in an area where it will not negatively impact the surrounding land uses. It is located approximately 3kms away from residential areas. The project infrastructure is located on property that is zoned as an industrial development zone. The project will not alter the land use in the area.

Landscaping, manicuring, and bush clearing is likely to occur for the proposed development to take place. There will therefore be a geographical impact related to the physical infrastructure of the proposed gas power plant, but no potential economic loss is likely to be incurred.

5.10 CONCLUSION: SUMMARY OF IDENTIFIED IMPACTS

The tables below provide a summary description of the identified social and economic impacts which are relevant for the proposed Phakwe Richards Bay Gas-to-Power Plant3 as was identified in the scoping phase of the report.

Table 13: Social Impacts During Construction

Impact Social 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
Increased noise levels during construction stage	Direct impact » The construction of the plant can be expected to result in creased noise levels to surrounding communities. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified
Description of expected significance of impact The proposed development site is located in an industrial area which is considered to be a Special Economic Zone (SEZ). This therefore means that the area has a number of large scale current and planned projects in the area. The development of the power plant, and given the nature of its clean energy production, is not expected to have significant negative impacts on it surroundings. 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.			

Table 14: Social Impacts During Operation

Impact Social Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
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
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. Indirect impacts: » Low probability of impacts to vegetation as a result of particulate deposition	Local	None identified
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
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:	Local	None identified

Impact Social Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	» Low probability of impacts to vegetation as a result of pollutant exposure and particulate deposition.		
Increased noise levels during operational stage	Direct impact » The construction of the plant can be expected to result in creased noise levels to surrounding communities. Indirect impact » Protest from neighbouring communities due to disturbance.	Local	None identified
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
Size and composition of the resident population	Direct impacts: » None Indirect impacts: » The proposed development could result in increased population sizes of communities close to the development.	Municipal	None identified
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 residential	Regional	None identified
Standard of living	Direct impacts: » None Indirect impacts: » With increased population and household numbers within the area, the standard of living could be negatively impacted as	Municipal	None identified

Impact Social Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	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 considered to be a Special Economic Zone (SEZ). This therefore means that the area has a number of large scale current and planned projects in the area. The development of the power plant, and given the nature of its clean energy production, is not expected to have significant negative impacts on it surroundings. 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.			

6 ECONOMIC IMPACT ASSESSMENT[10]

This section details the economic impacts of the construction and operational phases of the development of the PRBGP3.

The construction activities in establishing the PRBGP3 will generate positive social and economic impacts. The construction activities will trigger several direct, indirect, and induced activity in the economy through the new demands that are generated for goods and services that did not exist before.

The operation of the PRBGP3 will have a positive economic impact on not only the local economy of the City of uMhlathuze LM but also on the national economy (South Africa). The technology proposed has the twofold benefit of providing quick to market electricity desperately needed to meet the power demands in the RSA and secondly, in assisting with the stabilisation of the national grid to allow for some industry to reopen and grow.

The PRBGP3 will feed into the national power supply electric grid which would help stabilise power supply and increase capacity. This would significantly reduce demand pressure on ESKOM thus alleviating load shedding. Further, with the improved power supply and energy efficiency, this may bring the cost of electricity down allowing some new industries to open or to reopen.

Economic Impacts

The economic impacts of the PRBGP3 are derived through the application of the National Input-Output (IO) model based on both the capital outlay for the development of the PRBGP3 and the operational expenditure costs associated with the PRBGP3 as reported in the cost breakdown provided.

[10] The Input-Output Model process steps followed in this section are explained in Section 10: Annexure (Description Of The Socio-Economic Impact Process).

It is important to note that this socio-economic impact assessment only addresses the SA component that is expenditure taking place in SA. The expenditure associated with other capital equipment that will be imported are not accounted for in this assessment. The economic benefits of the imported plant and equipment will accrue to those countries from which they are imported or manufactured and are excluded in this assessment.

The plant's CAPEX and OPEX figures respectively are classified into the respective expenditure SIC Code[11] classifications and are entered into the I-O Model which generated the direct and indirect impacts of the expenditure taking into account the relevant multipliers for each individual expenditure item.

The economic impact assessment isolates PRBGP3's impact on:

- Increases in Production generated in the economy
- Contribution to Gross Value Add (GVA)
- Contribution to Employment Creation
- Contribution to Business Income levels retained in the economy

6.1 CONSTRUCTION PHASE

This section outlines the impact of PRBGP3 capital expenditure in its construction phase. The total capital outlay for the establishment of PRBGP3 amounts to R 21 billion. The capital benefits discussed are the result of the application of the Input-Output Model to this capital expenditure. The benefits are assessed in relation to Production, Gross Value Added, Business Income and Employment.

6.1.1 Production

The impact of the CAPEX investment can be expressed in terms of the economic value of additional business opportunities and output created by the development of the PRBGP3. The localisation of these opportunities will be dependent on the localisation of the supply chain for the construction of the PRBGP3. However, the main benefits will be to the local City of uMhlathuze businesses and linkages.

The term Production refers to the value of all inter and intra sectoral business sales generated in the economy. This accounts for all direct and indirect sales benefits. This figure indicates the value of every additional sale transaction because of the CAPEX implementation injected into the economy by PRBGP3.

The table below outlines the impact on production of the development of the PRBGP3 in R Millions.

Table 15: CAPEX Economic Impact on Production (R Millions), Current 2022 Values

Economic Impact	Direct	Indirect	Induced	Total
Production	R21 000	R22 075	R10 267	R53 342
Percentage Accrual	39%	41%	20%	100%

Source: Urban-Econ Calculations, 2022

A total of R 53.342 billion will be generated in Production within the economy, with approximately 39% of this accruing to first round suppliers (direct benefits) and 41% accruing to secondary suppliers (indirect benefits).

[11] SIC is the Standardized Industrial Classification Codes published by StasSA

6.1.2 Gross Value Add (GVA)

The new production will translate to a total value addition, Gross Value Added (GVA), into the economy comprising of direct contribution to GVA and indirect contribution to GVA. The economic scale at which the GVA impact is likely to be felt will be a function of the location of the companies appointed as service providers to undertake the required construction and engineering services. It is expected that the majority of these services will be secured within City of uMhlathuze LM in order to capture the full impact on the City of uMhlathuze LM economy (GVA).

GVA is a proxy for Gross Domestic Product (GDP) at a scale smaller than a whole country. Gross value added provides a Rand value for goods and services that have been produced, less the cost of all inputs and raw materials that are directly attributable to that production.

The table below shows the results of the Input-Output Model relating to the Gross Value Added generated through the capital expenditure for the PRBGP3 in R Millions.

Table 16: CAPEX Economic Impact on GVA (R Millions), Current 2022 Values

Economic Impact	Direct	Indirect	Induced	Total
GVA	R4 885	R7 458	R3 928	R16 271
Percentage Accrual	30%	46%	24%	100%

Source: Urban-Econ Calculations, 2022

This is a significant injection as the impact on GVA is projected to be R 16.271 billion. 30% of which will accrue directly to the building and construction sector through direct benefits and a further 24% of induced benefits mainly to the financial intermediation sector through the multiplier effect.

6.1.3 Business Income

The economic impact may also be measured in terms of the contribution to increasing business income and improving the businesses who benefit from the increased production and GVA stimulation. Business Income refers to the income that the new economic activity retains within the economy.

The following table shows the impact on business income during the construction phase.

Table 17: CAPEX Business Income Contribution (R Millions), Current 2022 Values

Economic Impact	Direct	Indirect	Induced	Total
Income Contribution	R2 506	R3 269	R1 573	R7 347
Percentage Accrual	34%	44%	21%	100%

Source: Urban-Econ Calculations, 2022

The businesses that are anticipated to benefit from the CAPEX investment of the PRBGP3 development are expected to see a cumulative increase in their income levels in the order of R7.347 billion.
The indirect business income benefits for suppliers are larger than those for direct contractors at 44%. This can be attributed to the fact that while the multiplier analysis is calculated on the premise that all impacts are contained within a regional economic context (City of uMhlathuze LM), the impacts are likely to extend as far as the supply chain of the PRBGP3's development for the construction phase, as the location of the impacts is dependent on from where goods and services are sourced.

6.1.4 Employment

The nature and scale of the PRBGP3 development will impact the economy through the creation of employment opportunities. This is based on the number of jobs created in each sector as a result of the expenditure in the construction phase of the PRBGP3. Total employment contribution reflects the number of jobs created by economic growth as a result of the construction of the PRBGP3. This is the most common measure of economic impact because it is easier to comprehend in real terms. It should be noted that these opportunities will be created only for the duration of construction period and, therefore, should be considered temporary in nature. Also, it should be noted that the geographic spread of these employment opportunities will be a function of the location of the companies appointed as service providers to undertake the required construction work. While a project of this nature is anticipated to create employment opportunities in the local area and surrounding City of uMhlathuze LM communities, the supply chains of the service providers will determine the localisation of these opportunities. The following table shows the impact on employment during the construction phase.

Table 18:CAPEX Employment Impact

Economic Impact	Direct	Indirect	Induced	Total
Employment Creation	600	1 267	621	2 484

Source: Urban-Econ Calculations, 2022

The employment benefits of the development are 2 484 Full Time Equivalent Jobs (FTEJ)[12] in total 600 of which is expected to be direct jobs, for the duration of the construction period. The direct FTEJ will be split between low-skilled and semi-skilled jobs as well as skilled and highly skilled jobs. About 90% of the FTEJ will be low-skilled and semi-skilled and 10% of the FTEJ will be skilled and highly skilled employees. About 500 of those employed will be from KZN and of these 300-400 will be from the Richards Bay area. At construction peak, the number of direct jobs opportunities created may reach 1,300 employees with a similar distribution of skills and place of origin.

These figures will be realised over the entire construction period of the project. The employment figures presented are significant in comparison to the employed persons in City of uMhlathuze LM. These employment benefits will be realised over the entire construction period of the project.

6.1.5 Tax Impacts Identified

The construction phase of the PRBGP3 development will also have positive tax implications in terms of Value Added Tax (VAT) paid as well as through payroll taxes and corporate tax. These will contribute towards government revenue. This increase in the tax base will be spent in the economy to improve the welfare of society. The tax income resulting from the plant's construction can, therefore, be viewed as a benefit to society. The tax income is reflected in the table below.

Table 19: PRBGP3 Tax Benefits, R Millions, Current 2022 values over the 20-year.

Economic Impact	Direct	Indirect	Induced	Total
Taxes	R744	R1 036	R519	R2 299

Source: Urban-Econ Calculations 2022

[12] FTEJ – Full time equivalent jobs: One (1) FTEJ equals 1 employment opportunity per annum. Thus 10 FTEJ = 10 persons employed for 1 year or 1 person employed for 10 years.

The VAT generates significantly more tax income compared to business income tax and payroll taxes. The operation of the plant should generate R 744million per annum in VAT. In total, tax income should increase by at least R 2 299 million as a result of the PRBGP3 development.

SUMMARY CAPEX IMPACT

The following table gives a summary of the CAPEX economic impacts described in this section.

Table 20: Summary CAPEX Impact (R Millions), Constant 2022 Values

CAPEX IMPACT	Direct	Indirect	Induced	Total
PRODUCTION	R21 000	R22 075	R10 267	R53 342
GVA	R4 885	R7 458	R3 928	R16 271
INCOME	R2 506	R3 269	R1 573	R7 347
EMPLOYMENT	600	1 267	621	2 484
TAXES	R744	R1 036	R519	R2 299

Source: Urban-Econ Calculations, 2022

6.2 OPERATIONAL PHASE

This section outlines the economic impact of PRBGP3 OPEX in its operational phase. The total costs associated with the operation of the PRBGP3 amount to R 5 billion during the first operating year. Projected over an operation period of 20 years the annual operation cost amounts to R 170 million during the first phase of operation in constant 2022 prices. It must be noted that the operational expenses used to determine impacts on the economy are selective, in that only real expenditure has been taken into account (e.g., only actual transactions to other economic parties were used).

The operational benefits discussed are the result of the application of the Input-Output Model to this operational expenditure. The benefits are assessed in relation to Production, Gross Value Added, Business Income and Employment. Further economic benefits that arise from the operation of the PRBGP3 are also discussed within this section including tax implications as well as trade impacts.The specifics of this are unpacked in the following sub sections in greater detail.

6.2.1 Production

The impact of PRBGP3's Operating Expenditure (OPEX) on production is indicated in the table below. This figure indicates the value of every additional sale transaction as a result of the operating expenditure injected into the economy by the operation of the PRBGP3. The value of production injected into the economy as a result of PRBGP3's OPEX spend amounts to R 10.725 billion which breaks down into R 5.062 billion in direct production and R 2.994 billion indirect production in the economy.

Table 21: OPEX Economic Impact on Production (R Millions), Current 2022 Values over 20-Years

Economic Impact	Direct	Indirect	Induced	Total
Production	5 062	2 994	2 669	10 725
Percentage Accrual	47%	28%	25%	100%

Source: Urban-Econ Calculations, 2022

Approximately 47% accrues to first round suppliers (direct benefits) and 28% accruing to secondary suppliers (indirect benefits).

6.2.2 Gross Value Add (GVA)

The table below indicates the impacts of this expenditure on GVA.

Table 22: OPEX Economic Impact on GVA (R millions), Current 2022 Values over 20-Years

Economic Impact	Direct	Indirect	Induced	Total
GVA	2 507	1 107	1 022	4 636
Percentage Accrual	54%	24%	22%	100%

Source: Urban-Econ Calculations 2022

The impact on GVA is projected to be R 4 636 million. About 54% of which will accrue through direct benefits and a further 22% through induced benefits.

6.2.3 Business Income

The table below indicates that due to PRBGP3's operation, a total contribution of R 1 793 million increase in business income is expected over the 20-year life of the plant. PRBGP3's contribution to business income is a result of the effect of its annual OPEX spend as reported in the cost estimations provided.

Table 23: OPEX Business Income Contribution (R Millions), Current 2022 Values over 20-Years

Economic Impact	Direct	Indirect	Induced	Total
Income Contribution	910	474	409	1 793
Percentage Accrual	51%	26%	23%	100%

Source: Urban-Econ Calculations, 2022

6.2.4 Employment

PRBGP3's employment contribution is outlined in the table below. This reflects the number of jobs that will be created in the economy as a result of every rand spent by PRBGP3. Using the I-O matrix, relevant multipliers are applied to the OPEX figure to generate the direct and indirect employment contribution by PRBGP3.

Table 24: OPEX Employment Impact, FTEJ over 20 Years

Economic Impact	Direct	Indirect	Induced	Total
Employment Creation	60	53	44	157

Source: Urban-Econ Calculations, 2022

The impact of PRBGP3's OPEX spend is the development of 60 direct job opportunities in the economy. This breaks down into 24 FTEJ skilled and highly skilled job opportunities and 36 FTEJ low-skilled and semi-skilled jobs being created during the operational phase of the plant on an annual basis. All employees will be from South Africa and any foreign employee required at the start of operation will be replaced at maximum on year 3 of the plants operation when local employees have acquired the necessary skills. Priority will be given to KZN personnel and Richards Bay in particular when employment decisions are being made. This will largely be dependent on the availability of personnel with the necessary skills. All the low and semi-skilled personnel will come from the Richards Bay area.

Indirect job opportunities created will amount to about 53 FTEJ per annum over a 20-year period life-cycle of the plant which are created as a result of PRBGP3's transactional trade with other businesses, new business sales, increased production and economic growth. This is based on a typical average number of jobs created in each sector, as a result of every rand spent in the operational phase of the PRBGP3. The PRBGP3 is anticipated to create employment opportunities in the local area and surrounding City of uMhlathuze LM communities, the supply chains of service providers and trading linkages will determine the localisation of these opportunities.

6.2.5 Trade Impacts Identified

The operational nature of the PRBGP3 is expected to have a positive economic impact on not only the local economy of the City of uMhlathuze LM but also on the national economy (South Africa). The technology proposed has the twofold benefit of providing quick to market electricity desperately needed to meet the power demands in South Africa and secondly, in assisting with the stabilisation of the national grid to allow for some industry to reopen and grow.

The operation of the PRBGP3 will feed into the national power supply electric grid which would help stabilise power supply and increase capacity. This would significantly reduce demand pressure on ESKOM thus alleviating load shedding. Further, with the improved power supply and energy efficiency, this may help bring down the cost of power allowing some industry to reopen with reduced costs

Energy provision is crucial to overall development. The South African economy uses a large amount of energy, is highly energy-intensive, and heavily dominated by the extraction of raw materials and primary processing. The energy sector is therefore crucial for fuelling the country's economic growth and development. The expected benefits of the PRBGP3 include greater energy efficiency which would make industry (in City of uMhlathuze LM and nationally) more internationally competitive and able to trade globally contributing to balance of trade.

6.2.6 Property Values Impacts (Other Economic Impacts)

Over the past two decades, environmental issues associated with the development of power plants have drawn greater attention in the economic and real estate literature particularly with respect to their impact on property values. Many groups argue that power plants are the source of negative local externalities including visual dis-amenities, noise and pollution. However, it is envisaged that the PRBGP3 development will have no negative impact on surrounding property values due to the nature of the operations and its location within Richards Bay Industrial Development Zone.

With respect to its location, Richards Bay is largely an industrial city with several large-scale industries. The development is therefore in line with both the function and aesthetic appeal of the area which will add to the commercial value of the port and its surrounds. The development will further add to the industrialisation of the area leading to further benefits in terms of higher commercial and industrial property values.

Further, it is expected that the development will initially lead to an increase in demand for housing close to the development especially during the construction phase leading to higher residential rents in the local municipal area. The increased employment opportunities created by the operation of the PRBGP3 may also lead to slightly higher residential rents as the PRBGP3 attracts higher demand for housing.

The general positive impact of the new investment in the uMhlathuze area is likely to have a positive investor impact in the local municipal area in general. Such a positive investor perception of the area and the additional growth that it implies may lead to indirect increases in property values.

SUMMARY OPEX IMPACT

The following table outlines the summary of the OPEX economic impacts described in this section.

Table 25: Summary OPEX Impact (R Millions), Current 2022 Values over 20-Years

OPEX IMPACT	Direct	Indirect	Induced	Total
PRODUCTION	5 062	2 994	2 669	10 725
GVA	2 507	1 107	1 022	4 636
INCOME	910	474	409	1 793
EMPLOYMENT	60	53	44	157

Source: Urban-Econ Calculations 2022

6.3 DECOMMISSIONING

Considering the nature of the project it is unlikely that a complete decommissioning of the PRBGP3 will take place in the foreseeable future but rather, that specific sections or components of the project may be upgraded or redesigned overtime. In this regard, it is likely that the impacts that may occur will be similar in nature to those that occur during construction. In the event of a partial or total decommissioning of the PRBGP3, there are some associated economic impacts.

A partial or total removal option of the PRBGP3 would require labour to carry out all decommissioning activities. This would result in temporary employment creation for the duration of the decommissioning activities. Direct employment effects would arise from the actual work done to decommission the power plant, such as hoisting with heavy lift vessels. Indirect employment effects would arise on the one hand for example from the increased demand for additional equipment and on the other hand from the income expenditures of the additional employees. The additional demand increases the number of jobs in the appropriate sectors. However, these opportunities will be created only for the duration of decommissioning and, therefore, are temporary in nature. Also, it should be noted that the geographic spread of these employment opportunities will be a function of the location of the companies appointed as service providers to undertake the required decommissioning work.

The main effect of the decommissioning costs will likely be felt within the City of uMhlathuze LM economy especially in the long run through the loss of additional GVA and production benefits. However, there may be some revenue benefits through the decommissioning of the plant. There may also be some positive production impacts through the dismantling activities offshore (cranes, etc.), and sale of metal scrap and proceeds from recycling of retrieved material.

There may also be some fiscal effects namely the loss in tax revenue and taxable earnings in the long run on the one hand. On the other hand, government could also take in tax revenue from the decommissioning activities.

Those filling the jobs created pay income tax, and the companies working on decommissioning have various taxes to pay (including corporate income tax).

6.4 CONCLUSION: SUMMARY OF IDENTIFIED IMPACTS

The tables below provide a summary description of the identified economic impacts which are relevant for the proposed Phakwe Richards Bay Gas-to-Power Plant3 as was identified in the scoping phase of the report.

Table 26: Economic Impacts During Construction

Impact Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Production during construction stage.	Direct impacts: » Increase production levels as the plant will attract employees to improve production. Indirect impacts: » The level of production can be expected to increase and spread to other industries that will benefit from this construction.	National	None identified
Economic Value (GDP)	Direct impacts: » There will be improved economic value for the plant's development Indirect impacts: » Through improved energy supply and production, GDP is expected to be positively impacted by the project.	National	None identified
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
Employment Creation during construction stages.	Direct impacts: » The project will result in direct employment creation.	National	None identified

Impact Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
	Indirect impacts: » Through improved productivity levels in the area, more employment can be created in other sectors.		
Description of expected significance of impact The proposed development site is located in an industrial area which is considered to be a Special Economic Zone (SEZ). This therefore means that the area has a number of large scale current and planned projects in the area. The development of the power plant, and given the nature of its clean energy production, is not expected to have significant negative impacts on it surroundings. 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.			

Table 27: Economic Impacts During Operation

Impact Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
Production during operational stage.	Direct impacts: » Increase production levels as the plant will attract employees to improve production. Indirect impacts: » With improved electricity generation and reduced power-cuts, the level of production can be expected to increase.	National	None identified
Economic Value (GDP)	Direct impacts: » There will be improved economic value for the plant's development Indirect impacts: » Through improved energy supply and production, GDP is expected to be positively impacted by the project.	National	None identified
Tax Revenue	Direct impacts: » The revenue generated at the operational stage of the plant will incur tax. Indirect impacts: » This will improve government revenue and hence resources that can be allocated for service delivery.	National	None identified

Impact Economic Impacts			
Issue	**Nature of Impact**	**Extent of Impact**	**No-Go Areas**
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
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
Property Prices	Direct impacts: » None Indirect impacts: » The impact on property prices will be minimal since the site in located in a SEZ location.	Regional	None identified
Employment Creation during 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
Description of expected significance of impact The proposed development site is located in an industrial area which is considered to be a Special Economic Zone (SEZ). This therefore means that the area has a number of large scale current and planned projects in the area. The development of the power plant, and given the nature of its clean energy production, is not expected to have significant negative impacts on it surroundings. 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.			

7 IMPACT ASSESSMENT AND MITIGATIONS

7.1 APPROACH TO ASCRIBING SIGNIFICANCE FOR DECISION-MAKING

Direct, indirect and cumulative impacts of the issues identified through the scoping study are 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 **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 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)
  - 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).

7.2 IMPACT ASSESSMENT FOR PHAKWE RICHARDS BAY GAS-TO-POWER 3

The tables in this section analyse the social and economic aspects resulting from the development of the PRBGP3. From the below analysis, it can be established that there are some negative social impacts and there are no economic negatives from the construction and operations of the power plant. Both the construction and operational phases of the project will activate new economic activity generating new production, income, GVA and employment in the economic.

7.2.1 Social Impacts

Table 28: Impact significance on Community Impacts

Nature: **[Community Impacts]**			
Impact description: Community impacts relate to impacts which affect a community's sense of place which is developed over time. The sense of place is created through the interaction of a number of different factors such as the areas visual resources, its air quality, climate, noise levels, culture and heritage as well as the lifestyle of individuals that live in and visit the area.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last for a period three years.	**Low Negative (10)**
Extent	Local (1)	There will likely be negative community impacts on areas surrounding the proposed development.	
Magnitude	Low (4)	The increase in level of air pollution, noise pollution and negative visuals from the establishment are not expected to be major since the site is located in a well-developed industrial area.	
Probability	Probable (3)	The possibility of the negative impact on pollution and visual affects is likely to take place.	
Mitigation/Enhancement Measures			
Mitigation: The community impacts have to be mitigated to reduce any negatives on the community as a result of the proposed development. Landscaping and trees could be planted around the development to reduce negative visual effects from the development and to encourage sustainable environment friendly operations.			
Post Mitigation/Enhancement Measures			

Nature: **[Community Impacts]**			
Duration	Short-term (2)	Pressure will only be added on the local municipality as the plant will be operational in the uMhlathuze Local Municipality area.	**Low Negative (6)**
Extent	Local (1)	The negative visual effect and the pollution levels can be mitigated by planting trees around the plant establishment.	
Magnitude	Low (1)	The possibility of the air, visual and noise impacts on the surrounding land uses is very low since the site is located in an IDZ.	
Probability	Improbable (1)	A reduced amount of pressure will be added on the local municipality to enforce measures to fight pollution.	

Table 29: Impact significance on Population Levels

Nature: **[Population Levels]**			
Impact description: With anticipated employment opportunities being created from the proposed development, there is a possibility of there being an influx of job seekers relocating to residential areas near the site in search if job opportunities. This might add pressure and increase the need for basic service delivery.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last for a period three years.	**Low Negative (10)**
Extent	Local (1)	There will likely be an increase in population numbers on residential areas surrounding the proposed development.	
Magnitude	Low (4)	The increase in population numbers should not be extensive as workers will primarily be sourced from the local communities.	
Probability	Probable (3)	The possibility of the impact on the population numbers is very low	
Mitigation/Enhancement Measures			
Mitigation: The increase population numbers have to be mitigated to avoid a situation where there is added pressure on limited resource.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (2)	The construction of the plant will take place over three years.	**Low Negative (7)**
Extent	Local (1)	The extent of the impact will be at a local municipal level as any changes in the population size of the will affect the demographics of uMhlathuze.	
Magnitude	Minor (2)	To reduce the magnitude of the population levels increase, mitigation measures such as	

Nature: **[Population Levels]**			
		prioritising local workers for employment should be applied	
Probability	Improbable (2)	Focusing on local employees will be reduce the probability of there being a increase in the population levels of the area.	

Table 30: Impact significance on Crime Levels

Nature: **[Crime Levels]**			
Impact description: With an increase in the number of job seekers moving close to the proposed development site, there is a possibility of there being an increase in the crime levels in the area as some individuals will not be able to find employment and might find themselves engaging in illegal activities to earn a living.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last for three years	**Low Negative (10)**
Extent	Local (1)	Crime levels might rise in the areas surrounding the site as more people move closer to the plant in search of job opportunities	
Magnitude	Low (4)	The magnitude of this impact is expected to be low since the immediate surrounding land uses are industrial property	
Probability	Probable (3)	The probability of this impact taking place is low	
Mitigation/Enhancement Measures			
Mitigation: The impact of potential rising crime levels must be mitigated so as to ensure that crime does not overshadow the positive impacts of this development, and hence deter investment to the region.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (2)	The duration of the construction will be three years	**Low Negative (7)**
Extent	Local (1)	The extent of the impact is expected to be local	
Magnitude	Minor (2)	The magnitude of potential crime levels can be reduced by ensuring that there is good security measure on the premises of the plant.	
Probability	Improbable (2)	The probability of crime increased crime levels in the area is low	

Table 31: Impact significance on Standard of Living

Nature: **[Standard of Living]**			
Impact description: With increase pressure on basic services as well as increased crime levels, the standard of living in the residential areas close to the proposed development would like fall and some households might move away from these residential areas.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Long-term (4)	The operational phase of the plant is expected to last for 20 years	**Low Negative (12)**
Extent	Local (1)	Pressure will only be added on the local municipality since the plant's workforce and operations will be focused on the local municipal level.	
Magnitude	Low (4)	The magnitude of this impact is expected to be low	
Probability	Probable (3)	The probability of this impact taking place will not be substantial	
Mitigation/Enhancement Measures			
Mitigation: Any negative impacts on the standard of living in the area as a result of this proposed project need to be mitigated			
Post Mitigation/Enhancement Measures			
Duration	Long-term (4)	The plant is expected to operate for 20 years before decommissioning.	**Low Negative (9)**
Extent	Local (1)	The extent of this impact is expected to be local since the plant's operations are expected to be focused in uMhlathuze Local Municipality.	
Magnitude	Minor (2)	To mitigate the magnitude of the impact occurring, proper employment procedures have to be followed with workers being part of a relevant labour union to ensure that their concerns are addressed. This would assist in ensuring that there standard of living of the workers does not deteriorate over the 20-year lifecycle of the plant	
Probability	Improbable (2)	Given the nature of the plant and the important role it will play at a national level, the probability of standards of living deteriorating when proper employment measures are followed is low.	

7.2.2 Economic Impacts

Table 32: Impact significance on Employment Creation

Nature: **[Employment Creation]**
Impact description:

Nature: **[Employment Creation]**			
The construction of the PRBGP3 will result in the creation of short-term opportunities in the local community			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last for a period of 3 years	**Low Positive (11)**
Extent	Local (1)	Pressure will only be added on the local municipality as a total 600 jobs are expected to be created directly from the construction of the plant.	
Magnitude	Low (4)	The increase in demand for employees will not result in noticeable employment changes in the local economy since South Africa is still experiencing high levels of unemployment.	
Probability	Highly Probable (4)	The possibility of the impact on employment creation in the region is highly probable as the plant infrastructure will have to be build before the plant can begin its operations.	
Mitigation/Enhancement Measures			
Mitigation: Given the positive nature of the above discussed impact, there is no need to implement any measures to reduce this impact. The construction of the plant will create much needed employment opportunities. This impact can be enhance through the creation of youth internship opportunities to train and transfer skills to unemployed youth. This would improve the chances of these youth to be absorbed in the mainstream economy as they would have been trained in a particular skill.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (2)	The construction period will last for a period of 3 years	**Low Positive (12)**
Extent	Local (2)	A substantial portion of the workers employed during the construction of the plant will be those from the local municipality	
Magnitude	Low (4)	The magnitude of this impact can be enhanced through the creation of youth internship opportunities to train and transfer skills to unemployed youth	
Probability	Highly Probable (4)	The possibility of the impact on employment creation in the region is highly probable as the plant infrastructure will have to be built before the plant can begin its operations.	

Table 33: Impact significance on Gross Value Add

Nature: **[Increase Gross Value Add (GVA)]**			
Impact description: The process of constructing the PRBGP3 will result in greater economic activity in the region which will largely impact the region at which the plant is based.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Short-term (2)	The construction period will last for a period of 3 years	**Low Positive (12)**
Extent	Regional (3)	Given the nature of the proposed plant and its role to society, the regional gross value add will be positively impacted by the construction and operation of the plant.	
Magnitude	Low (4)	The magnitude of the GVA impact from the proposed development will be low. will be low since there are large of.	
Probability	Probable (3)	The possibility of the impact on GVA creation in the region will be highly probable if the plant is developed.	
Mitigation/Enhancement Measures			
Mitigation: Increase in GVA is a positive impact. South Africa is currently experiencing constrained energy resource.			
Post Mitigation/Enhancement Measures			
Duration	Short-term (2)	The construction period will last for a period of 3 years	**Low Positive (12)**
Extent	Regional (3)	The impact of GVA from the proposed plant might also contribute at a national level as material and equipment used in constructing the plant will likely be sourced from other South African provinces.	
Magnitude	Low (4)	The magnitude of the GVA impact from the proposed development will be low.	
Probability	Probable (3)	The possibility of the impact on GVA creation in the region will be highly probable during the development of the plant.	

Table 34: Impact significance on Property Values

Nature: **[Property Values]**			
Impact description: The operation of the highly technical power plant which uses an advanced method of energy generation will have a positive impact on the property values of surrounding establishments.			
	Rating	**Motivation**	**Significance**
Prior to Mitigation			
Duration	Long-term (4)	The operational period of the plant will last for 20 years.	**Low Positive (10)**

Nature: **[Property Values]**			
Extent	Local (1)	There will likely be a positive impact on property values for neighbouring establishments.	
Magnitude	Minor (2)	The magnitude of the property values impact from the proposed development will be very low and mainly focused on the property values surrounding the site.	
Probability	Probable (3)	The possibility of the impact on the property values is likely to occur since the property will be developed in a area which is surrounded by other establishments.	
Mitigation/Enhancement Measures			
Mitigation: To further enhance this impact, the local municipality of uMhlathuze could develop a investment strategy with the intention of attracting more investors to the region.			
Post Mitigation/Enhancement Measures			
Duration	Long-term (4)	The operational period of the plant will last for 20 years.	**Low Positive (12)**
Extent	Local (1)	There will likely be a positive impact on property values for neighbouring establishments.	
Magnitude	Low (4)	Marketing the various developments and investments attracted to the site might attract further investment and enhance the value of property in the area. This would enhance this positive impact.	
Probability	Probable (3)	The possibility of the impact on the property values is likely to occur since the property will be develops in a area which is surrounded by other establishments.	

7.3 CONCLUSION: CUMULATIVE IMPACT ASSESSMENT

From the above discussion it can be said that the proposed development will result in both negative and positive impacts. All identified economic impacts will be positive and some social identified impacts are negative in nature. As is illustrated in the cumulative table below, the status of the complete overall plant is considered to be positive since the negative impacts identified have a low significance rating.

The location where the proposed plant is to be situated has been identified as a potential location to house other energy generation plants which are currently busy with applications for electricity generation plant developments. The cumulative impacts of these potential developments as well as the proposed PRBGP3 will have a greater impact significance rating as indicated in the table below.

Table 35: Cumulative Impact Assessment for Proposed Project and other Projects in Area.

Nature:

The overall impacts and cumulative impacts are made up of a combination of social and economic impacts.		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Local (2)	Regional (4)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Low (4)
Probability	Improbable (2)	Probable (4)
Significance	**Low (10)**	**Low (16)**
Status (positive or negative)	Positive	Neutral
Reversibility	Medium	Low
Irreplaceable loss of resources?	No	Yes
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: The overall impact of the proposed project has a low significance of 10 when considered in isolation. The overall status of the proposed development is considered to be positive given the high demand for energy generation in South Africa as well as other factors such as the needed jobs which will be created by this project. On the other hand, the cumulative impact of the project and other projects in the area will result in increased negative impacts such as air pollution, noise pollution, visual impacts, and traffic congestion. To mitigate these negative impacts, the following steps can be taken: • Limit the number of energy generation licenses approved in the study area • Prioritise cleaner energy producers over those which might result in relatively higher pollution levels • Prioritize the license approval for producer who will result in greater social benefits such as employment creation opportunities.		

8 NEED AND DESIRABILITY: SOCIO-ECONOMIC IMPACT ASSESSMENT

The “need and desirability” is considered as part of an EIA process, the content of the IDPs, SDFs, EMFs and other relevant plans, frameworks and strategies are taken into account when considering the merits of proposed project’s application for approval. An important aspect of looking at the need and desirability process is the ecological, social and economic impacts that will result because of the alignment or deviation of the proposed development to the strategies and plans of government. As such, the SEIA has to specifically provide information on these impacts in order to be able to consider the merits of the project application. The “need and desirability” is therefore determined by benchmarking the proposed project against the interest as reflected in the IDP, SDF for uMhlathuze.

The socio-economic viability of the proposed project should be considered within the context of justifiable economic development, measured against the broader societal short-term and long-term needs. While the viability considerations of the private developer might indicate if a development is “do-able”, the “need and desirability” will be determined by considering the broader community’s needs and interests as reflected in an IDP, SDF and EMF for the area. While the importance of job creation and economic growth for South Africa cannot be denied, the Constitution calls for justifiable economic development. The specific needs of the broader community should therefore be considered together with the opportunity costs and distributional consequences in order to determine whether or not the development will result in the securing of ecological sustainable development and the promotion of justifiable social and economic development – in other words to ensure that

the development will be socially, economically and environmentally sustainable. The following questions will be addressed by the need and desirability analysis:

1. Is the development permitted in terms of the property's existing land use rights?
2. Will the development be in line with the various planning and strategy documents?
3. Should development occur on the proposed site at this point in time?
4. Should development, or if applicable, expansion of the area concerned in terms of this land use (associated with the activity being applied for) occur on the proposed site at this point in time?
5. Does the community/area need the project and the associated land use concerned (is it a societal priority)?
6. Are the necessary services available together with adequate unallocated municipal capacity (at the time of application), or must additional capacity be created to cater for the project?
7. Is this project part of a national programme to address an issue of national concern or importance?
8. Do location factors favour this land use (associated with the development proposal and associated listed activity(ies) applied for) at this place?
9. Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?
10. Will the development impact on people's health and well-being (e.g., in terms of noise, odours, visual character and 'sense of place', etc.)?
11. Will the proposed development or the land use associated with the proposed development applied for, result in unacceptable opportunity costs?
12. What will the cumulative impacts (positive and negative) of the proposed land use associated with the development proposal and associated listed activity(ies) applied for, be?
13. Is the development the best practicable environmental option for this land/site?
14. What will the benefits be to society in general and to the local communities?
15. Any other need and desirability considerations related to the proposed development?

8.1 KEY NEEDS AND DESIRABILITY ANALYSIS CONSIDERATION

To gain a good understanding of the needs and desirability of the suggested project, an overview and background of the South African energy generation is important. This section 11.1 aims to provide this background context.

8.1.1 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.

8.1.2 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[13].

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.

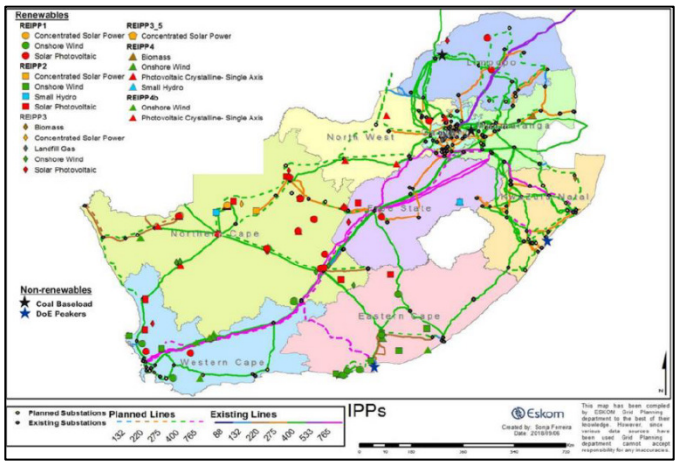
8.1.3 The National Energy Act, 2008 (Act No. 34 Of 2008) (NEA)

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.

8.1.4 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 11).

Figure 11: Approved IPP Projects in terms of the (REIPP) Programme



Source: ESKOM SOC, 2020

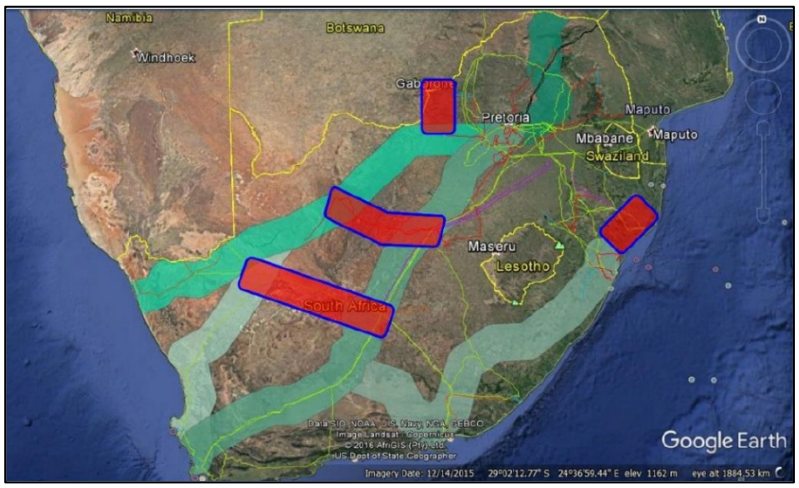
8.1.5 Renewable Energy Independent Power Producer (REIPP) Programme

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

[13] South African Energy Report, 2018.

(Figure 14), 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 12: Transmission Network Corridors Required to Integrate IPPs



Source: ESKOM SOC, 2020

8.1.6 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. The South African government has also laid out Strategic Gas Pipeline Corridors in 9 phases and these are as follows:

- Phase 1a: Saldanha to Ankerlig
- Phase 1b: Saldanha to Mossel Bay
- Phase 2: Mossel Bay to Coega
- Phase 3: Richards Bay to Gauteng
- Phase 4: Mozambique (Southern Border) to Richards Bay
- Phase 5: Abraham Villiers Bay (Northern Cape) to Saldanha
- Phase 6: Abraham Villiers Bay (Northern Cape) to Oranjemund
- Phase 7: Coega to Richards Bay
- Phase 8: Rompco Pipeline Corridor
- Phase 9: Inland Corridor from Saldanha to Coega

8.1.7 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.

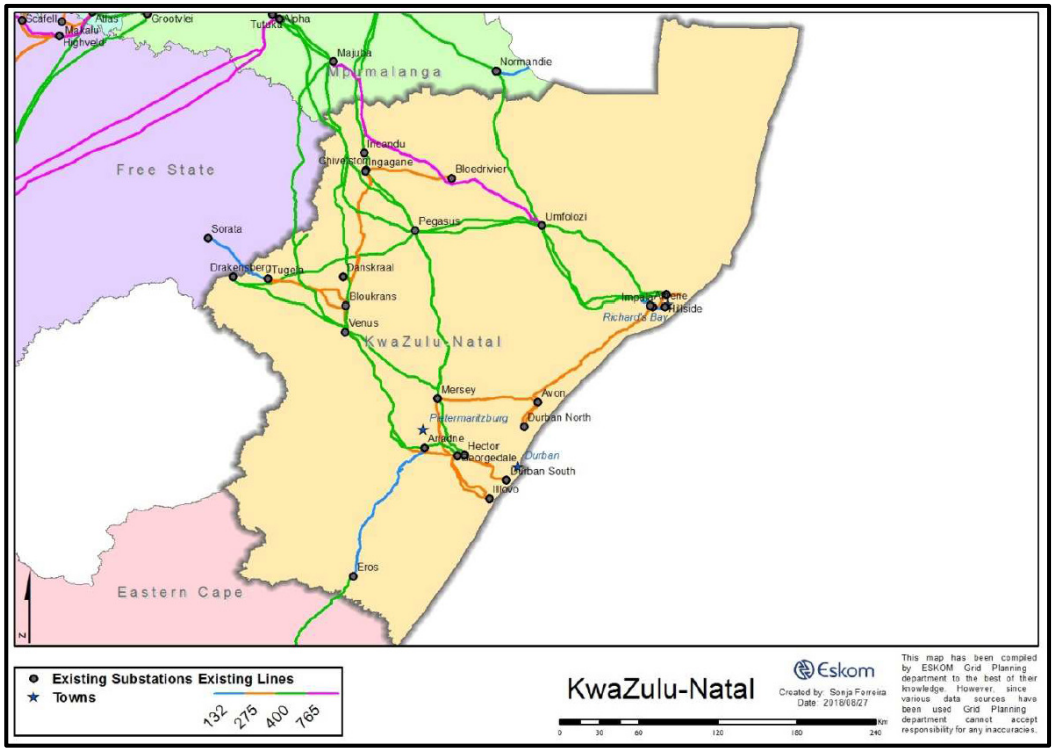
8.1.8 The Need For Utility Scale Power Generation Projects In RSA

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.

8.1.9 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 13).

Figure 13: 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 16). 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.

8.1.10 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:

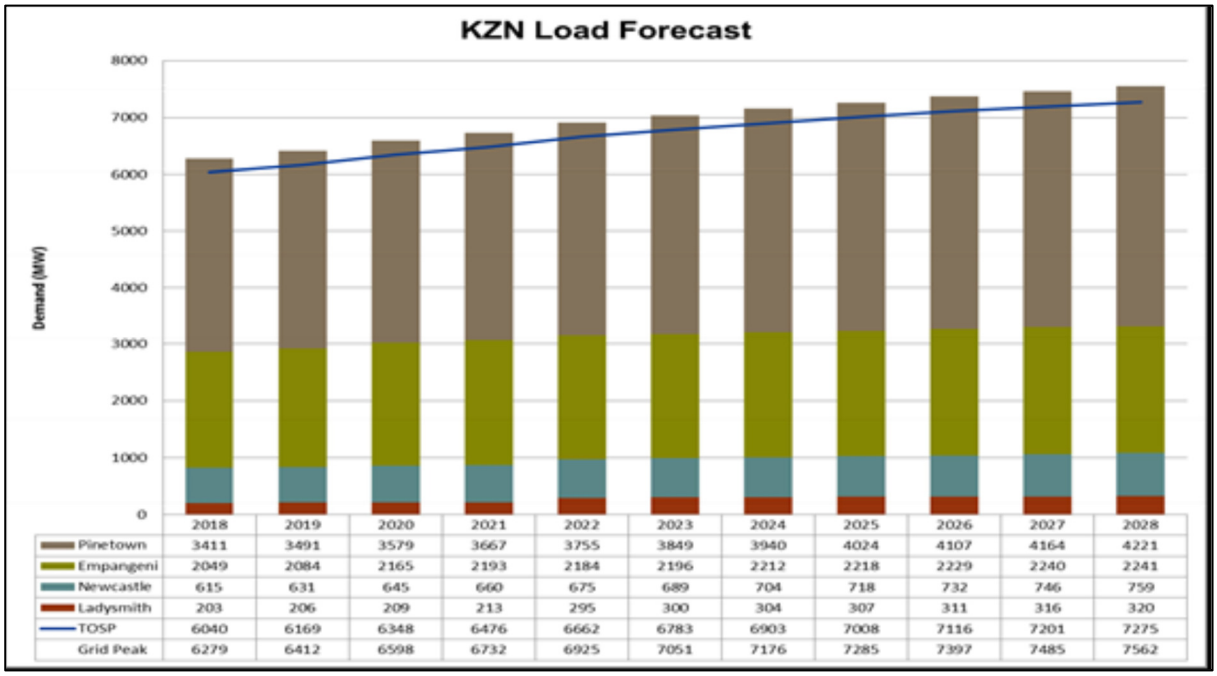
8.1.10.1 *KZN 765 kV strengthening*

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.

8.1.10.2 *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 14: 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

8.1.11 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.

8.1.12 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.

8.1.13 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.

8.1.14 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.

8.2 NEEDS AND DESIRABILITY ANALYSIS

The table below illustrates the needs and desirability analysis process which aims to indicate if whether or not there is a need for the proposed development and if the proposed development is desirable.

Table 36: Need and Desirability Assessment Process

1. Is the development permitted in terms of the property's existing land use rights?
Yes. The property site has been zoned as an industrial development zone.
2. Will the development be in line with the following?
(a) Provincial Spatial Development Framework ("PSDF").

Yes. One of the guiding principles of the PSDF is sustainability and resilience. Land development should be spatially compact, resource-frugal, compatible with cultural and scenic landscapes, and should not involve the conversion of high potential agricultural land or compromise ecosystems. Resilience is about the capacity to withstand shocks and disturbances such as climate change or economic crises, and to use such events to catalyse renewal, novelty and innovation. The focus should be on creating complex, diverse and resilient spatial systems that are sustainable in all contexts. Development should be contained within a limited footprint, preferably adjacent to existing settlements, and the required ecological buffers and setbacks must be adhered to. The specialist studies undertaken as part of this EIA process ensure that the proposed development is in line with the PSDF and that the project design, construction and operation of any aspects of the project (if the EIA is approved), are appropriate to ensuring that ecological integrity is maintained at an acceptable level.
(b) Integrated Development Plan and Spatial Development Framework of the Local Municipality (e.g., would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).
Yes. One of the main areas of intervention as listed in the uMhlathuze Spatial Development Framework exploring sustainable ways of electricity generation to reduce the negative impact of power cuts in the region's economic activity. The uMhlathuze Municipality has budgeted R100 million to spend on the electricity line to RBCT to avoid future failure of electricity supply to this large export facility. The proposed development (through providing permanent accommodation and retails space) will therefore not compromise the integrity of the existing IDP and SDF, but should benefit the municipality via contributions into the various sectors and local town economy.
(c) An Environmental Management Framework ("EMF") adopted by this Department. (e.g., Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)
Not Applicable as there is no such framework as yet formally adopted by the Department of Environmental Affairs.
(d) Any other Plans (e.g., Integrated Waste Management Plan (for waste management activities), etc.)).
No other plans are applicable.
3. Is the land use (associated with the project being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (in other words, is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?
Yes. The proposed project is in line with the SDF's identified need to provide energy. The proposed mitigation measures contained within this EIA will assist in ensuring that the proposed development is in line with the uMhlathuze SDF and IDP.
4. Should development, or if applicable, expansion of the area concerned in terms of this land use (associated with the activity being applied for) occur on the proposed site at this point in time?
Yes. Given nature of the development, and the fact that the zoning of the site is industrial, there are no significant modifications expected on the land where the project is to be developed. In this regard, the land zoning allows for a variety of industrial developments to take place on the site which includes gas power plant units.

5. Does the community/area need the project and the associated land use concerned (is it a societal priority)?
The surrounding community would gain a marginal benefit from the development in terms of a number of temporary employment opportunities during the construction, as well as possible permanent positions once the plant is operational. The uMhlathuze Local Municipality would benefit via the applicant's contribution in rates and taxes, once the development is complete. The development will also contribute towards relieving the pressure on electricity generation.
6. Are the necessary services available together with adequate unallocated municipal capacity (at the time of application), or must additional capacity be created to cater for the project?
The Applicant is responsible for the installation of all services to the properties before any development construction can take place. Formal letters from the uMhlathuze Local Municipality confirming that there is adequate capacity (in terms of sewerage, potable water, solid waste, electrical supply, access and road network, as well as storm water management) for necessary services to cater for the development need to be obtained.
7. Is this project part of a national programme to address an issue of national concern or importance?
Yes. The proposed project addresses a regional need. The need and desirability for electricity generation is of high priority for South Africa and as a result of this, South Africa has been experiencing loadshedding. The municipality is also in need of finances which will be generated through the collection of tax revenue when the site is developed. Jobs will be created with the proposed development in the area of uMhlathuze during the installation of services and building of the different facilities making up the development thus unlocking the potential for economic growth and development.
8. Do location factors favour this land use (associated with the development proposal and associated listed activity(ies) applied for) at this place? (This relates to the contextualisation of the proposed land use on the proposed site within its broader context.)
Yes, the site is zoned for industrial development and is surrounded by a wide variety of industries.
9. Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?
No. In accordance with the existing surrounding land use from the proposed development, no significant impact on the environment are anticipated. Some minor impacts are anticipated during the construction phase of the project, however these can readily be mitigated through the implementation of the identified mitigation measures in preceding sections. There is also a possibility for there to be minor air and visual impacts during the operational phase of the plant as indicated in the impact identification and assessment phases of the project.
10. Will the development impact on people's health and well-being (e.g., in terms of noise, odours, visual character and 'sense of place', etc.)?
Yes. Given the nature of the development and the fact that it will be designed in accordance with the existing surrounding industrial land uses in the study area, no significant negative impacts on health and wellbeing are anticipated. Some minor impacts are anticipated during the construction phase of the project; however these can readily be mitigated through the implementation of the identified mitigation measures in preceding sections.
11. Will the proposed development or the land use associated with the proposed development applied for, result in unacceptable opportunity costs?

No. The development is within the existing development rights of the property, and does not conflict with the relevant planning regulations and zoning scheme. In addition, the proposal would not cumulatively have a significant negative impact on either the bio-physical or socio-economic environment.
12. What will the cumulative impacts (positive and negative) of the proposed land use associated with the development proposal and associated listed activity(ies) applied for, be?
The proposed development site is zoned for industrial developments and is in line with the surrounding residential and commercial developments. The proposed project addresses a national need. The need and desirability for more reliable and sustainable energy generation is of high priority for South Africa due to the challenges faced by Eskom when it comes to generating sufficient energy to meet the needs of South African households and businesses. South Africa is also in need of additional revenue streams which will flow from the proposed development in the form of taxes and rates. Jobs will be created with the proposed development in the area of uMhlathuze during the installation of services and building of the gas power plant, thus unlocking the potential for economic growth and development. Cumulatively there is the potential for the proposed development to increase the demand on local service infrastructure, in terms of transport, water & sanitation etc.
13. Is the development the best practicable environmental option for this land/site?
Yes. The site is zoned for industrial development and is in line with the surrounding industrial land uses around the site.
14. What will the benefits be to society in general and to the local communities?
The surrounding community would gain a benefit from the development in terms of a number of temporary employment opportunities during the construction, as well as permanent positions (i.e., employed on during the plant's operational phase). The uMhlathuze municipality would benefit via the applicant's contribution in rates and taxes, once the development is complete. The need and desirability for the energy generation plant development can be expected to be of high priority for the Municipality and the country due to the ongoing electricity challenges faced by uMhlathuze and South African community needs, taking into account South Africa's resource constraints. The municipality is also in need of additional revenue streams. Jobs will be created with the proposed development in the area of uMhlathuze during the installation of services and site development, thus unlocking the potential for economic growth and development.
15. Any other need and desirability considerations related to the proposed development?
There are no other need and desirability considerations related to the proposed development.

8.3 CONCLUSION

The below table illustrates the summary findings of the Needs and Desirability analysis to establish if the proposed development can be considered desirable for the suggested region.

No	Needs and Desirable Questions: SEIA	Assessment	
		Need	Desirable
1	Is the development permitted in terms of the property's existing land use rights?		Yes
2	Will the development be in line with the various planning and strategy documents?		Yes

3	Should development occur on the proposed site at this point in time?	Yes	
4	Should development, or if applicable, expansion of the area concerned in terms of this land use (associated with the activity being applied for) occur on the proposed site at this point in time?		Yes
5	Does the community/area need the project and the associated land use concerned (is it a societal priority)?	Yes	
6	Are the necessary services available together with adequate unallocated municipal capacity (at the time of application), or must additional capacity be created to cater for the project?		Yes
7	Is this project part of a national programme to address an issue of national concern or importance?	Yes	
8	Do location factors favour this land use (associated with the development proposal and associated listed activity(ies) applied for) at this place?		Yes
9	Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?		No
10	Will the development impact on people's health and well-being (e.g., in terms of noise, odours, visual character and 'sense of place', etc.)?		Yes
11	Will the proposed development or the land use associated with the proposed development applied for, result in unacceptable opportunity costs?		No
12	What will the cumulative impacts (positive and negative) of the proposed land use associated with the development proposal and associated listed activity(ies) applied for, be?	N/A	N/A
13	Is the development the best practicable environmental option for this land/site?		Yes
14	What will the benefits be to society in general and to the local communities?	N/A	N/A
15	Any other need and desirability considerations related to the proposed development?	N/A	N/A

South Africa has, for a number of years, been experiencing challenges when it comes to energy generation. As a result of this the country has been experiencing loadshedding as the country's largest energy generator (Eskom) attempts to reduce the pressure on the national electricity grid. The above discussion demonstrates that there is a need for this proposed project as it is in line with national policies aimed at strengthening the country's energy supply. The project is also desirable since it will result in improved economic activity and growth at the national level with very limited negative social impacts to the community of uMhlathuze.

9 CONCLUSION

The following main conclusions are reached through this research:

- South Africa is experiencing high energy demand and as a result of the gap between the high demand and low supply there has been continued load-shedding and therefore a need for additional electricity supply.
- High dependence on coal as an energy source has attracted growing national and international criticism due to greenhouse gas emissions the contribute significantly to climate change and air pollution. Due to the impact of coals as energy source there is a need for South Africa to diversify the sources of electricity generation.
- The proposed PRBGP3 and its associated infrastructure which is to be located at the Richards Bay IDZ Phase 1F, aims to supply natural gas-based electricity which is less harmful to the environment when compared to coal produced energy.

- The socio-economic impact assessment in this report focuses on the social impacts which are likely to arise from the development of the proposed plant as well as the various economic impacts which might arise from the proposed development. Under the social impacts, several impacts have been identified as being negative and these include air pollution, expected increase in noise levels, expected increase in traffic level and possible increases on the crime levels of the area.
- The mitigation measures are specific to a particular impact and these can be summarized as follows:
    - Community Impact
        - The negative visual effect and the pollution levels can be mitigated by planting trees around the plant establishment.
    - Population Levels Impact
        - To reduce the magnitude of the population levels, mitigation measures such as prioritising local workers for employment should be applied.
    - Crime Levels Impact
        - The magnitude of potential crime levels can be reduced by ensuring that there is good security measure on the premises of the plant.
    - Standard of Living Impact
        - To mitigate the magnitude of the impact occurring, proper employment procedures have to be followed with workers being part of a labour union to ensure that their concerns noted and
- All identified economic impacts from the proposed development are expected to be of a positive nature and these include the following:
    - Employment creation
        - A total of 2 484 jobs are expected to be created during the construction phase of the proposed PRBGP3 and a further 157 jobs are expected to be created during the operational phase of the project. This includes direct, indirect and induced job opportunities.
    - Increase Gross Value Add
        - During the construction of and operational phases of the project, the total contribution to GVA from the plant is expected to be more than R25 Billion rands.
    - Property Values
        - The operation of the highly technical power plant which uses an advanced method of energy generation will have a positive impact on the property values of surrounding establishments.
- The PRBGP3 development also has a larger positive economic contribution in terms of contributing energy towards the national electric grid which will ease load shedding and allow reduced power costs for the reopening of industry.
- The cumulative impact assessment of the proposed plant illustrates an impact of low significance.
- The overall status of the proposed development is considered to be positive given the high demand for energy generation in South Africa as well as other factors such as the needed jobs which will be created by this project.
- All these findings support the proposal of proceeding with the development of the PRBGP3 at the identified site in Phase 1F of the Richards Bay IDZ.
- In addition to the above findings on the proposed development, it is recommended that a comprehensive social enhancement study be conducted for this project.

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ANNEXURE A: DESCRIPTION OF THE SOCIO-ECONOMIC IMPACT METHODOLOGY

Socio-economic impact analysis provides a quantitative method to estimate the social and economic benefits that a particular project or industry brings to the economies and surrounding communities where the specific project or industry is located. The socio-economic impact analysis is designed to inform decision makers about the potential social and economic consequences of a project.

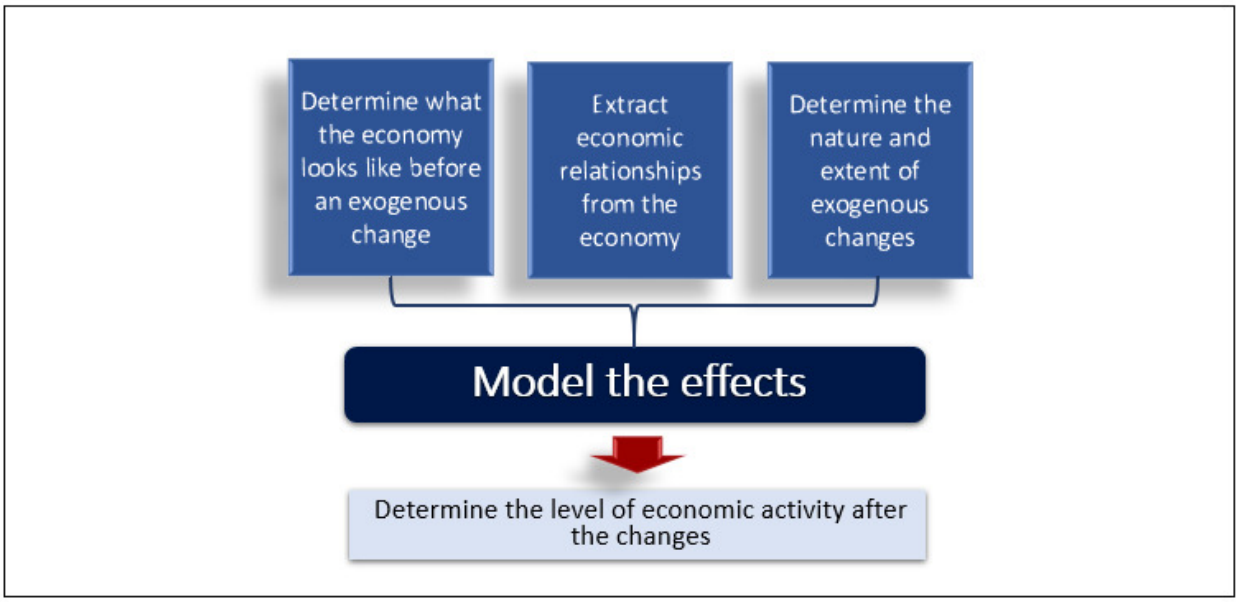
Socio-economic impact studies use financial and economic data to generate estimates of output, gross value add (GVA), employment, and tax revenues associated with changes in the level of economic activity resulting from the project or industry being analysed. Socio-economic impact assessments communicate the importance of a project using standard measures of economic activity – GVA, jobs, wages, tax revenues. The identified impacts can be estimated at the direct, indirect, and induced levels of impact.

A Socio-Economic Impact Assessment seeks to:

- Provide a method/approach to determine the after effect of a decision on the functioning of a society and an economy
- Measure the results of external stimuli on the society and economy.

Modelling socio-economic impacts can be depicted in the figure below.

Socio-Economic Impact Assessment Methodology Logic



Source: Urban-Econ, 2022

DESCRIPTION OF THE SOCIO-ECONOMIC IMPACT ASSESSMENT

In order to quantify the socio-economic impacts of the project the modelling technique involves the application of an Input-Output Multiplier Model that allows the quantification of socio-economic impacts. The macroeconomic analysis is undertaken to determine the socio-economic multipliers of the development and are expressed in the number of sustainable and temporary jobs created; the new investment in the economy that

may result due to the project; new or lost business turnover of surrounding businesses, and even the new levels of government taxes that may be raised due to the project.

The economic value and impact of the project intervention can be in the form of new investment in, for example, technology, transport facilities, social development, housing, business development, but it can also be in terms of changes in the existing production processes or renewal of established assets. Changes in Government policy and the impacts thereof on the economy can also be determined. The economic effects may be viewed in terms of:

- Job creation in terms of full time equivalent (FTE) annual opportunities
- Gross value added in the economy
- Incomes generated in the economy (including wages)
- Business output (or sales volume).

Outside of the Input-Output Multiplier Model the effects on the following can also be determined:

- Tax generated and
- Wealth (including property values).

Any of these measures can be an indicator of improvement in economic well-being that is usually a goal of investment projects. The net economic impact is usually viewed as the expansion or contraction of an area's economy, resulting from changes in (i.e., opening, closing, expansion or contraction of) a facility, project, program, or the whole industry. Often there is also interest in assessing the economic impact of an already existing facility, policy, or project. This is usually viewed in terms of the jobs, income and/or business sales that are directly or indirectly supported by the existing facility.

Generally, the focus of the economic impact assessment is to apply project information and set up an economic impact simulation model to fully capture and assess the impact on local, regional and national levels. The impact assessment usually addresses the quantification of, inter alia:

- Capital projects
- Operational revenue stream
- Other relevant transaction flows
- Employment expenditure
- Operational expenditure
- Development spending

All of the above imply changes in the economy and need to be identified and captured in an impact simulation model identifying impacts locally, regionally and nationally in terms of, inter alia:

- Increased production
- Increased revenue
- Small business impact
- Skills requirements
- Employment creation
- Increased taxes
- Sectoral impacts
- Poverty alleviation

EXPLAINING THE IO MODEL

The term economic impacts refer to the effects on the level of economic activity in a given area as a result of some form of external intervention in the economy. A multiplier analysis using an Input-Output model is undertaken to quantify the economic impacts of a particular project.

Input-output analysis is a form of economic analysis based on the interdependencies between economic sectors. This method is most used for estimating the impacts of positive or negative economic shocks and analysing the

ripple effects throughout an economy. The model uses a series of multipliers derived from a series of rows and columns of data that quantify the supply chain for sectors of the economy. The shock (expenditure) can then be entered into the table where the relevant multipliers will be applied, and the resulting impacts can be seen regarding gross value added (GVA), new business sales, income contribution and employment creation. Estimates are used as the underlying data to the input-output tables are based on industry averages.[14]

Data used as inputs to the model are current expenditures, either capital expenditures or operating expenditures as outputs from the model are static. Distinction is made between costs associated with construction and ongoing annual operating costs due to the different nature and durations of the expenditure. Capital expenditures are usually of a relatively short duration while operating expenditures are of a longer term annually recurring expenditure.

The IO Model measures the direct, indirect and induced impacts of the PRBGP3. Direct impacts indicate the value of the impact as a result of the expenditure used in the production of the final goods or services (in this case the PRBGP3). Indirect impacts indicate the value of the inputs used by firms that produce the goods and services for those firms first impacted by the direct expenditure. Induced impacts indicate the resultant effects of the direct and indirect effects. The total impact therefore is the sum of the direct, indirect, and induced impacts.

The *direct impacts* are the changes in the economy occurring as a direct result or consequence of public or private sector capital and operating expenditure, in this case relating to the PRBGP3. Direct impacts are changes that occur in "front-end" businesses that would initially receive expenditures and revenue as a direct consequence of the operations and activities of a project. This impact would be felt by first round contractors (first round suppliers) for the PRBGP3.

The *indirect* economic effects occur when the suppliers of new goods and services to the PRBGP3 contractors (first round suppliers) experience larger markets and potential to expand. Indirect multipliers measure indirect impacts arising from changes in activity for suppliers of the "front-end" businesses. Indirect multipliers create the "ripple effect" in the economy. The impact on what the suppliers do to fulfil new incremental spending, i.e., fuel, transportation equipment and machinery. Includes their actions with other suppliers and impact on increased labour demand.

Induced economic spending results in the impacts on goods and services demanded due to increased expenditure by households from income earned due to the PRBGP3. Induced multipliers measure induced impacts arising from shifts in spending on goods and services as a consequence of changes to the payroll of the directly and indirectly affected businesses. Induced effects are measures of household spending. Expenditures at this level can include the income of employees, as well as the income arising through the backward linkages of this spending in the economy.

Direct, indirect and induced effects measure the increase in economic value, job creation, business turnover and income, and increases in tax income.

[14] The impact of the Covid-19 virus on the South African economy has recently (April 2020) been determined by means of an Input Output Model.

Input-Output multipliers can be used to estimate the impacts on the economy through various measures. Economic impact outputs measure the following:

- Production output
- GVA
- Employment
- Wages & salaries
- Taxes.

Production output is the broadest measure of economic activity. Total gross value of goods and services produced by a given company or industry measured by the price paid to the producer. Producer price is compared to the price paid by the consumer, which can include transportation and retail mark-ups. Output is a big number but double-counts impacts.

Gross Value Added (GVA) refers to the additional value of a good or service over the cost of inputs used to produce it from the previous stage of production. GVA is equal to net output, or the difference between revenues and expenses on intermediate inputs. GVA is the incremental value created through labour or mechanical processing. Total GVA is a more meaningful measure of economic impact than output, as it avoids double counting during each round of impacts. GVA is smaller than Output but is more important to government stakeholders.

Employment is the number of additional jobs created as a result of the expenditures made by PRBGP3. Estimated as the number of jobs per R1 million spent depending on the definition used, direct employment is generally employees on payroll. Indirect employment is related to the supplier's workforce. Induced employment are the retail and other types of jobs supporting household expenditures. Wages and Salaries are a measure of the cash earnings of employees. Employment is usually expressed in Full Time Equivalent (FTE) measures where one person employed for one-year equals one FTE. Total employment contribution reflects the number of jobs created by economic growth as a result of the construction of the PRBGP3. This is the most common measure of economic impact because it is easier to comprehend than abstract figures. When calculating employment figures, the I-O model operates on total man hours into full-time annual equivalent jobs or employment opportunities.

LIMITATIONS OF THE INPUT OUTPUT MODEL

IO Models are static models providing a snapshot of the economy in a particular year. That means that the impacts for each year needs to be modelled separately for each year. However, to overcome the problem the impacts are all measured in constant values rather than present values. This approach also allows the total multi-year cumulative impact of both construction and operational phases to be determined, realising that the impacts will be spread over time in the year that the actual expenditure takes place.

National IO Models measures the impacts of the "general" economy. Due to the complexity of an economy, the economic sectors (as expressed in the Standard Industrial Classification Codes (SIC Codes[15]) are grouped together for the main economic sectors in the IO Model. This means that the impacts of highly specialised and

[15] The Standard Industrial Classification of All Economic Activities (SIC) consists of a coherent and consistent classification structure of economic activities based on a set of agreed concepts, definitions, principles and classification rules, adjusted for South African conditions by StatsSA

sophisticated economic activities need to be adjusted to reflect the particular impacts of that injections (project). The effect of this general model is often noticed in the employment outputs when highly skilled personnel will be employed.

Job counts have two major limitations namely i) they do not necessarily reflect the quality of employment opportunities and ii) they cannot be easily compared to the public costs of attracting those jobs (through subsidies, tax breaks or public investments). Therefore, due to each job being different in quality, skill and level there is no way of determining the real increase in jobs using the I-O matrix. This figure is for informative purposes and reflects the effect of new production, increased GVA and an increase in business incomes as a result of expenditure.

Government tax revenues come from personal income taxes, indirect taxes less subsidies, corporate income taxes and is measured as the total amount of tax revenues generated for each level of government (municipal, provincial and national).

THE INPUT OUTPUT MODEL USED IN THIS ASSESSMENT

The IO Model in this assessment is based on the National StatsSA 2013 IO Model adjusted to 2022 figures. The 2013 IO model is the most recent national SA model compiled and to date funding has currently been stopped to develop further models.

The National IO model is the best model to be used in assessing the economic impact of the PRBGP3 due to the nature of the project whose impacts are envisaged to be mainly at a national scale. Due to the size and nature of the project it is likely that during the construction phases, although local labour is likely to be used, there will be both regional (district municipality and province level) and national impacts through ripple multiplier effects. The operations of this large-scale project require a high skill level and the application of sophisticated technology and hence most of the economic impacts will also be at a national scale.

SUMMARISING SYNOPSIS

Socio-Economic Impact Assessments (SEIA) are instruments intended to identify and quantify social and economic impacts. Typically, socio-economic impacts are assessed from the perspective of the impacted environment of the development. Socio-economic impacts refer to the effects on the level of economic activity in a given area as a result of some form of external intervention in the economy, in this instance the PRBGP3. To determine the benefits associated with the PRBGP3, an Input-Output Model is applied to both capital and operational expenditure of the project. An Input Output Model is an economic model of all transaction flows in a given economy. It is a demand driven model measuring shocked by external changes in the economy such as a cash injection or investment project in this case the PRBGP3 development. The impact that the construction and operational phases of the development of the PRBGP3 will have on the economy, as measured by the following economic indicators:

- Increases in the Gross Value Add (GVA)
- New business sales or turnover generated in the economy
- Contribution to income levels retained in the economy
- Contribution to employment creation, measured in average annual equivalent jobs.