



TotalEnergies EP South Africa B.V.

**ENVIRONMENTAL AND SOCIAL IMPACT  
ASSESSMENT (ESIA) FOR THE OFFSHORE  
PRODUCTION RIGHT AND ENVIRONMENTAL  
AUTHORISATION APPLICATIONS FOR BLOCK  
11B/12B - REF NO: 12/4/13 PR**

Draft Environmental and Social Impact  
Assessment Report



# CHAPTER 5



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Draft Environmental and Social Impact Assessment Report

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**WSP**





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## 5 PROJECT NEED AND DESIRABILITY 96

<b>5.1 CONSISTENCY WITH NEMA PRINCIPLES</b>	<b>96</b>
5.1.1 TIME AND PLACE	97
5.1.2 NATURE, SCALE AND LOCATION	97
<b>5.2 POLICY, PLANS AND GUIDELINES</b>	<b>98</b>
5.2.1 NATIONAL DEVELOPMENT PLAN 2030, 2012	98
5.2.2 SOUTH AFRICA INTEGRATED RESOURCE PLAN (IRP) 2019	99
5.2.3 OPERATION PHAKISA (SOUTH AFRICA'S OCEAN ECONOMY), 2014	99
5.2.4 GAS MASTERPLAN BASE CASE REPORT (2021)	99
5.2.5 INTEGRATED ENERGY PLAN, 2016	100
5.2.6 SOUTH AFRICA INTEGRATED RESOURCE PLAN (IRP) 2019	101
5.2.7 SOUTH AFRICAN ECONOMIC RECONSTRUCTION AND RECOVERY PLAN (2020)	101
5.2.8 WESTERN CAPE PROVINCIAL STRATEGIC PLAN (2019-2024)	101
5.2.9 NET ZERO BY 2050: A ROADMAP FOR THE GLOBAL ENERGY SECTOR, 2021	102
5.2.10 FIRST NATIONALLY DETERMINED CONTRIBUTION (2021)	102
5.2.11 WESTERN CAPE CLIMATE CHANGE RESPONSE STRATEGY (2021)	103
<b>5.3 POWER GENERATION</b>	<b>104</b>
5.3.1 FUTURE ENERGY MIX DEMAND AND SUPPLY	105
<b>5.4 PROJECT RISKS AND OPPORTUNITIES</b>	<b>110</b>
5.4.1 ENVIRONMENTAL RISKS AND OPPORTUNITIES	110
5.4.2 SOCIO-ECONOMIC RISKS AND OPPORTUNITIES	112
5.4.3 SPILL AND PIPELINE LEAK	113



## **TABLES**

Table 5-1 – Offshore Oil & Gas Development Milestones

107

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## **FIGURES**

Figure 5-1 – PetroSA F-A Platform and Schematic Diagram of Block 9 Layout 109

## 5 PROJECT NEED AND DESIRABILITY

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Appendix 3 of the EIA Regulations 2014, as amended, states that the purpose of the Scoping process is to, *inter alia*:

- b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the development footprint on the approved site as contemplated in the accepted Scoping report.

The need and desirability of the Project is described in terms of:

- A review of international guidance and national policy, strategy and plans that shape current plans and policies regarding options for decarbonisation of the South African economy given the commitments made to the international community with due consideration of economic development and job creation.
- A summary of the history of hydrocarbon exploration and production in South Africa and the current status of the F-A Platform to contextualise the timing and location of the Block 11B/12B Project.
- The key environmental, social and economic risks and opportunities identified in the specialist studies prepared for the Project.

Given that, at the time of writing, no off-take agreement has been reached between TEEPSA and potential purchasers of the Block 11B/12B gas and condensate, the need and desirability of the Project is based on possible end-user scenarios, namely:

- Scenario 1 - Gas and condensates are sent to the existing PetroSA GTL plant for further processing into synthetic fuels and industrial products.
- Scenario 2 - Gas is sent to either the Eskom Gourikwa Power Plant, which could be transformed into a combined cycle power plant, or to a new combined cycle power plant that could be built.

The options are not necessarily mutually exclusive. PetroSA may take the condensate but not gas in an off-take agreement; these discussions are ongoing.

Exploration activities in Block 11B/12B commenced in 2012 and ended in 2020. Drilling efforts focused on the south-west section of the Block, where the drilling of the Brulpadda – 1AX exploration well was completed in February 2019, and the drilling of the Luiperd – 1X exploration well was completed in October 2020.

This exploration programme led to an important gas discovery, and after completion of further technical and feasibility studies, the potential viability of the gas and associated condensate resources was confirmed; however commercial agreements for the sale of the gas into the domestic market must still be achieved.

### 5.1 CONSISTENCY WITH NEMA PRINCIPLES

The DFFE Need and Desirability Guideline (2017) provide guidance to the interpretation and implementation of the National Environmental Management Act (NEMA) and the EIA Regulations 2014, as amended. The specific requirement of the Guidelines is stated as: “In order to properly interpret the EIA Regulations’ requirement to consider “need and desirability”, it is necessary to turn to the principles contained in NEMA, which serve as a guide for the interpretation, administration and implementation of NEMA and the EIA Regulations.”



As stated in the Guidelines, ‘... consideration of “need and desirability” in EIA decision-making therefore requires the consideration of the strategic context of the development proposal along with the broader societal needs and the public interest.’

The Guidelines also state: “... the concept of “need and desirability” relates to, amongst others, the *nature, scale and location* of development being proposed, as well as the *wise use of land*. While essentially, the concept of “need and desirability” can be explained in terms of the general meaning of its two components in which need primarily refers to *time* and *desirability* to place (i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed?), “need and desirability” are interrelated and the two components collectively can be considered in an integrated and holistic manner”.

The NEMA principles specifically require that environmental management must:

- “place people and their needs at the forefront of its concern” and equitably serve their interests;
- “be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must consider 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;
- pursue environmental justice “so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person”;
- ensure that decisions take “into account the interests, needs and values of all interested and affected parties”; and
- ensure that the environment is “held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage”.

### 5.1.1 TIME AND PLACE

The premature depletion of the most recent gas fields supplying the F-A Platform has resulted in the plant and equipment being placed into care and maintenance; and the Project will make use of this existing offshore infrastructure to process the gas from Block 11B/12B. No off-take agreements have been signed, but TEEPSA is in discussion with PetroSA to evaluate the provision of feedstock to the GTL plant and as well as with the authorities and with Eskom to evaluate the supply of natural gas to the Gourikwa Power Plant or to a new power plant. The Project is a continuation of the oil and gas production that is clustered around the existing F-A Platform and pipeline to convey processed hydrocarbons onshore.

In the context of the decarbonisation of the economy, the development of a hydrocarbon resource needs to be in keeping with Government energy strategy that addresses the country’s economic needs. Government policy includes natural gas as a part of the energy mix that is meant to grow. . South Africa is following the worldwide shift to renewable energy as the primary source happening in; however, it is necessary to retain some flexibility.

### 5.1.2 NATURE, SCALE AND LOCATION

The ESIA addresses the Guidelines in considering environmental, social and economic risks and impacts that may result from the proposed Project activities. In particular, physical environmental risks have been addressed in underwater acoustic modelling, modelling of the fate of drill cuttings discharge, air emissions and the quantity of greenhouse gas produced in Project phases and over the lifetime of the Project.





The physical risks and impacts of placing infrastructure in the ocean to ecology and biodiversity are addressed together with the potential for disruption to other maritime users, primarily commercial and small-scale fishers that also utilise the offshore area in and around Block 11B/12B. The fate of a large-scale oil spill has been comprehensively modelled to inform the response strategy in terms of clean-up and restoration and compensation.

The offshore location of the proposed Project has reduced the Project onshore footprint. Onshore activities will be limited to support and supply vessels operating from the Mossel Bay port and helicopter flights operating from George airport.

The highly technical nature and difficult operating conditions requires trained personnel to undertake the drilling and testing of wells and installation of subsea infrastructure; and the decommissioning and removal of subsea infrastructure at the Project end of life. There is, however, existing local technical expertise in operating the F-A Platform and over the production phase of the project, there will be a requirement for skills training to ensure that personnel are available to operate the Platform.

## **5.2 POLICY, PLANS AND GUIDELINES**

This section summarises international guidance, national policy, strategy and plans that frame the debate regarding energy and climate change to provide a roadmap for South Africa to follow in achieving an economically and socially equitable transition in reducing greenhouse gas emissions while growing the economy and creating employment opportunities.

The strategic context of South Africa's energy transition is outlined in several documents and this section summarises these that outline the roadmap for the country to make the transition to a green economy.

### **5.2.1 NATIONAL DEVELOPMENT PLAN 2030, 2012**

The National Development Plan (NDP) offers a long-term perspective and governmental objectives with the principal goal of eliminating income poverty (i.e., reducing the proportion of individuals living below the poverty line to zero) and reducing inequality (i.e., reducing the Gini coefficient to 0.6) in South Africa by 2030. The NDP stems from the National Planning Commission's Diagnostic Report released in 2011, which identified South Africa's achievements and shortcomings since the first democratic election in 1994.

Six focussed, interlinked priorities are identified in the NDP to address income poverty and growth. Included amongst these, is the priority for "Faster and more inclusive economic growth". The goal is to transform the economy and create sustainable expansion for job creation by achieving an economic growth rate of 5 % per annum on average. To achieve this, the NDP proposes to enhance human capital, productive capacity and infrastructure to raise exports, which will in turn increase resources for investment and reduce reliance on capital inflows. The key to achieving this is to strengthen the energy sector while ensuring long-term affordability and sustainability.

Notwithstanding the above, another key focus of the NDP is ensuring environmental sustainability and an equitable transition to a low-carbon economy. South Africa has some of the world's most significant coal and gas deposits and, while the coal deposits are a relatively cheap source of energy, the carbon intensive nature of the resource presents significant barriers to achieving decarbonisation of the economy in terms of commitments made by the South African Government to reduce GHG emissions.



The National Development Plan mentions the construction of infrastructures to import LNG and the increase of exploration to find domestic gas feedstock as infrastructure investment to be prioritised. Both these elements are part of the summary of actions (Actions 16 and 17).

### **5.2.2 SOUTH AFRICA INTEGRATED RESOURCE PLAN (IRP) 2019**

The Plan places energy at the centre of a decent standard of living for all citizens while considering the commitments made by South Africa to reduce the total greenhouse gas emissions in terms of the Paris Agreement on Climate Change and how this can be reconciled with the need to support the country's current energy demand.

The document sets out the energy transition process towards achieving net-zero carbon by 2050, with the plan informed by the above documents, including the expected decommissioning of approximately 24 100 MW of coal power plants between 2030 and 2050.

The IRP specifically refers to the potential of natural gas as part of the energy mix to complement renewable energy, and explicitly mentions the will to accelerate exploration of local recoverable gas.

While the Plan acknowledges electricity as the preferred energy supply and outlines how a diversified mix of renewables will support this, the proposed updated plan (for the period ending 2030) includes a provision of 11.9 GW of gas and diesel in the energy mix from 2026 which would deliver 15.7 percent (MW) of installed energy capacity. The Plan also discusses further research and development on innovative solutions, financial considerations and demand forecasts to support implementation of the planned initiatives (IRP, 2019).

### **5.2.3 OPERATION PHAKISA (SOUTH AFRICA'S OCEAN ECONOMY), 2014**

This initiative commenced in 2014 with the objective of identifying the potential of the marine environment to support economic growth based on existing and potential coastal infrastructure and service sectors that can support growth opportunities.

South Africa is the strategic African Hub for maritime operations in the South-South trade corridor from Asia to the east coast of South Africa, as well as for the connector routes along the west and west coasts of South Africa.

Six growth areas were identified, namely marine transport and manufacturing, offshore oil and gas exploration, aquaculture, marine protection services and ocean governance, small harbours development and coastal and marine tourism. Operation Phakisa promotes South Africa's position as a preferred destination for repair, maintenance and upgrade of drilling ships, semi-submersibles and jack-up rigs associated with the oil and gas industry. It has highlighted Saldanha Bay as a dedicated oil and gas servicing hub and this facility will support the project, specifically in the location in Saldanha Bay of the capping stack that will be used in responding to an unplanned event.

### **5.2.4 GAS MASTERPLAN BASE CASE REPORT (2021)**

The Gas Master Plan: Base Case Report describes the natural gas sector as it currently stands and the roadmap for planning and investment in developing natural gas resources in South Africa. The report provides baseline information including an overview of the gas value chain and regulatory framework and sets the scene for the development of a Gas Master Plan, which once developed, will serve as a policy instrument, providing a roadmap for taking strategic, political and institutional decisions which will guide industry investment planning and coordinated implementation.



South Africa currently consumes approximately 0.15 tcf natural gas per annum. This is approximately three percent of the country's primary energy demand and, over the past decade, has had an average annual growth rate of 1.6% due to limited gas supply. South Africa's current gas supply in the north east of the country comes exclusively from Sasol's Pande and Temane gas fields in Mozambique, which reserves are declining, and there is an imminent gas shortage.

Using a combination of a top-down and bottom-up approach to model future energy demand, natural gas could play a crucial role in a flexible and modular decentralised natural gas distribution network. The installation of gas distribution pipelines to existing gas-to-power generation facilities and to power plants to facilitate partial or complete conversion to natural gas feedstock. The report also deals with the import of LNG.

The report addresses gas demand in several sectors, in both power sector and non power sector. For the power sector, the report mentions the conversion of diesel fired OCGTs to gas, but also the potential conversion of coal fired power stations to gas. For the non power sector, the reports describe existing as well as potential demand in the petroleum sector, with the case of PetroSA's GTL plant, in the transport sector, and in the industrial sector. (Department of Mineral Resources and Energy. South African Gas Master Plan 2022: Basecase Report v.01).

### **5.2.5 INTEGRATED ENERGY PLAN, 2016**

The Integrated Energy Plan, 2016 (IEP) provides a roadmap of the future energy landscape of South Africa, with the aim of guiding policy development and future energy infrastructure investments. An analysis of current energy consumption trends in South Africa has been completed which has been utilised to map and project future energy consumption. In this regard, the IEP has identified and determined the optimal mix of energy sources and technologies required to meet energy demand.

The IEP acknowledges the importance of harnessing renewable energy resources to reduce GHG emissions. However, the use of natural gas as a transitional, low carbon fuel source has been highlighted. The diversification of energy mix has been considered necessary to improve the security of energy supply in the country.

Natural gas has been identified in the IEP as having the most significant potential in the energy mix in South Africa, due to the use of natural gas in combined cycle gas turbines in the electricity sector, gas to liquid plants in the liquid fuel sector, as well as for direct thermal application in the industrial and residential sectors. Natural gas consumption, albeit very low in relation to coal, exceeds consumption with most demand being met through imports from Mozambique. The IEP thus promotes the exploration of local coastal gas and recoverable shale gas resources, in line with required legislation and regulations.

The IEP acknowledges the importance of harnessing renewable energy resources in an attempt to reduce GHG emissions. However, the use of natural gas as a transitional, low carbon fuel source has been highlighted. The diversification of energy mix has been considered necessary to improve the security of energy supply in the country. As such, the Block 11B/12B project gas and condensate can provide feedstock to the F-A Platform and to PetroSA and Eskom if off-take agreements are signed.

## **5.2.6 SOUTH AFRICA INTEGRATED RESOURCE PLAN (IRP) 2019**

The Plan places energy at the centre of a decent standard of living for all citizens while considering the commitments made by South Africa to reduce the total greenhouse gas emissions in terms of the Paris Agreement on Climate Change and how this can be reconciled with the need to support the country's current energy demand.

The document sets out the energy transition process towards achieving net-zero carbon by 2050, with the plan informed by the above documents, including the expected decommissioning of approximately 24 100 MW of coal power plants between 2030 and 2050.

The IRP 2019 specifically refers to the potential of natural gas as part of the energy mix to complement renewable energy, and explicitly mentions the will to accelerate exploration of local recoverable gas.

While the Plan acknowledges electricity as the preferred energy supply and outlines how a diversified mix of renewables will support this, the proposed updated plan (for the period ending 2030) includes a provision of 11.9 GW of gas and diesel in the energy mix from 2026 which would deliver 15.7 percent (MW) of installed energy capacity. The Plan also discusses further research and development on innovative solutions, financial considerations and demand forecasts to support implementation of the planned initiatives (IRP, 2019).

## **5.2.7 SOUTH AFRICAN ECONOMIC RECONSTRUCTION AND RECOVERY PLAN (2020)**

The Plan outlines the structural interventions required to achieve the National Development Plan goals of reducing unemployment, poverty and inequality. While acknowledging the challenges faced by the economy have, over time, worsened due to sustained low levels of investment and growth and exacerbated by the recent Covid-19 pandemic, the Plan calls for investment in securing additional energy supplies, including gas, drafting legislation to facilitate upstream sector investment to unlock investment and creating additional generating capacity (The South African Economic Reconstruction and Recovery Plan, 2022).

Power generation is a common use for natural gas and using gas from the 11B/12B Project for power generation would be relevant to address the current South African energy crisis. The associated socio-economic benefits together with the environmental impacts and relevant mitigation measures are detailed in this report.

## **5.2.8 WESTERN CAPE PROVINCIAL STRATEGIC PLAN (2019-2024)**

The Plan was prepared in 2020 to provide a vision for the Province going forward. The strategy is detailed through five vision-inspired priorities (VIPs) that a five-year plan to:

- build safe and cohesive communities
- boost the economy and job creation
- empower our people, promote mobility and spatial transformation, while at the same time
- driving innovation within a culture of a truly competent state.
- measure our commitment to finding ways to improve the lives, livelihoods and experiences of our residents

Specific interventions include, among others, the diversifying the regional energy mix and reduce energy intensity. This objective will be driven by promoting the natural gas sector, solar PV installations by businesses, and energy efficiency amongst businesses and households.

The growth rate of the Western Cape economy more than halved to 2% between 2008 and 2017 and growth is projected to average 1.6% over the medium term (2019 to 2023), which is marginally lower (1.7%) than between 2013 and 2017. The economic growth is reflected in the unemployment rate in the Province and, at the end September 2019, was 21.5%.

The Western Cape economy experiences constraints owing to national- and provincial-level factors of which the inability of the energy sector's to support even modest economic growth is one. Skills shortages and mismatches and climate change impacts are also identified. Chronic electricity supply shortages highlight the need to transition from coal-fired power to green energy and opportunities for renewable energy, smart grids, large-scale rooftop PV systems, and Liquefied Natural Gas are identified as potential options. The Province is engaging with national government for key regulatory changes to allow for municipalities to purchase power from IPPs and relaxing the requirements for the installation of Small-Scale Embedded Generation to increase energy security.

The Saldanha Bay Industrial Development Zone (SBIDZ) is a key driver of investment in the oil, gas, and marine engineering sector with the first components of the customised infrastructure in place.

## **5.2.9 NET ZERO BY 2050: A ROADMAP FOR THE GLOBAL ENERGY SECTOR, 2021**

The IPCC Assessment reports and Special Reports provides an analysis of the technically feasible, cost-effective and socially acceptable pathways for countries to reach net zero by 2050. These reports describe over 400 milestones, extending to all sectors and technologies, to transform economies dominated by fossil fuels to being predominantly powered by renewable energy. One of the guiding principles of the Roadmap is that transitions to clean energy must be fair and inclusive; nobody should be left behind. The Roadmap also acknowledges the social and economic challenges involved in making the transition, stating that not all personnel in the fossil fuel industry will transition to the clean energy sector. It also acknowledges that developing economies require funding to build energy systems, especially in provision of electricity to people who do not have access. As such, each country needs to design a roadmap that fits with the stage of economic development (The International Energy Agency, Net Zero by 2050: A Roadmap for the Global Energy Sector, 2021).

## **5.2.10 FIRST NATIONALLY DETERMINED CONTRIBUTION (2021)**

The Paris Agreement requires countries to commit to greenhouse gas emission reductions as a contribution to the global response to climate change. Structural changes that have been, and continue to be made, include efficiency measures, a shift to renewable energy sources and adaptations to climate change threats. These efforts have reduced greenhouse gas emissions and South Africa intends continuing with initiatives that decarbonise the economy in a just and fair transition.

South Africa's first Nationally Determined Contribution (NDC) identified emission targets by 2025 and 2030 as a range between 398 and 614 Mt CO<sub>2-eq</sub> respectively. The updated NDC targets are:

- 2025 - annual GHG emissions in a range from 398-510 Mt CO<sub>2-eq</sub>
- 2030 - annual GHG emissions will be in a range from 350-420 Mt CO<sub>2-eq</sub>

The reduction of the range between upper and lower bounds of the updated NDC targets will require implementation of ambitious investment to decarbonise energy-generation as outlined in the 2019 Integrated Resource Plan (First Nationally Determined Contribution Under the Paris Agreement, 2021).

The greenhouse gas emissions resulting from the development of Block 11B/12B have been calculated and are forecast to increase the national greenhouse gas inventory by 0.016%.

### **5.2.11 WESTERN CAPE CLIMATE CHANGE RESPONSE STRATEGY (2021)**

Western Cape Climate Change Response Strategy (2021) – prepared by the Climate Change Directorate within the Department of Environmental Affairs and Development Planning, as an update to the 2014 strategy. The Plan expresses the need for a green and low-carbon economic recovery leading to a net zero emissions province by 2050. The report provides a summary of the observed and projected climate change impacts for the province and outlines a strategic framework to achieve the mitigation and adaptation objectives:

- Objective 1 – effective response to the climate emergency: acting while there is time to adapt to the impacts of climate change. The Province intends accelerating implementation of actions that respond to climate change mitigation and an increase in resilience to changing climate conditions. The response must, however, align with provincial priorities of providing safe and cohesive communities, promoting job and economic growth, mobility and spatial transformation as well as inspire innovation and culture amongst its citizens.  
The Western Cape Province recognises that ‘Reaching the 2030 and 2050 emissions reduction targets requires drastic ‘cleaning up’ of industrial and agricultural processes that release greenhouse gases and a reduction in our reliance on fossil fuels within the current decade.’. However, it also recognises that the Province’s investments need to be channelled towards more resilient economic activities and low-carbon energy.
- Objective 2 – an equitable and inclusive transition to net zero by 2050. The Strategy objectives focus on implementing agile adaptation to climate change that includes preparation of a GHG inventory that will be expanded to develop a full GHG profile for the Western Cape as part of the 2050 Emissions Pathways process that is being undertaken in the 2020/21 and 2021/22 financial years. Two crucial transitions are envisaged:
  - A shift from internal combustion engines to electric mobility
  - A massive shift from fossil fuel-based energy to renewable energy sources

As part of the broader ‘just transition’ both initiatives will significantly impact current industrial and employment composition in the country. The Strategy acknowledges the need to implement systems to deal with these challenges and changes and that any transition must be flexible to not lock the country or the province into long-term high GHG-emitting energy sources, especially when considering so-called ‘transition’ fuels in the shift from fossil-based energy sources to renewables. In the short-term, the Province will focus on short-lived climate forcers such as black carbon, methane, tropospheric ozone, and hydrofluorocarbons

- Objective 3 – investment in natural capital to reduce climate risks and increase socio-economic resilience. The threat of climate impacts to land- and ocean-based ecosystems is recognised with the need for protection through long-term preparedness and planning. Addressing these threats is imperative, as they ultimately impact economic potential from tourism, agriculture, the blue

economy, and freshwater supplies. However, the Strategy does not present any specific action regarding ocean-based ecosystems

- Objective 4 – exemplary governance to lead a just and inclusive transition. Climate change is seen as a human rights issue; in terms of inequality due to climate change not manifesting universally resulting in some people being more vulnerable than others. The Strategy response is to follow the proposal of the Climate Change Bill, 2021, that the premier’s intergovernmental forum (in the Western Cape, the Premier’s Coordinating Forum) also acts as a Provincial Forum on Climate Change; with a support network is envisaged comprising of mostly existing forums that will provide for horizontal and vertical integration and alignment.

The strategy also outlines institutional arrangements to ensure integration across all departments and civil society (Western Cape Climate Response Strategy Vision 2050: A Vision for a Resilient Western Cape, 2021)

### 5.3 POWER GENERATION

Natural gas currently contributes 2.6% of South Africa’s total energy mix, with an annual consumption of 0.15 tcf and an annual average growth rate of 1.6% over the last decade due to the limited supply options (SA Gas Master Plan: Basecase Report (2012)). The South Africa Government intends to increase the contribution of natural gas to the national energy mix from 2.6% to 15.7% by 2023 to (IRP, 2019). Currently 90% of natural gas demand in South Africa is met through importation by Sasol of natural gas from the Pande and Temane gas field located in Moçambique.

Power generation is a typical use of natural gas, and it can make a large part of the power mix in some countries, such as Nigeria (77% in 2021), Bolivia (51% in 2021), Argentina (44% in 2021), or The Netherlands (41% in 2021) (Source: Enerdata). When used for power generation, natural gas emits about half as much carbon dioxide compared to coal, and it doesn’t emit any sulphur nor nitrogen oxydes. Therefore, the replacement of coal power generation by gas power generation allows not only to reduce carbon emissions but also to improve air quality.

The role of natural gas production as one element in the mix of technologies to secure energy generation capacity going forward is recognised in a strategic plans for decarbonisation of the South African energy mix. Natural gas can serve as a bridge on the path from reliance on coal to carbon-neutrality from 2050 (as per the Paris Agreement) and complement renewable energy sources (as per the IRP (2019) that are under development as part of the strategic approach.

Considering the current energy crisis in South Africa, the urgent need to add new generation capacity and the phasing out of aging coal power stations to reduce the CO<sub>2</sub> emissions, gas fired power generation is a potential use of the natural gas that is a very good fit for South Africa’s needs.

The Eskom owned and operated Gourikwa Power Plant is located approximately 13 km west of Mossel Bay, and approximately 1 km west of the PetroSA facility. Construction of the power plant commenced in 2006. Commercial operation started in 2007 with Phase I comprising three 138 MW turbine units. Phase II, comprising two 138 MW turbine units, commenced operation in 2008.

The turbine units are currently diesel-fired with a pipeline directly from PetroSA to the power plant fuel storage tanks, with each turbine consuming a maximum of 40 t of fuel per hour. The open-cycle gas turbines contribute 740 MW to the national grid during peak demand hours and in emergency situations and can operate in synchronous condenser operation (SCO) to regulate fluctuations in the network voltage (<https://www.eskom.co.za/eskom-divisions/gx/peaking-power-stations/>).



The Gourikwa power plant turbines are already compatible with natural gas, and Eskom has planned the full conversion of the plant from an Open Cycle Gas Turbine (OCGT) to a Closed Cycle Gas Turbine (CCGT). In June 2023, Eskom issued a request for proposal (RFP) to supply the Gourikwa power plant with natural gas with the intention that the plant switches to gas as the main feedstock, supplemented by diesel when necessary, by end 2027.

[https://www.news24.com/fin24/climate\\_future/energy/ready-steady-gas-eskom-kicks-off-bid-to-switch-two-plants-from-diesel-to-natural-gas-20230612](https://www.news24.com/fin24/climate_future/energy/ready-steady-gas-eskom-kicks-off-bid-to-switch-two-plants-from-diesel-to-natural-gas-20230612).

The construction of a fully new CCGT in Mossel Bay would also be a possibility, as indicated for example by Eskom's CEO at the Southern Africa Oil and Gas Conference in September 2022, and some project developers have indicated some interest to be part of such projects.

TEEPSA is in discussion with the DMRE, the Central Energy Fund, Eskom, PetroSA, the Minister of Electricity, as well as with other public and private entities in order to investigate this opportunity.

### **5.3.1 FUTURE ENERGY MIX DEMAND AND SUPPLY**

The situation of the Gourikwa power plant can be contextualised in the current situation of the energy supply mix and forecast demand for power in South Africa.

The role of natural gas production as one element in the mix of technologies to secure energy generation capacity going forward is recognised in a strategic plans for decarbonisation of the South African energy mix. Natural gas can serve as a bridge on the path from reliance on coal to carbon-neutrality from 2050 (as per the Paris Agreement) and complement renewable energy sources (as per the IRP (2019) that are under development as part of the strategic approach.

In terms of demand for energy in South Africa, the Organisation for Economic Co-operation and Development (OECD) in their November 2022 Economic Outlook Note for South Africa ([www.oecd.org/economy/South Africa](http://www.oecd.org/economy/South%20Africa), accessed March 2022) forecast economic growth of 1.7% in 2022, 1.1% in 2023 and 1.6% in 2024. While this is lower than the NDP Vision 2030 forecast of 3% on average over the next 10 years, the challenge of energy security remains, especially where it is seen as a driver of economic development and social upliftment.

Natural gas currently contributes 2.6% of South Africa's total energy mix, with an annual consumption of 0.15 tcf and an annual average growth rate of 1.6% over the last decade due to the limited supply options (SA Gas Master Plan: Basecase Report (2022)). In 2019, as per the IRP 2019, the South Africa Government intended to increase the contribution of natural gas to the national energy mix from 2.6% to 15.7% by 2023 to (IRP, 2019). This has not materialised yet, as no new gas supply has been made available since then, neither domestic gas nor imports (LNG or pipe gas).

By 2022 South Africa had 54 GW of wholesale/public nominal capacity as follows: 39.8 GW of coal, 1.9 GW of nuclear, 2.7 GW of pumped storage, 0.6GW of hydro, 3.4 GW from diesel, 3.4 GW of wind energy and 2.8 GW of Solar energy (Source: CSIR Energy Centre, February 2023).

With the proposed decommissioning of about 11 GW of coal-fired generation capacity by 2030 and 18 GW by 2035 (IRP 2019), the question of the replacement of this generation capacity is crucial. The IRP 2019 plans (in addition to some already committed/ contracted capacity) the following new capacity: 1.5 GW of coal, 2.5 GW of hydro, 2 GW of storage, 20 GW of renewables and 3 GW of gas.





In 2030, the total coal-fired energy generation will be 33.4 GW and the total renewables energy-generation will be 44.5 GW. As a percentage of installed capacity (% of GW), coal contributes 43% with the balance contributed by renewable sources. The percentage of annual energy contribution (as a percentage of GWh) is 58.8% for coal-fired capacity, 34% from renewable generation capacity including storage), with the balance attributable to nuclear, gas and 'other' generation such as biogas, co-generation and landfill (IRP, 2019).

Since then, the challenges that Eskom has had regarding satisfying the electricity demand in South Africa have turned into an energy crisis. Whereas load shedding was implemented during 6 days in 2018 and 22 days in 2019, this figure reached 161 days in 2022, and 227 days year to date in 2023 on 15/09/2023, reaching stage 6 on a regular basis (Source: <https://esp.info>). By definition, this means that there is a structural deficit of at least 6 GW of power generation. In order to address this crisis, a National Energy Crisis Committee was established in 2022, and the position of Minister of Electricity in the Presidency was created early 2023. There is a consensus about the urgent need to add new generation capacity and many options are reviewed, including renewables and gas.

In the considerations about the future energy mix, it is clear that the renewable energies will have a growing share, therefore the questions around the management of the intermittency are becoming more obvious. It is necessary to keep in the overall power mix a sufficient amount of dispatchable power generation in order to ensure the continuity of the supply of electricity as well as the stability of the grid. Gas can play that role with far less emissions than coal and barely any air pollution.

Another element to be considered in the future power mix is the challenge to connect large volumes of renewable energy to the grid. If South Africa has a large potential for solar and wind projects, many such areas are remote and difficult to connect to the grid. Eskom's grid is also largely congested, and a number of projects cannot come online for this reason. The Minister of Electricity announced in June 2023 that the national grid is not ready yet to receive large amounts of renewable energy (Article: [Eskom grid can't handle new renewable energy yet - The Mail & Guardian](https://www.theguardian.com/global-development/2023/jun/25/eskom-grid-cant-handle-new-renewable-energy-yet), 25 June 2023. <https://mg.co.za/environment/2023-06-25-eskom-grid-cant-handle-new-renewable-energy-yet/>). It is clear that there will have to be large investments in the grid in the coming years, but the challenges encountered by the connection of renewable to the grid and the costs involved may increase the need for large scale generation projects which then would be easier to connect.

### 5.3.1.1 Hydrocarbon Development Milestones

The offshore oil and gas industry in South Africa has a long history and the table below provides a summary of the milestones in the development of the offshore resources ([www.petrosa.co.za](http://www.petrosa.co.za)).

**Table 5-1 – Offshore Oil & Gas Development Milestones**

<b>Year</b>	<b>Event</b>
1969	First offshore well drilled by Superior Group. Natural gas deposits are also discovered in the continental shelf complex off the Southern Cape coast
1973	Soekor <sup>13</sup> drills its own first offshore well
1980	Discovery of the F-A gas field in Block 9 of the Bredasdorp Basin, off the Southern Cape coast. Exploration drilling off the South African coast by Soekor and international companies results in oil being discovered in seven wells and gas in 25 wells (of the 48 wells drilled)
1983	Discovery of the E-M gas field, which together with the F-A gas field, provides the basis for establishing the gas-to-liquid (GTL) plant in Mossel Bay
1987	Construction of the GTL plant in Mossel Bay commences
1988	Discovery of Oryx, the first of South Africa's current oil-producing fields. Oryx is 100% owned by PetroSA
1989	Drilling of EC-E, the first discovery well for the Sable oil field, located 95 km offshore and 17 km west of Oribi (previously known as E-BT field)
1990	Discovery of Oribi oilfield, 140 km south-west of Mossel Bay. Oribi is owned 80% by PetroSA and 20% by Energy Africa Limited. The first oil produced comes from the E-AG1 and E-AR1 boreholes during extended well tests
1991	Drilling of E-BD, the second discovery well for the Sable oil field
1992	The F-A gas field commence production and the GTL refinery is commissioned
1997	South Africa's first oil production starts as the Oribi field comes onstream
2000	Gas production from the E-M field commences Oil production from the Oryx field commences
2002	The Petroleum Oil and Gas Corporation of the Republic of South Africa (PetroSA) is established as a merger of Mossgas (Pty) Limited, Soekor (Pty) Limited, and parts of the Strategic Fuel Fund Association
2003	The Sable oil field, located approximately 95 km off the southern coast at a depth of approximately 100 metres, starts producing in October 2003
2007	The South Coast gas fields commence gas and condensate production
2008	Oil production from the Sable field stops to allow gas production to start
2010	The F-O gas project is initiated to augment the gas feedstock supply to the GTL refinery
2011	Project Ikhwezi, the PetroSA flagship project to find additional gas reserves off the coast of Mossel Bay is granted an Environmental Authorisation ( <a href="http://www.petrosa.co.za">www.petrosa.co.za</a> , accessed March 2023). However, in the F-O Field, three out of the five drilling wells yield 25 billion cubic feet of gas out of an expected 242bn cubic feet and first gas is only produced in December 2014 ( <a href="http://www.news24.com">www.news24.com</a> , accessed March 2023).
2012	A pre-feasibility study confirms that importing LNG to supply the GTL plant and the ESKOM Gourikwa power plant is technically and commercially feasible and is approved by PetroSA

<sup>13</sup> Southern Oil Exploration Corporation

Year	Event
2017	A feasibility study for Enhanced Condensate Processing (ECP) completed in June 2017, subject to shareholder approval, proposes the processing of imported heavy condensate (PetroSA annual report, 2020).
2018	Minister of Energy rejects PetroSA's plans to purchase and refine oil to produce petrol and diesel (Skiti S, 2018. Minister halts PetroSA deal 'online').
2020	The F-A Platform and PetroSA GTL plant are put into care and maintenance due to the lack of gas supplies
2020	The South African Government announced the proposed merger of PetroSA, the Strategic Fuel Fund (SFF) and iGas <sup>14</sup> into a new State-Owned Enterprise, the National Petroleum Company to consolidate production of fuel and encourage foreign investment into the sector
2023	PetroSA issues a Request for Proposals to establish a partnership for the refurbishment, modification, upgrade funding and /or operation of the GTL plant

### 5.3.1.2 PetroSA F-A Platform

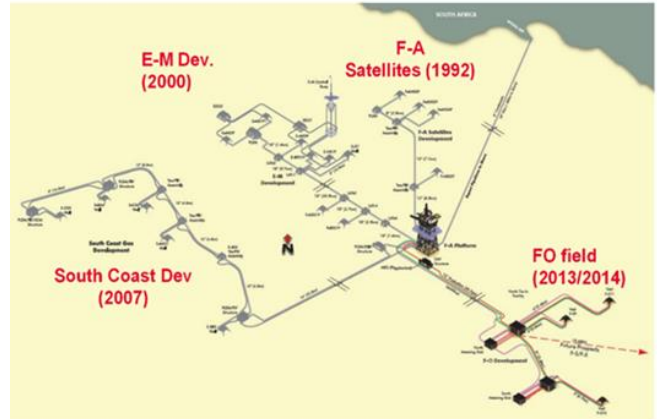
The F-A Platform was commissioned in 1992 when the F-A field started production (Figure 5-1) for the existing F-A Platform and gas field layout). The F-A Platform provided feedstock (gas and condensates) to the PetroSA GTL plant, also commissioned in 1992, through a gas pipeline and a condensate pipeline. Over the years, the GTL plant has obtained feedstock from the oil and gas fields surrounding the F-A Platform but with insufficient reserves in Block 9, the F-A Platform has been idle since the end of 2020, together with the GTL plant.

The proximity of the F-A Platform with the Block 11B/12B would allow its integration in the project, with necessary upgrades to allow for processing of gas and condensate from Block 11B/12B. Based on current estimates, the Block 11B/12B hydrocarbons could extend the operational life of the F-A Platform and associated infrastructure by up to 25 years.

TEEPSA is currently in discussion with PetroSA regarding the use of the F-A Platform and the pipelines linking it to shore as part of the 11B/12B development project.

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<sup>14</sup> The South African Gas Development Company, also known as "iGAS", is a state-owned agency established per the Ministerial Directive dated 2 October 2000, for the development of the hydrocarbon gas and gas infrastructure in Southern Africa.



**Figure 5-1 – PetroSA F-A Platform and Schematic Diagram of Block 9 Layout**

### 5.3.1.3 PetroSA Gas-to-Liquid Plant

The GTL Plant was purpose-built to take advantage of the gas and condensates resources discovered in the Block 9 and, over the years, it has obtained feedstock from the oil and gas fields surrounding the F-A Platform. However, the GTL plant under care and maintenance due to declining gas reserves to provide feedstock to the plant ([www.iol.co.za](http://www.iol.co.za) – “Questions raised over future of loss-making state-owned fuel company PetroSA”, 11 October 2022).

The uncertainty over the PetroSA GTL plant is well documented with various, ultimately unsuccessful, proposals for alternative feedstock sources since the early depletion of the offshore Licence Block 9 FO gas field intended to supply the GTL plant.

PetroSA has been looking for various ways to ensure a future to the plant, including some modifications of its production scheme, and for this purpose launched several RFPs at the beginning of 2023, contemplating various options, based on gas, and/or condensates, and/or crude oil.

TEEPSA is currently in discussion with PetroSA to supply the GTL plant with gas and condensate from Block 11B/12B. PetroSA has indicated that it can take 234 000 m<sup>3</sup>/h of gas from Block 11B/12B as well as its entire potential condensate production.

(<https://www.energyvoice.com/oilandgas/africa/petrochemicals-africa/476899/petro-sa-mossel-bay-gtl/>).

### 5.3.1.4 Domestic Gas vs. imported gas and LNG

Currently 90% of natural gas demand in South Africa is met through importation by Sasol of natural gas from the Pande and Temane gas field located in Mozambique. This supply will start declining sharply from 2026, with a potential depletion date in the early 2030 (Engineering News, [South Africa facing a so-called gas cliff, but gas supplier has alternative ready \(engineeringnews.co.za\)](http://engineeringnews.co.za), 29 November 2022). This will leave many gas users in the north east of South Africa without supply. In order to solve this problem, and more generally in order to implement the strategy of an increase of the share of gas in the South African energy mix, the South African authorities are considering the development of LNG import projects, namely in Saldanha, Coega and Richards Bay. The Matola Project in Mozambique could also supply gas to the country through the Rompco pipeline.

If LNG imports can be a solution to supply gas demand, locally produced domestic gas, such as the one that is planned to be produced by the 11B/12B project, presents a number of benefits compared to LNG: as domestic gas is produced locally and is not sourced on international markets like LNG, it has a shorter supply chain, and it doesn't have to be linked to international commodity prices, and can therefore be more attractive and more stable in terms of price, which would be beneficial for South African buyers and the South African economy. Domestic gas also generates revenues for the South African state in the form of taxes and royalties, and also creates economic activity in the country, as opposed to abroad in the case for imported gas. Using domestic resources as opposed to imported resources also improves the energy security of the country, as well as the balance of payments. Therefore, in the perspective of using natural gas in the South African energy mix, it is much more beneficial to do it with domestic resources than with imported resources.

## 5.4 PROJECT RISKS AND OPPORTUNITIES

This section summarises the key risks and opportunities identified in the technical studies undertaken for the Block 11B/12B ESIA. These risks and opportunities localise the development of oil and gas in the context of the prevailing environmental, social and economic conditions.

### 5.4.1 ENVIRONMENTAL RISKS AND OPPORTUNITIES

Technical studies of the potential impacts resulting from the activities undertaken as part of the development of Block 11B/12B identified the following key risks and opportunities to the marine environment:

- Conflict with marine planning and protected areas:
  - The Garden Route National Park was declared a protected area in 2009 and comprises terrestrial, coastal (to the high-water mark) and nearshore zones between Wilderness in the west and Tsitsikamma in the east. The undated Draft Management Plan identifies offshore oil and gas exploration and subsequent potential production initiatives as a threat to the Park and specifically identifies the threat of oil and gas exploration as a potential new source of pollution to the marine buffer zones.  
The proposed development guidelines include support only for climate-resilient development and to engage with stakeholders to prevent pollution of coastal and marine resources (South African National Parks. Garden Route National Park: Draft Park Management Plan for the Period 2020-2029. Undated).
  - The Marine Spatial Planning Framework is a requirement of the Marine Spatial Planning Act, 2018 (Act No. 16 of 2018) and integrates multiple interests in the marine environment and aims to promote good governance of the ocean. The Framework provides high-level direction for undertaking marine spatial planning and describes the process for preparation, implementation, evaluation and revision of the Marine Area Plans.  
Marine Area Plans contain defined categories of uses for specific areas, so-called 'zones' that pre-define desired combinations of use to minimise conflicts, create greater transparency for developers and investors and make processes such as licensing more efficient (DFFE, 2021. National Framework for Marine Spatial Planning in South Africa. Department of Forestry, Fisheries and the Environment, Cape Town: South Africa).

The Draft Offshore Oil and Gas Sector Plan: Input for Marine Spatial Planning (MSP) identifies Proposed Oil and Gas Production Zones where priority will be given to the extraction of oil and gas resources.

The following activities are regulated in the zone as they could impede the primary use, but can be approved as consent use:

- Laying of new underwater communication cables
- Strict spatial environmental protection that would be incompatible with production activities (e.g., gazettement of new Marine Protected Areas).

Given the nature of the activities involved in oil and gas production, the following uses are prohibited in this zone:

- Military practices

Shipping is prohibited adjacent to surface oil and gas infrastructure based on the existing Traffic Separation Scheme (TSS) south of Mossel Bay. If required, new TSS's may be introduced to minimize risks to new oil and gas platforms and infrastructure.

- The Draft Marine Draft Marine Biodiversity Sector Plan (2023) identified the installation of subsea pipeline associated with oil and gas processes as non-compatible within the proposed CBA Natural areas and, where avoidance of the proposed CBA area is not feasible, alternative CBAs and/or biodiversity offsets are to be identified to meet targets for the same biodiversity features that are found at the site. Notwithstanding that selection of well locations and the final pipeline alignment will take care to avoid designated areas, in the event of disturbance, there will be a requirement for out-of-kind biodiversity offsets or compensation to meet biodiversity management targets.
- Commercial and Small-scale Fishing:  
Although there is some overlap between the Block 11B/12B Project Development Area and fishing grounds for several commercially important species, the significance of the impact of Project activities on these fish stocks is low to negligible.

For Project activities within the Priority Exploratory Area, overlap with two commercially important species is evident but can be abated with appropriate communication and coordination with the sector prior to activities commencing.

Given that there is limited overlap of Project activities and associated safety zones within Block 11B/12B or the pipeline routing options with commercial and small-scale and mariculture activities, the significance of the impact on fish stocks important to fisheries is negligible.

- Greenhouse Gas (GHG) emissions and climate change effects:  
The PetroSA GTL plant utilises the Fischer-Tropsch process that converts hydrocarbons to synthetic fuels (synfuel) and chemicals. If the plant, together with other local conventional refineries is closed, approximately 80% of South Africa's refining capability would be lost but with a reduction of only 6% of the sector's carbon emissions. The remainder of the carbon emissions, approximately 90%, are linked to the synfuel production of the Sasol Secunda coal-to-liquid plant that provides feedstock to the Sasol gas-to-chemicals plant (National Business Initiative. Just Transition and Climate Pathways Study for South Africa. Chapter 02: Decarbonising South Africa's Petrochemicals and Chemicals Sector. Undated).



The Project will emit 1,5 MtCO<sub>2e</sub> of Scope 1 emissions (direct emissions) for all Project phases. South Africa's climate change mitigation target as updated in the 2021 Nationally Determined Contribution (NDC) is in a range of 350 – 420 Mt CO<sub>2e</sub> for the period of 2026 to 2030. In comparison to South Africa's targeted total national inventory for 2030 of 350 MtCO<sub>2e</sub>, the Project's average annual emissions will increase the national inventory by 0,016% (including the construction and the decommissioning phases). The GHG emissions from the F-A platform, which is an associated facility to the Project is a Scope 3 emission and would amount to approximately 4 MtCO<sub>2e</sub> over the production period of 25 years.

Climate-driven changes to the metocean conditions in the region of the Project are unlikely to adversely impact on the subsea infrastructure. The F-A Platform is vulnerable to ocean conditions and climate-change adaptation requirements that may be necessary for operation over the life of the Project and to conform to safety standards will be considered in the engineering design of ongoing upgrades and maintenance to the Platform.

The challenge to the oil and gas sector is to employ technology and operating practices that minimise the GHG emissions. TotalEnergies has committed to no routine operational flaring and GHG emissions from Block 11B/12B will be included in annual corporate reporting.

#### **5.4.2 SOCIO-ECONOMIC RISKS AND OPPORTUNITIES**

Technical studies of the potential impacts resulting from the activities undertaken as part of the development of Block 11B/12B have highlighted the following risks and opportunities to the socio-economic environment:

- **Safeguarding employment and skills:**

Both the PetroSA and the Gourikwa Power Plant are located within the Garden Route District (GRD) Municipality and the Mossel Bay Local (MBL) Municipality. Although petroleum products are not listed in the District's Top 10 exports, the report acknowledges the contribution of the GTL plant to the district and local economy (Western Cape Government Provincial Treasury. 2022-2023 Municipal Economic Review and Outlook (MERO) Garden Route District. November 2022).

Citing Burkhardt (2021), the 2022-2023 MERO report cites job losses of 500 out of 1200 employees due to the partial closure of the PetroSA plant in 2020. The report also recognises that the GTL plant losses are likely to impact job losses throughout the District in sectors such as manufacturing and transport, as increased production costs induce lower demand workers in these sectors.

The development of Block 11B/12B can potential safeguard the direct and indirect employment opportunities generated by PetroSA and the support afforded to local business and the regional economy. PetroSA also invests in the local communities with education, health, community development and environmental and sustainable development programs (PetroSA website).

- **Economic contribution:**

Given the requirement for highly technical skilled and experienced personnel working on drill vessels and subsea and pipeline installation vessels, limited employment opportunities will be created in the construction and closure phases of the Project. The 25-year production phase of Block 11B/12B will create opportunities for skills development, particularly in areas relating to the operation and maintenance of the F-A Platform. TEEPSA will work with PetroSA to implement



appropriate training and skills development programs to ensure that technical and managerial personnel are appropriately trained to manage the Project.

The Project contribution to the local and regional economy will be limited to the purchase of goods and services. However, these opportunities will be maximised by a Project policy that will give preference to local procurement.

The Social and Labour Plan (SLP) prepared in support of the Production Right application focuses on identifying opportunities for economic empowerment and skills development and training in local communities. The SLP will identify opportunities in communities to support and also provide for learnerships and skills development; particularly in anticipation of the Project 25-year production period.

Once first gas commences, the Project will pay the Treasury taxes, royalties and levies that are due on oil and gas production.

- Fisheries sector:

The nearshore and offshore environments the southern cape coast support several commercial and small-scale fishers. While disruption to fishing activities in areas where Block 11B/12B overlaps with fishing grounds for longline pelagic and squid jig fishing, this can be minimised with planning and coordination with all fishery sectors during exploration, construction and closure phases. The safety zones that will be established around the specialised vessels undertaking Project work during these phases will be temporary with the longest exclusion being around metocean buoys deployed to collect further information on conditions within Block 11B/12B.

The production phase is unlikely to conflict with small-scale fishing activities that occur in the near-shore and intertidal zone. The small-scale fishers that venture the distance offshore to fish in the fishing grounds that overlap with Block 11B/12B may be affected by the temporary and permanent safety zones; however, careful coordination with small-scale fishing associations, the impact of restricted access on livelihoods can be minimised, if not avoided altogether.

- Marine tourism:

Several tourism activities based on the scenic terrestrial and coastal landscape are supported along the south coast. There is also a substantial economic effect due to the demand for goods and services by the tourism sector that creates employment opportunities in these supporting sectors. The potential disruption to tourism activities by Project activities can be minimised with planning and coordination to ensure that Project activities do not disrupt either maritime tourism such as cruise ships calling at Mossel Bay or the nearshore tourism activities such as sailing, fishing, SCUBA diving, shark diving and whale watching.

- Intangible cultural heritage:

The marine and coastal environment holds a special place in the heritage and culture of the First Nations/Indigenous Peoples of the south coast area. The risk of the Project impacting on the tangible and intangible heritage is negligible other than in the instance of an oil spill or pipe leak.

### 5.4.3 SPILL AND PIPELINE LEAK

While gas and condensate released into the environment degrades faster than crude oil, a spill or pipeline rupture would have a catastrophic impact on the offshore, nearshore and coastal zone ecology and biodiversity, as well as intangible cultural heritage. The technical reports prepared for





the ESIA identified the following as the critical elements of an oil spill under various seasonal conditions:

- Dispersion and dilution of the oil and condensate in the deep ocean and on continental shelf water column.
- Direction of travel of the oil and condensate, with reference to offshore and coastal sensitive ecological areas.
- The time to reach the nearest point of the coastline and the areas of the coastline where the oil and condensate would spread.

The models are indicative and represent a best estimate of the event. However, it is recognised that if an oil spill were to reach the coastline in any quantity, it would have a significantly adverse impact on marine life, the rugged coastline of the south coast and on the estuaries open to the sea, especially the ecological sensitive Knysna lagoon that hosts a sanctuary for a population of seahorses. Apart from the necessary clean-up and restoration of affected habitat, the community would be compensated if they were to suffer a collective loss related to intangible cultural heritage due to the event. The disturbance would be remedied in a culturally appropriate manner to ensure that the marine environment can be restored as a dwelling place for ancestral spirits.

While there are national, regional and local resources that could be mobilised quickly to respond to an oil spill and the Project developer would be legally liable for the clean-up and rehabilitation costs, the only effective mitigation is that all phases of the Project are conducted to the highest operational standards to ensure that no spills or leaks occur.



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