EXECUTIVE SUMMARY:
DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT
Proposed Gas to Power Powership Project at the Port of Richards Bay, uMhlatuze Local Municipality, KwaZulu-Natal
DFFE REF NO: 14/12/16/3/3/2/2007

1. Introduction

Karpowership SA (Pty) Ltd proposes a Gas to Power via Powership Project at the Port of Richards Bay, uMhlatuze Local Municipality, Kwazulu-Natal.

Triplo4 Sustainable Solutions has been appointed to undertake the Scoping and Environmental Impact Reporting (S&EIR, also referred to as the EIA process required in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA).

The proposed Gas to Power Powership Project at the Port of Richards Bay has been formulated in response to the Request for Proposals (RFP) for technology agnostic New Generation Capacity under the Risk Mitigation IPP Procurement Programme (RMI4P) issued by the Department of Mineral Resources and Energy (DMRE) to alleviate the immediate and future capacity deficit as well as the limited, unreliable and poorly diversified provision of current power generating technology with its inherent adverse environmental and economic impacts. The "Risk Mitigation Power Purchase Procurement Programme (2000MW): National" has also been designated the status of a Strategic Integrated Project (SIP) under the Infrastructure Development Act, 2014 by the Presidential Infrastructure Coordinating Commission. SIPs are considered to be projects of significant economic or social importance to South Africa as a whole or regionally that give effect to the national infrastructure plan and for this reason, can be expeditiously implemented through the provisions of the enabling Act.

The Integrated Resource Plan (IRP) 2019 identifies the necessary generation mix of technologies to respond to the demand for electricity. Inherent in the planning process is the commitment to energy security, cost efficiency and effectiveness, and environmental sustainability. The RMI4P succeeded in attracting project proposals featuring a variety of technology combinations to provide dispatchable generation. These determinations facilitate the process of procuring the required electricity capacity. Preferred Bidder status in the RMI4P was awarded to eight projects on 18 March 2021 and three further projects on 1st June 2021, being:

- ACWA Power Projects DAO (Solar PV + BESS + Diesel Generator)
- Oya Energy (Solar PV + BESS + Diesel Generator + Onshore Wind)
- Umoyilanga Energy (Solar PV + BESS + Liquid Petroleum Gas (LPG) Generator + Onshore Wind)
- Two projects for Mulilo Total (Reciprocating Gas Engines + Solar PV) and (Solar PV + BESS + Diesel Generator))
- Three projects for Karpowership SA (Floating Modular Reciprocating Gas Engines with Heat Capture Steam Turbines)
- Three further Preferred Bidder projects were added on 1 June 2021 to Scatec (Solar PV + BESS).

The Gas to Power via Powership Project at the Port of Richards Bay forms part of the solutions provided by the RMI4P preferred bidders that provide for a combination of a range of technologies that can be noted above.

Gas generated electricity has been identified by the DMRE as one of the most affordable and reliable forms of power. From the 11 preferred bidders, only 1 bidder's project bid a lower cost, confirming the affordability of the gas to power project as a fully dispatchable technology.

28 projects submitted bids in response to the RMI4P on 22 December 2020. Bids were assessed for compliance with qualification criteria and then assessed on lowest cost and committed economic development contributions. The Karpowership Port of Richards Bay project was subsequently named as one of the 11 successful bids announced by the DMRE. Karpowership's project status, upon award as a preferred bidder for the RMI4P, became classified as

a Strategic Integrated Project (SIP) and are to be managed within the requirements as set out in the Infrastructure Development Act 23 of 2014- Appendix 7.1

2. Governance Framework

NEMA prohibits a person from commencing a listed activity without environmental authorisation. The Project triggers several activities listed in the EIA Regulations Listing Notices 1, 2 and 3 of 2014 (as amended) ("**Listing Notices**"). The procedural requirements for such an application and associated EIA that needs to be undertaken, are prescribed by the EIA Regulations, 2014 promulgated under NEMA (as amended) ("**EIA Regulations**").

In addition, the Project triggers an activity listed under the National Environmental Management: Air Quality Act 39 of 2004 (NEMAQA) which requires an atmospheric emission licence (AEL). The same EIA process prescribed by the EIA Regulations is applied to the AEL application, with a number of additional requirements set out in NEMAQA and its Regulations.

The EIA Regulations outline two authorisation processes. Dependant on the type of activity that is proposed, either a Basic Assessment or a Scoping and Environmental Impact Assessment process is required to obtain Environmental Authorisation (EA).

Triplo4 has determined that the proposed Gas to Power via Powership Project at the Port of Richards Bay triggered activities in Listing Notice 1-3 of the EIA Regulations.

Table 0-1: Listed Activities

Activity	Summarised Description
Listing Notice 1	
11	The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.
12	The development of infrastructure or structures with a physical footprint of 100 square metres or more within a watercourse or within 32m of a watercourse.
15	The development of structures in the coastal public property where the development footprint is bigger than 50 square metres
17	Development in the sea or in an estuary or within the littoral active zone; in respect of infrastructure or structures with a development footprint of 50 square metres or more.
18	The planting of vegetation or placing of any material on dunes or exposed sand surfaces of more than 10 square metres, within the littoral active zone
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.
19A	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from— (i) the seashore; (ii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater; or (iii) the sea
27	The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation.
Listing Notice 2	
2	The development and related operation of facilities or infrastructure for the generation of electricity from a non-renewable resource where the electricity output is 20 megawatts or more.
4	The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres
6	The development of facilities or infrastructure for any process or activity which requires a permit or licence or an amended permit or licence in terms of

	national or provincial legislation governing the generation or release of emissions, pollution or effluent.
7	The development and related operation of facilities or infrastructure for the bulk transportation of dangerous goods— (i) in gas form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 700 tons per day; (ii) in liquid form, outside an industrial complex, using pipelines, exceeding 1 000 metres in length, with a throughput capacity of more than 50 cubic metres per day.
14	The development and related operation of— (ii) an anchored platform; or (iii) any other structure or infrastructure — on, below or along the sea bed.
Listing Notice 3 (KwaZulu-Natal)	
10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.
12	The clearance of an area of 300 square metres or more of indigenous vegetation within an identified geographical areas.
14	The development of— (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse.

A Water Use Authorisation in terms of Section 21 of the National Water Act 36 of 1998 (NWA) is required and was granted from Department of Water and Sanitation in July 2021.

3. Environmental Process

The EIA Regulations define the detailed approach to the S&EIR process, which consists of two phases: the Scoping Phase and the Impact Assessment Phase (the current phase).

A Scoping and Environmental Impact Reporting (S&EIR) process was conducted during 2020-2021, which is required for an EA, as per the timeline below:

- The Scoping Report, including the Plan of Study and approved Public Participation (PP) Plan for the EIA, was accepted by the Competent Authority (CA), namely the Department Forestry, Fisheries and the Environment (DFFE), on 06 January 2021.
- A Final EIA Report (EIAr) and Environmental Management Programme Report (EMPr) were submitted to the CA on the 26 April 2021. The CA refused the EA application and provided KSA with the Record of Refusal (RoR) on 23 June 2021.
- On 13 July 2021, KSA appealed the CA's refusal. On 1 August 2022, the Appeal Authority (the Minister) dismissed the appeal and exercised her powers in terms of Section 43(6) of NEMA. The application was remitted back to the CA, with the instruction to address various perceived gaps and defects through a new EIAr and associated PPP, in order for the application to be considered by the CA.

The CA advised that an updated EIAr, addressing the various perceived gaps in information, and subject to a Public Participation Process (PPP), must be submitted to the CA for reconsideration.

The key objectives of the EIA are to:

- Inform Interested and Affected Parties (I&APs) about the proposed Project and the EIA process followed;
- Obtain comments from I&APs (including the relevant authorities and the public) and ensure that all issues, concerns and queries raised are fully documented and addressed in the EIA Report;
- Identify and assess potential significant impacts associated with the proposed development;
- Formulate mitigation measures to avoid and/or minimise impacts and enhance benefits of the Project; and

- Produce a Final EIA Report which will provide all the necessary information for the Competent Authority to decide whether (and under what conditions) to authorise the proposed Project.

Figure 0-1: Overview of the Port of Richards Bay

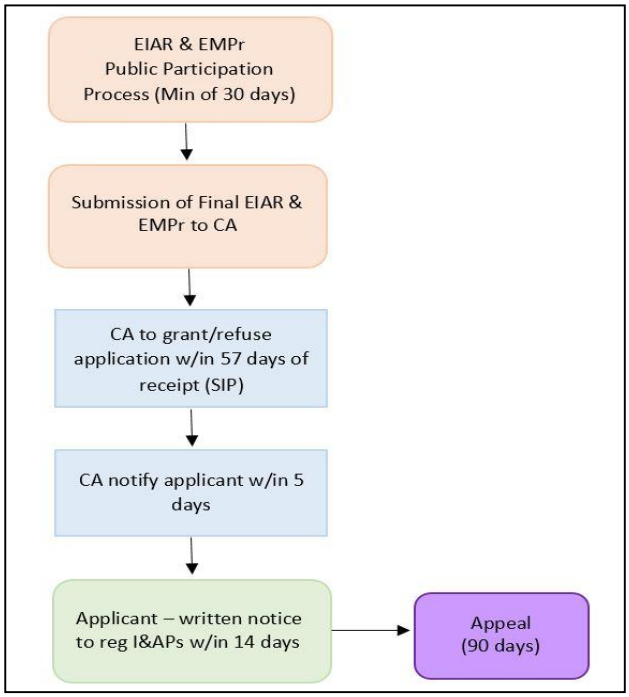

Figure 0-2: EIR Process

4. Description of the Site & Environment

The project is located in the Port of Richards Bay. It is located within proximity to the Richard's Bay Industrial Development Zone (RBIDZ) in the uMhlatuze Local Municipality in the KwaZulu-Natal Province. The Port of Richards Bay, located within Ward 2 of the uMhlathuze Local Municipality, is state-owned and managed by Transnet National Ports Authority (TNPA) in a landlord capacity.

The port of Richards Bay situated adjacent to the Richards Bay Industrial Development Zone (RBIDZ) – Special Economic Zones (SEZ), which is specifically designed to allow for related industries to be based in an Industrial Zone.

The proposed Powerships, Floating Storage & Regasification Unit (FSRU), temporary Liquified Natural Gas Carrier (LNGC) and gas line, will be located in the Port of Richards Bay under the jurisdiction of TNPA. While the transmission line is across Transnet properties as well as uMhlatuze Local Municipality properties, and the proposed switching station situated slightly within South32 Aluminum Pty Ltd property (alongside the existing Bayside substation).

The Powerships and FSRU are to be moored in the protected waters within the Port of Richards Bay. The Powerships are positioned within the dead-end basin adjacent to the break bulk quay /multi-purpose terminal.

Figure 0-1: Overview of Port Site

Figure 0-4 Overview of Transmission Route

Industrial development currently developed close to the section of the Port where the proposed project is

located includes a large-scale aluminium smelter (Bayside) as well as a phosphorous chemical plant (Foscor). Bidvest Terminals are situated within the Port boundaries, to the East of the proposed project.

The majority of recreational uses of the Port are generally located on the Northern side of the Port. Recreational fishing and other legal and illegal fishing take place at the harbour mouth, which is more than 4km away from the proposed location of the Powerships and FSRU.

The study area falls within a Critical Biodiversity Area listed as irreplaceable. Richards Bay Game Reserve, which is also an Important Bird Area (IBA) lies less than 1km to the southwest of the site, and the Enseleni Nature Reserve is located approximately 10km to the north of the site. Overall, the proposed terrestrial transmission line (preferred route) is located in low sensitivity areas, mainly due to its location in transformed areas or in highly degraded areas adjacent to transformed areas.

UMhlatuze LM has a population of approximately 351 531 persons and is characterised by high levels of educational attainment.

5. Project Motivation

The Karpowership project has arisen in response to the need to address the current energy crisis experienced in South Africa. It is in response to a bid issued by DMRE as part of the RMI4P. The purpose of the RMI4P is to satisfy the short-term electricity supply gap, ease the current electricity supply constraints and reduce the wide-scale usage of diesel-based peaking electrical generators using alternative energy technologies ((Steenkamp & Weaver, 2022; DMRE, 2021a). The energy generated through the Karpowership project will contribute towards alleviating the loadshedding burden and resultant negative socio-economic impacts by providing much needed dispatchable energy, which can be provided at baseload, mid-merit and peaking.

The RMI4P, declared a Strategic Integrated Project, is an important response to the energy crisis, and in line with the mandate of the State to provide services that ensures socio-economic growth and well-being for the benefit of all of society. Karpowership's proposed project is in accordance with the IRP 2019 where provision has been made for gas in the energy mix. Powerships should not be considered a replacement of renewable energy, but rather a complementary technology to renewable energy, which supports the transition away from coal and diesel, and a reduction in the negative environmental impacts associated with coal and diesel. Coupled with the urgent need to respond to the energy crisis Karpowership's project bring a solution where electricity can be dispatched on instruction when the energy supply is under strain (i.e. it is dispatchable).

In addition, the project will result in positive multiplier impacts on the local economy during both the construction and operational phases. Karpowership will play a positive role in the local economy through skills-, enterprise- and supplier development programmes. The direct, indirect, and induced economic impacts of the project on employment, income generation, new production and economic value will be positive. This will include skills development and capacity development towards the realisation of a just transition in South Africa. It is therefore anticipated that the Karpowership project will result in an overall positive socio-economic impact when considering the host of economic and environmental impacts.

It is worth reiterating that the Karpowership project is located within an active port, and adjacent to the Richards Bay Industrial Development Zone (Special Economic Zone), which is considered a key growth node catering specifically for the energy and maritime sectors.

However, a responsible and sustainable approach to the proposed project is still required, in line with the requirements of NEMA and the environmental management Acts, Policies and Guidelines. The Duty of care (as prescribed in Section 28 of NEMA) must be observed. Therefore, numerous multidisciplinary specialist impact assessments have been undertaken as part of the EIA process, integration of specialist findings was ensured and the application of a polycentric view to the impact assessment was applied. Negative and positive impacts have been identified, and as far as possible all negative impacts have been avoided or mitigated to reduce the impact, and further management recommendations provided

for as per the EMPr. All Specialists supported the project and no fatal flaws were identified for the preferred alternatives. The polycentric approach of the EIA gave consideration to all relevant factors, inclusive of potential impacts that the proposed project could have on the local as well as the broader community.

There is further opportunity for scientific research and monitoring programmes to inform adaptive management to the life cycle of this project, and for similar port-based projects. The Sustainability Specialist, based on Specialists' inputs, independently assessed the project's geographical, physical, biological, social, economic and cultural aspect of the environment through the application of three methods that assisted with synthesizing and conceptualizing technical information for decision making purposes. The following conclusion was reached: *"Given that the professionals who undertook the specialist studies have supported the granting of the environmental authorisation, with various requirements for mitigation and management, I support this project be granted the environmental authorisation, provided the necessary mitigation and management recommendations are upheld. The recommendations provided in this report offer further opportunity to reduce the negative impacts of this project on the environment and enhance the positive contributions and legacy that Karpowership SA can contribute to this community."*

6. Project Description

The Project entails the generation of electricity by two Powerships moored in the Port of Richards Bay, fed with natural gas from a third ship, a Floating Storage & Regasification Unit (FSRU). The three ships will be moored in the port for the Project's anticipated 20-year lifespan. A Liquefied Natural Gas Carrier (LNGC) will bring in liquified natural gas (LNG) and offload it to the FSRU approximately once every 20 to 30 days, dependent on power demand which is determined by the buyer, ESKOM. The FSRU stores the LNG onboard and turns the liquid form into gaseous form (Natural Gas) upon demand from the Powership (Regasification). Natural gas will be transferred from the FSRU to the Powerships via a subsea gas pipeline. The Project's design capacity is 540MW. Electricity will be generated on Powerships by 27 reciprocating engines, each having a heat input in excess of 10MW (design capacity of 18.32MW each at full capacity). Heat generated by operation of the reciprocating engines is captured, and that energy is used to create steam to drive three steam turbines that each have a heat input of circa 15.45MW. The contracted capacity of 450MW, which cannot be exceeded under the terms of the RMI4P, will be evacuated via a 132kV transmission line over a distance of approximately 3.6km. The electricity will be evacuated from the Powership to the Impala substation, via a connection point (necessitating a new switching station) in proximity to the existing Bayside Substation, which feeds electricity into the national grid.

7. Alternatives

The EIA Regulations, 2014 (as amended) require that all S&EIR processes must identify and describe feasible and reasonable alternatives. Numerous alternatives were identified and considered to date.

Table 0-2: Alternatives Screened Out

Alternative	Screened Out Reason
Layout Alternative: Powership - The 2 Powerships are located closer to the sensitive sand bank and further away from the shore, which will require a longer transmission line and higher tower.	This is a feasible alternative, however considered less suitable from engineering and environmental perspectives.
Layout Alternative: Transmission Lines - The route is located to a large extent of its length within wetlands, and it traverses two Critically Endangered vegetation types: Mangrove Forest and Swamp Forest.	Considered as a fatal flaw and therefore not supported

The following alternatives were considered in the EIA:

7.1. Layout Alternatives

Marine:

Preferred Powership and Gas Pipeline Alternative 1: The Powerships are positioned within the dead-end basin, and located closer to the first tower of the transmission line. The powerships positioned on the main land 'promontory' adjacent to the large mangrove

stand, and positioned further away than alternative 2 from the sensitive sand bank. This alternative position was approved by TNPA and in line with their port planning.

Powership and Gas Pipeline Alternative 2: is considered less suitable from engineering and environmental perspectives, as the Powerships and the mooring systems are placed closer to the sensitive sand bank and further away from the shore, which will require a longer transmission line and higher tower.

Transmission:
Alternative 1 (Preferred): The majority of the route is located in areas of low to moderate ecological sensitivity, and will be traversing highly sensitive wetland and swamp forest, and a large portion of this alternative follows the route of the existing powerline servitude. This alternative offers a shorter route to the end point.

Alternative 2: this route traverses areas that have been historically transformed, however these areas are still considered highly sensitive. Furthermore, this proposed transmission line route is located to a large extent of its length within wetlands, and it traverses two Critically Endangered vegetation types: Mangrove Forest and Swamp Forest. These have extremely high sensitivity and as such, can be considered as a fatal flaw and therefore this alternative route is not supported.

7.2. Design Alternatives

The proposed transmission line can be constructed of either monopole or lattice steel construction, based on the final engineering design requirements, the topography and geotechnical survey results. As the extent of the lattices' footprint is much bigger and require more vegetation clearance than the monopoles, the monopoles are the preferred options.

7.3. Technology Alternatives: Fuel

The Powerships to be deployed will generate electricity using Wärtsilä engines running exclusively on natural gas. Wärtsilä conducts extensive research on the use of different fuel sources within its engines, improving and optimising their technology to future-proof and deliver leading efficiency. Wärtsilä have made significant progress on the possibility of using hydrogen gas to power with their engine technology; whilst it is already technically possible to utilise a mix of hydrogen with natural gas, this technology is in its infancy and is undergoing rigorous research and development for pure hydrogen operations, and outcomes of that research and development (R&D) are anticipated within the coming years.

7.4. No Go Alternative

The option of not implementing the activity, i.e. the "no-go" alternative, was considered. In respect of the Project, it would mean that the existing status quo would prevail. While the benefit of this option is that there will be no negative environmental or social impacts, there also would be no positive environmental or socio-economic benefits as well as deployment of cleaner turnkey energy technology in keeping with the South Africa's Just Energy Transition objectives.

Based on the findings of the independent specialist studies, the proposed project will not result in significant negative environmental or social impacts provided the mitigation measures recommended by the EAP and specialists, as contained in Section 7 of the draft EIA report and the EMPr are implemented.

In fact, the proposed project will have positive environmental impacts due to mitigation measures involving ecological research and subsequent long-term improvements resulting from improved knowledge. Negative environmental impacts resulting from loadshedding, declining energy or the use of more environmentally harmful alternative fuel sources will also be avoided.

The highly significant positive socio-economic impacts will not be realised in the no-go scenario. A socially just transition for the poor and unskilled workforce and marginalised individuals and Government's target for a sustainable energy supply mix will also not occur in context of the Karpowership Project in Port of Richards Bay. The lost benefit of having electricity derived from natural gas, reduces the stability and resilience of power grids, thereby reducing the energy transition towards facilitating rapid deployment of renewable energy sources. Dispatchable power to the national

grid to meet existing as well as future increased electricity demand within the country will not be available to prevent the disastrous and devastating economic decline associated with loadshedding resulting from an ever increasing deficit of power. Continued loadshedding will negatively impact on the wellbeing of the majority of the SA population, on the economy as a whole as well as on local and international investor sentiments. Opportunities to stimulate the economy through employment, social development programmes, bursaries for education, other educational programmes, skills development programmes and procurement from local suppliers will be lost while the broader economic sectors such as industry, tourism, and entertainment will also face growth constraints. Moreover, individuals and especially the disadvantaged and marginalised, will have to face increasing risks to their livelihoods as well as reduced economic opportunities.

When the minimal potential environmental and socio-economic risk with mitigation is measured against the potential environmental and socio-economic benefits, there is simply no contest. The environmental benefits are significant and the social and economic benefits vastly outweigh the mitigated environmental and socio-economic impacts.

The no-go option is thus not consistent with the principles of sustainable development in relation to the provision of electricity which falls under the SDG 7: Affordable and Clean Energy and SDG 8: Decent Work and Economic Growth. It is thus the reasoned opinion of the EAP that the proposed 540MW Gas to Power Powership Project, should be authorised subject to the conditions proposed in Section 9.2, which include compliance with the EMPr. Hence the "no-go" alternative is not recommended.

8. Stakeholder Engagement

Stakeholder engagement is a key component of the S&EIR process and is being undertaken in accordance with the requirements of the EIA Regulations. Stakeholder engagement periods include the following:

- Initial notification and submission of the BID;
- Formal public comment period on the draft EIA Report

The key stakeholder engagement activities during the EIA processes are summarized in Table 0-3 below.

Table 0-3 Summary of Stakeholder Engagement Activities

Activity	Date
Initial Notification	
Advert, BID, Site Notices, Flyers, Leaflets, Radio Announcements	24 -28 October 2022
Pre-Consultation Meetings	12 October – 09 November 2022
Impact Assessment	
Draft EIAR Comment Period	10 November – 13 December 2022
Public & Virtual Meeting	23 November 2022

9. Assessment of Potential Impacts

9.1. Specialist Studies & Technical Reports

Specialist studies were undertaken to investigate key potential direct, indirect and cumulative impacts:

- Hydrology & 1:100 Year Floodline Assessment
- Aquatic Assessment
- Hydropedology Assessment
- Geohydrology Assessment
- Water Balance Assessment
- Wetland Delineation & Functionality Assessment
- Heritage & Palaeontology Assessment
- Terrestrial Biodiversity Assessment
- Avifauna Assessment
- Baseline Underwater Noise Report
- Underwater Noise Assessment Report
- Underwater Heritage Report
- Marine Ecology Assessment & Fisheries Impact Report
- Marine Avifaunal Assessment
- Estuarine and Coastal Assessment
- Traffic incl. Marine Assessment
- Thermal Plume Modelling Report
- Air Quality Impact Assessment
- Ambient Noise Impact Assessment
- Climate Change Impact Assessment
- Socio-Economic Impact Assessment
- Small Scale Fishers Specialist Engagement Report
- Sustainability Report
- Tourism Impact Assessment
- Visual Impact Assessment

- Major Hazard Installation Assessment
- Role of Gas in the Just Transition
- Cost implications Gas vs Renewable forms of Energy

For all potentially significant impacts, the significance of the anticipated impact was rated without and with recommended mitigation measures in Table 0-4

9.2. Impact Significance

The significance of potential impacts of the proposed Project was determined in order to assist decision-makers. The overall impact ratings, assuming mitigation measures (refer to Section 9.3.2) are effectively implemented, are:

- No significant or negligible impacts or risks were identified for specialist studies conducted in terms of heritage, traffic, marine traffic, major hazard installation, hydrology, geohydrology, hydropedology, tourism and visual aspects.
- Negative impacts and risks of very low and/or low significance were identified for wetlands, Terrestrial Biodiversity, atmospheric emissions and terrestrial noise. Socio-economic negative impacts ranged from low to medium.
- The overall impact of the Project on the Richards Bay Estuary and coastal environment after mitigations will be medium to low,
- The overall impact of the Project on the Richards Bay Avifauna after mitigation will be medium to very low.
- Low to very high positive impacts were indicated for aspects related to the Tourism Industry, and the socio-economic assessment indicated numerous positive impacts ranging from low, medium to high positive.

A polycentric approach to the proposed project requires the holistic consideration of all relevant factors, inclusive of potential impacts that the proposed project could have on the local as well as the broader community. Section 2(4)(b) of NEMA states that *Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in* the *environment by pursuing the selection of the best practicable environmental option.* Sustainable development as per NEMA requires the integration of social, economic, and environmental factors in the planning, implementation, and evaluation of proposed projects, to ensure that development serves the needs of present and future generations.

The independent sustainability specialist assessment therefore considered both the positive and negative impacts of actual and potential impacts on the geographical, physical, biological, social, economic, and cultural aspects of the environment in a polycentric and holistic approach that:

- Acknowledges that this environment is a complex and dynamic system
- Acknowledges the interrelated socio-ecological and socio-economic relationships
- Identifies the risks and consequences of alternatives and options for mitigation of activities, to minimise negative impacts, maximise benefits, and promote compliance with the principles of environmental management as set out in Section 2 of NEMA.

The table below summarises the impacts assessed in the EIA, including their significance before and after the implementation of essential mitigation measures.

Table 0-4: Summary of Impacts

Potential Impact and Risk	Significance	
	Pre-Mitigation	Post Mitigation
Hydrology Impacts (Section 7.5.1)		
Disturbing vadose zone during soil excavations / infilling activities	Neutral/ Negligible	Neutral/ Negligible
Exposure of soils, leading to increased runoff from cleared areas and erosion of the watercourses	Low	Neutral/ Negligible
Surface water contamination and sedimentation	Low	Neutral/ Negligible
Soil disturbance & erosion and sedimentation of nearby watercourses (operational phase)	Neutral/ Negligible	Neutral/ Negligible

Switching station spillages (incidents only; operational phase	Neutral/ Negligible	Neutral/ Negligible
Leakages from vehicles occurring during transmission line maintenance (operational phase)	Neutral/ Negligible	Neutral/ Negligible
Aquatic Impacts (Section 7.5.2)		
Removal of riparian vegetation and habitat impacting bank stability; Disturbance of the natural soil profile resulting in the proliferation of invasive alien plant species; Loss of aquatic vegetation and habitat.	Medium	Low
Changes in natural drainage lines which may lead to ponding or increased runoff patterns.	Medium	Low
Leakages from vehicles and machines. Oil & fuel spills from vehicles (Construction phase)	Medium	Low
Leakages from vehicles and machines. Oil & fuel spills from vehicles (Operational phase)	Low	Low
Change in species composition due to loss of aquatic habitat, water quality changes.	Low	Low
Hydropedology Impacts (Section 7.5.3)		
Site preparation impacting on soil interflow processes, soil quality, soil structure and land capability	Neutral/ Negligible	Neutral/ Negligible
Disturbing vadose zone during soil excavations / infilling activities	Low	Neutral/ Negligible
In-situ placement of new soils, altering existing soil-flow processes impacting on soil interflow processes, soil quality, soil structure and land capability	Low	Neutral/ Negligible
Vegetation clearing & soil stockpiling impacting on soil interflow processes, soil quality, soil structure and land capability	Low	Neutral/ Negligible
Surface water (wetland) quality	Low	Neutral/ Negligible
Soil quality	Low	Neutral/ Negligible
Excavation will disturb soil interflow processes	Low	Neutral/ Negligible
Oil & fuel spills impacting on soil quality	Low	Neutral/ Negligible
Geohydrology Impacts (Section 7.5.4)		
Disturbing vadose zone during soil excavations / construction activities	Low	Neutral/ Negligible
Hydrocarbon contamination of the vadose zone (construction phase)	Low	Neutral/ Negligible
Surface water contamination and sedimentation from the following construction activities	Low	Neutral/ Negligible
Impacts to downstream groundwater users	Neutral/ Negligible	Neutral/ Negligible
Temporary dewatering of perched groundwater (if it occurs)	Low	Neutral/ Negligible
Hydrocarbon contamination of the vadose zone (operational phase)	Neutral/ Negligible	Neutral/ Negligible

Impacts to downstream groundwater users (operational phase)	Neutral/ Negligible	Neutral/ Negligible
Wetland Impacts (Section 7.5.5)		
Direct habitat modification – Direct impact	Medium-Low	Low
Water Quality (Pollution) – direct impact	Medium-Low	Low
Catchment modifications (land cover and surface runoff) – indirect impact	Low	Very Low
Water Quality (Pollution) – indirect impact	Low	Very Low
Archaeology and Palaeontology Impacts (Section 7.5.6)		
No impact		
Terrestrial Biodiversity Impacts (Section 7.5.7)		
Loss of modified habitat (Construction Phase)	Medium-Low	Low
Loss of reed beds (Construction Phase)	Medium	Low
Loss of bushveld (Construction Phase)	Medium-Low	Low
Loss of flora Species of Conservation Concern (SCC) (Construction Phase)	Medium	Low
Loss of fauna SCC (Construction Phase)	Medium	Low
Loss of biodiversity in general (Construction Phase)	Medium-Low	Low
Fragmentation (Construction Phase)	Medium-Low	Low
Invasion of alien species (Construction Phase)	High	Low
Loss of modified habitat (Operational Phase)	Medium-Low	Low
Loss of reed beds (Operational Phase)	Medium-Low	Low
Loss of bushveld (Operational Phase)	Medium-Low	Low
Loss of flora SCC (Operational Phase)	Medium-Low	Low
Loss of fauna SCC (Operational Phase)	Medium-Low	Low
Loss of biodiversity in general (Operational Phase)	Medium-Low	Low
Fragmentation (Operational Phase)	Medium-Low	Low
Invasion of alien species (Operational Phase)	High	Low
Avifauna Impacts (Section 7.5.8)		
Powerships: Habitat Loss (Construction Phase)	Medium-Low	Medium-Low
Powerships: human disturbance (Construction Phase)	Medium	Medium-Low
Transmission Line: Habitat Loss (Construction Phase)	Medium-Low	Very Low
Infrastructure: human disturbance (Construction Phase)	Medium	Medium-Low
Habitat loss: Infrastructure (Operational Phase)	Medium-Low	Very-Low
Project infrastructure: collisions (Operational Phase)	Medium-High	Medium-Low
Project infrastructure: electrocution (Operational Phase)	Medium-Low	Medium-Low
Powership: light pollution (Operational Phase)	Low	Low
Powership: noise and vibration impacts (Operational Phase)	Medium	Medium
Powership: human disturbance (Operational Phase)	Medium-Low	Very-Low
Underwater Noise Impacts (Section 7.5.9)		
No impact		
Underwater Archaeology Impacts (Section 7.5.10)		
Extremely low probability of Maritime and	Neutral/ Negligible	Neutral/ Negligible

Underwater Cultural Heritage resources		
Coastal, Estuary and Marine Ecology Impacts (Section 7.5.11)		
Disturbance or loss of estuarine and marine fauna (Construction phase)	Medium-Low	Low
Changes in water quality as a result of water-based construction activity	Medium	Medium-Low
Disturbance to surrounding estuarine ecology, and fisheries and mariculture, due to increased noise levels	Medium-Low	Medium-Low
Avifauna Impacts (Powerships and Transmission line)	Medium	Medium-Low
Loss of fauna Species of Conservation Concern (Construction phase)	Medium	Low
Solid waste pollution (Operational Phase)	Medium-Low	Low
Chemical pollution arising spills of hazardous substance (Construction Phase)	Medium-High	Medium-Low
Intake of cooling water on marine organisms in the surrounding water body (Operational Phase)	Medium	Medium-Low
Cooling water discharge on the estuarine/marine ecology (Operational Phase)	Medium-High	Medium
Effects on surrounding estuarine/marine ecology due to increased underwater noise and vibrations (Operational Phase)	Medium-High	Medium
Effects on surrounding estuarine/marine ecology due to increased light pollution (Operational Phase)	Medium-High	Medium-Low
Effects of the combined operational impacts on ecosystem services (fisheries and mariculture)	Medium	Medium
Chemical pollution arising from construction related spills of hazardous substances and shipping activities (Operational Phase)	High	Medium-Low
Effects of catastrophic accidents on estuarine/marine ecology, avifauna and ecosystem services (Operational Phase)	Low	Low
Atmospheric Impacts and Risks (Section 7.5.12)		
SO_2 ; NO_2 and PM_{10}	Low	Low
Terrestrial Noise Impacts and Risks (Section 7.5.13)		
Noise impacts from construction activities	Medium-Low	Low
Noise impacts from operational activities	Medium-Low	Low
Climate Change Impacts and Risks (Section 7.5.14)		
Contribution to climate change	Low (Positive)	Low (Positive)
Socio-Economic Impacts and Risks (Section 7.5.15)		
Changes in biodiversity and climate on the livelihoods of communities	Low	Low (Positive)
The economics, and livelihoods for local fishermen in the region	Medium	Medium (Positive)

(not just fishermen within the harbour location)		
Reduction of tourism and related activities in the Municipal area and in the broader region.	Medium	Low (Positive)
Increase in demand for municipal infrastructure, social services and crime associated with the construction workers and job seekers (Construction phase)	Low	Low
Increase in demand for municipal infrastructure, social services and crime associated with the construction workers and job seekers (Operational phase)	Medium	Medium
Skills transfer and development (Construction Phase)	Low (Positive)	Medium (Positive)
Skills transfer and development (Operational Phase)	Low (Positive)	Low (Positive)
Sense of place experienced due to visual and noise effects	Low	Low
Increases in economic production, value, income and employment during construction and operations	High (Positive)	High (Positive)
Tourism Impacts and Risks (Section 7.5.16)		
Potential negative noise impact in the Port of Richards Bay on the marine tourism activities	Low	N/A
Potential negative visual and noise impacts on tourism at the Port of Richards Bay	Low	N/A
Potential positive impacts of Karpowerships electricity provision on the hospitality and tourism industry in Richards Bay	Very High (Positive)	Very High (Positive)
Potential Positive Impacts on Energy and Industrial Tourism in Richards Bay	Low (Positive)	Low (Positive)
Traffic Impacts (Section 7.5.17)		
No impacts.		
Visual Impacts (Section 7.5.18)		
No Impacts.		
Major Hazard Installation Risk (Section 7.5.19)		
Acceptable impacts.		
Marine Traffic Impacts and Risk (Section 7.5.20)		
No impacts		

9.3. Key Mitigations Measures

The mitigation hierarchy (avoid, reduce, rehabilitate and offset) was applied. Key design mitigation proposed to address impacts of the bypass are summarised below:

Avoid

The following key measures are intended to avoid specific impacts:

- Screening out Alternative 2 of the transmission line asthis route option traverses two Critically Endangered vegetation types: Mangrove Forest and Swamp Forest. These have extremely high sensitivity and as such, can be considered as a fatal flaw which should be avoided.
- The positioning of the 2 Powerships closer to the sensitive sand bank and further away from the shore, which will require a longer transmission line and a higher tower. This feasible alternative was screened out as was considered less suitable from engineering and environmental perspectives.
- Alignment of the transmission line along transformed or disturbed areas, and existing servitudes.

- The use of close-loop water systems that exclude the use of biocides chlorine and thus any potential pollution within the marine environment.

Reduce

- The design of the Powerships provides for built-in noise mitigation e.g. double hull and anti-vibration mounts.
- Management of water intact velocities and placement of intake outside the benthic environment to reduce impacts within the marine ecosystem.
- Navigational simulations and TNPA agreements regarding FSRU and Powership positioning ensured the optimal location of the vessels to avoid marine traffic collisions and align with TNPA Port planning.
- Various measures were stipulated as per the EMPr for the construction and operational phase to reduce impacts.

Rehabilitate

Rehabilitation is stipulated for any areas disturbed during construction as per the measures provided in the EMPr and rehabilitation plan. For example, in terms of wetland rehabilitation, should the rehabilitation measures implemented successfully, approx. 23.3 ha equivalent of wetlands will be improved in comparison to the current state. In addition, the EMPr and the rehabilitation plan also provides for the maintenance of areas to prevent degradations during the operational phase.

10. Conclusion & Way Forward

This draft EIAR Report identified and assessed the potential biophysical and socio-economic impacts associated with the Proposed Gas to Power Powership Project at the Port of Richards Bay.

It is the opinion of the EIA project team, incorporating the signatories below, that all components of this application, including the EIR with attached independent specialist reports, EMPr, public participation process and supporting documentation, comply with the relevant guidelines and contain all the required information in terms of GN 982 of the EIA Regulations to enable an informed decision by the competent authority.

It is the reasoned opinion of the EAP that the Gas to Power Powership project is acceptable, will not create unacceptable environmental impacts and can be reasonably authorised subject to the implementation of the mitigations and management measures set out in the EMPr. This opinion was reached with due consideration of:

- the independent specialist studies, with each and every specialist concluding their assessment with a supportive statement for the proposed development (i.e. no fatal flaws were identified for the preferred alternatives);
- the independent contributions to the need and desirability assessment;
- the impacts identified from a macro, micro, cumulative and polycentric (integrative) perspective in terms of the geographical, physical, biological, social, economic and cultural aspect of the environment; and
- the potential to avoid or minimise negative impacts and maximise positive impacts through inter alia the socio-economic development plan and reduced loadshedding.

Figure 0-5: Overview of Project Locality – Gas to Power via Powership in Port of Richards