

1.1 BACKGROUND TO THE PROJECT

Sasol Petroleum Mozambique Limitada (Sasol) has obtained approval from the Mozambique Council of Ministers for the Production Sharing Agreement's (PSA) Field Development Plan (FDP) that will see further hydrocarbon resources developed to support the economic growth of Mozambique.

What is The Production Sharing Agreement (PSA)?

Sasol Petroleum Mozambique (SPM) has a Production Sharing Agreement (PSA) with the Government of Mozambique and ENH (Empresa Nacional de Hidrocarbonetos). In turn, a Petroleum Production Agreement (PPA) has been entered into between Sasol Petroleum Temane (SPT) and its partners [Companhia Moçambicana de Hidrocarbonetos (CMH) and the International Finance Corporation (IFC)] and the Government of Mozambique which covers the currently- producing assets of the Temane and Pande fields.

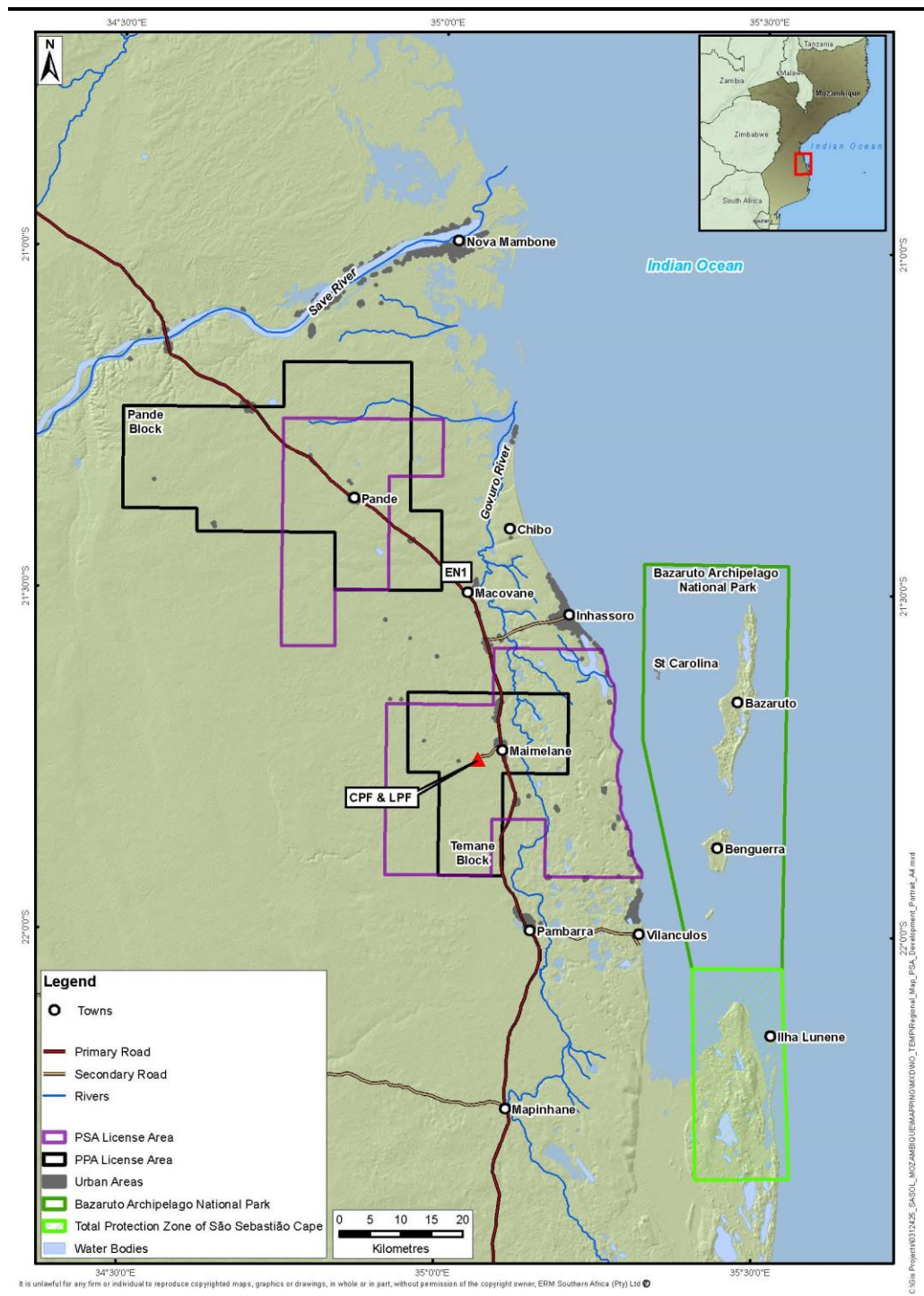
- **The PPA** and PSA licences overlap each other to a large extent in both the Pande and Temane areas. The PPA licence applies to specific hydrocarbon bearing formations within these areas.
- **The PSA licence** covers all other formations in the Temane and Pande geographical areas for which a Field Development Plan has been approved for development, and also includes other fields and prospects where exploration and appraisal wells have been drilled but have not as yet been declared commercial.

The PSA Development comprises various hydrocarbon reservoirs in the Temane, Pande and Inhassoro areas; all of which are located in the Inhambane province of Mozambique, 40 km north-west of Vilanculos and 560 km north of Maputo (*Figure 1.1*). Under the terms of the PSA license agreement, Sasol holds a 100 percent working interest as Operator.

Sasol's gas processing plant, known as the Temane Central Processing Facility (CPF), is situated in Temane 40 km northwest of Vilanculos. The plant began operation in 2004, supplied by wells situated in the Temane Gas Field. All of the plant's production is delivered as either pipeline gas to South Africa, as condensate by road to Beira for onward shipment, or is used in Mozambique for industrial purposes and power generation. In Inhambane Province, the gas is supplied to the EDM (Electricity of Mozambique) gas-fired power station, which generates electricity for Inhassoro, Vilanculos and surrounding areas.

Since the Natural Gas Project (NGP) was first established, Sasol has brought further gas wells on stream in the Temane and Pande Gas Fields. At present, the CPF is supplied by 24 onshore production wells, 12 in the Temane Field and 12 in the Pande Field. Production at the CPF has been ramped up to process the additional gas and liquids and current production is around 197 GJ of gas per annum and 250 m³ per day of condensate.

Figure 1.1 Regional Map of the PSA Development Area

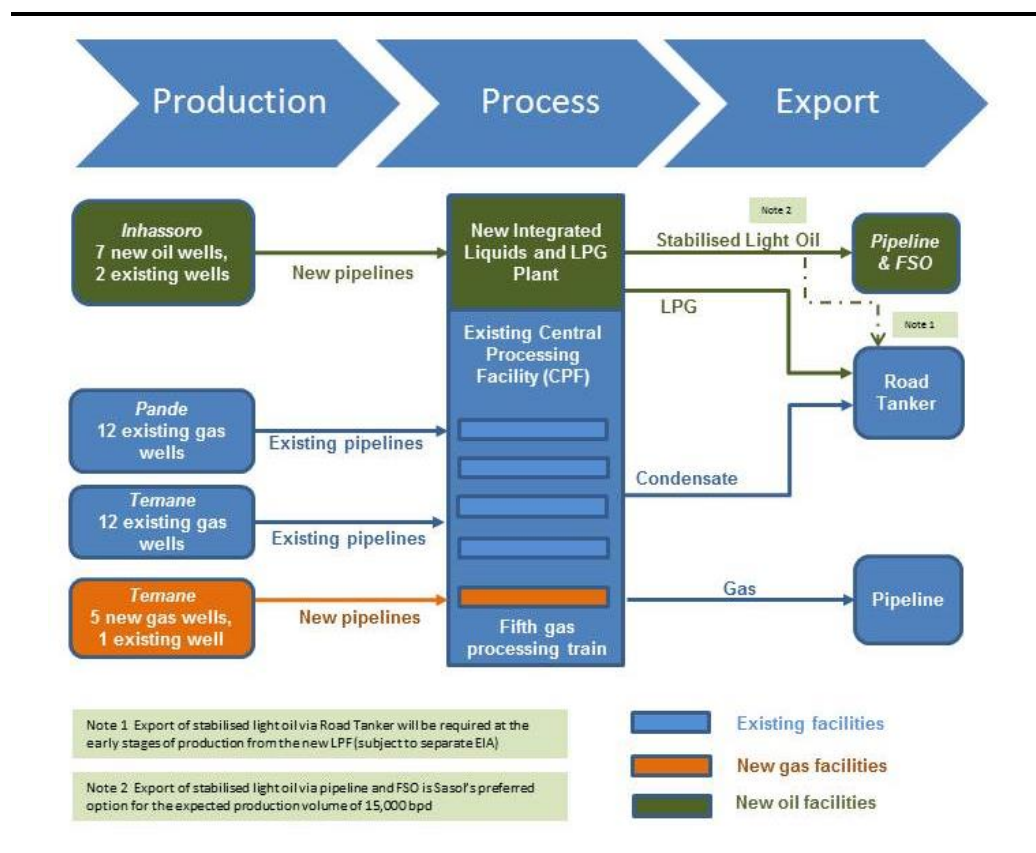


Sasol is committed to the phased evaluation and development of additional oil and gas resources within its concession areas.

In 2014, detailed technical and environmental work on the PSA Development and LPG Project was started, which involves the expansion of the CPF and the development of a new Liquids Processing Facility (LPF) adjacent to the CPF, in order to process additional PSA gas, condensate and light oil from the area defined in the Production Sharing Agreement with the Mozambique Government. The light oil is very similar to the existing condensate, being a straw-coloured liquid with a consistency like paraffin.

The proposed Project will significantly increase Sasol’s capability to process gas and liquids, and the LPF will include a facility to produce Liquefied Petroleum Gas (LPG) to replace much of the LPG currently imported at significant cost to Mozambique (*Figure 1.2*). The environmental license for the PSA Development and LPG Project was issued by MITADER in December 2014, following review of the PSA Development and LPG Project EIR (Golder, 2014). The license excluded authorisation of the transportation of the additional hydrocarbon liquids, which will increase from 250 m³ to 2 500 m³ per day.

Figure 1.2: Conceptual Overview of the PSA Development Project, Including New Oil and Gas Wells, Flowlines, Production Facilities and Product Transport



There remains some uncertainty about the quantity of light oil that will be produced and an alternative transport option, suited to larger volumes, is to pump it via an onshore and offshore pipeline to an offshore Floating, Storage and Offloading unit (FSO), some 50 km north of Bazaruto island (*Figure 1.3* and *Figure 1.4*), where it can be collected by shuttle tankers. The pipeline will extend from the LPF along the route of the existing Pande trunkline, turning north-eastward to a landfall some 17 km north of Inhassoro, and from there routed offshore for approximately 50 km in a north easterly direction to the proposed FSO.

It is also possible that road transportation would be preferred initially, followed by the pipeline / offshore storage option as volumes ramp up. Sasol therefore wishes to license both the road and pipeline / offshore storage transport options as a part of the PSA Development Project, in order to provide flexibility in later planning once liquid volumes are confirmed. The latter method, known as the Sasol Pipeline and FSO Project for the exportation of stabilised light oil, is the subject of the current report.

Figure 1.3 *A Map of the Proposed Pipeline and FSO Location*

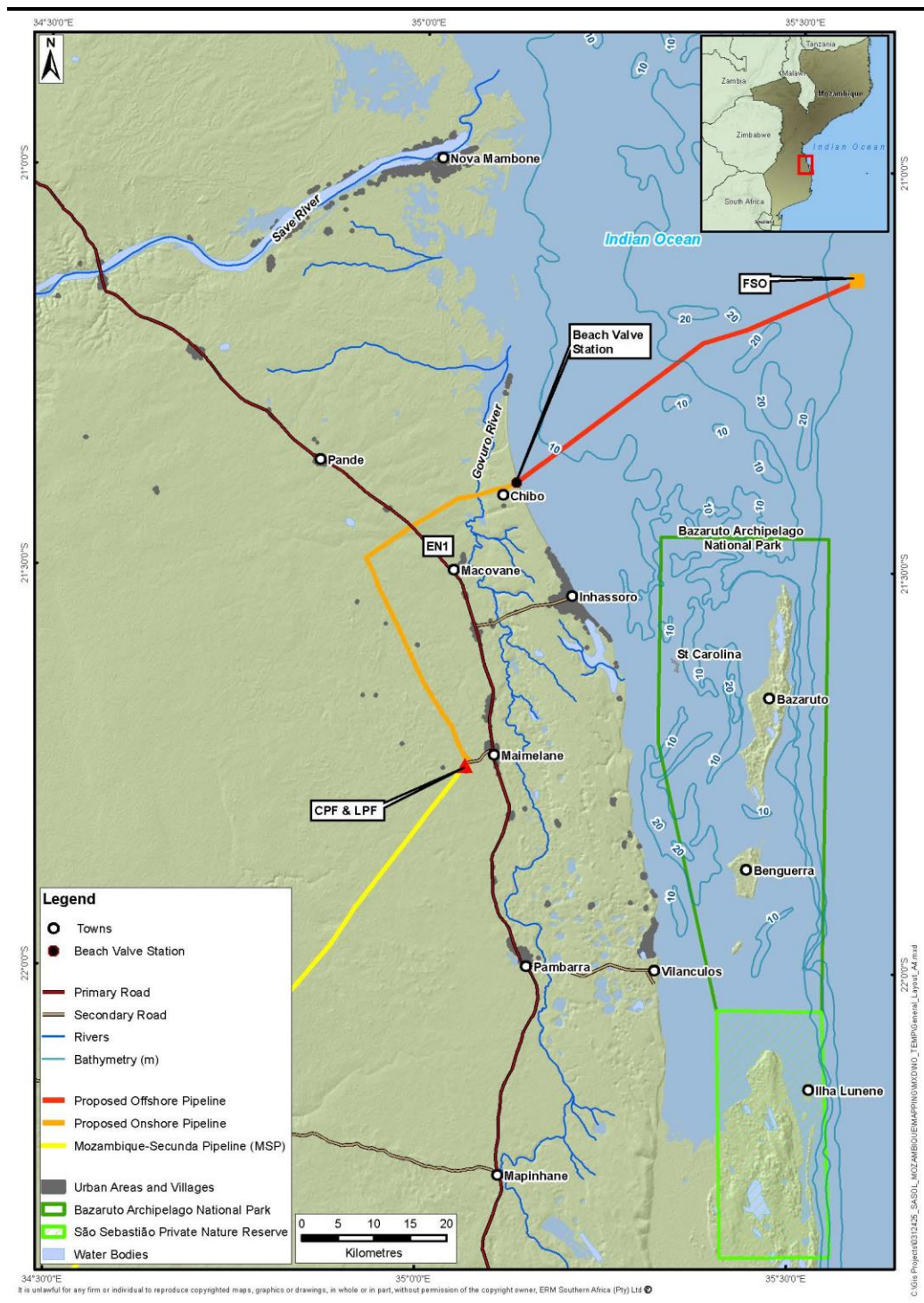
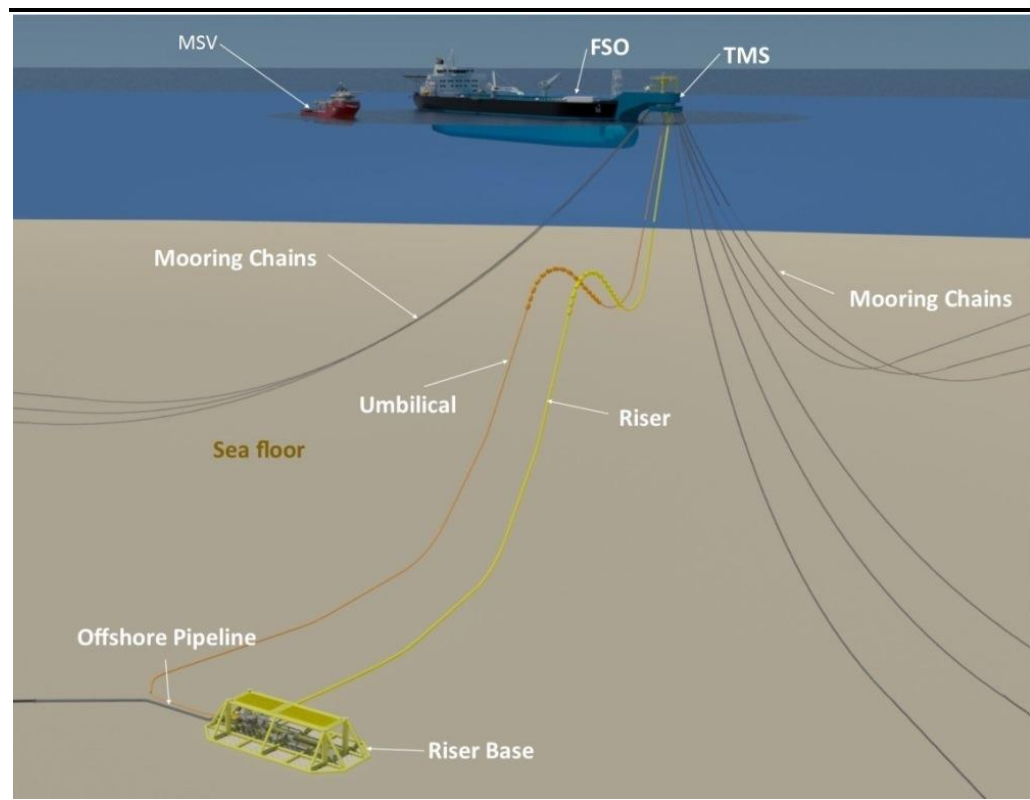


Figure 1.4: Field Layout of FSO, Mooring and Subsea Infrastructure



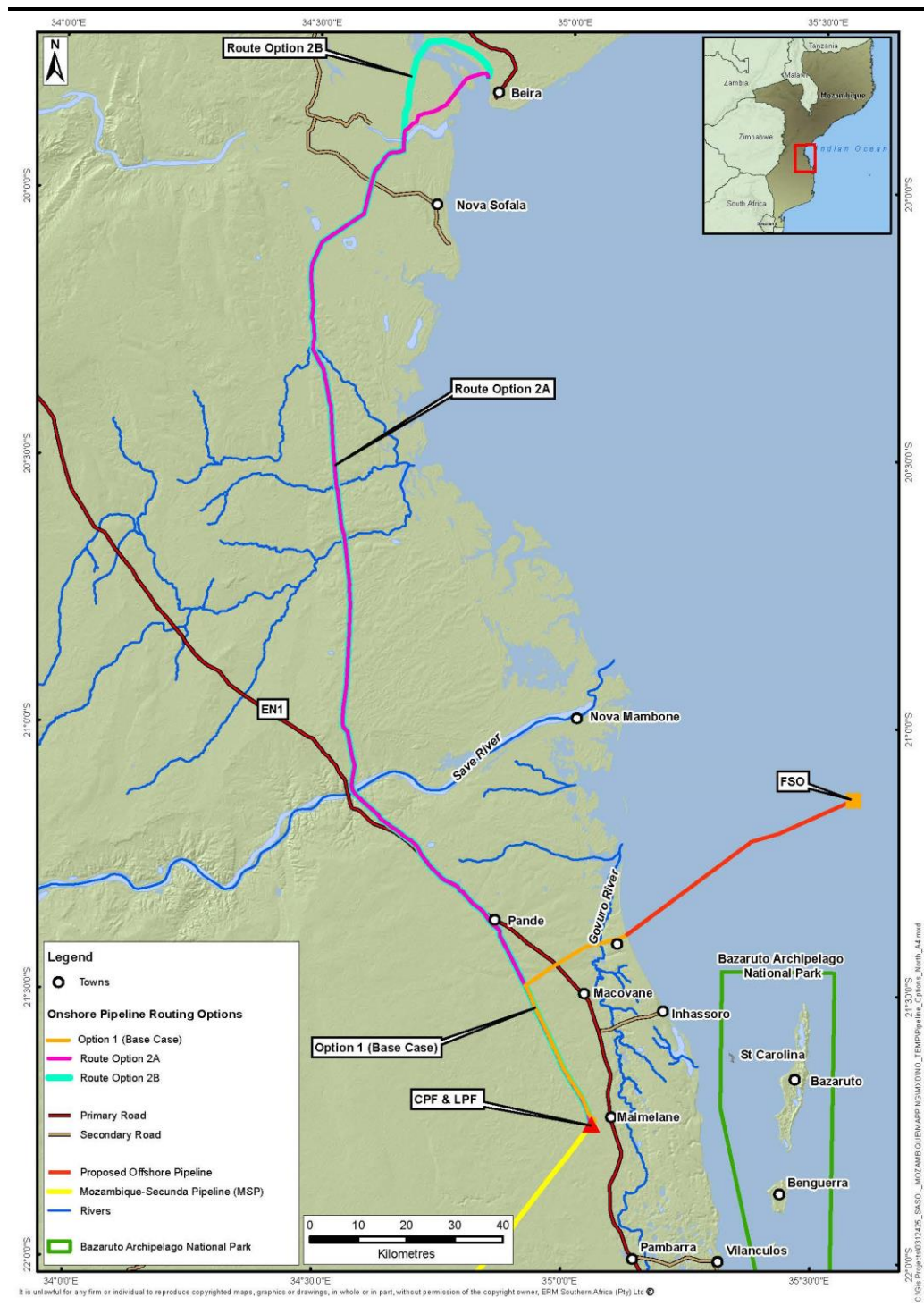
1.2 PROJECT MOTIVATION

1.2.1 Liquid Pipeline Export

During the Select (Feasibility) Phase of the Project, Sasol evaluated the options available for the export of 15 000 barrels per day of stabilised light oil from the new LPF. Two overall liquid pipeline concepts were studied:

- **Option 1 (base case):** The construction and commissioning of an pipeline from the new PSA LPF to an offshore FSO north of the Bazaruto Archipelago (*Sasol Pipeline and FSO Project, refer to Figure 1.3*).
- **Option 2 (alternative to base case):** The construction and commissioning of an onshore pipeline from the new PSA LPF at Temane to the tank farm at the Beira Offloading Terminal (*Figure 1.5*) and including the following alternatives:
 - **Option 2A:** A 258 km 12 inch pipeline to Beira offloading terminal including a 7.5 km Beira Estuary crossing; and
 - **Option 2B:** A 291 km 12 inch pipeline to Beira offloading terminal including a 33 km re-route avoiding the Beira Estuary crossing.

Figure 1.5: Evaluation of Export Pipeline Concept Options



Option 1 (the *Sasol Pipeline and FSO Project*) was carried forward for further engineering definition as it was considered technically and commercially feasible owing largely to the shorter onshore and offshore pipeline lengths and subsequent terrain to be crossed.

Option 2 was rejected based on cost and the technical constraints surrounding the construction methods for a pipeline crossing of the Pungwe River at the Beira Estuary.

The onshore pipeline to Beira in general was considered to be significantly more challenging than Option 1 in terms of construction, requiring four major river crossings.

1.2.2 *Road Tanker Export*

An alternative to the liquid pipeline approach is liquid export via road transportation. This is essentially an expansion of an activity already in progress over the past 10 years for the 250m³ per day of PPA condensate along the same routes (ie the Temane to Beira and Temane to Maputo routes).

The use of a pipeline as an alternative to road transportation of the stabilised light oil is generally determined by the volume to be transported. As volumes increase, the cost of constructing and operating a pipeline becomes attractive, when compared with road – based transport alternatives. The use of a pipeline also presents opportunities to reduce the overall Safety Health and Environmental (SHE) risks associated with road tanker transportation, namely road traffic accidents.

The exact volume of liquids for export will be confirmed during the initial PSA Drilling campaign (in 2016 and 2017). Should the volume of stabilised light oil be lower than anticipated following the results of the PSA Drilling campaign, Sasol may consider the continuation and expansion of the current road tanker liquid export option. However, for the anticipated production volume of 15 000 barrels per day, the liquid pipeline method (the *Sasol Pipeline and FSO Project*) is Sasol's preferred option and will be assessed by this Scoping and EIA process.




1.3 *HISTORY OF SASOL IN THE PROJECT AREA*





Sasol's presence in this region was established in 1998 when, in partnership with Arco^[1], exploration seismic surveys in Pande and Temane were conducted as well as five wells drilled in Temane. This led to the signing of the PSA between Sasol and the Government of Mozambique in October 2000, this agreement served as the basis for Sasol's investment in the Natural Gas Project (NGP). In 2001, as part of the NGP, Sasol commenced the construction of the Central Processing Facility (CPF) and the 865 km Mozambique-Secunda Pipeline (MSP). The NGP became commercial productive in February 2004.

Table 1.1 places the PSA Development and LPG Project in the context of Sasol's activities which have taken place since February 2004 and describes planned future Projects.

^[1] Sasol bought Arco's shares in the project in 1999

Table 1.1 Stages of Development of Sasol's Natural Gas Project since 2004

<p>Initial Production Activities (2004)</p> <p>The first phase of the Sasol Natural Gas Project (NGP) involved the initial extraction, processing, transportation and utilisation of natural gas reserves in the Inhambane Province of Mozambique. The Mozambique component of this consisted of:</p> <ul style="list-style-type: none"> • Development of the Temane Gas Field, including the installation of wells and construction of flowlines and access routes between the wells and the Central Processing Facility; • The establishment of a CPF at Temane, which separates the gas from liquid hydrocarbons and produced water which is present in the well fluids; and • The construction of an 865 km pipeline between Temane in Mozambique and Ressano Garcia (and then onward to Sasol's gas reticulation network at Secunda in South Africa). <p>Related to the NGP, the Government of Mozambique (GoM) entered into a gas sales agreement with the Matola Gas Company (MGC) to sell a portion of the Petroleum Production Tax taken in kind (royalty gas). MGC undertook the construction of a 68 km pipeline from the off-take point at Ressano Garcia to Matola, for distribution to industrial clients in Matola and Machava.</p>	 <p><i>Avoidance of large baobabs during the construction of the Mozambique - Secunda Pipeline (MSP).</i></p>  <p><i>Livelihood restoration monitored in accordance with Sasol's Resettlement Planning and Implementation Programme for farmers who lost crops.</i></p>
<p>Other Drilling and Construction Activities (2006-2008)</p> <p>As part of the 2006-2008 Drilling Campaign to support the CPF expansion project, as described above, a further eight appraisal wells on the eastern side of the Govuro River were drilled and fourteen old wells were permanently plugged and abandoned. In addition, three exploration wells were drilled.</p>	 <p><i>Rehabilitation of an abandoned well site using drilling mud waste</i></p>

<p>Development of Additional Capacity to Supply Gas (2006-2009)</p> <p>In order to sustain the CPF expansion, the capacity to produce gas from the Petroleum Production Agreement (PPA) area was increased. This involved the development of the Pande G6 gas reservoir as well as increasing the production capacity of the Temane G9 reservoir. Pande gas is conveyed to the Temane CPF by means of a 48 km long trunkline. The first production from the Pande Field started in July 2009.</p>	 <p><i>Community Pedestrian and Road Safety Programme in Pande, developed by Sasol and the Provincial Roads authorities.</i></p>
<p>Increasing the Capacity of the MSP Compressor Stations (2007-2010)</p> <p>In accordance with a long-term strategy to increase gas flow in the Mozambique-South Africa pipeline, Sasol undertook detailed planning of compressor stations at Komatipoort, in South Africa, and at Dindiza, Gaza Province, in Mozambique. The design of the facilities includes above ground infrastructure housing two compressors driven by gas turbines.</p>	 <p><i>Compressor station at Komatipoort</i></p>
<p>Expansion of the Temane CPF (2007 - 2011)</p> <p>The Natgas 183 Expansion was designed to increase the production capacity of the plant from 120 PJ/a to 183 million PJ/a.</p> <p>The project consisted of the installation of additional equipment within the CPF perimeter, designed to process the additional volumes of gas, store increased volumes of by-products, and provide additional capacity to treat and safely dispose of waste products.</p>	 <p><i>MBR sewage treatment plant installed at the CPF to significantly increase treatment capacity as a part of the NATGAS 183 Project.</i></p>
<p>Onshore PSA Seismic Acquisition Campaign (2009)</p> <p>In March 2009, Sasol launched its third onshore seismic project in two areas, one between Mabote and Maphinane in the southern section of the Exploration Block and the other north of the PandeGas Field and the Save River. A total of 927 km of seismic lines were de-mined and shot.</p>	 <p><i>Gradual recovery of woodland along an old seismic line cut in 2009</i></p>

Onshore Drilling Campaign (2010-2011)

The drilling campaign included two exploration wells, one north of the Save River and one south of the Temane Field, a horizontal appraisal well in the Inhassoro District and a second produced water reinjection well at the Temane CPF, designed to provide Sasol with redundancy in the event of reinjection failure at one of the wells. In addition, eight wells were recompleted in both the Temane and Pande Fields in order to improve gas production flows.



Using mixed-bury-cover (MBC) to dispose of drilling waste at Inhassoro well pads

CPF LP Compression and Electrical Expansion Projects (2013-2014)

Following on from the Natgas 183 Expansion commissioned in October 2011, the CPF facilities upgrade includes further infrastructure designed to ensure continued efficient production of gas at the CPF over time. The project entails the construction of additional low pressure (LP) compressors driven by gas turbines and installation of additional gas turbine generators for power supply. Construction of the first two LP compression units began in 2014 and was completed in 2015. Work on the remainder of the project will continue, in phases, until 2022.



Measuring emissions from the plant stacks as a basis for air pollution modelling of cumulative impacts.

Increasing the Capacity of the MSP Loop Line Project - Phase 1 (2013-2015)

The intention to increase the gas value chain to meet expected market demand has necessitated further increases in the capacity of the MSP. The loop line was planned to increase the capacity of the MSP from 170 MGJ/annum to 212 MGJ/annum. The completed loop line will be 254 km long, routed from the Temane CPF to Scraper Trap Station 2 and installed in the same right of way as the MSP. The first (128 km) phase of the loop line became operational in December 2014, routed from the CPF to Scraper Trap Station 1. This phase will increase the MSP's capacity to 188 MGJ/a. Construction of the second phase of the project will start in 2015, with operation expected by January 2017.



Cleaning of earth moving equipment brought into the loop line construction area for invasive plant prevention.

Mozambique Gas to Power Project (CTRG) (2014)

In 2014, in-country monetisation of Mozambique’s gas resources on a large scale reached a milestone with the commissioning of Central Térmica de Ressano Garcia, known as CTRG. Completed at a cost of US\$246 million, CTRG is a 175MW gas-to-power plant that is a joint venture between *Electricidade de Moçambique* – 51 percent and Sasol 49 percent. This, the first permanent, gas-fired power plant in Mozambique, supplies electricity to more than two million Mozambicans, equating to 23 percent of the country’s current demand.



One of seventeen graves identified for exhumation at the CTRG site, prior to construction. Revision of the site boundaries avoided all but one these exhumations.

The PSA Development & LPG Project (2014-2020)

This Project involves the development of five new gas wells and seven new oil wells in the PSA (plus two existing oil wells), to be delivered to a new LPF built adjacent to the Sasol CPF. The Project is to include increased production of gas, light oil and LPG, which will replace much of the imported product currently imported into Mozambique.

Project licensed by MITADER on 12 December 2014, based on submission of a full EIR and Environmental Management Plans. The license was revised on 16 March 2016 based on an EIA Addendum and revised EMPs.

Environmental licensing of road transport and the onshore /offshore pipeline and FSO is in progress in separate EIAs.



The Nhangonzo Coastal Stream, a potential ‘Critical Habitat’ identified during the PSA Development EIA.

NGP Seismic Acquisition Project (2015-2017)

Sasol proposes to conduct further 2D and focussed 3D seismic acquisition over large areas of its PPA and PSA license areas. In the short term, an urgent programme has been scheduled in the Pande and Inhassoro Fields, within the PPA and PSA license area, to support the development of G10 and G6 oil reservoir well drilling plans and the remediation of the Pande 4 well. Both 2D and 3D seismic data will be acquired.



Encephalartos ferox identified in the Govuro River floodplain near Nova Mambone during fieldwork for the NGP Seismic EIA Addendum.

Proposed Mozambique Gas to Power Project (MGtP) (2015 -2020)

To further reduce Mozambique’s reliance on foreign power imports, Sasol and the Mozambique state power company, EDM, propose to develop the Mozambique Gas to Power (MGtP) Project, a 400 MW natural gas power plant supplied with PSA gas from the existing Sasol Central Processing Facility. The proposed MGtP site is located in close proximity to the CPF, approximately 500 m south of the existing fence line.

In addition to the plant itself, the MGtP project will include a 25 km long 400 kV power line linking the plant to the national grid, a 13 km long water supply pipeline from the Govuro River, a 3 km long access road and a gas pipeline between the CPF and the power plant. For the construction phase, a temporary beach landing is being considered near Inhassoro, together with some necessary upgrading of roads and bridges between Inhassoro and the CPF.



Example of large equipment being offloaded from a barge - information presented to stakeholders in Inhassoro public meetings.

1.4

THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The Project requires an Environmental License from the Ministry of Land, Environment and Rural Development (MITADER), in accordance with the National Environmental Law (Law No 20/1997), considering both the *Decree* regulating Environmental Impact Assessment (*Decree No. 45/2004* amended by *Decree 42/2008*) and the *Environmental Regulation for Oil Operations (Decree 56/2010)*.

In accordance with *Decree 45/2004*, Sasol has submitted the Project Registration documents to the Ministry of Land, Environment and Rural Development (MITADER) for categorization. As per the *Decree 45/2004*, it has been classified as a ‘*Category A Project*’ (Refer to Appendix 1 of the EIA Regulations), *Reference Number 90/180/DGA/DPTADER/16*, for which a full EIR is required.

In order to obtain an Environmental License, Sasol must prepare an Environmental Impact Report (EIR), in accordance with the Mozambican environmental regulatory requirements. Environmental Resources Management International Services Ltd (ERM) has been appointed by Sasol to manage the EIA process and the submission of the EIR on their behalf.

This document constitutes the Environmental Pre-feasibility and Scoping Report (EPDA) and Terms of Reference (ToR), an essential document in the EIA process, which determines the scope of the EIR itself.

This EPDA Report (hereafter referred to as a Scoping Report) will be presented to Interested and Affected Parties (I&APs) as part of the public participation process, which is mandatory for ‘*Category A*’ activities.

1.5

THE PURPOSE OF THIS SCOPING REPORT

This Draft Scoping Report provides the findings and outcomes of (1) the **EIA Pre-assessment Application** and (2) the **Environmental Pre-feasibility and Scoping** stages *only*. For the purposes of this report, these stages will be termed *Scoping*.

The main objectives of this report are to:

- Present a description of the proposed Project;
- Present the EIA process, methodology and the relevant legislation that will be adhered to;
- Present an initial description of the physical, biological and socio-economic characteristics of the Project Area;
- Identify the environmental and socio-economic issues related to the proposed Project, in the Project Area on which the EIR will be focused;
- Identify any fatal flaws associated with the proposed Project; and
- Present an outline of the Terms of Reference for the various specialist studies that will assess the identified environmental and social issues.

Note – this Scoping Report **does not** present a full baseline assessment or an assessment of the environmental and socio-economic impacts. Rather it is a Terms of Reference for the EIA process to be followed. Detailed answers will be presented in the Environmental Impact Report.

1.6

APPLICANT AND ENVIRONMENTAL ASSESSMENT PRACTITIONER DETAILS

1.6.1

Applicant

The applicant for the proposed Project is Sasol Petroleum Mozambique. The contact details for the applicant are as follows:

SPM - SASOL Petroleum Mozambique

Contact: Ailton Rego

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Tel: +258 357400

Email: ailton.rego@sasol.com



1.6.2

Environmental Assessment Practitioner

ERM is a global environmental consulting firm employing over 5 000 specialists in more than 160 offices in over 40 countries. ERM is one of the largest, totally focused, sustainability consulting firms in the region.

As required by *Decree No. 42/2008*, ERM is registered with MITADER. The contact details for ERM's Mozambique office are as follows:



1.7 DETAILS OF THE EIA PROJECT TEAM

A list of the EIA Team members that will conduct the EIA process on the behalf of Sasol is provided in *Table 1.2*.

Table 1.2 *EIA Project Team*

Activity	Name	Company and Location
Project Management Team		
Partner in Charge and Technical Lead	Ingeborg McNicoll	ERM - South Africa
Project Manager	Dieter Rodewald	ERM - South Africa
In-Country Project Manager	Uke Overvest	Impacto - Mozambique
In-Country Assistant Project Manager	Ricardo Costa Pereira	ERM - Mozambique
Assistant Project Manager	Vicky Stevens	ERM - South Africa
In Country QA/OC	Paula Gonzalez	ERM - Mozambique
Technical Leads		
Marine Specialist	Vicky Stevens	ERM - South Africa
Terrestrial Technical Lead	Jessica Hughes	ERM - South Africa
Social / Resettlement Technical Lead	Callie Philips	ERM - Kenya
Soils/Hydro/ Geohydrology Technical Lead	Ken King	ERM - South Africa

1.8 STRUCTURE OF THIS REPORT

This report comprises ten chapters, the contents of which are listed below:

Table 1.3 *Structure of this Report*

Section	Description
	Non-Technical Summary
Chapter 1	Introduction
Chapter 2	Project Description
Chapter 3	Legal Framework and Best Practice Standards
Chapter 4	The EIA Process
Chapter 5	The Public Participation Process
Chapter 6	Description of the Affected Biophysical Environment.
Chapter 7	Description of the Affected Socio-Economic Environment
Chapter 8	Identification of Key Issues
Chapter 9	Terms of Reference for the EIA Studies
Chapter 10	References

1.9

ASSUMPTIONS AND LIMITATIONS

- This report uses secondary data sources that have been reviewed by ERM. The identified gaps in the data will be addressed during the EIA phase; and
- This report has been prepared using a high level description of the Project which is sufficient for the purposes of Scoping. Additional information will be provided in later reports once the engineering design is more advanced and the technical specifications and requirements are defined.