APPENDIX K3 – Minutes of Virtual Meeting

MINUTES OF MEETING Virtual Public Meeting	Queries:	Donavan Henning ☎ 011 781 1730 ✉ donavanh@nemai.co.za

Project Name:	Proposed 750MW Combined Cycle Gas Turbine Power Plant in Richards Bay, City of uMhlathuze Local Municipality, King Cetshwayo District Municipality, KwaZulu-Natal

Applicant:	mabasa energy & fuels	Environmental Assessment Practitioner:	NEMAI CONSULTING

Date:	25 August 2026	Time:	11:00 – 13:00
Facilitator:	Donavan Henning	Platform:	MS Teams

A. ATTENDANCE

A copy of the Attendance Register is attached in Appendix A.

B. AGENDA

Agenda Item	Speaker
1. Opening & Welcome	*Facilitator*
2. Attendance	
3. Purpose of the Meeting	
4. Meeting Notes	
5. Presentations	
(5.1) Project Background & Motivation	*Mabasa Energy and Fuels*
(5.2) Project Description	*PDEX Consulting*
(5.3) Overview of Draft EIA Report	*Nemai Consulting*
(5.4) Overview of Climate Change Impact Assessment	*Promethium Carbon*
(5.5) Overview of Air Quality Impact Assessment	*uMoya-NILU Consulting*
6. Discussion	*All*
7. Way Forward	*Facilitator*
8. Close	

C. PRESENTATIONS & DISCUSSIONS

Note: These minutes provide a summary of the meeting and do not reflect a verbatim account of the discussions.

Item	Details	Action	Target Date
1.	**OPENING AND WELCOME**		
1.1.	D. Henning from Nemai Consulting welcomed everyone to the virtual public meeting for the proposed 750MW Combined Cycle Gas Turbine (CCGT) Power Plant in Richards Bay, KwaZulu-Natal (KZN). The meeting commenced at approximately 11:00.	-	-
2.	**PURPOSE OF THE MEETING**		
2.1.	D. Henning indicated that the meeting formed part of the Environmental Impact Reporting Phase of the overall Environmental Impact Assessment's (EIA) Public Participation Process. He stated that the aims of the meeting included the following: • To provide an overview of the proposed project; • To present the status of the EIA Process; • To provide an overview of the draft EIA Report;	-	-

Item	Details	Action	Target Date
	• To provide an overview of the Climate Change and Air Quality Impact Assessments; and • To allow stakeholders to raise questions and to provide a platform for project-related discussions.		
3.	**PROJECT BACKGROUND & MOTIVATION**		
3.1.	N. Williams from Mabasa Energy and Fuels presented the motivation for and benefits of the proposed project (see presentation contained in Appendix B).	-	-
4.	**PROJECT DESCRIPTION**		
4.1.	S. Trickett, C. Marland, G. Klooster and C. Janse Van Rensburg from PDEX Consulting presented an overview of the following (see presentation contained in Appendix B). • Project overview; • How a combined cycle gas turbine plant works; • Operating modes; • Fuel supply: natural gas; • Inputs, outputs and emissions; • Water use and wastewater; • Electrical system and grid connection; • Site layout and plant arrangement; • Fire protection and safety; • Hazardous materials on site; • Construction phase; • Operations: staffing and traffic; and • Design aspects still to be finalised.	-	-
5.	**OVERVIEW OF DRAFT EIA REPORT**		

5.1.	D. Henning presented an overview of the draft EIA Report.
	
	His presentation (contained in Appendix B) included the following:
	• Project location and site views.
	• Scope of the EIA.
	• Draft EIA Report –
	  ○ Status of EIA Process;
	  ○ Key sections of the draft EIA Report;
	  ○ Environmental legal framework;
	  ○ Profile of the receiving environment;
	  ○ Specialist studies;
	  ○ Impact assessment;
	  ○ Environmental Management Programme (EMPr); and
	  ○ Public Participation.
		-	-

6.	**OVERVIEW OF CLIMATE CHANGE IMPACT ASSESSMENT**		
6.1.	S. Murray from Promethium Carbon presented an overview of the Climate Change Impact Assessment. Her presentation (contained in Appendix B) included the following: • Project and location; • Scope of the Climate Change Impact Assessment; • Purpose and key questions; • South Africa's energy and climate policy context;	-	-

Item	Details	Action	Target Date
	• Approach to assessing emissions; • Key assumptions and inputs; • Emissions results; • Upstream LNG emissions; • Project emissions in the Nationally Determined Contribution (NDC) context; • Transition role vs carbon lock-in; • Illustrative electricity-system scenarios; • Projected climate change in Richards Bay; • Vulnerability and resilience assessment; and • Recommended mitigation and adaptation measures.		
7.	**OVERVIEW OF AIR QUALITY IMPACT ASSESSMENT**		
7.1.	M. Zunckel from uMoya-NILU Consulting presented an overview of the Air Quality Impact Assessment. His presentation (contained in Appendix B) included the following: • Objectives of the study; • Emission scenarios assessed; • Methodology; • Emission inventory; • Dispersion modelling results; • SO_2 Annual Average, 24-hour maximum & 1-hour maximum; • NO_2 1-hour maximum; • PM_{10} 24-hour maximum; • Summary of impacts; and • Conclusions.	-	-
8.	**DISCUSSION**		
8.1.	N. Padayachee from uMngeni-uThukela Water (UUW) requested construction and operational water volumes, indicative timing and milestones so the water utility can plan supply capacity. He also requested evidence that reuse, recycling and water-efficiency measures had been fully considered and that the stated demand includes all processes. He highlighted below-average rainfall expectations and the finite abstraction limits under the applicable Water Use Licence. C. Marland explained that the EIA presents options and uses a conservative worst-case approach, with wet cooling representing the higher-water-demand case. He noted that water requirements will be finalised during the feasibility study, with additional allowances included so the stated demand is not exceeded.	-	-
8.2.	S. Camminga from the Richards Bay Clean Air Association (RBCAA) reiterated the concerns she had raised during the review of the Draft Scoping Report regarding the data obtained by the Air Quality Specialist from the South African Air Quality Information System (SAAQIS). She noted the discrepancies between the RBCAA and SAAQIS datasets. M. Zunckel indicated that the Atmospheric Impact Report (AIR) will be updated with RBCAA data.	M. Zunckel	TBC

Item	Details	Action	Target Date
8.3.	S. Camminga stated that the use of white lines on the isopleth maps in the AIR made it difficult to distinguish between the impact zones. M. Zunckel indicated that they would relook at the isopleth maps.	M. Zunckel	TBC
8.4.	S. Camminga questioned how the AIR could identify cumulative exceedances under Scenarios 3 and 4 while assigning an overall "medium" significance rating, particularly when another specialist report assigned a "high" significance rating. D. Henning noted that each specialist assessed impacts falling within the scope of their respective discipline and that the Air Quality Impact Assessment provides the specialist basis for the assessment of air-quality impacts.	-	-
8.5.	S. Camminga asked whether the Quantitative Risk Assessment addressed the municipality's capacity to manage emergencies. D. Henning indicated that the applicable Major Hazard Installation requirements and detailed emergency-response arrangements would be addressed during the feasibility and detailed-design phases, including obtaining the relevant approvals, where required.	-	-
8.6.	S. Camminga asked how long the plant could operate on diesel in the event of a disruption to the LNG supply, whether the facility would shut down instead, and what air-quality impacts could arise from extended diesel use, particularly in view of nearby residential areas and prevailing wind conditions. C. Marland explained that the black-start generators would be used only in the event of a national-grid failure where no external electricity supply was available to the plant. He indicated that the generators would operate for a limited number of hours to enable the main generating units to start, after which the turbines would operate on natural gas. The project team considered a disruption to the natural-gas supply unlikely, given the liquid-gas storage available at the terminal and the buffering capacity within the Lily Gas Pipeline. He further noted that the inclusion of diesel backup was being reconsidered and could be removed from the project design if the proposed gas-supply arrangements were shown to provide sufficient reliability. M. Zunckel indicated that the AIR will be updated to consider black-start and diesel use.	M. Zunckel	TBC
8.7.	F. Schmidt from Richards Bay Alloys raised concerns regarding corrosion risks to pipelines, transmission infrastructure choices, coastal erosion impacts affecting fuel logistics, water use implications of cooling technologies, wastewater disposal constraints, LNG dependency, diesel transport requirements and the need for wetland offsets. S. Trickett indicated that HDPE would be used for underground pipes where practicable, while high-pressure LNG pipeline sections may require other materials and cathodic protection. He noted that the LNG pipeline itself falls outside this project's scope and is subject to a separate assessment.	-	-

Item	Details	Action	Target Date
	S. Trickett explained that major electrical design parameters, including transmission voltage, were driven by grid requirements. C. Marland highlighted the gas storage and buffering capacity available within the broader gas supply system to mitigate short-term supply disruptions. D. Henning indicated that the environmental authorisation issued in 2016 provided for wetland infilling and the clearance of indigenous vegetation associated with the authorised industrial development, and that wetland-offset measures had been undertaken by the RBIDZ. He further noted that the proposed power plant would not directly encroach on the remaining wetland situated south-west of the site.		
8.8.	F. Schmidt stated that aquifer abstraction may be prohibited. He also questioned reliance on municipal potable water and sewer systems. He further identified possible raw-water or industrial-effluent alternatives requiring further investigation. S. Trickett indicated that seawater-based wet cooling could potentially be considered in Richards Bay. He noted that the final cooling configuration would depend, among other considerations, on whether a suitable and sustainable non-potable water source could be secured. C. Marland indicated that discussions with the Richards Bay Industrial Development Zone's water technical personnel were planned and that further engagement with UUW would occur.	-	-
8.9.	S. Camminga noted the reported change in ownership and potential increase to approximately 150 truck movements per day at Richards Bay Alloys. D. Henning indicated that the Traffic Impact Assessment considered the cumulative development of the overall RBIDZ Phase 1F area and identified the required intersection and access upgrades. He noted, however, that the newly reported traffic volume associated with Richards Bay Alloys might not have been included in the assessment.	-	-
9.	**CLOSE**		
9.1.	D. Henning thanked all participants for their attendance and contributions. The meeting was concluded at approximately 13:00.	-	-

Item	Appendices
1.	Attendance Register
2.	Copies of Presentations

APPENDIX A

ATTENDANCE REGISTER

List of Virtual Attendees

1. Sandy Camminga
2. Lance Coetzee
3. Nokwazi Magubane
4. Franz Schmidt
5. Kaylee van den Bosch
6. Nathaniel Padayachee
7. Bavumile Skhosana
8. Nadine Williams
9. Stephen Trickett
10. Chris Marland
11. Charl Janse Van Rensburg
12. Gerhard Klooster
13. Shannon Murray
14. Mark Zunckel
15. Atham Raghunandan
16. Thobile (Unverified)
17. GSK (Unverified)
18. Donavan Henning

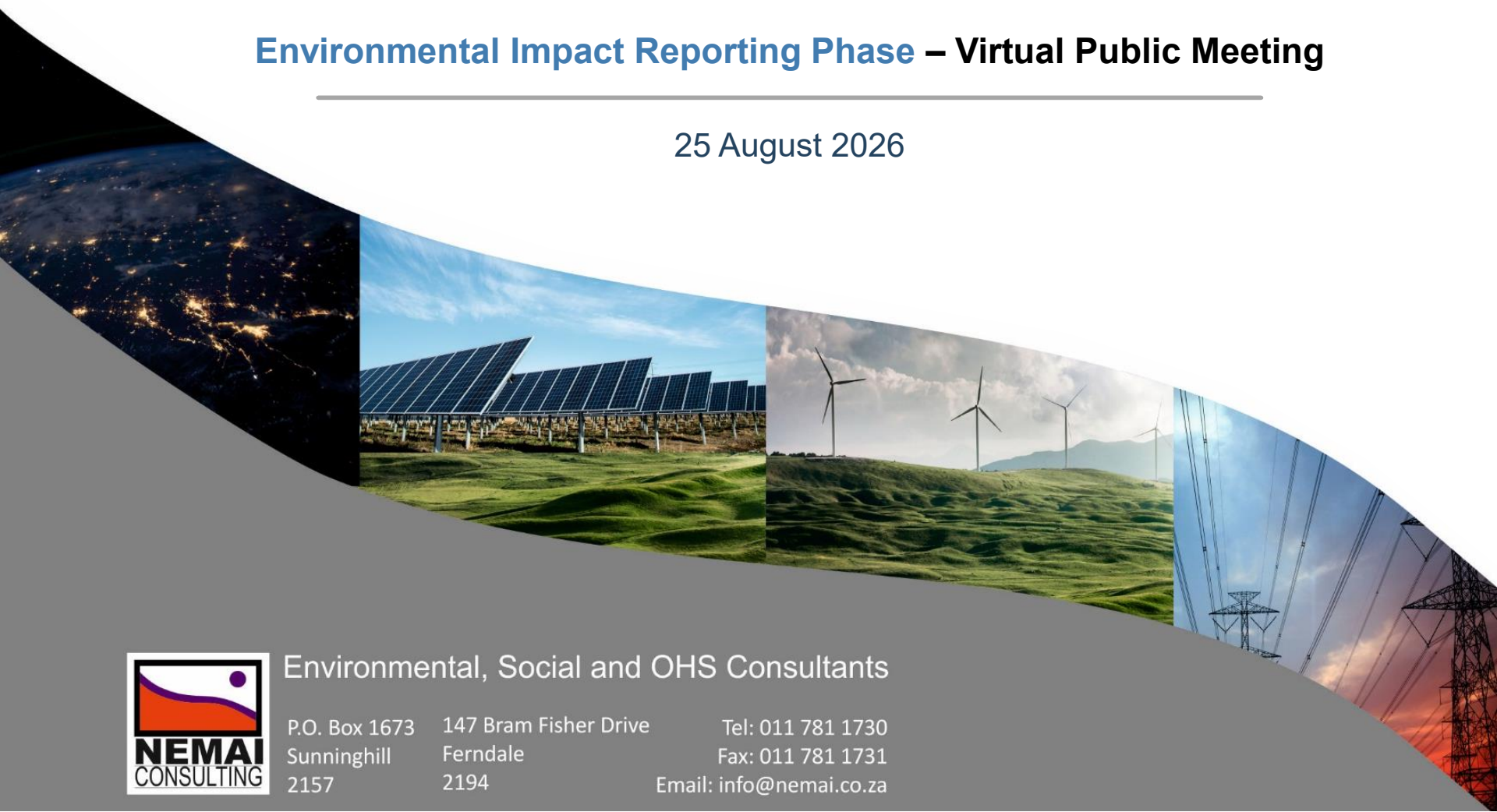
APPENDIX B

COPIES OF PRESENTATIONS

PROPOSED 750MW COMBINED CYCLE GAS TURBINE POWER PLANT IN RICHARDS BAY, KWAZULU-NATAL

Environmental Impact Reporting Phase – Virtual Public Meeting

25 August 2026



Environmental, Social and OHS Consultants

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(1) AGENDA

1	OPENING & WELCOME
2	ATTENDANCE
3	PURPOSE OF THE MEETING
4	MEETING NOTES
5	PRESENTATIONS
5.1	Project Background & Motivation
5.2	Project Description
5.3	Overview of Draft EIA Report
5.4	Climate Change Impact Assessment
5.5	Air Quality Impact Assessment
6	DISCUSSION
7	WAY FORWARD
8	CLOSE

(2) ATTENDANCE - PROJECT

Applicant	Mabasa Energy and Fuels
Technical Team	PDEX
Environmental Assessment Practitioner	Nemai Consulting
Climate Change Specialist	Promethium Carbon
Air Quality Specialist	uMoya-NILU Consulting

(3) PURPOSE OF THE MEETING

- This meeting forms part of the EIA's Public Participation Process for the **Environmental Impact Reporting Phase**.

- Aims of meeting:
  - To provide an overview of the proposed Project.
  - To present that status of the EIA Process.
  - To provide an overview of the draft EIA Report.
  - To provide an overview of the Climate Change and Air Quality Impact Assessments.
  - To allow stakeholders to raise questions and to provide a platform for project-related discussions.

(4) MEETING NOTES



Meeting is being recorded.



Request for questions to be raised after presentations.



Address project team through facilitator.



Raise your virtual hand to ask a question / provide a comment.



Please mute your microphone unless if you're asking a question.



Meeting ending time.

(5.1) PROJECT BACKGROUND & MOTIVATION

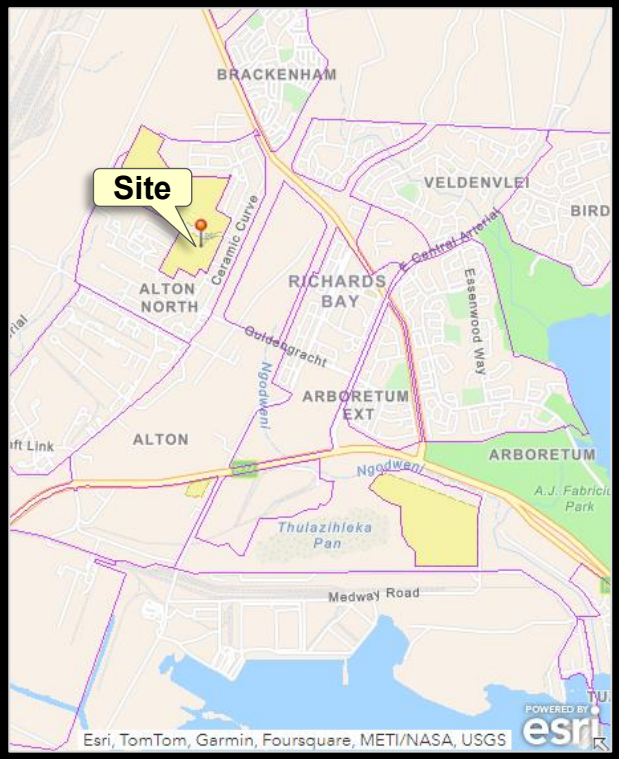
PDEX
Project Development and Execution

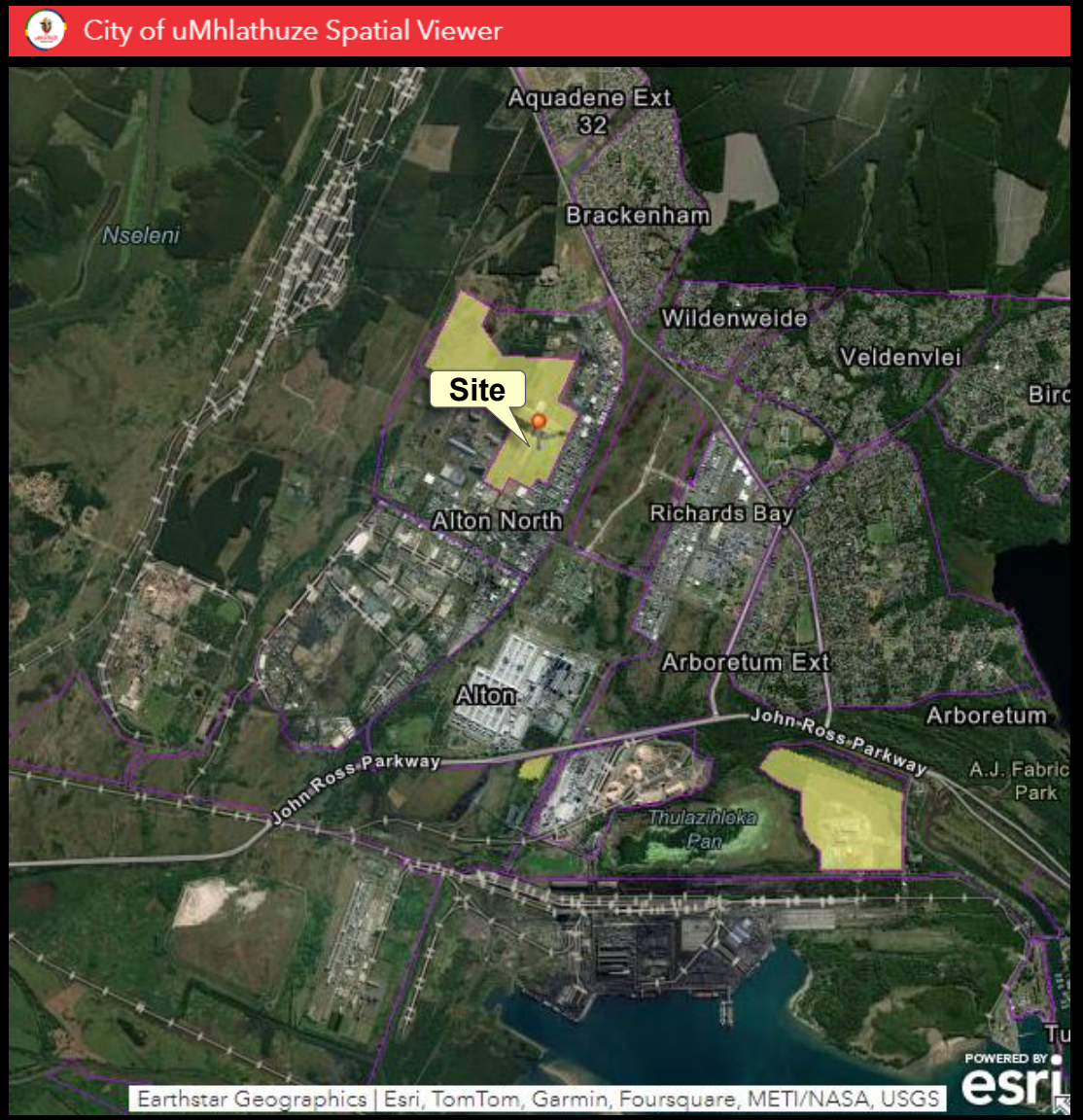
(5.2) PROJECT DESCRIPTION

(5.3) OVERVIEW OF DRAFT EIA REPORT

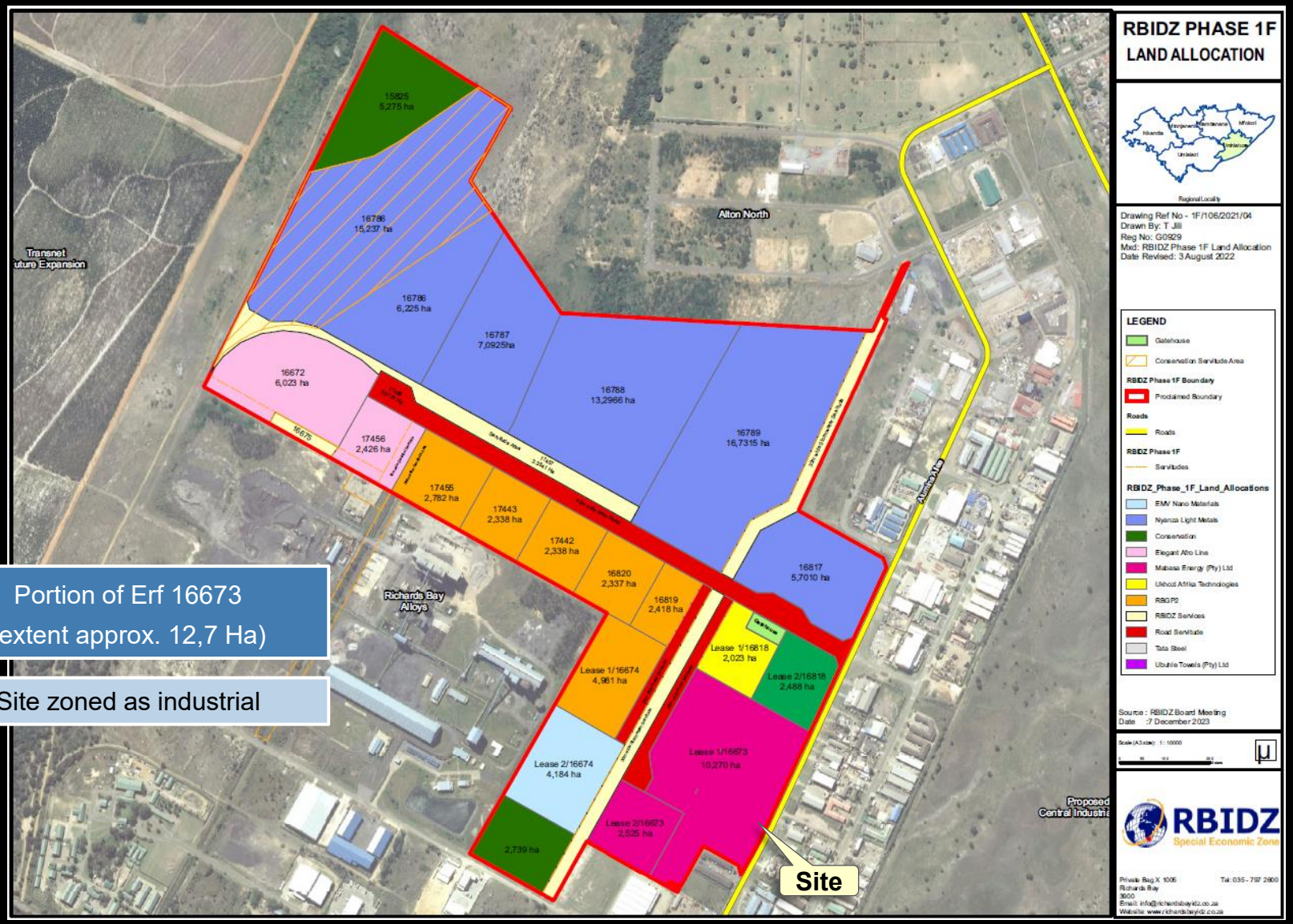
SITE LOCATION







SITE LOCATION



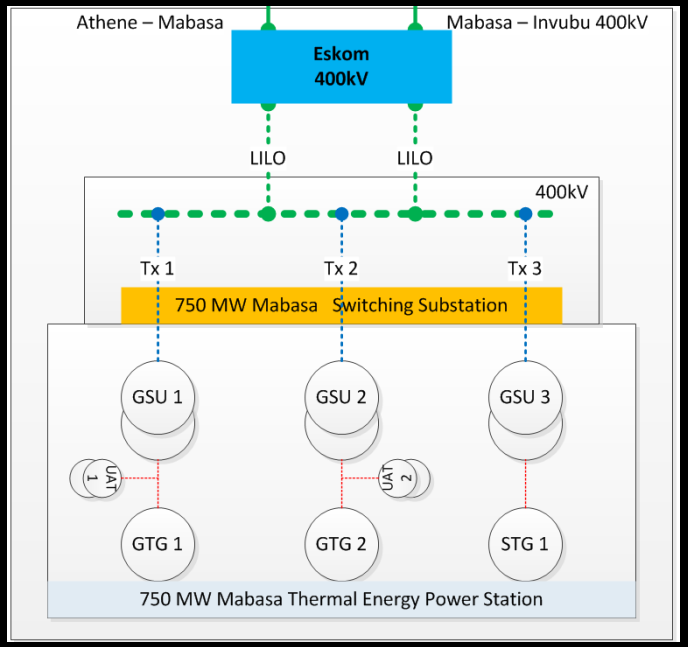
Portion of Erf 16673
(extent approx. 12,7 Ha)

Site zoned as industrial

Scope

The EIA covers the proposed power plant.
The associated natural gas pipeline and grid connection are excluded





Site Views



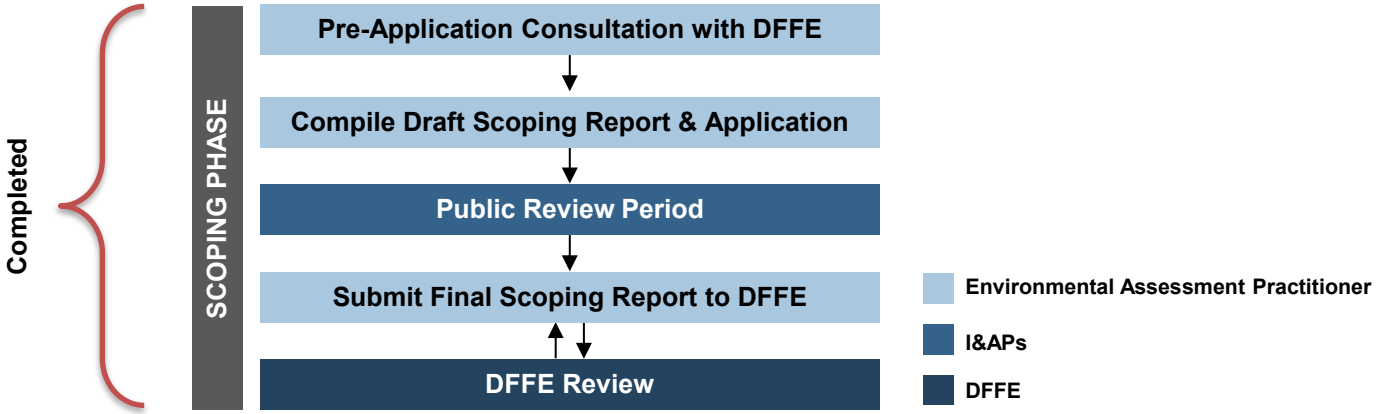






Overview of Draft EIA Report

Status of EIA Process

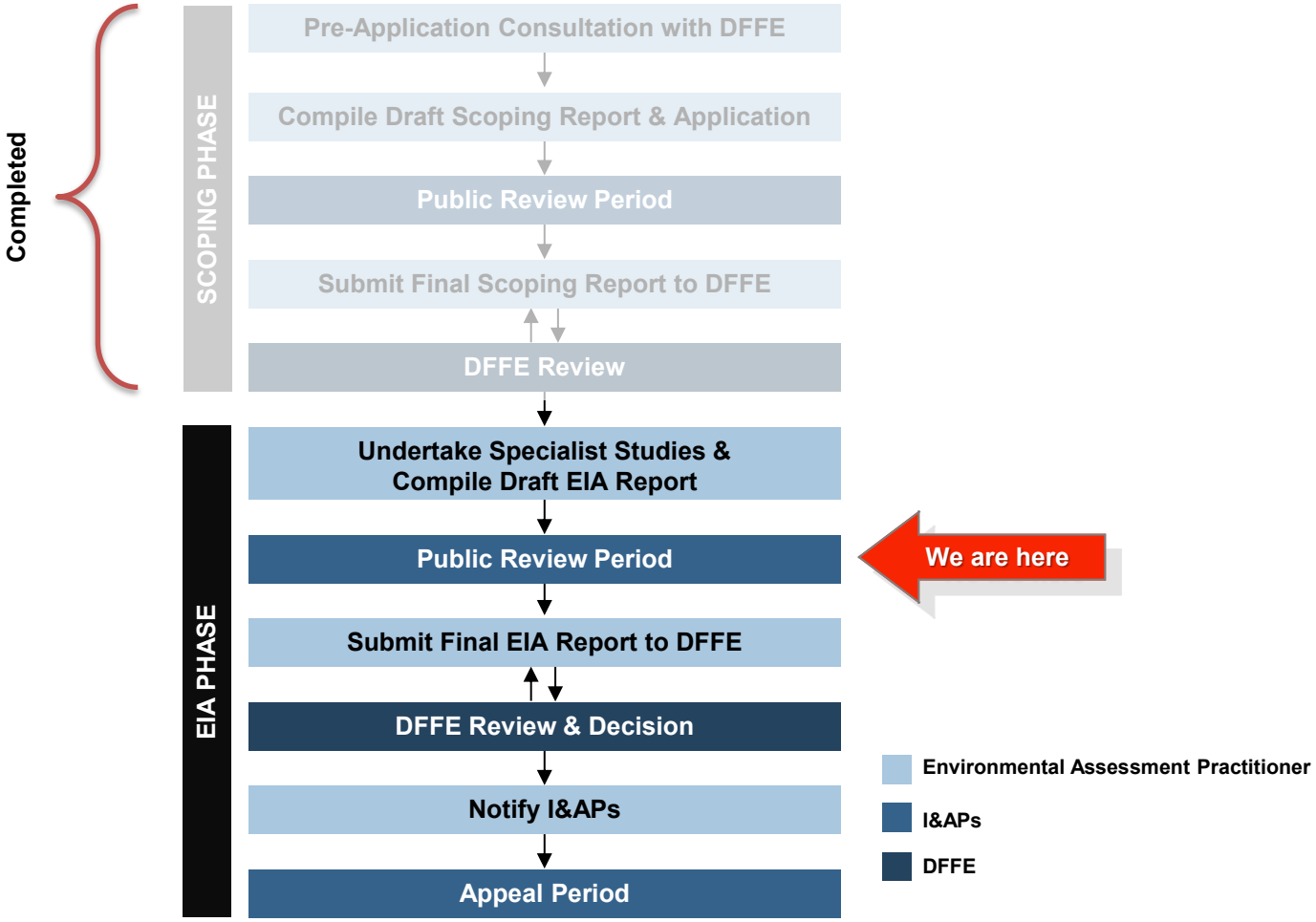


Scoping Phase aims:

- ❑ Undertake public participation to determine concerns
- ❑ Prioritise environmental issues and impacts
- ❑ Identify relevant specialist studies and develop ToR
- ❑ Determine scope of ensuing EIA phase

Overview of Draft EIA Report

Status of EIA Process



Overview of Draft EIA Report



https://nemai.co.za/downloads/

Draft Environmental Impact Assessment Report

- Appendix A Maps and Technical Drawings
- Appendix B DFFE Acceptance of Scoping Report and Plan of Study
- Appendix C Oath of EAP
- Appendix D RBIDZ Letter Regarding the Availability of Services
- Appendix E1 Climate Change Impact Assessment
- Appendix E2 Air Quality Impact Assessment
- Appendix E3 Freshwater Ecosystem Assessment
- Appendix E4 Terrestrial Biodiversity Assessment
- Appendix E5 Floral Assessment
- Appendix E6 Faunal Assessment
- Appendix E7 Hydrology Assessment
- Appendix E8 Noise Impact Assessment
- Appendix E9 Visual Resource Compliance Statement
- Appendix E10 Community Health Impact Assessment
- Appendix E11 Socio-Economic Impact Assessment
- Appendix E12 Social Impact Assessment
- Appendix E13 Quantitative Risk Assessment
- Appendix E14 Agricultural Agro-Ecosystem Assessment
- Appendix E15 Desktop Palaeontology Impact Assessment
- Appendix E16 Geotechnical Assessment
- Appendix E17 Declarations of Specialists
- Appendix F Traffic Impact Assessment for Phase 1F RBIDZ
- Appendix G Application for HIA Exemption and No Objection Letter
- Appendix H Database of Authorities, Stakeholders and I&APs
- Appendix I EMPr
- Appendix J Curricula Vitae of EAP
- Appendix K Comments and Responses Report
- Appendix L Comment Sheet

Overview of Draft EIA Report



KEY SECTIONS OF THE EIA REPORT

- PROJECT BACKGROUND AND MOTIVATION
- PROJECT DESCRIPTION
- LEGISLATION AND GUIDELINES CONSIDERED
- SCOPING AND EIA PROCESS
- NEED AND DESIRABILITY
- PROFILE OF THE RECEIVING ENVIRONMENT
- SUMMARY OF SPECIALIST STUDIES
- IMPACT ASSESSMENT
- ANALYSIS OF ALTERNATIVES
- PUBLIC PARTICIPATION
- CONCLUSIONS & RECOMMENDATIONS

Overview of Draft EIA Report

Environmental Legal Framework

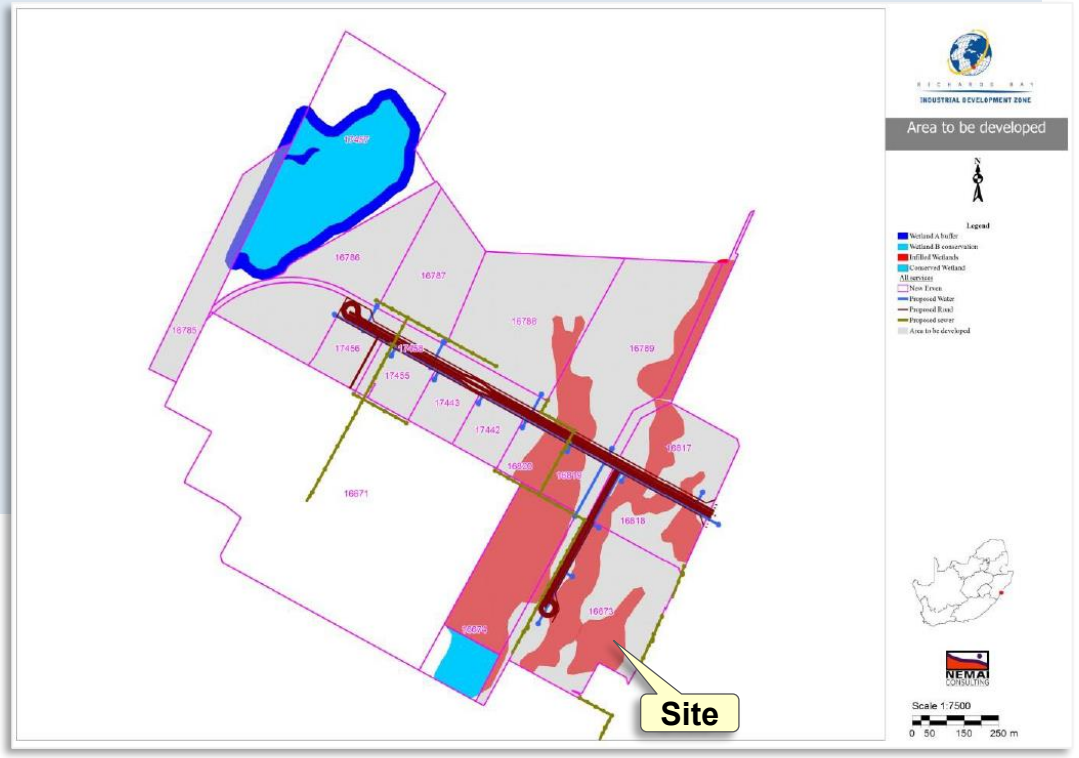
Constitution of the Republic of South Africa, 1996

- ☑ **National Environmental Management Act (Act No. 107 of 1998)**
  - ☑ **EIA Regulations (as amended):**
    - ✓ Listing Notice 1
    - ✓ Listing Notice 2
    - ✓ Listing Notice 3
- ☑ **National Water Act (Act No. 36 of 1998)**
- ☑ **National Environmental Management: Air Quality Act (Act No. 39 of 2004)**
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Environmental Management: Waste Act (Act No. 59 of 2008)
- National Heritage Resources Act (Act No. 25 of 1999)
- Occupational Health & Safety Act (Act No. 85 of 1993)
- KZN Nature Conservation Management Act (Act No. 09 of 1997)
- KZN Heritage Act (Act No. 04 of 2008)
- Major Hazard Installation Regulations, 2023
- *Other…*

Overview of Draft EIA Report

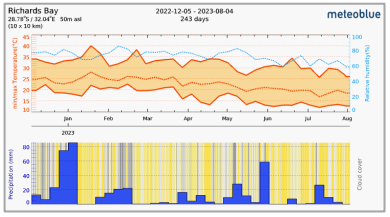
Environmental Legal Framework

- Environmental Authorisation was granted for RBIDZ Phase 1F in Sept 2016 (DFFE ref. no.: 14/12/16/3/3/2/665), which caters for the following:
  - Water infrastructure
  - Sewer infrastructure
  - Stormwater infrastructure
  - Roads
  - Electrical services
  - Infill of wetlands (to enable development of site for industrial purposes)
  - Clearing of indigenous vegetation

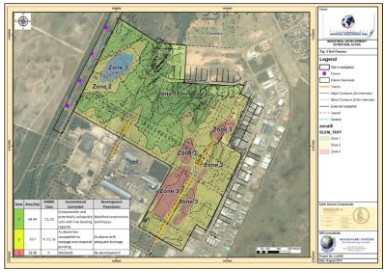


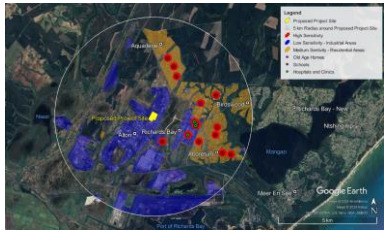
Overview of Draft EIA Report

Profile of the Receiving Environment

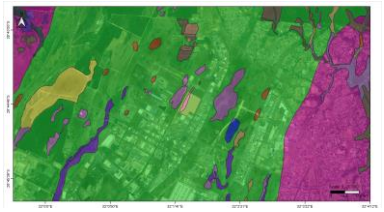


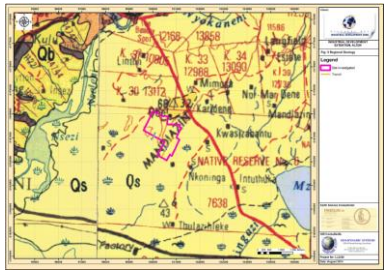




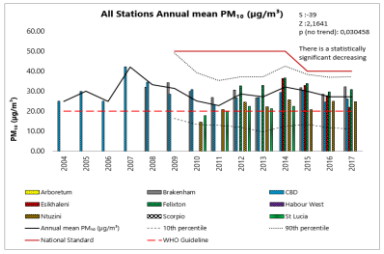


- Land Use & Land Cover
- Climate
- Geology and Soil
- Hydrogeology
- Topography
- Surface Water
- Estuarine Environment
- Terrestrial Biodiversity
- Socio-Economic Environment
- Air Quality
- Visual Quality
- Noise and Vibration
- Agriculture
- Planning
- Waste
- Transportation
- Heritage and Palaeontology
- Existing Structures and Infrastructure
- Health







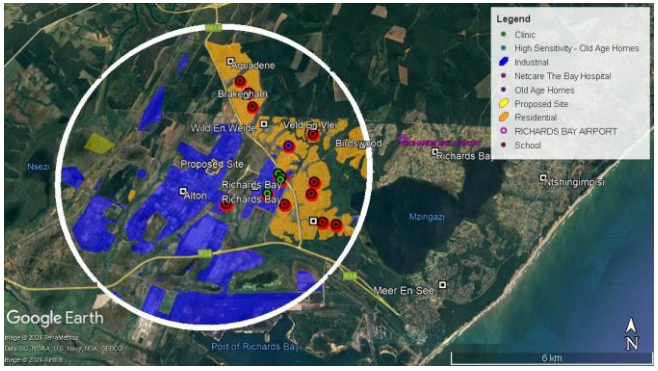


Overview of Draft EIA Report

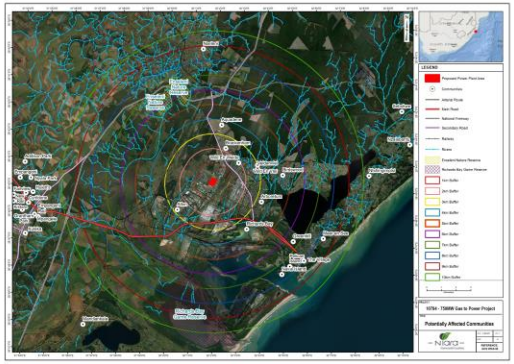
Profile of the Receiving Environment

Sensitive Environmental Features

- **Surface water** – stormwater canal, wetlands, flood risk.
- **Groundwater** – coastal aquifer with shallow groundwater.
- **Geotechnical** constraints.
- **Terrestrial biodiversity** – portions of site retain moderate ecological value.
- Ambient **air quality** – sensitive receptors and cumulative emissions from numerous industries.
- **Climate** – project vulnerability.
- **Visual** environment – sensitive receptors.
- **Noise** environment – sensitive receptors.
- Richards Bay **Estuary** – ± 2.6 km to the south.
- **Socio-economic** environment – sensitive receptors.
- Existing **services and infrastructure**.







Overview of Draft EIA Report

Specialist Studies

1. Climate Change Impact Assessment
2. Air Quality Impact Assessment
3. Freshwater Ecosystem Assessment
4. Terrestrial Biodiversity Assessment
5. Floral & Faunal Assessments
6. Visual Resource Compliance Statement
7. Hydrology Assessment
8. Noise Impact Assessment
9. Geotechnical Assessment
10. Desktop Palaeontology Impact Assessment
11. Agricultural Agro-Ecosystem Assessment
12. Health Impact Assessment
13. Socio-Economic Impact Assessment;
14. Social Impact Assessment
15. Quantitative Risk Assessment
16. Traffic Impact Assessment





Overview of Draft EIA Report

Specialist Studies

1. **Climate Change Impact Assessment**
2. **Air Quality Impact Assessment**
3. Freshwater Ecosystem Assessment
4. Terrestrial Biodiversity Assessment
5. Floral (Plant Species) Assessment
6. Faunal (Animal Species) Assessment
7. Visual Resource Compliance Statement
8. Hydrology Assessment
9. Noise Impact Assessment
10. Geotechnical Assessment
11. Desktop Palaeontology Impact Assessment
12. Agricultural Agro-Ecosystem Assessment
13. Health Impact Assessment
14. Socio-Economic Impact Assessment;
15. Social Impact Assessment
16. Quantitative Risk Assessment





PROMETHIUM CARBON

(5.4) CLIMATE CHANGE IMPACT ASSESSMENT

(5.5) AIR QUALITY IMPACT ASSESSMENT

Overview of Draft EIA Report

Impact Assessment

Identification of Impacts

- Impacts associated with **listed activities** contained in the EIA Regulations' Listing Notices.
- Impacts identified during the **Scoping** phase.
- An appraisal of the Project's **activities and proposed infrastructure**.
- An assessment of the **receiving biophysical, social, economic and built environments**.
- Findings from **specialist studies**.
- Issues highlighted by **environmental authorities**.
- Comments received during public participation from **I&APs**.

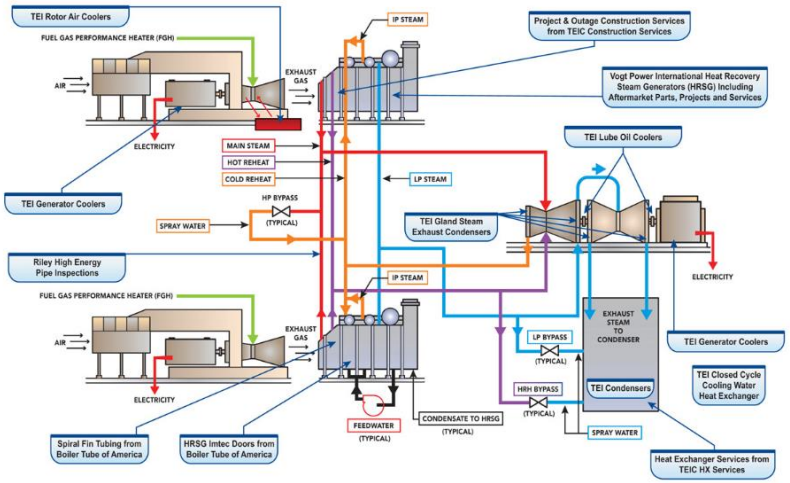
Overview of Draft EIA Report

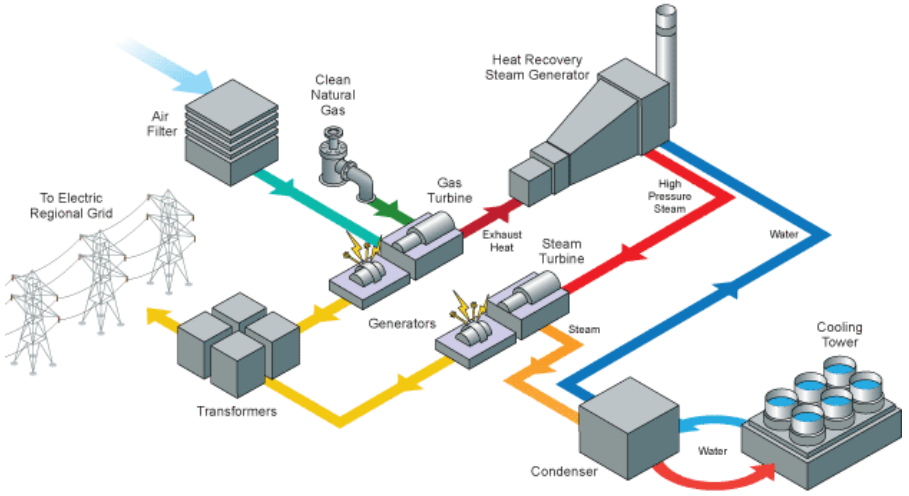
Impact Assessment

Assessment of Impacts

Pre-Construction → Construction → Operation

Activities

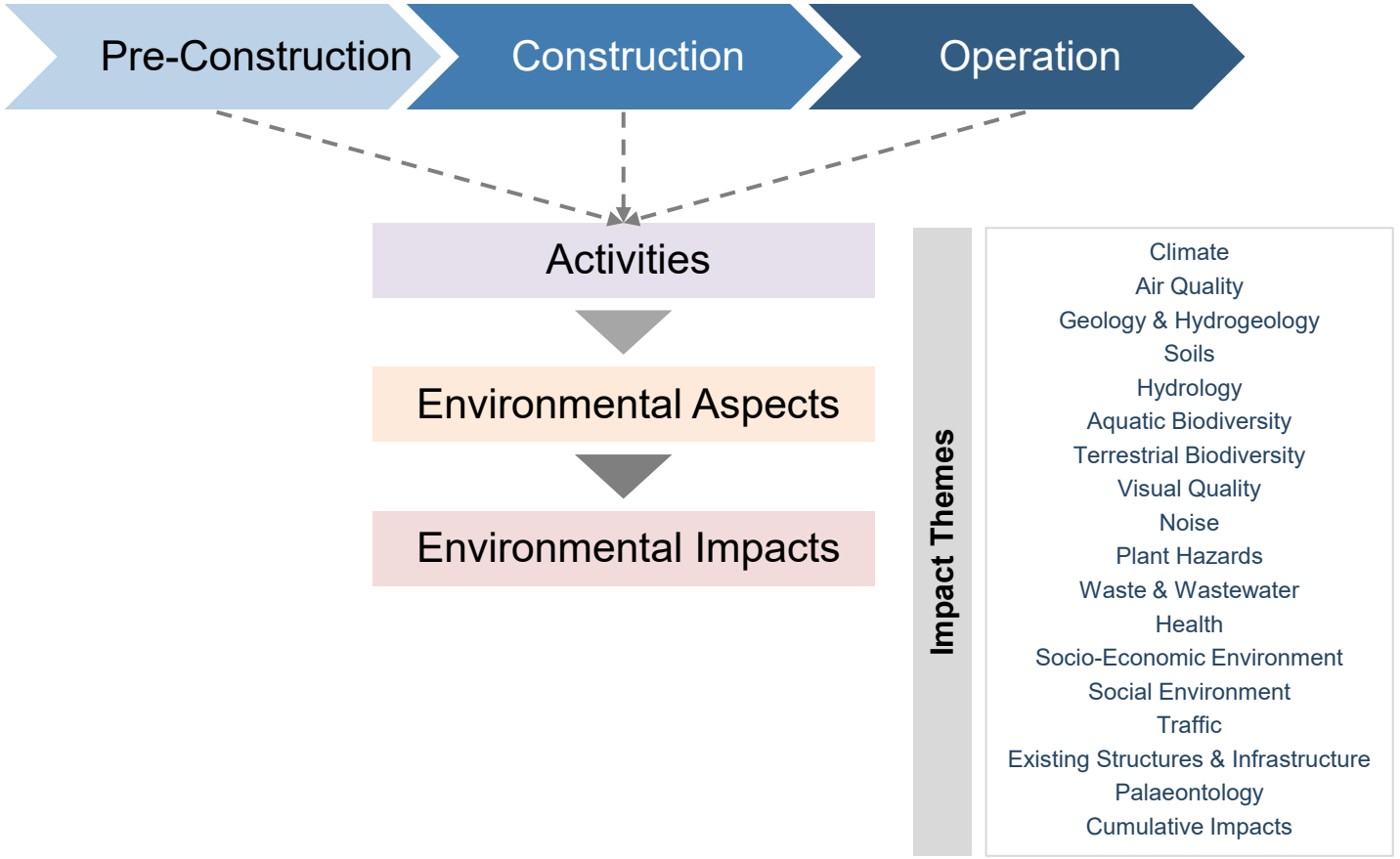




Overview of Draft EIA Report

Impact Assessment

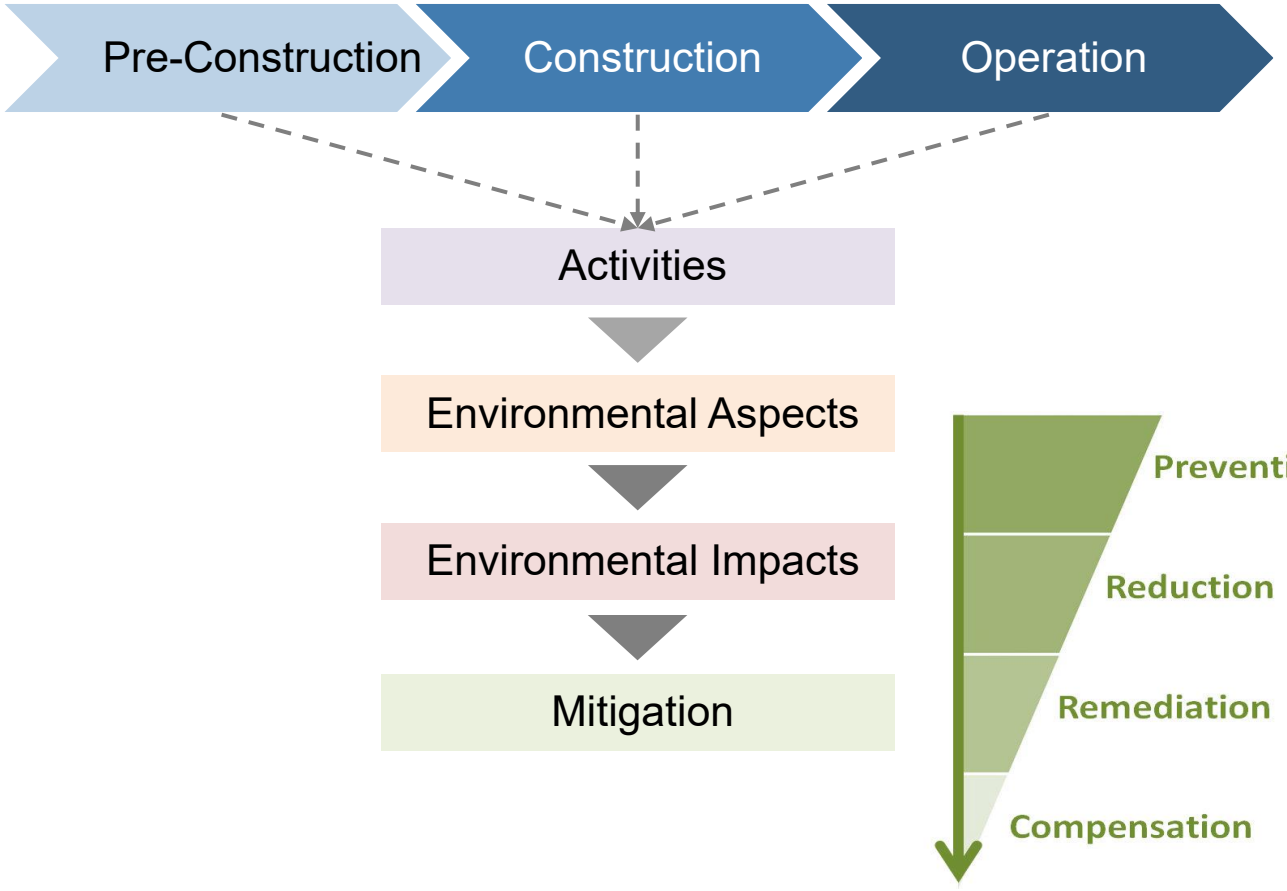
Assessment of Impacts



Overview of Draft EIA Report

Impact Assessment

Assessment of Impacts



Overview of Draft EIA Report

Impact Assessment

Key Operational Risks

- GHG emissions and climate-related risks.
- Incremental air emissions and cumulative air-quality impacts.
- Water demand.
- Flood risks.
- Stormwater and groundwater risk.
- Hazardous materials, fire, explosion and major-hazard risks.
- Noise from operation of plant.
- Waste and wastewater risks.
- OHS hazards.

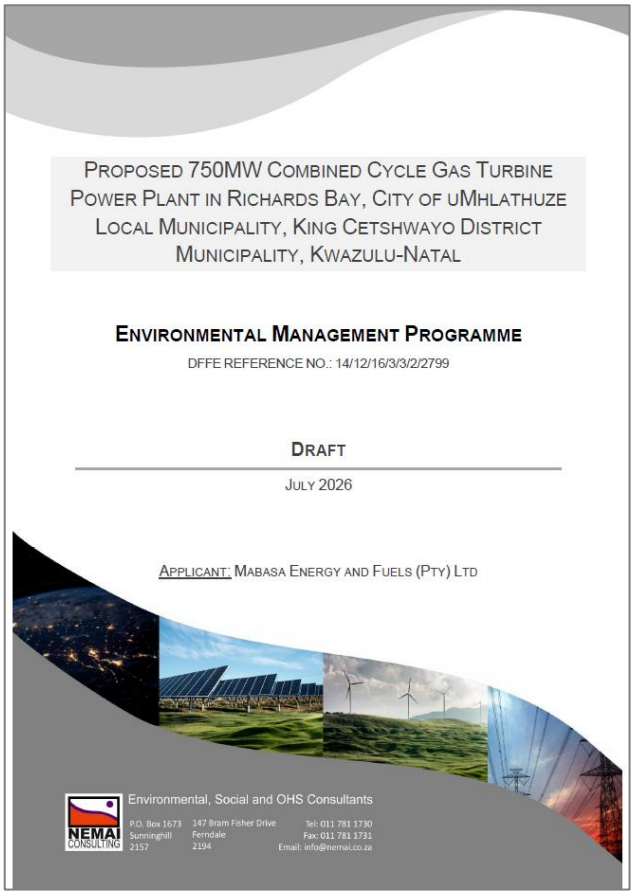
Key Management Measures

- Climate-resilient infrastructure measures.
- GHG emissions monitoring and reporting.
- AEL management requirements, including monitoring and reporting.
- Flood modelling and Stormwater Management Plan during detail design.
- Monitor groundwater up- and down-gradient.
- Complete process hazard analysis and MHI Risk Assessment.
- Noise attenuation measures into the final plant design.
- Comprehensive OHS System.

Residual impacts require design controls, legal compliance, monitoring and adaptive management.

Overview of Draft EIA Report

Impact Management



Environmental Management Programme

Roles & Responsibilities

Monitoring

- ❑ Baseline Monitoring
- ❑ General
- ❑ Pre-Construction Survey
- ❑ Environmental Monitoring
- ❑ Compliance Monitoring and Auditing

Environmental Training & Awareness Creation

EMPr Review

Environmental Activities, Aspects & Impacts

Sensitive Environmental Features

Impact Management

Pre-Construction & Construction Phases

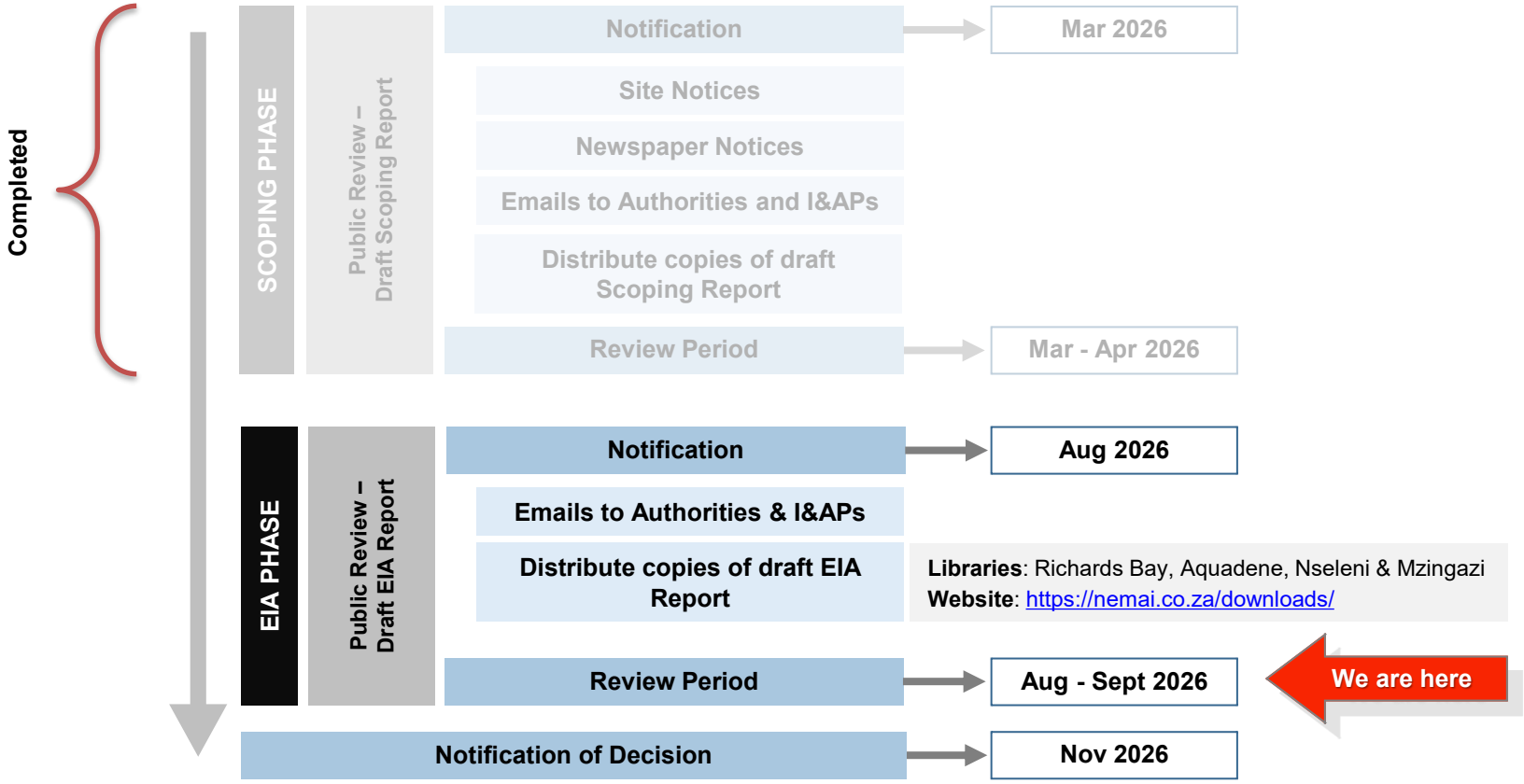
- ❑ Administration & Compliance
- ❑ Stakeholder Communication & Awareness
- ❑ Site Establishment & Security
- ❑ Traffic, Access & Infrastructure
- ❑ Water, Soil & Pollution Prevention
- ❑ Materials, Waste & Equipment
- ❑ Biodiversity, Heritage & Visual
- ❑ Health, Safety & Emergency Preparedness

Operational Phase

- ❑ Climate Change
- ❑ Air Quality
- ❑ Plant Hazards & OHS
- ❑ Water
- ❑ Waste & Wastewater
- ❑ Terrestrial Biodiversity
- ❑ Access and Traffic
- ❑ Socio-Economic Impacts

Overview of Draft EIA Report

Public Participation



Written comments on the draft EIA Report are due by 7 September 2026

(6) DISCUSSIONS

(7) WAY FORWARD & CLOSE

Thank you



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750MW Gas-to-Power Plant

Mabasa Energy and Fuels (Pty) Ltd

Project Description and Motivation

August 2026

CONFIDENTIAL

Project Description

Proposed 750-Megawatt Combined Cycle Gas Turbine Power Plant right here in Richards Bay, located in Alton North within Phase 1F of the Industrial Development Zone.

We are proposing a state-of-the-art power plant that uses natural gas to generate electricity. The facility will be designed as a "combined cycle" plant. This means it uses two gas turbines to generate power, but it also captures the exhaust heat that would normally be wasted, through Heat Recovery Steam Generators. This recovered heat is then used to create steam, which drives a separate steam turbine to generate even more electricity. This technology makes the plant highly efficient, lowers gas consumption, and significantly reduces emissions compared to traditional power generation.

Project Motivation

This project is about energy security. Following the country's Integrated Resource Plan, there is a clear national need to procure new generation capacity from gas to ensure a reliable energy supply. This facility is designed for base-load operations, meaning it can run 24 hours a day, seven days a week to continuously support the grid.

But beyond supporting the national grid, this project is fundamentally about our local community. By transitioning to liquefied natural gas, we are supporting a broader shift toward cleaner fuels.

Project Benefits

We also anticipate a significant boost to the local economy. The project is estimated to create over 500 jobs during the construction phase, and roughly 50 permanent jobs once the plant is operational. Our commitment goes beyond just hiring; we are dedicated to hands-on training; skills transfer for local personnel and providing opportunities for local suppliers and small businesses.

We chose the Richards Bay Industrial Development Zone because it is a purpose-built estate designed to attract investment and cluster manufacturing businesses. We want this power plant to be a catalyst for further local growth.

Closing Remarks

We are currently undertaking a rigorous Environmental Impact Assessment process to thoroughly investigate all potential impacts. Your feedback today is a crucial part of making sure we do this right, safely, and in a way that benefits everyone.

Thank you, and I look forward to hearing your thoughts and answering your questions.

Thank You

PROPOSED 750 MW COMBINED CYCLE GAS TURBINE POWER PLANT

Richards Bay IDZ, City of uMhlathuze Local Municipality, KwaZulu-Natal

PROJECT DESCRIPTION

Public meetings on the Draft EIA Report
25, 26 and 27 August 2026

Presented on behalf of Mabasa Energy and Fuels (Pty) Ltd by
PDEX Consulting (Pty) Ltd, Owner's Engineer



Agenda

1. Project overview
2. How a combined cycle gas turbine plant works
3. Operating modes
4. Fuel supply: natural gas
5. Inputs, outputs and emissions
6. Water use and wastewater
7. Electrical system and grid connection
8. Site layout and plant arrangement
9. Fire protection and safety
10. Hazardous materials on site
11. Construction phase
12. Questions

1. Project overview

750 MW

Nominal output to the grid

Combined cycle, base load, 24/7 or as required by the system operator

Gas

Fuel

Natural gas (mainly methane) from the planned Zululand Energy Terminal at the Port of Richards Bay

2 + 2 + 1

Configuration

Two gas turbines, two heat recovery steam generators and one steam turbine

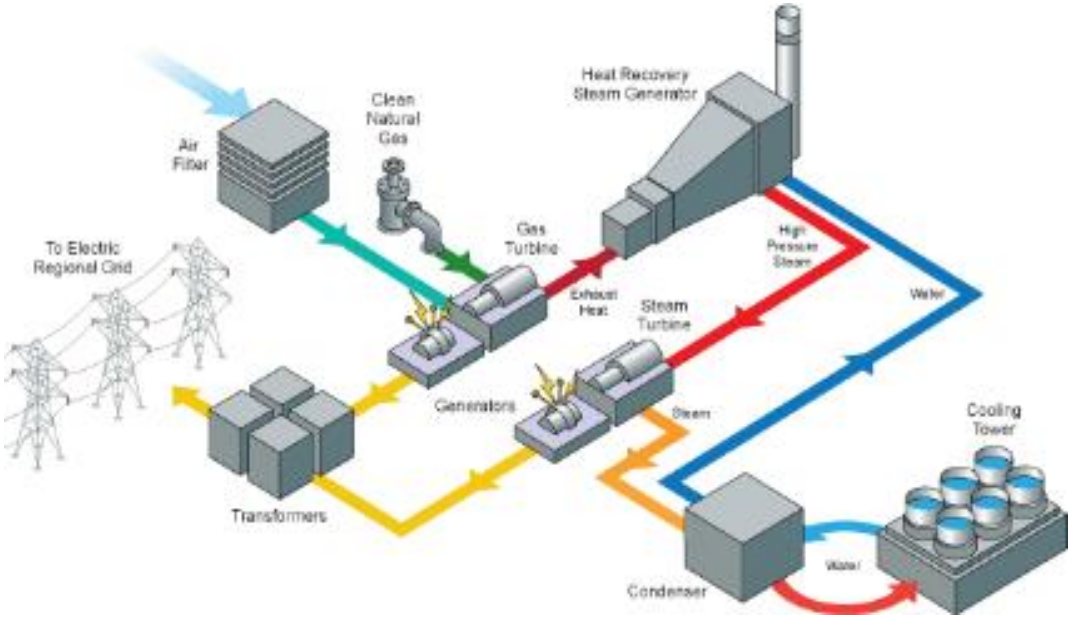
12.7 ha

Site

Erf 16673, Phase 1F of the Richards Bay IDZ. Land leased from the RBIDZ

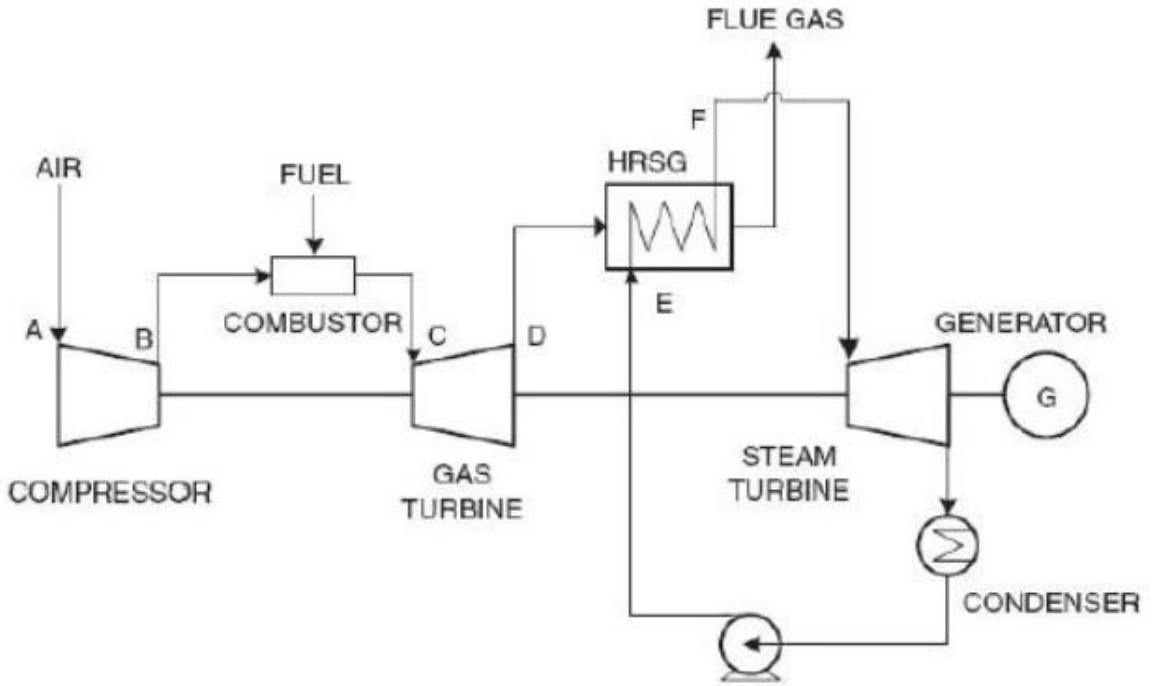
Main plant equipment

- Two heavy duty Class F gas turbines with generators and dry low NOx burners
- Two triple pressure, reheat heat recovery steam generators (HRSGs)
- One condensing steam turbine with generator and surface condenser
- Cooling: induced draft cooling tower, or air cooled condenser (to be decided)
- Balance of plant: pumps, heat exchangers, tanks, water treatment, transformers
- One integrated distributed control system (DCS)
- 400 kV switchyard with three 15/400 kV step up transformers and two station transformers
- Offices, control room, workshop, warehouse and stores



Typical combined cycle generation process

2. How a combined cycle gas turbine plant works



Schematic of a combined cycle power plant

Why combined cycle

- Net efficiency of about 58 percent, compared with about 40 percent in simple cycle
- Less gas burned and lower CO_2 per unit of electricity
- Proven technology in use worldwide, flexible and reliable

1

Air and gas

Filtered ambient air is compressed and natural gas is burned in the gas turbine combustor.

2

Gas turbine

Hot gas expands through the turbine and drives the first generator (about 250 MW each).

3

Heat recovery

Exhaust gas at about 600 °C passes through the HRSG, which raises steam instead of wasting the heat.

4

Steam turbine

Steam drives the steam turbine and third generator (about 250 MW), then condenses and returns to the HRSG.

5

Stack

Cooled exhaust leaves the main stack at about 100 °C. Each gas turbine also has a bypass stack for simple cycle operation.

3. Operating modes

Combined cycle (normal operation)

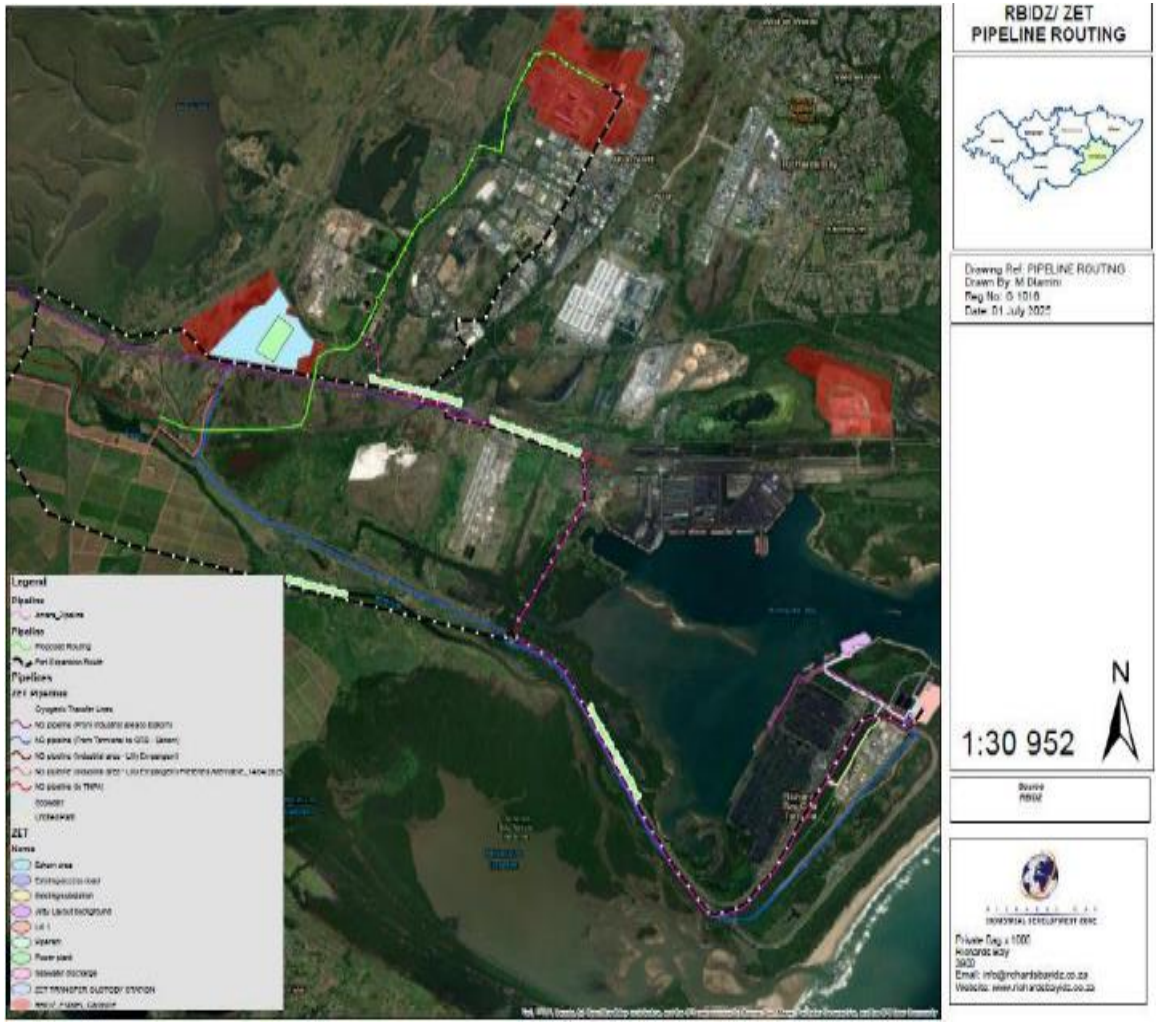
- Exhaust heat from the gas turbines raises steam for the steam turbine
- Bypass stacks closed, main HRSG stacks in use
- Net efficiency about 58 percent (LHV basis)
- Base load, continuous operation
- Nominal output 750 MW (range 750 to 870 MW depending on gas turbine model)
  - approximately 500 MW from the two gas turbines
  - approximately 250 MW from the steam turbine
- Main stacks approximately 65 m tall, exhaust at about 100 °C

Simple (open) cycle

- HRSGs bypassed, steam turbine not in operation
- Main stacks closed, bypass stacks in use
- Efficiency about 40 percent
- Used for fast start up and peaking (start in under 35 minutes)
- Nominal output 500 MW (range 500 to 600 MW)
  - 500 MW from the two gas turbines
  - 0 MW from the steam turbine
- Bypass stacks about 40 m tall, exhaust at about 620 °C

The plant is designed for base load operation in combined cycle. Every stack will be fitted with a continuous emissions monitoring system (CEMS).

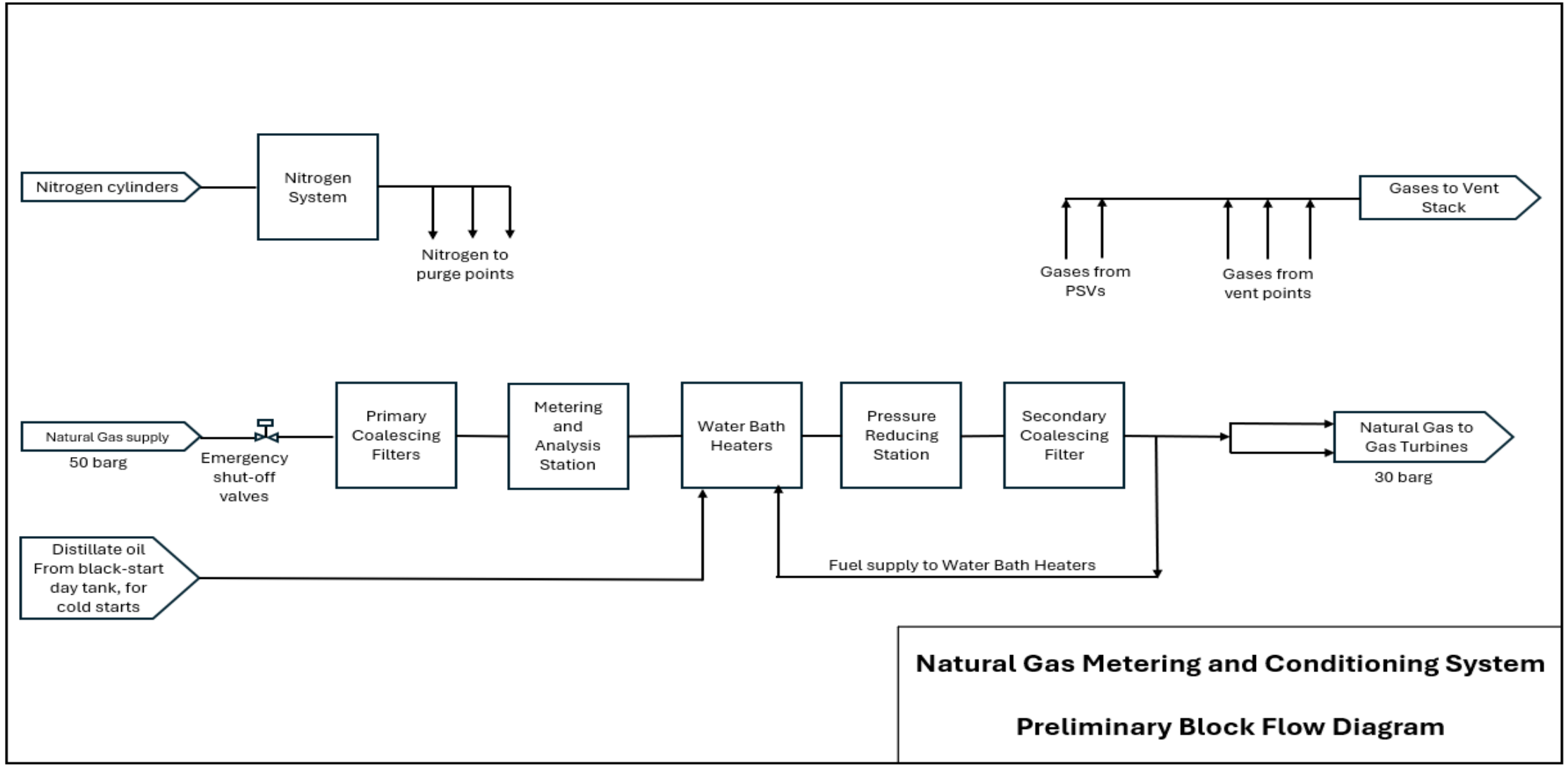
4. Fuel supply: natural gas



RBIDZ / ZET pipeline routing (source: RBIDZ, February 2026)

- Natural gas imported as LNG at the planned Zululand Energy Terminal (ZET) in the Port of Richards Bay, regasified and piped to the plant
- Consumption at full load about 120 tonnes per hour
- No natural gas storage on site: only the gas in the pipes and equipment (about 9 tonnes)
- Supply pressure about 50 bar, reduced on site to 30 to 35 bar in a metering and conditioning station (filters, meters, heaters, pressure reduction)
- Emergency shutdown valves at the site boundary, nitrogen purging and a safe vent stack
- Backup operation on diesel is only included as a worst case. It is unlikely to be implemented and would only be driven by commercial or grid requirements

4. Natural gas supply system



Natural gas metering and conditioning system: preliminary block flow diagram (PDEX, Rev A)

5. Inputs, outputs and emissions

Main inputs

- Natural gas by pipeline, about 120 t/h at full load
- Ambient air for combustion
- Water for the steam cycle, cooling and services
- Small quantities of consumables: water treatment chemicals, lubricating oil, hydrogen for generator cooling, nitrogen for purging, diesel for emergency equipment

Main outputs

- Electricity: 750 MW combined cycle, 500 MW simple cycle
- Exhaust gas: mainly nitrogen, water vapour, O_2 and CO_2
- Evaporation from cooling towers (wet cooled case)
- Wastewater from blowdown and water treatment, treated and monitored before discharge
- Noise

Estimated emissions at full load

Parameter	Water cooled	Dry cooled (ACC)	Unit
Net plant efficiency	56.5 %	55.8 %	
NOx (as NO_2) in exhaust	25	25	ppmv @ 15% O_2, dry
CO in exhaust	25	25	ppmv @ 15% O_2, dry
Unburned hydrocarbons	5	5	ppmv @ 15% O_2, dry
CO_2	340	345	kg/MWh
NOx (as NO_2)	0.27	0.275	kg/MWh
CO	0.17	0.17	kg/MWh
SOx (as SO_2)	0	0	kg/MWh

Stacks

	Bypass stack (simple cycle)	Main stack (combined cycle)
Height	40 ± 5 m	65 ± 5 m
Diameter	approx. 6.9 m	approx. 7.0 m
Exit temperature	approx. 620 °C	approx. 100 °C

6. Water use: wet cooling versus dry cooling

Wet cooled case (cooling tower), presented in the EIA

Water requirement	Per day
Potable water (offices, ablutions)	6 000 L
Demineralised water for the HRSGs	256 000 L
Service water	48 000 L
Cooling tower makeup (if this option is selected)	21 000 000 L

Cooling tower makeup is about 875 m³/h and would come from clarified water supplied by the RBIDZ, borehole or seawater source, not the potable network. Efficiency is about 1 percent better than dry cooling.

Dry cooled alternative (air cooled condenser)

- Cooling water makeup close to zero: total water need drops to about 310 000 L per day
- Far less wastewater (no cooling tower blowdown)
- Larger footprint, more fan noise and higher parasitic load
- Slightly lower output on hot days and about 1 percent lower efficiency
- Higher capital cost

Water supply and storage

- Potable water supplied by the RBIDZ. Demin plant feed and service water from RBIDZ potable supply (confirmed option), alternatively from bulk clarified water supplied by the RBIDZ, boreholes or a bulk source. Cooling tower makeup from bulk clarified water, or boreholes or a bulk source. Discussions with uMngeni-uThukela Water are ongoing
- Combined service and firewater tank with two days of storage; the firewater reserve is ring fenced at the bottom of the tank
- Demin plant: reverse osmosis with mixed bed ion exchange, two 100 percent trains, 550 m³ nitrogen blanketed demin tank

6. Wastewater, drainage and stormwater

Oily water

Floor drains, turbine wash and bunds around oil equipment drain to an oil water separator. Recovered oil is collected by a licensed contractor.

Chemical effluent

Demin plant regeneration water and RO brine go to a neutralising sump where the pH is corrected with acid or caustic.

Wastewater monitoring sump

Final point of capture. Continuously monitored for pH, dissolved solids and other parameters. Off spec water is held back and retreated.

Discharge

Measured and recorded before discharge to the RBIDZ sewer, in line with City of uMhlathuze requirements.

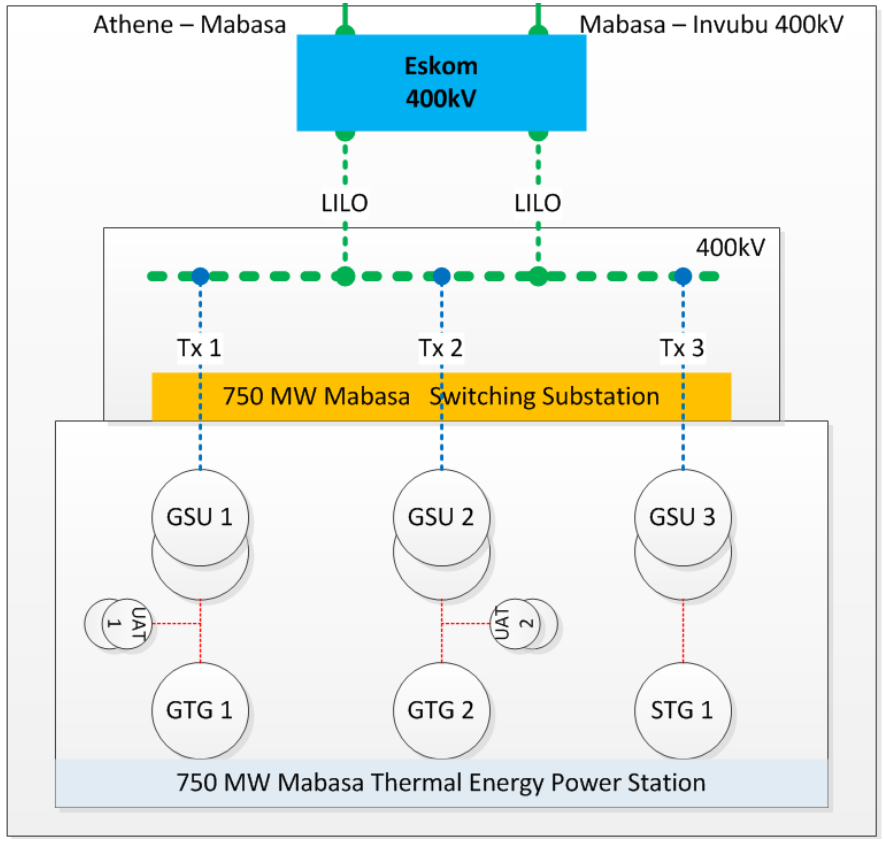
Stormwater and drainage

- Clean stormwater: open ditches or underground pipes, covered in operating areas, to the RBIDZ stormwater system
- Stormwater falling in bunded or potentially contaminated areas is routed to the oil water separator or neutralising sump
- The monitoring sump is sized to hold the first 10 minutes of a major downpour
- Domestic sewage to the RBIDZ sewer and municipal network

Main water system equipment

Item	Size
Service, fire and raw water tank	5 000 m³
Demin water plant	256 m³/day
Oily water separator	5 m³/h
Neutralisation sump	100 m³
Wastewater monitoring sump	100 m³

7. Electrical system and grid connection



Preliminary Eskom / Mabasa switching substation configuration





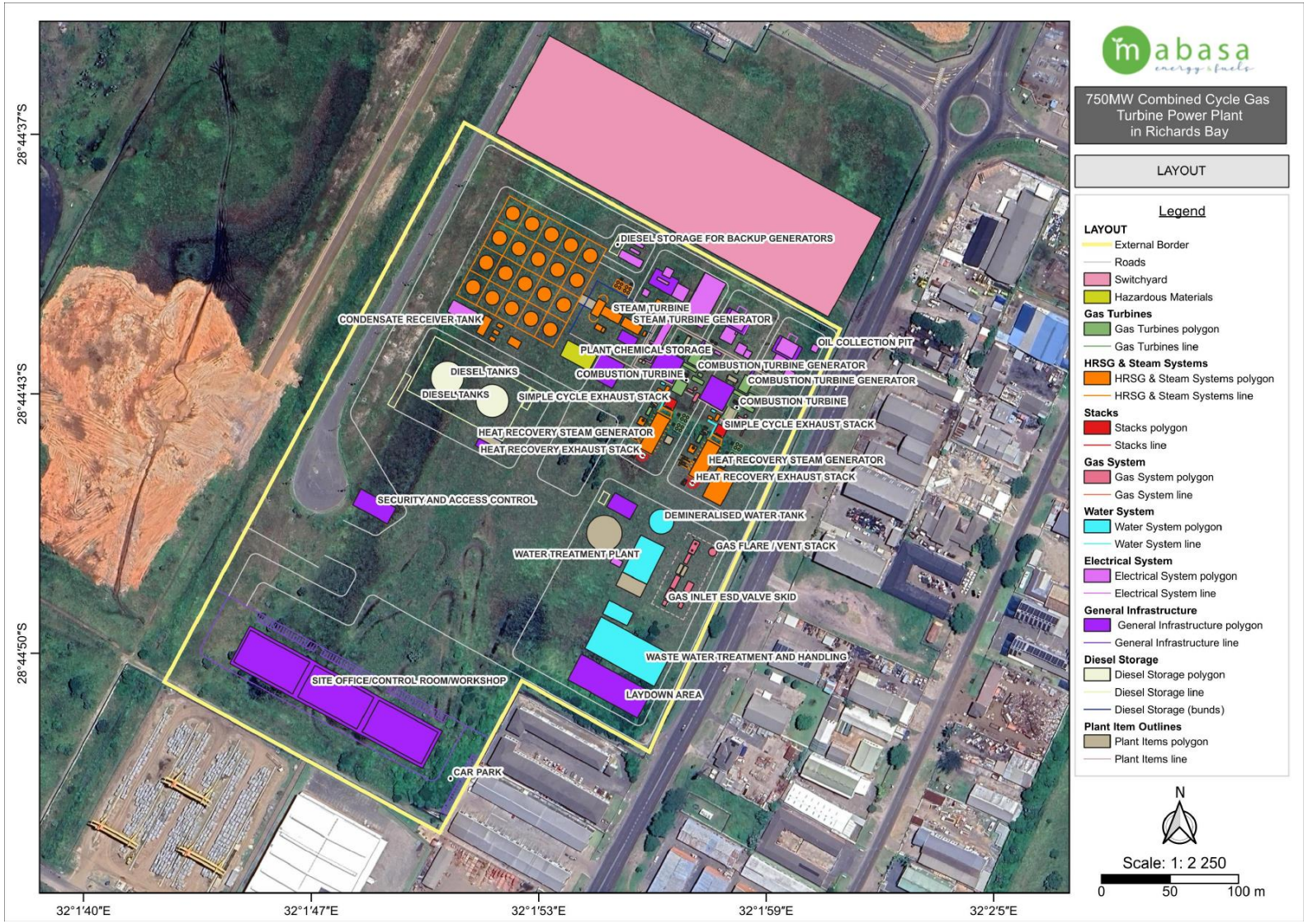
Plant electrical system

- Each generator connects to its own step-up transformer through isolated phase busduct
- Three oil filled generator step up transformers, 15 kV to 400 kV
- Two unit auxiliary transformers, 15 kV to 11 kV (or 6.6 / 3.3 kV), feeding plant motors and local substations
- Open air 400 kV switchyard: three transformer bays, busbars, circuit breakers, isolators, surge arrestors
- Eskom section with two 400 kV feeder bays and a control building
- Emergency diesel generators (about 1 MW) for safe shutdown if the grid is lost
- Provision for a black start generator (about 20 MW) if required by the Grid Code or PPA. Expected use: rarely, if ever

Connection to the Eskom transmission network (for information only)

- Loop in, loop out on the existing Eskom 400 kV network into a new switching station at the plant
- Overhead 400 kV double circuit line needs a servitude of at least 55 m; an underground cable needs at least 12 m
- The grid connection is subject to Eskom requirements and a separate authorisation process

8. Site layout



Key features

- Erf 16673, Phase 1F of the RBIDZ, about 12.7 ha, 40 to 43 m above sea level
- Access via Alumina Allee Road and the existing tarred estate road
- Power block (gas turbines, HRSGs, steam turbine hall) in the centre of the site
- 400 kV switchyard along the north eastern boundary , containing both the Eskom Switching Station and the Mabasa Substation
- Water treatment, wastewater handling and gas inlet skid to the south east
- Offices, control room, workshop, car park and laydown area along the south west
- Chemical storage and diesel day tanks bunded, close to the power block
- Bulk services (water, sewer, stormwater, roads, electricity) available at the site boundary from the RBIDZ

8. Plant arrangement and buildings



Arrangement principles

- Compact footprint with good access for operation, maintenance and cranes
- Steam turbine in a building (turbine hall) with workshop, laboratory, stores and staff facilities
- Electrical switchgear and control room in buildings; other major equipment outdoors
- Main office, control building, warehouse, workshop, firewater pump house and guard house
- Roads and laydown areas designed for heavy vehicles and mobile cranes
- Perimeter fencing, lighting and security, with a separate fence around the HV switchyard
- Bunded storage for oils, fuels and chemicals, all draining to the oily water or neutralisation systems
- Sufficient space for either the cooling tower or the air cooled condenser option

9. Fire protection and safety

1 Codes and standards

NFPA 850 and related NFPA standards, SANS codes, OHS Act (Act 85 of 1993), Major Hazard Installation Regulations and municipal fire by-laws. Site specific fire risk assessment during detailed design.

2 Detection and alarm

Addressable fire detection with heat, smoke and flame detectors, hydrocarbon gas detectors in the gas conditioning area and turbine enclosures. Confirmed detection isolates the fuel and releases suppression automatically.

3 Firewater supply

Dedicated 720 m³ firewater reserve ring fenced in the 5 000 m³ tank: two hours at the maximum demand of about 6 000 L/min. Electric and diesel driven 100 percent fire pumps plus a jockey pump. Underground ring main with hydrants, hose reels and monitors.

4 Fixed suppression

Water spray (deluge) on transformers, CO_2 total flooding in gas turbine and generator enclosures, sprinklers in offices and occupied buildings.

5 Diesel storage

Foam pourers on tanks and bunds, tank shell cooling rings, bunds sized at 110 percent of the largest tank, overfill protection, earthing and lightning protection.

6 Emergency facilities

Portable and wheeled extinguishers, marked escape routes, emergency lighting, assembly points and integration with the site emergency response plan.

10. Hazardous materials on site

Material	Use	Maximum on site
Natural gas	Turbine fuel (in pipes and equipment only, no storage)	approx. 9 t
Diesel	Emergency power generators and fire pumps (black start generator if required)	20 m³ (45 m³)
Diesel, backup turbine fuel	Only if required commercially. Unlikely	0 or 12 500 m³
Hydrogen	Generator cooling, cylinder banks	480 Nm³ (45 kg)
Nitrogen	Purging and blanketing, cylinder banks	500 to 1 000 Nm³ (625 to 1 250 kg)
Lubricating, hydraulic and transformer oil	Turbines, pumps and transformers	8 m³ stored; 50 m³ in turbines & 200 m³ inside transformers
Hydrochloric acid (30%) and caustic soda (40%)	Demin plant regeneration and pH correction	35 m³ each
Ammonia solution (20 to 30%)	HRSG water chemistry	15 m³
Phosphate solution	HRSG water chemistry (if required)	15 m³
Sodium hypochlorite or sodium chloride	Cooling tower algae control (wet cooled case only)	15 m³ or 5 t
CO_2	Gas turbine fire suppression	approx. 10 t

How they are managed

- No natural gas or LNG storage on site
- Bunds sized at 110 percent of the largest tank, with impermeable floors and controlled drainage
- Acids and alkalis in separate bunds, chemical resistant linings, ventilation and gas detection for ammonia
- Hydrogen stored outdoors in a ventilated compound away from ignition sources
- Eyewash and shower stations, spill kits, signage and PPE at each storage and dosing point
- Assessment against the Major Hazard Installation Regulations; the quantitative risk assessment forms part of the EIA
- Deliveries by bulk tanker, cylinder truck or flatbed, mostly about once a month per material

11. Construction phase

3 years

Construction period (indicative)
About 30 to 36 months from site establishment to commercial operation, typical for a plant of this size (to be confirmed)

500+

Construction jobs
Estimated jobs during construction, with a focus on local labour, training and skills transfer

approx. 50

Permanent jobs
Operations and maintenance staff once the plant is running, on a continuous shift basis

RBIDZ

Water and services
Construction water, power and sewer from the RBIDZ Phase 1F connections at the site boundary

Main construction activities

- Site establishment: fencing, construction camp, offices, laydown area and access control
- Earthworks, terracing, stormwater and underground services
- Piling and concrete foundations for turbines, HRSGs, stacks, tanks and transformers
- Delivery of heavy equipment through the Port of Richards Bay and along the N2 and Alumina Allee (abnormal loads for turbines, generators and transformers)
- Mechanical erection of turbines, HRSGs, stacks, pipework, tanks and cooling system
- Electrical and control installation, switchyard and transformer bays
- Commissioning: first simple cycle, then combined cycle, followed by performance testing

Managing construction impacts

- Environmental Management Programme (EMPr) applied by all contractors
- Dust suppression, noise limits and restricted working hours near receptors
- Traffic management plan for abnormal loads and peak shift traffic
- Waste segregation, hazardous waste to licensed facilities
- Local employment and procurement targets, on site training
- Health and safety in terms of the OHS Act and Construction Regulations

Operations: staffing and traffic

approx. 30

Weekday day shift staff

Operations crew, maintenance, engineering and administration

approx. 15

Night and weekend staff

Control room, field operators and security

20 to 25

Light vehicle trips per shift change

Concentrated in short peaks at shift changeover

Delivery and collection traffic during normal operation

Category	Vehicle	Typical frequency
Water treatment chemicals (acid, caustic, ammonia, phosphate)	Chemical tanker or flatbed with IBCs	About once a month each
Nitrogen and hydrogen	Gas cylinder truck	About once a month each
Diesel top up (emergency equipment)	Fuel tanker or bowser	About once a month
Lubricating and hydraulic oil	Flatbed or panel van	Quarterly or less
Spares and consumables	Light delivery vehicle	2 to 3 per week
General waste	Municipal or contracted waste truck	Weekly
Water treatment sludge and waste oil collection	Vacuum tanker or skip truck	About once a month or less

Design aspects still to be finalised

Gas turbine selection

Siemens Energy SGT5-4000F or GE 9F.03. Performance figures to be updated once selected.

Cooling technology

Wet cooling tower or air cooled condenser. The EIA assesses the wet case as the worst case for water and effluent.

Backup fuel

Diesel dual fuel capability only if required by the power purchase or lenders agreements. Considered unlikely.

Black start

Provision for a 20 MW diesel generator if required by the Grid Code or system operator. This would be in addition to the emergency diesel power generators.

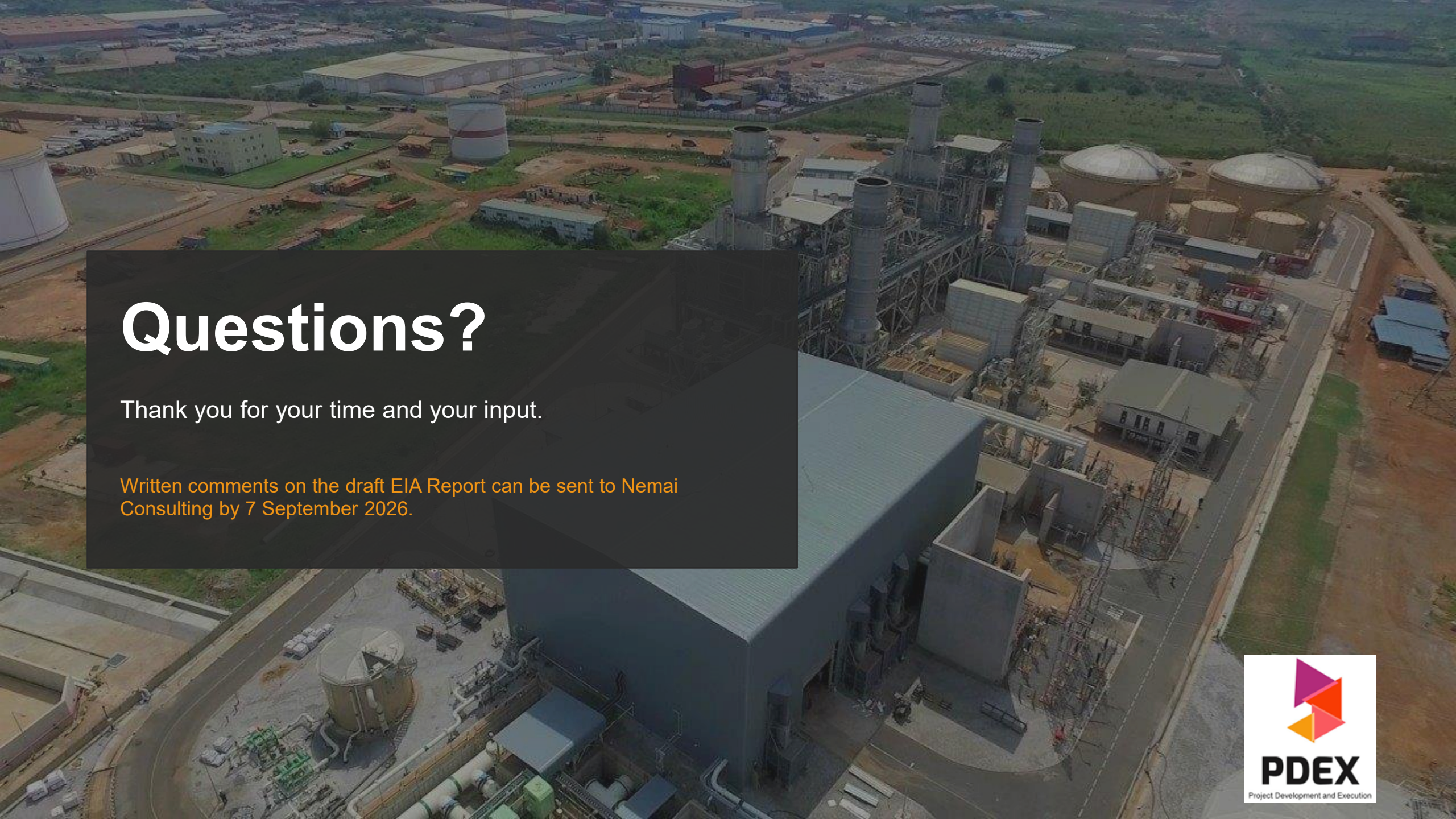
Water source and wastewater disposal

Supply and disposal arrangements with uMngeni-uThukela Water and the RBIDZ are still being finalised. Wastewater will meet all required municipal standards.

Grid connection

Overhead or underground tie in to the Eskom network. Subject to Eskom and a separate process.

In every case the EIA assesses the more onerous option so that the environmental assessment covers the worst case.



Questions?

Thank you for your time and your input.

Written comments on the draft EIA Report can be sent to Nemai Consulting by 7 September 2026.

PDEX
Project Development and Execution

Specialist Climate Change Impact Assessment: Proposed 750MW Combined Cycle Gas Turbine Power Plant

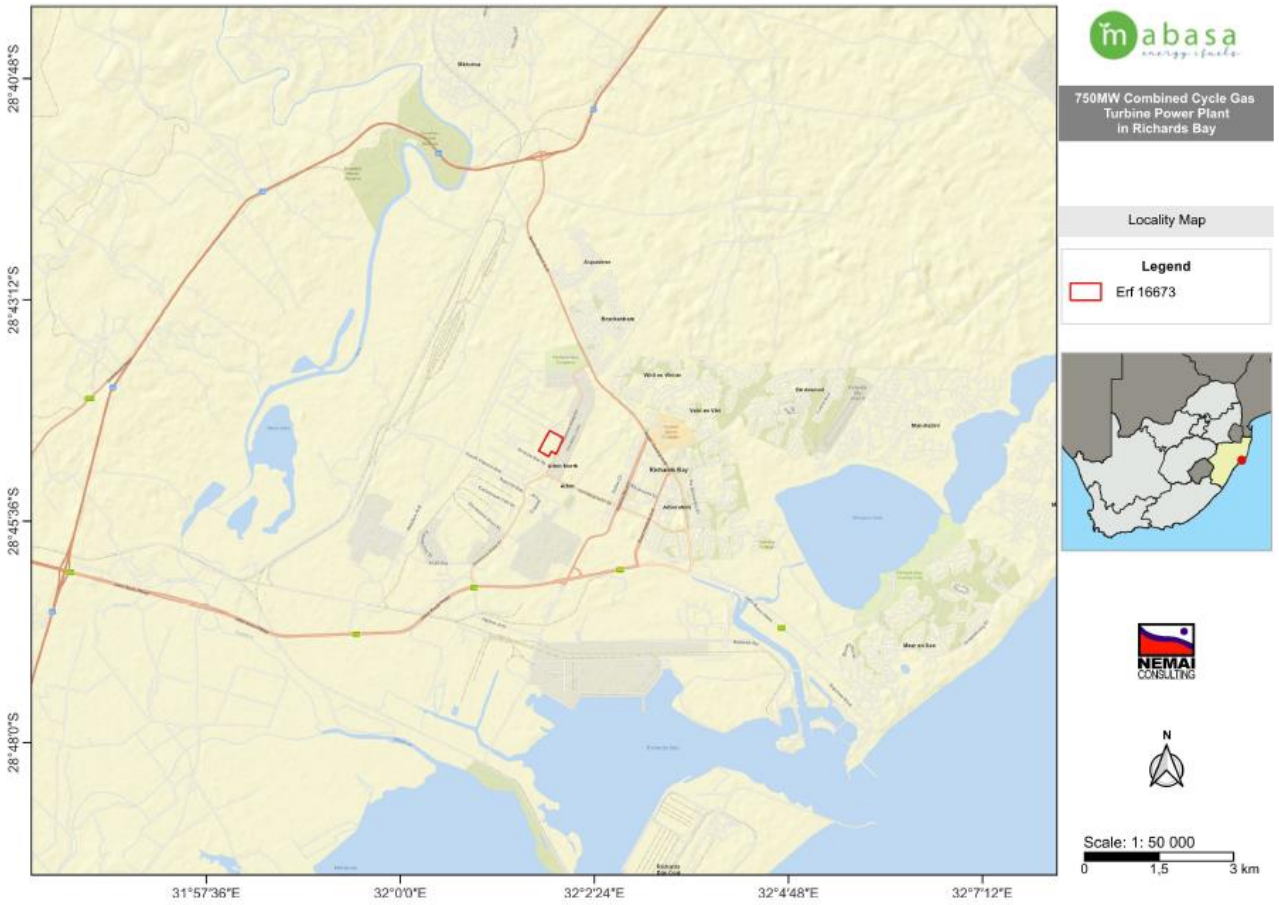
25 August 2026



PROMETHIUM CARBON

Project and location

The proposed CCPP is in the Richards Bay Industrial Development Zone and is assessed as a functionally linked gas-to-power development.



750MW CCGT
2 gas turbines + 2 HRSGs + 1 steam turbine generator

Dispatchable generation
Designed to provide reliable capacity to the national grid

Why linked infrastructure matters
Fuel supply, transmission connections and ancillary facilities are considered where functionally linked and reasonably foreseeable.

LNG
fuel supply

Gas turbine
electricity

Heat Recovery Steam Generator (HRSG)

Steam turbine
more electricity

What does the CCIA assess?

A gas project both contributes to global GHG concentrations and must operate in a climate that is already changing

Contribution to the atmosphere



LNG/ gas supply → **Gas-fired power plant** → **Emissions add to atmosphere**

- Combustion and upstream fuel supply generate GHG emissions
- These emissions add to cumulative global warming
- Climate change is driven by historical & ongoing global emissions

The project is affected by climate change even though the physical risks are not caused by this project alone

Physical climate risks for the Project

- Flooding and intense rainfall can affect site drainage and access
- Storm events can disrupt infrastructure and operations
- Heat and humidity can affect equipment and performance
- Climate variability including El Nino-linked events, can increase operational risk

Purpose and key questions

Public concern

- Fossil fuel project
- GHG emissions
- Carbon lock-in
- Local climate vulnerability

Energy-system context

- Energy security
- Grid reliability
- Dispatchable capacity
- Renewables integration

Assessment discipline

- Quantified emissions
- Policy context
- Avoided emissions not guaranteed
- Physical risk and resilience



This is not a "no impact" project; it is an emitting project assessed within a wider policy and electricity-system context.

South Africa's energy and climate policy context

Energy system / security

- IRP and procurement context identify a role for dispatchable and flexible generation.
- Gas-fired generation is considered as part of South Africa's transition mix.
- Gas can support grid stability and complement variable renewable electricity.

Climate / decarbonisation

- South Africa has a declining NDC emissions trajectory.
- The Climate Change Act reinforces mitigation, adaptation and transition objectives.
- Gas remains a fossil fuel and therefore adds emissions.
- Its role as a transition technology is conditional on avoiding long-term carbon lock-in.

The question is not whether gas has emissions — it does. The question is how those emissions are weighed against its proposed role in South Africa's electricity transition.

How emissions were assessed

The CCIA uses a transparent project-level GHG inventory approach and includes direct and relevant indirect emissions.

Inventory boundary

Scope 1 + 2
On-site fuel combustion, small diesel use and intrinsic on-site electricity use.

2.29 $MtCO_2e/yr$

Scope 3
Upstream LNG extraction, processing, liquefaction, shipping, regasification and domestic transport.

1.4 $MtCO_2e/yr$

Lifecycle
Construction, operation and decommissioning, with operation driving >99% of total emissions.

~3.7 $MtCO_2e/yr$

Key GHG accounting principles

Relevance | Completeness | Accuracy | Transparency | Conservativeness

Emissions = Activity Data × Emission Factor

Key assumptions and inputs

750 MW
Full assessed plant capacity

100% utilisation
Conservative bounding assumption

25 years
Assumed project life

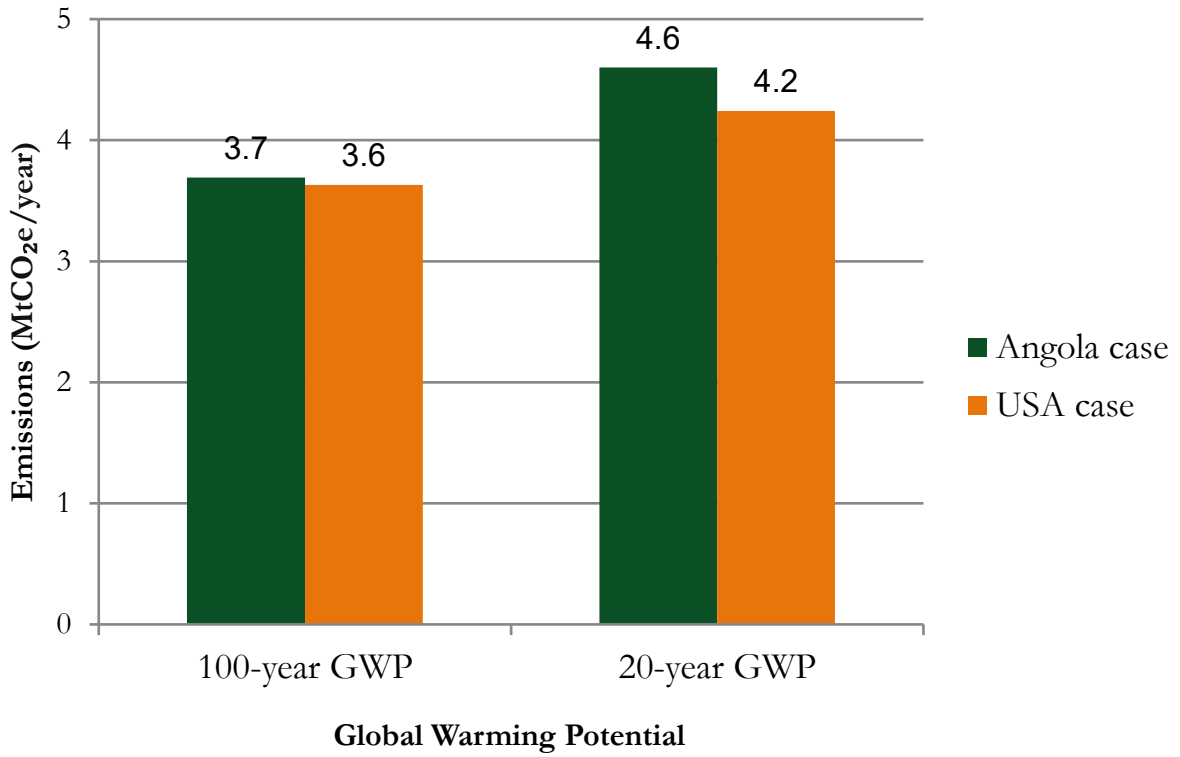
Two LNG supply cases
Angola and USA



Actual emissions would scale with actual utilisation; the assessment intentionally uses conservative assumptions rather than assuming lower dispatch.

Emissions Results

Headline annual emissions are shown using the 100-year regulatory basis and the 20-year methane-sensitive view.



100-year GWP
~3.7 $MtCO_2e$/year. This is the basis used for national reporting and policy comparison.

20-year GWP
~4.6 $MtCO_2e$/year for the Angola case. This highlights methane's near-term warming influence.

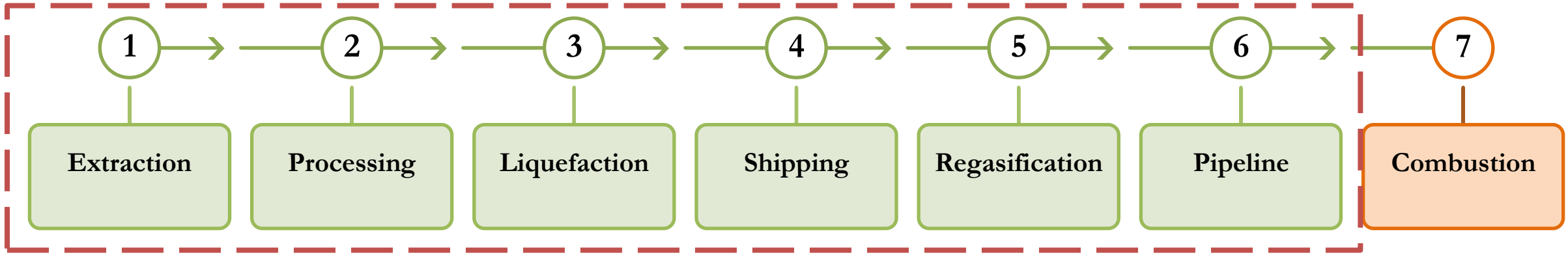
Operation drives >99%
Construction and decommissioning are comparatively small in lifecycle terms.

Scope 3 is material
The upstream fuel chain is included to show the broader lifecycle picture.

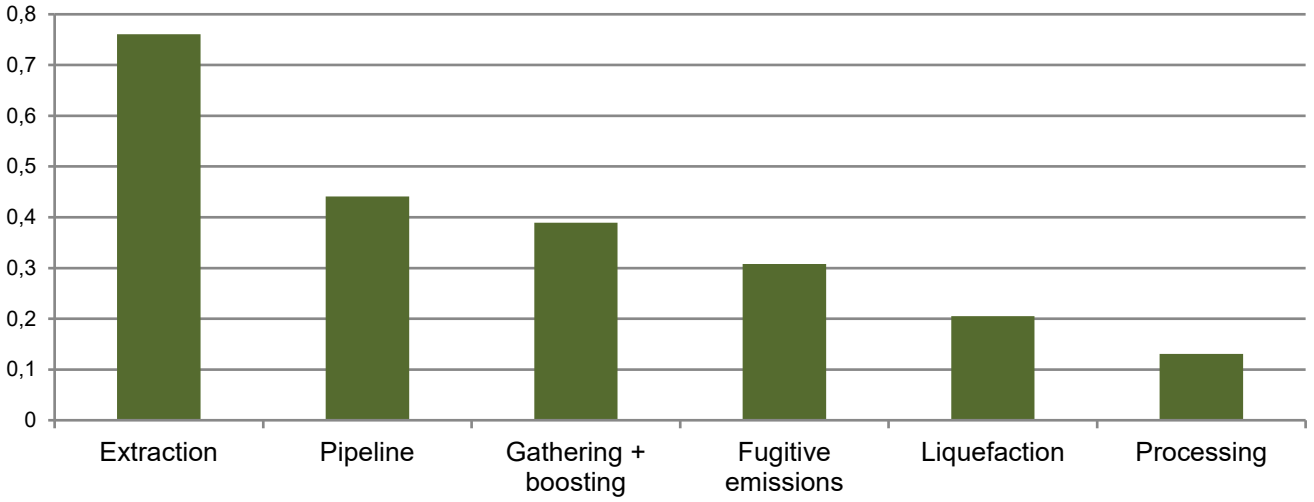
Not a zero-impact outcome: the project adds to cumulative atmospheric GHG concentrations over its life cycle.

Why upstream LNG emissions are shown

Scope 3 emissions arise outside the direct control of the proponent, but they are included to transparently show lifecycle implications.



Most important upstream contributors in the 20-year GWP view



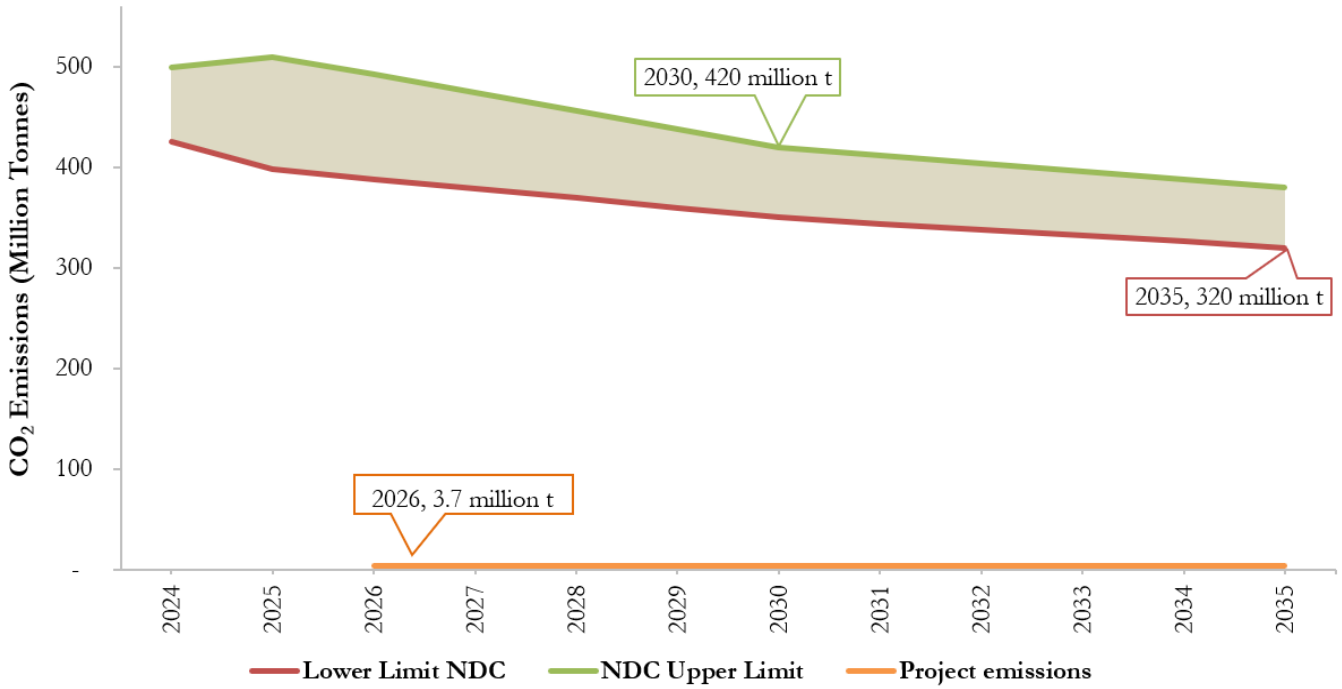
100-year GWP
Upstream Scope 3 ≈ **1.40** $MtCO_2e$/year (Angola case)

20-year GWP
Upstream Scope 3 ≈ **2.31** $MtCO_2e$/year (Angola case)

Scope 3 does not mean the proponent controls every upstream source. It means the CCIA has chosen a fuller lifecycle view rather than only showing direct emissions.

Project emissions in the NDC context

For national policy comparison, the presentation uses the 100-year GWP metric used in South Africa's reporting and NDC context.



100-year GWP

~0.9%
of the 2030 upper NDC limit

~1.2%
of the 2035 lower-limit trajectory

20-year GWP

~1.1%
of the 2030 upper NDC limit

~1.4%
of the 2035 lower-limit trajectory

Note: the 20-year methane-sensitive view is shown separately because it is not the formal NDC-comparison metric.

Small, not insignificant
Relevant to national policy, not determinative of NDC compliance.

Transition role vs carbon lock-in

Potential transition role

- Dispatchable generation
- Supports system reliability
- Can complement variable renewables
- Lower emissions intensity than coal ***where coal is actually displaced***

Carbon-lock-in risk

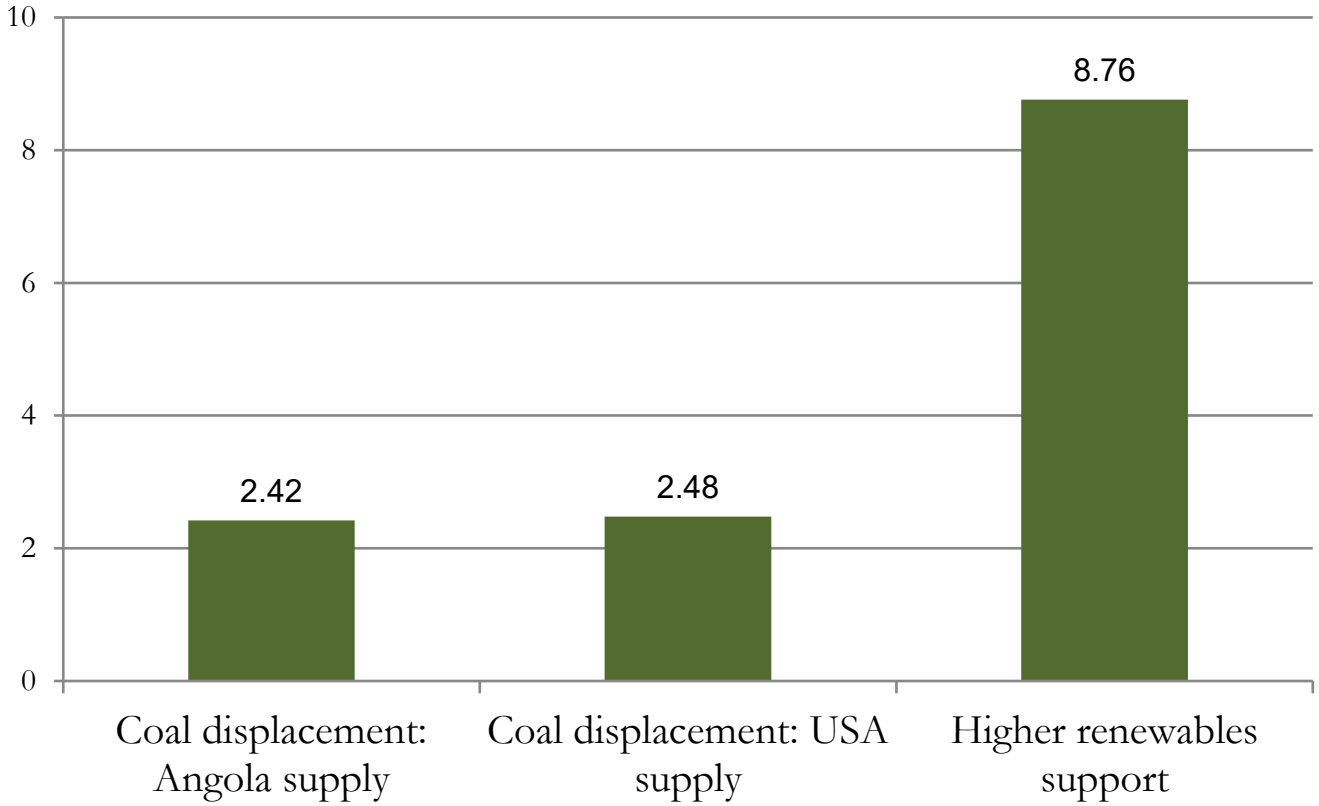
- 25-year plant life
- Long-lived gas and LNG infrastructure
- Continued fossil-fuel emissions
- Exposure to tightening climate policy
- Risk if operation extends beyond the role envisaged in the transition

Gas is not treated as low-carbon. Its climate implications depend on how, how often and for how long the plant operates within the transition.

Illustrative electricity-system scenarios

Future dispatch cannot be predicted at project-assessment stage; avoided-emissions results are scenario-based only.

Illustrative only — not guaranteed emission reductions.



Potential avoided emissions ($MtCO_2e$/year).

Two illustrative scenarios

Coal displacement and increased renewable energy support.

Defined assumptions only

These scenarios help interpret possible system-level outcomes; they do not predict how the plant will dispatch.

Projected climate change in Richards Bay

The CCIA identifies site and value-chain risks that should inform detailed design and operating resilience.



Increased rainfall / flooding
Overwhelmed stormwater systems; site access delays; structural damage

Higher temperatures
Heat stress on equipment; material fatigue; worker health and safety considerations

Storm events
Transport-route disruption; port operations disruption; increased insurance/ adaptation costs

Drought / water stress
Climate-related water supply variability may affect plant and auxiliary water requirements.

Sea-level / coastal exposure
Site is inland, but indirect exposure remains through port and fuel-supply infrastructure

Temperature

Warming is virtually certain and very hot days are expected to increase.

Extreme rainfall

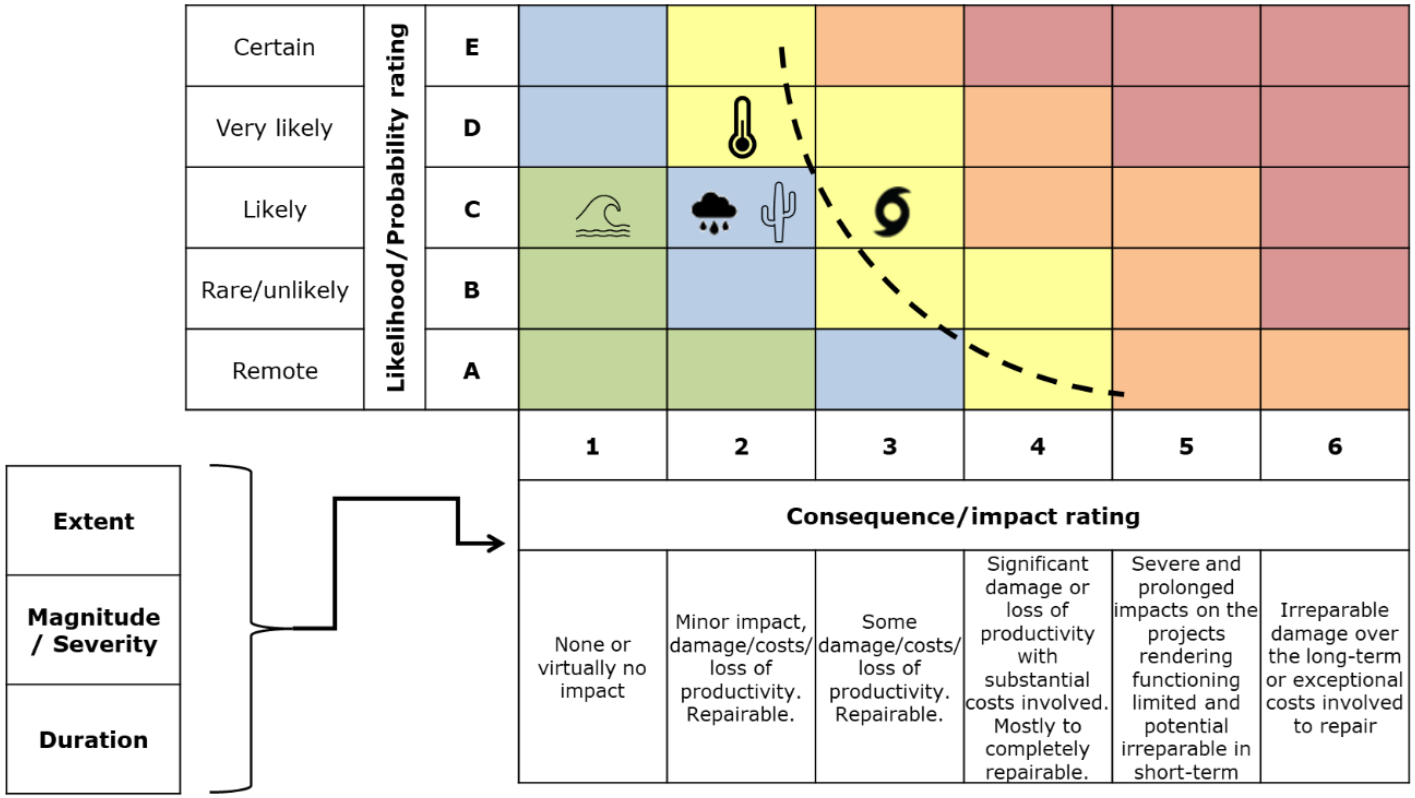
Rainfall intensity and severe storms require particular attention in design.

HILP events

Rare severe storm events may have lower probability but potentially high consequences.

Vulnerability and resilience assessment

Most physical risks are manageable through adaptive capacity, but rainfall intensity and severe storms require particular attention.



Overall finding

Risks are not considered, in themselves, to preclude development.

Design implications

Flood management, stormwater design and structural resilience need to be taken through detailed design.

Operational implications

Emergency preparedness, continuity planning and supply-chain disruption planning are key.

Climate resilience is not only an environmental issue — it is also an engineering, operational and emergency-management issue.

Recommended mitigation and adaptation measures

61
Pm
(147)

The practical response is to reduce what can be reduced and design for the climate risks that remain.

Reduce emissions

- ✓ **Efficiency**
  Optimise plant performance and fuel efficiency
- ✓ **Monitoring**
  Track fuel use and GHG emissions
- ✓ **Supply chain**
  Engage on upstream emissions where possible
- ✓ **Construction**
  Reduce materials and transport where feasible

Design for climate risk

- ✓ **Stormwater**
  Detailed stormwater/flood management design
- ✓ **Structures**
  Resilience to severe rainfall and storm events
- ✓ **Water**
  Plan for dry periods and municipal supply strain
- ✓ **Continuity**
  Emergency response and supply-chain disruption planning

The Project is materially emitting and exposed to climate risks. The CCIA nevertheless identified no climate-related fatal flaw that, on its own, would preclude Environmental Authorisation, subject to appropriate management of climate risks and emissions.

PROMETHIUM

CARBON

61 Pm (147)

www.promethium.co.za

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Thank You



PROPOSED MABASA 750 MW COMBINED CYCLE GAS TURBINE POWER PLANT IN RICHARDS BAY

Public Meeting

Overview of Air Quality Impact Assessment

uMoya-NILU Consulting

Project Team

Mark Zunckel, Nopasika Xulu, Atham Raghunandan

uMOYA-NILU

OBJECTIVES OF STUDY

- Establish the existing air-quality environment
- Identify sensitive receptors
- Quantify emissions from the proposed plant
- Predict how pollutants disperse through the atmosphere
- Assess impacts during construction, operation and decommissioning
- Assess cumulative impacts with existing industries
- Assess potential future cumulative impacts
- Compare predicted concentrations with South African National Ambient Air Quality Standards (NAAQS)

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EMISSION SCENARIOS ASSESSED

- Scenario 1: Mabasa CCPP in simple cycle mode
  - Using Combustion Turbines to generate 500 MW of electricity and in isolation of other sources
- Scenario 2: Mabasa CCPP in combined-cycle mode
  - Using Combustion Turbines and Heat Recovery Steam Generators (HRSGs) to generate 750 MW of electricity and in isolation of other sources
- Scenario 3: Cumulative
  - Mabasa CCPP in combined-cycle mode with the contribution of existing industrial sources
- Scenario 4: Cumulative
  - Mabasa CCPP in combined-cycle mode with the contribution of existing industrial sources and approved future facilities

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METHODOLOGY

- Identified sensitive receptors
- Emission inventory
  - Characterised emissions for each scenario focusing on PM_{10}, SO_2 and NO_x
- Dispersion modelling
  - Applied the DEA-recommended CALPUFF model to predict ambient pollutant concentrations
- Impact assessment
  - Compared predicted concentrations against the National Ambient Air Quality Standards (NAAQS)
- Cumulative assessment
  - Quantified the combined effects of the project with existing major industrial sources and approved future gas-to-power projects in Richards Bay

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EMISSION INVENTORY

Stack parameters used for the Mabasa CCPP dispersion modelling assessment

Source name	Stack Height (m)	Stack Diameter (m)	Stack Exit Velocity (m/s)	Stack Temp. (°C)	Stack Flowrate (Nm^3/hr)
Gas Turbine 1 Stack	40	6.9	40	600	1 683 832
Gas Turbine 2 Stack	40	6.9	40	600	1 683 832
HRSG 1 Stack	65	6.3	25	100	2 053 370
HRSG 2 Stack	65	6.3	25	100	2 053 370

MES for Sub-category 1.4 and stack emission rates

Source name	MES (mg/Nm^3)	Emission rates (t/a)			
		Gas Turbine 1 Stack	Gas Turbine 2 Stack	HRSG 1 Stack	HRSG 2 Stack
SO_2	400	5 900	5 900	7 195	7 195
NO_X	50	737.5	737.5	899.3	899.3
PM_{10}	10	147.5	147.5	179.9	179.9

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EMISSION INVENTORY

Existing Industrial Sources

- Mondi
- Foskor
- Richards Bay Minerals
- Tongaat Hullet Felixton
- Transnet Port Terminals
- South 32
- MPACT

Approved Future Facilities

- Elegant Afro Chemicals Chlor-Alkali Plant
- Eskom 3000 MW CCPP
- Nseleni Power Corporation Limited Floating CCPP
- Nyanza Light Metals Titanium Dioxide Pigment Plant
- Phakwe Richards Bay Gas 3 CCPP (RBIDZ)
- Phakwe Richards Bay 320 MW Gas PP (Alton industrial)

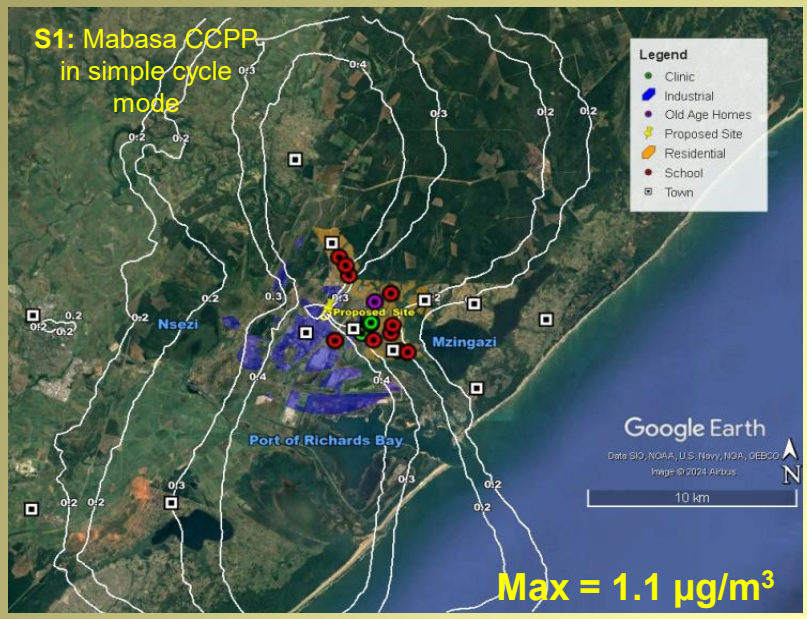
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DISPERSION MODELLING RESULTS

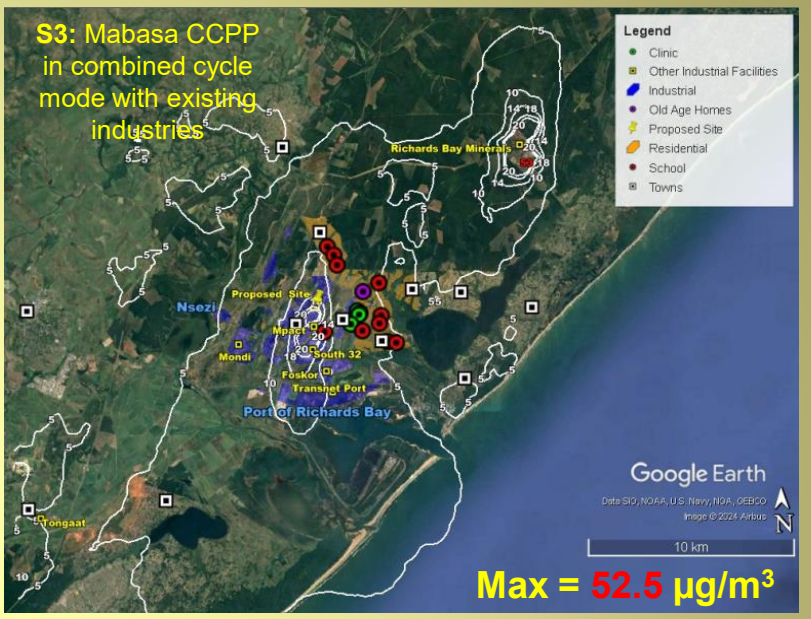
Description	Scenario	Pollutant and averaging period		
		SO_2		
		Annual	24-hour	1-hour
Predicted maximum SO_2	Scenario 1	1.1	14	41
	Scenario 2	4.2	37	110
	Scenario 3	**53**	**243**	**682**
	Scenario 4	**59**	**315**	**695**
NAAQS		**50**	**125**	**350**
		NO_2		
Predicted maximum NO_2	Scenario 1	0.1		4
	Scenario 2	0.4		11
	Scenario 3	21		**273**
	Scenario 4	22		**273**
NAAQS		**40**		**200**
		PM_{10}		
Predicted maximum PM_{10}	Scenario 1	0.03	0.4	
	Scenario 2	0.1	0.9	
	Scenario 3	26.8	**189**	
	Scenario 4	27.2	**189**	
NAAQS		**40**	**75**	

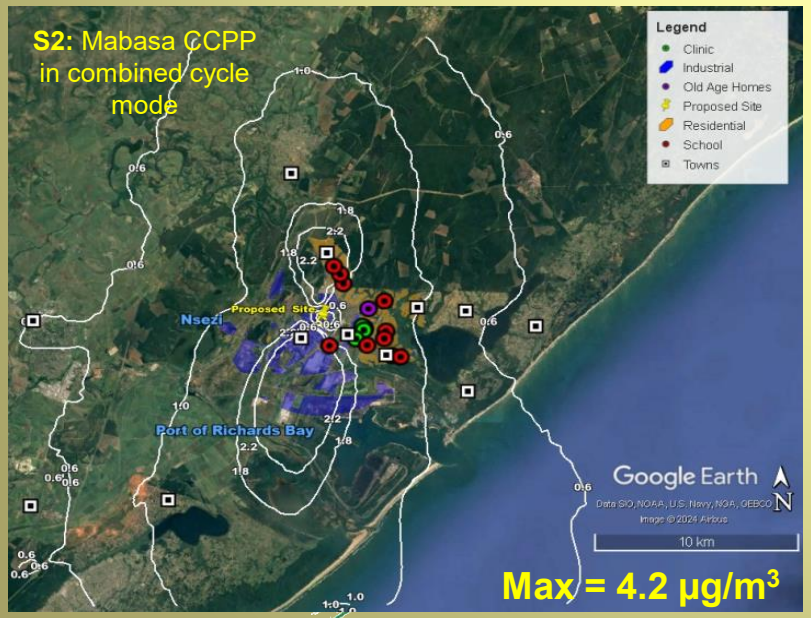
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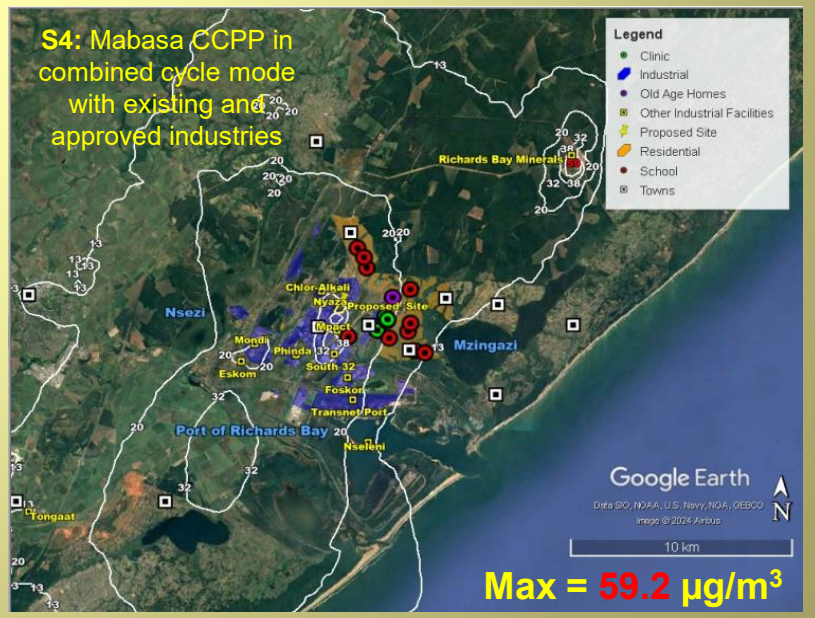
SO_2 Annual Average



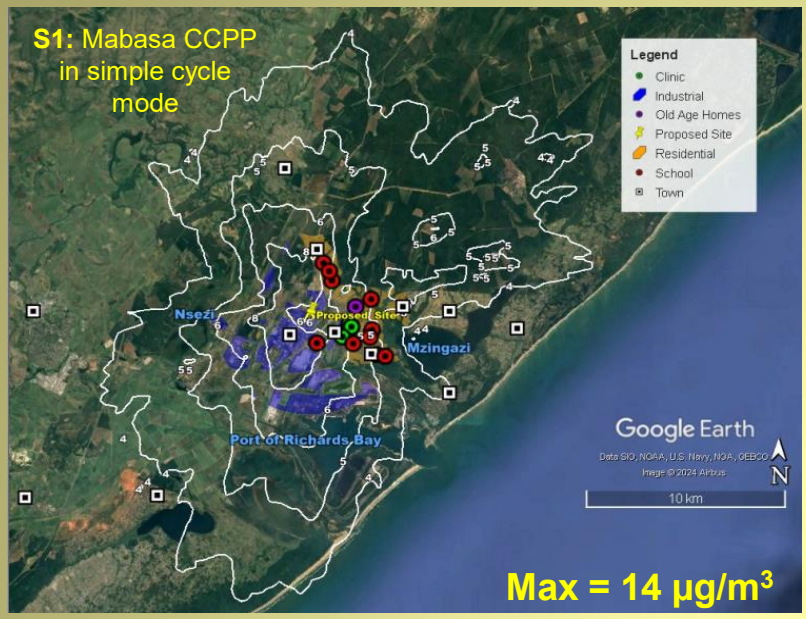
NAAQS
50 µg/m³



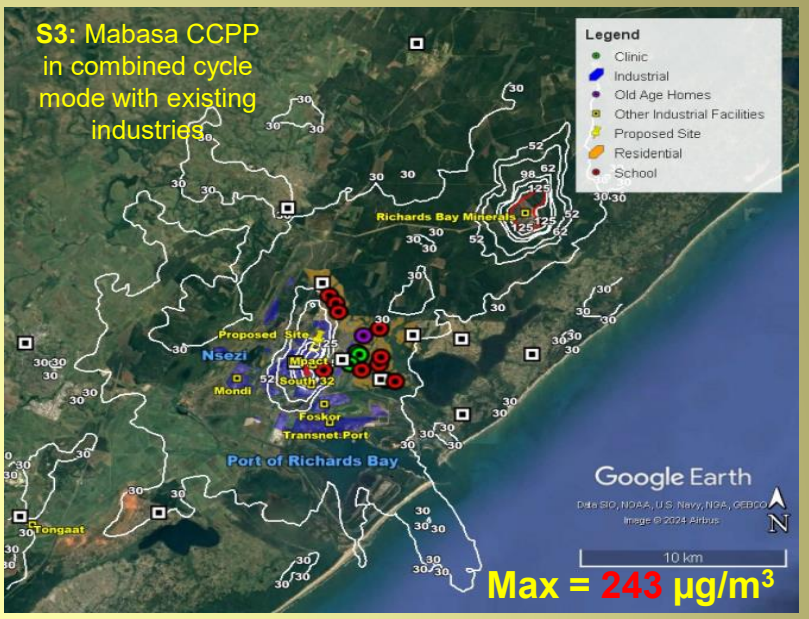


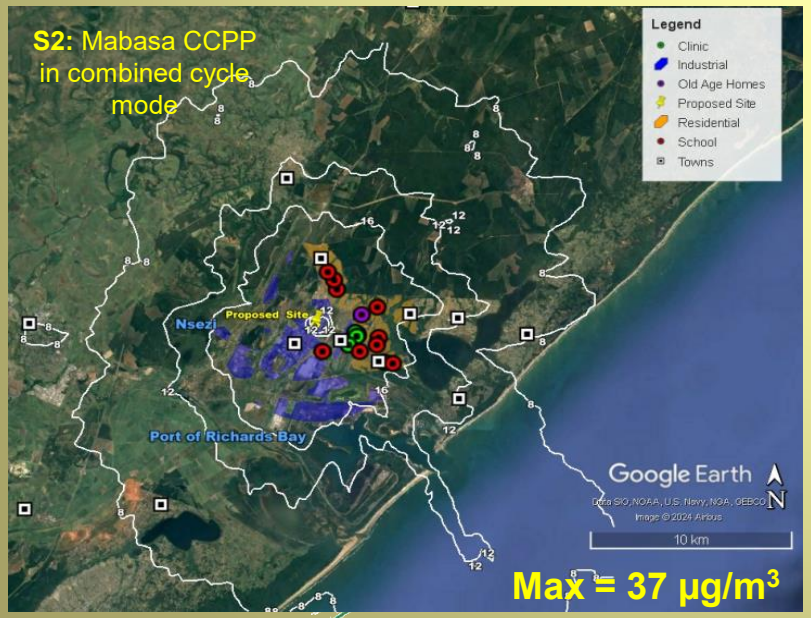


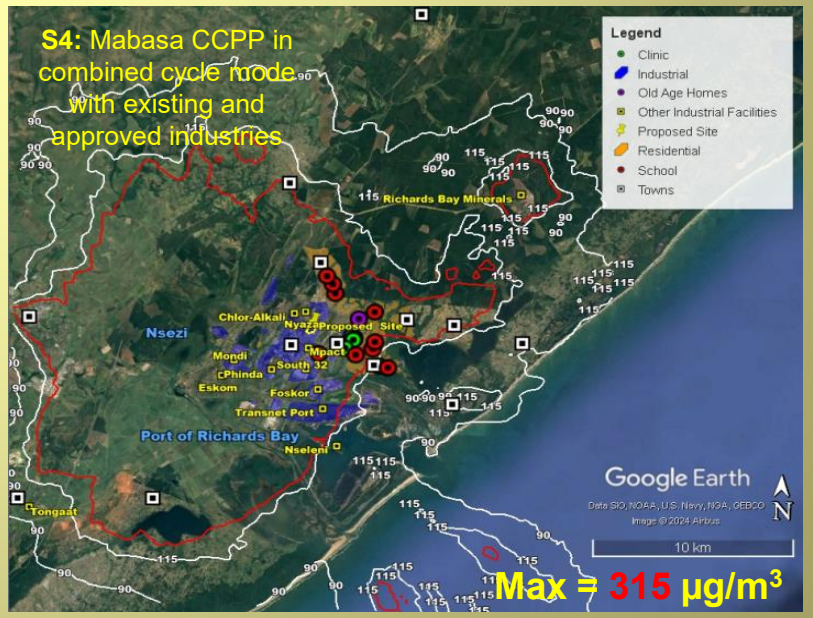
SO_2 24-hour maximum



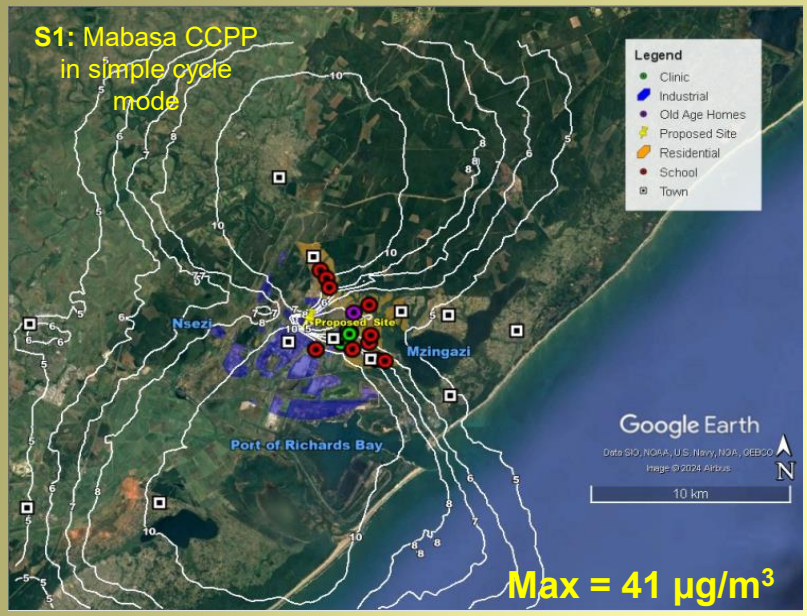
NAAQS
125 µg/m³



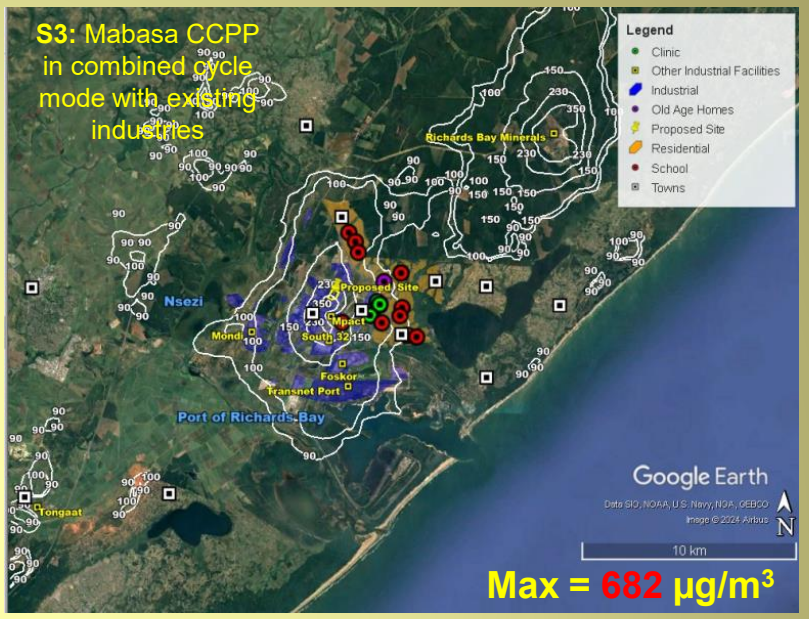


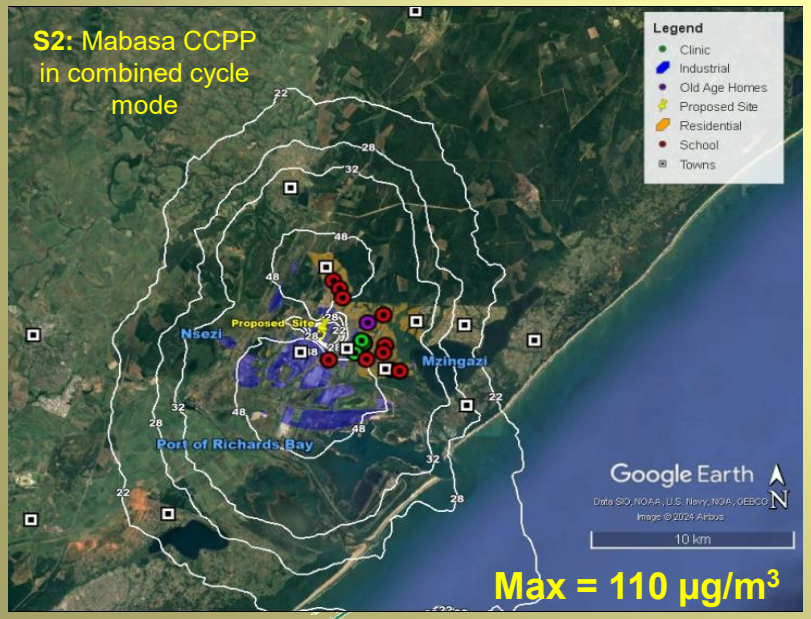


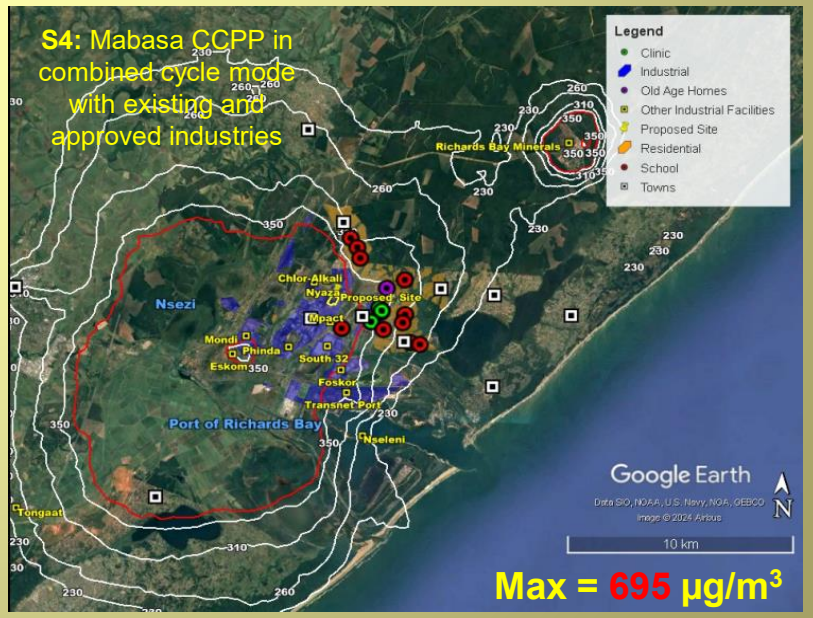
SO_2 1-hour maximum



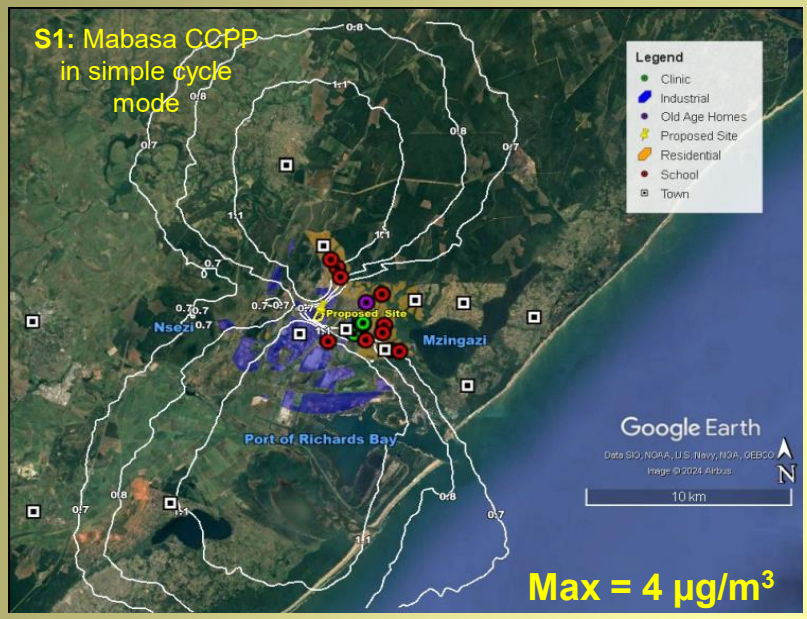
NAAQS 350 µg/m³



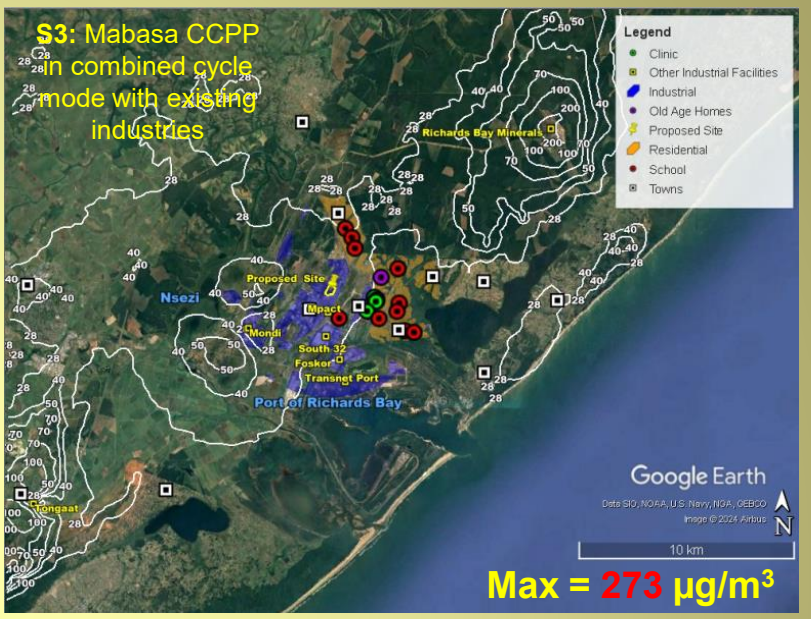


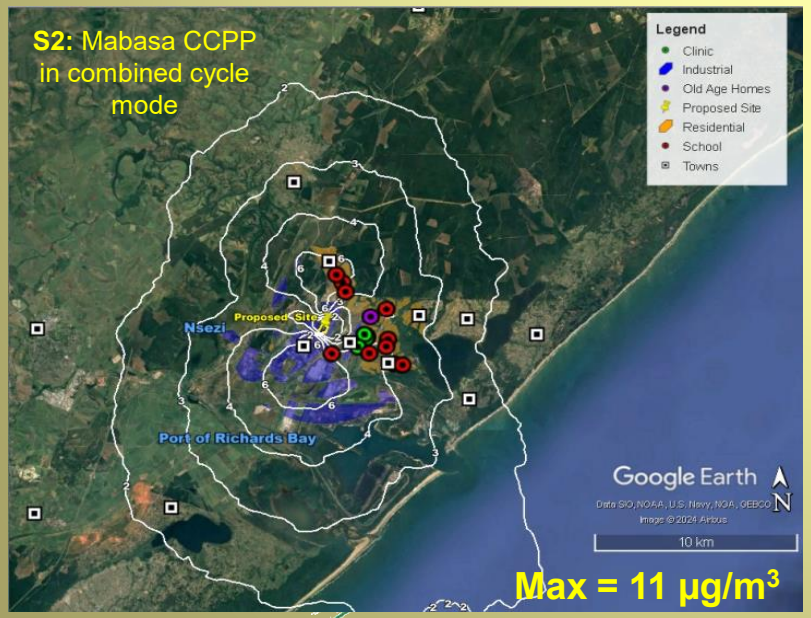


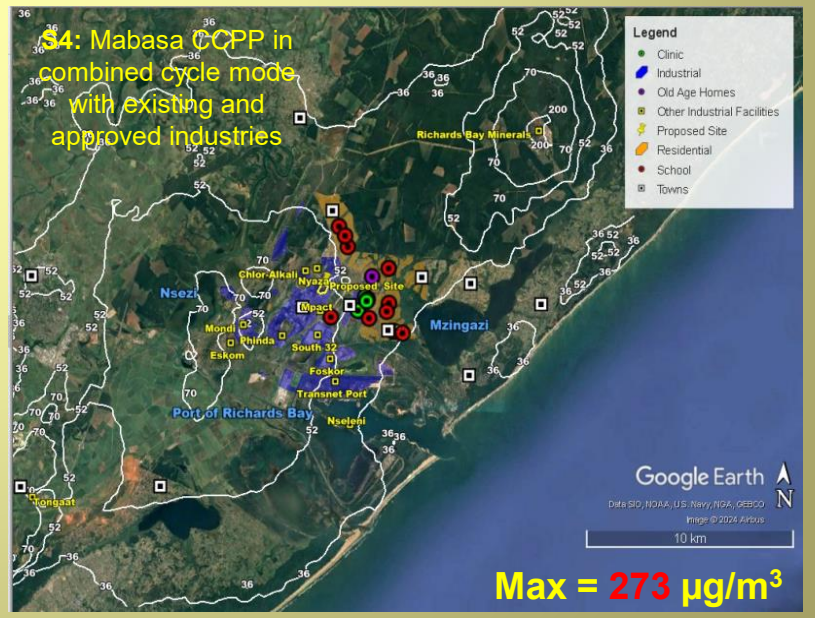
NO_2 1-hour maximum



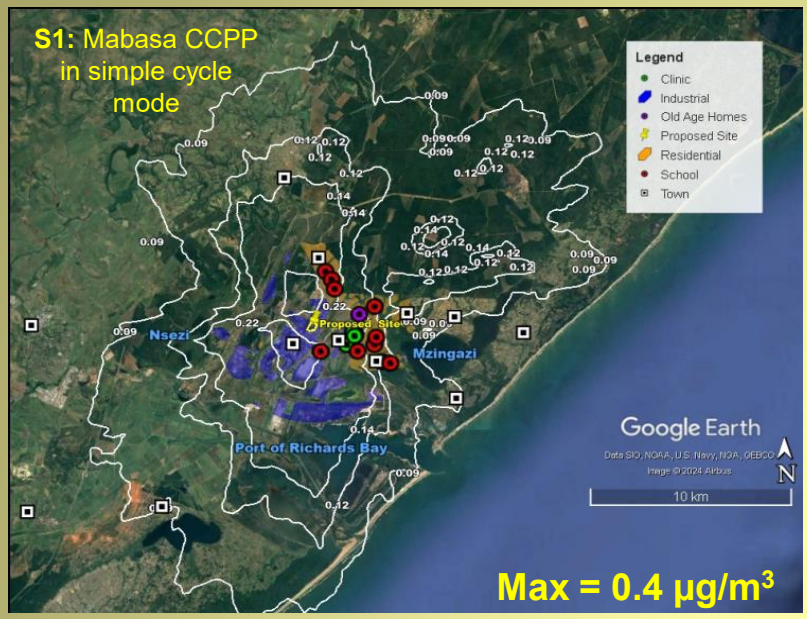
NAAQS 200 µg/m³



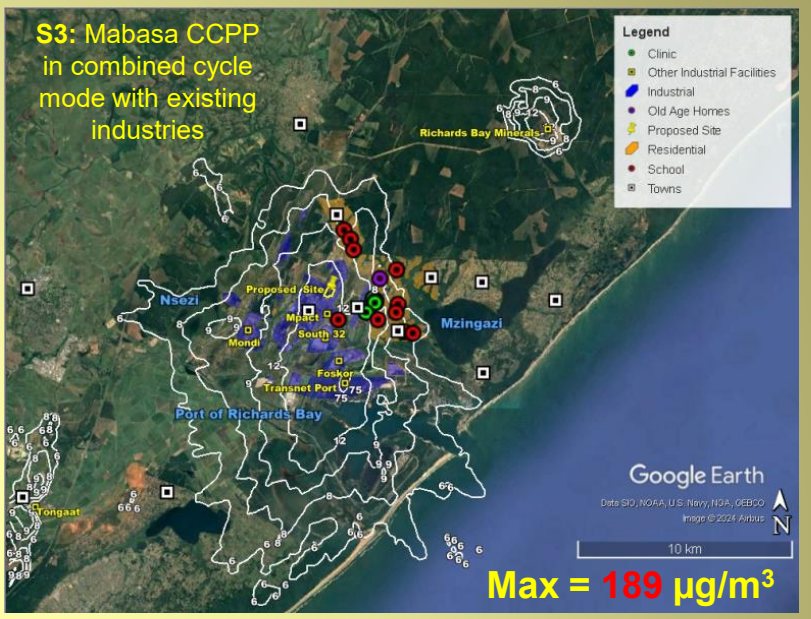


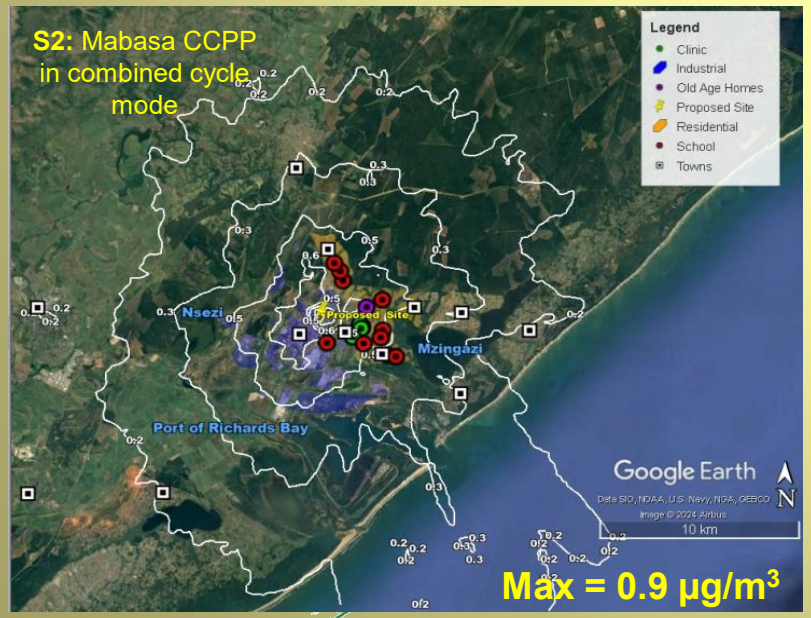


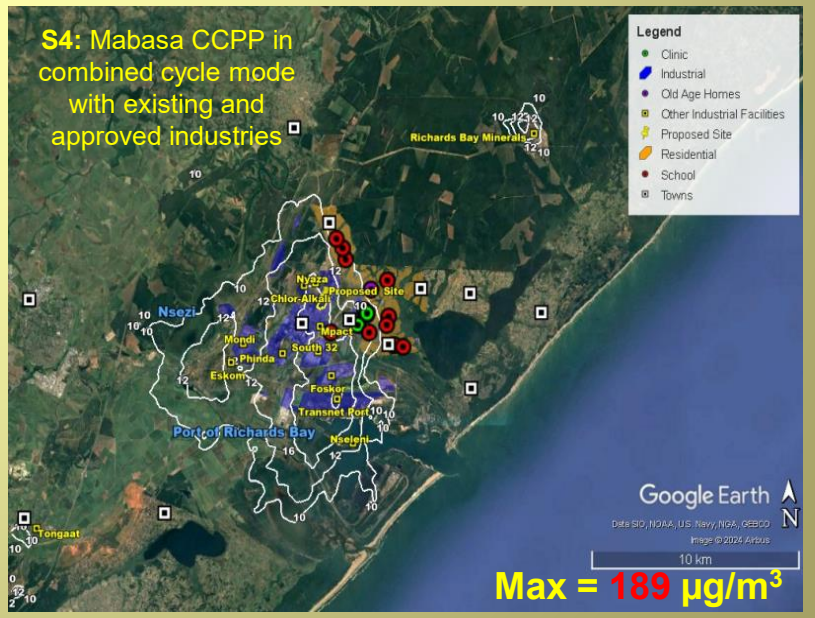
PM_{10} 24-hour maximum



NAAQS
75 µg/m³







SUMMARY OF IMPACTS

- **Scenarios 1 & 2:**
  - Predicted SO_2, NO_2 and PM_{10} concentrations are low, with low overall impacts. Combined Cycle produces slightly higher concentrations than Simple Cycle.
- **Scenario 3:**
  - Cumulative SO_2, NO_2 and PM_{10} concentrations exceed the NAAQS, resulting in a medium cumulative impact. However, the Mabasa CCPP's contribution is low.
- **Scenario 4:**
  - Cumulative SO_2, NO_2 and PM_{10} concentrations also exceed the NAAQS and are slightly higher than Scenario 3, resulting in a medium cumulative impact. The approved projects add only a small incremental effect, while the Mabasa CCPP's contribution remains low.
- **Overall**: The Mabasa CCPP has a low individual contribution to ambient air quality impacts, while the medium cumulative impacts in Scenarios 3 and 4 are primarily driven by existing and approved developments.

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CONCLUSIONS

- Air-quality impacts are low
  - Mabasa alone is predicted to have a low impact, with no NAAQS exceedances attributable to the project
- Small contribution to cumulative impacts
  - Where cumulative exceedances occur, Mabasa's contribution is generally low, and negligible for PM_{10}
- Robust modelling approach
  - The assessment was based on sound input data, appropriate emission scenarios and the CALPUFF dispersion model, which is well suited to complex terrain and regional-scale dispersion assessments
- Independent assessment
  - The assessment was undertaken by uMoya-NILU Consulting, an independent air-quality consultancy with an experienced atmospheric modelling team
- Overall Conclusion
  - Based on the robust modelling assessment, the low contribution of Mabasa to ambient concentrations, and the absence of project-related NAAQS exceedances, the air-quality assessment supports authorisation of the proposed Mabasa CCPP.

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