



**REPUBLIC OF MOZAMBIQUE
CABINET COUNCIL**

NATURAL GAS MASTER PLAN



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NATURAL GAS MASTER PLAN

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List of Acronyms

ME	Ministry of Energy
MF	Ministry of Finances
MIC	Ministry of Industry and Trade
MICOA	Ministry for the Coordination of Environmental Affairs
MINAG	Ministry of Agriculture
MIREM	Ministry of Mineral Resources
MPD	Ministry of Planning and Development
MTC	Ministry of Transport and Communications
MP	Ministry of Fisheries
ENH	National Hydrocarbons Company
INP	National Petroleum Institute

SMEs	Small and Medium Enterprises
EDM	Electricidade de Mozambique (Mozambique Power Company)
INAMAR	National Marine Institute
INAHINA	National Institute of Hydrography and Navigation
ROMPCO	Republic of Mozambique Pipeline Investments Company
TOE	Tonne of oil equivalent
LNG	Liquefied Natural Gas
Tcf	Trillion Cubic Feet

1. Introduction

Mozambique has an enormous energy potential, which provides the country with favourable means to fulfil its domestic and regional energy needs for Southern Africa and beyond. The latest discoveries of mineral coal with reserves estimated at 20 billion tons, and natural gas estimated at 277 trillion metric cubes, as well as, the abundant water resources with a potential of 18.000 MW, puts Mozambique in a very privileged position both in the region and in the world. Its vast potential in the field of renewable energy, particularly biomass, solar and wind energy, also adds to the country's potential as a global reference in the energy sector.

The abundance of resources and privileged geographic location of Mozambique favours the establishment of various industries of regional and global scale. This creates unique opportunities that can accelerate the country's development.

Despite this reality, Mozambique is still one of the least industrialized countries in the world, a scenario that can be overturned with the sustainable use of these resources. Just for reference, it can be mentioned that the total primary energy consumption in 2011 was 8 (eight) million tons of oil equivalent (TOE), which puts the country below the average consumption in the world and in Africa. Furthermore, 78% of the primary energy supplied comes from biofuels (wood, hay, manure, food waste, etc.). With the exception of the big cities, biofuels are still widely used, both for commercial and household purposes, especially in rural areas.

Taking into consideration such a vast potential, it is of the utmost importance that a long-term strategy is drawn to ensure the rational and sustainable use of these non-renewable natural resources, particularly gas; that is, using these resources in such way that they can contribute to the country's socioeconomic development, while at the same time, preserving the environment and ensuring enough resources for future generations to fulfil their energy needs and develop the country. The development of the gas industry, including Liquefied Natural Gas (LNG), megaprojects, gas processing, gas pipelines and other infrastructure may contribute significantly for the growth of the Gross Domestic Product (GDP).

The Natural Gas Master Plan is, therefore, an instrument to promote sustainable development of the country. It is a document of a strategic nature, promoting an intersectoral coordination in the design and implementation of development activities based on natural gas. The Natural Gas Master Plan is an integral part of the strategy of the Government of Mozambique regarding the exploitation of mineral resources and the improvement of infrastructures and human capital development in Mozambique.

In its approach, the Natural Gas Master Plan takes into account the fundamental reality of the country and the energy sector, recognizing that Mozambique is currently a poor country with little infrastructure and its large labour force not yet qualified for fully supporting gas development.

Given the profound and rapid changes that are occurring in Mozambique, the Master Plan should not be seen as a static instrument but as a dynamic document that should be regularly adjusted to the changing reality.

2. Occurrence of Natural Gas in Mozambique

The first natural gas surveys were carried out between 1904 and 1920 in Inhaminga, in the province of Sofala, and in Pande, in the province of Inhambane. The subsequent period, spanning from 1948 to 1974, saw the introduction of more intensive activities, involving prominent oil companies, such as *Gulf & Amoco*, *Hunt*, *Aquitaine e Sunray & Clark & Skelly*. During this period, there were seismic, magnetic and gravimetric surveys, aerial photographs, and earth and sea cartographic studies of over 26.000 kilometers of land. Over the course of the same period, 14 holes were drilled resulting in the discovery of 3 (three) gas fields; namely: Pande, in 1961 (Pande-1), Búzi, in 1962 (Búzi 1) and Temane, in 1967 (Temane-1). However, these discoveries were declared non-commercial.

With the establishment of the state run National Oil Company (*Empresa Nacional de Hidrocarbonetos E.E.*), in 1981, the surveying activity gained new momentum; this time it involved several multi-national companies that between 1981 and 1986 carried out seismic studies on a 25.000 km onshore and in 760 km of offshore area.

In 2000, the South African company, Sasol, which had also conducted important surveying activities in partnership with *CMH S.A. a subsidiary of ENH*, entered into a 25-year agreement with the Government of Mozambique, to develop a project aimed at producing 120 Million Giga Joules of natural gas for domestic use in Mozambique and export it to South Africa. This agreement enabled the implementation of the gas project from the gas fields in Pande and Temane, and the construction of an 865 km pipeline between Temane and Secunda, in South Africa, which in turn, allowed the country to become the biggest producer and exporter of natural gas in the Southern Africa region. The current proved natural gas reserves of Pande and Temane are estimated in over 3.5 Tcf.

Currently, the basins of Mozambique and Rovuma are the most surveyed basins in Mozambique. These two basins have the concession areas or blocks that are licensed to companies interested in undertaking exploration and production activities. The following are the existing concessions:

Table 1: Natural Gas Concessions

Concession	Sedimentary Basin	Operator	Year	Country
Pande/Temane – Petroleum Production Agreement	Mozambique	Sasol	2000	South Africa
Pande/Temane Production Sharing Agreement	Mozambique	Sasol	2000	South Africa
Blocks 16 & 19	Mozambique	Sasol	2005	South Africa
Area 2 & 5*	Rovuma	Statoil	2006	Norway
Sofala*	Mozambique	Sasol	2006	South Africa
Area 1 Offshore	Rovuma	Anadarko	2007	USA
Area Onshore	Rovuma	Anadarko	2007	USA
Area 4	Rovuma	ENI	2007	Italy
Area 3 & 6	Rovuma	Petronas	2008	Malaysia
Buzi	Mozambique	Buzi Hydrocarbons	2008	Indonesia
Area A	Mozambique	Sasol	2010	South Africa

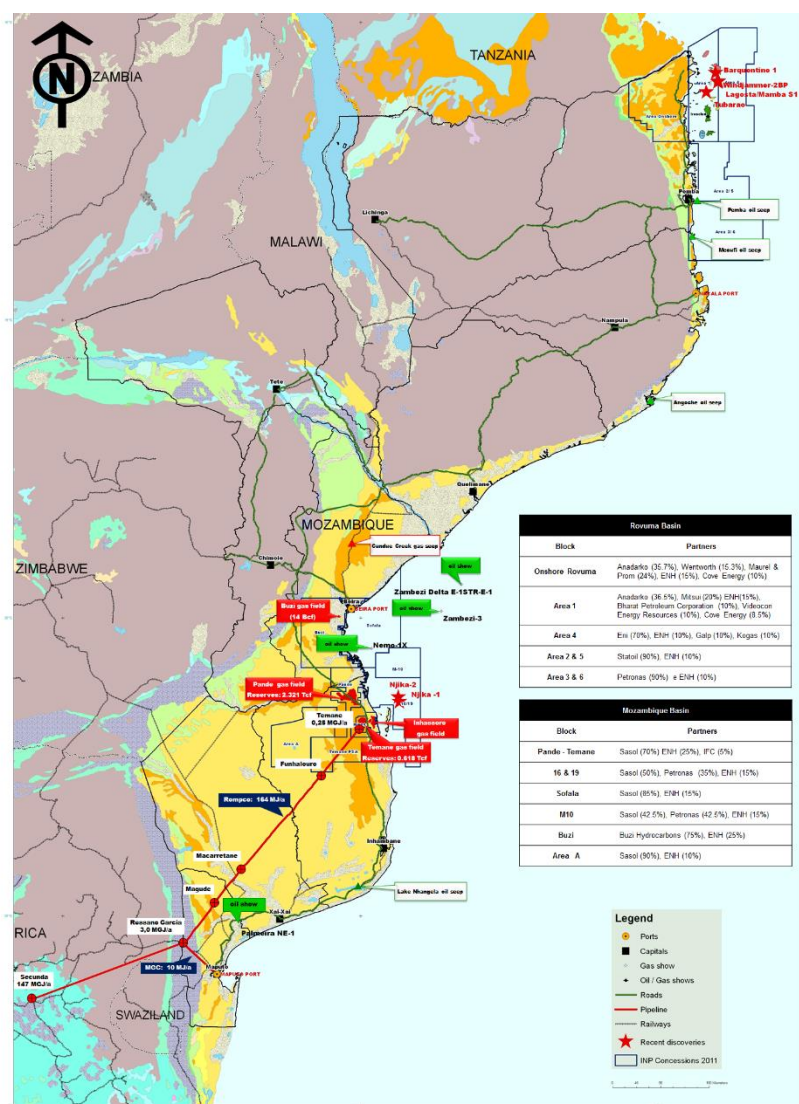
Source: INP

* Up to the date of publication of this document these areas had already been returned to the Government.

The Mozambique Basin, with an area of about 300,000 km², covering both land and sea (i.e., onshore and offshore), is located in the central region of the country. Different works were carried out in this basin, including seismic studies, survey and development drilling. As a result of these activities, in the 60s, the gas fields of Pande, Temane and Buzi were discovered; and years later, 2003-2009, the fields of Inhassoro, East Temane and Ndjika were also discovered.

The Rovuma Basin is located in the Northern region of the country (province of Cabo Delgado), covering a land and sea area of approximately 60,000 km². Despite its massive potential, up until recently, very little surveying activities were carried out in this area. However, over the last 3 years there was a considerable surge of activities and investments, culminating in discoveries by Anadarko (USA), of world-class gas fields (Windjammer, Barquentine, Lagosta, Tubarão, Camarão, Golfinho and Atum). Italy's ENI also discovered considerable quantities of natural gas (in the Mamba and Coral complex).

Figure 1: Occurrence Natural gas in Mozambique.



Source: INP

The Rovuma Basin discoveries represent an important landmark, not only due to the potential existing quantities of gas, but also, the opportunities that will allow the development and implementation of various integrated projects, such as, the Liquefied Natural Gas (LNG), liquid fuels (GTL), power plants, production of fertilizers, etc., that will certainly position Mozambique as a reference for production and export of natural gas.

A study entitled “*The Future of Natural Gas in Mozambique*”, estimates that the total figure of resources discovered in Mozambique is around 128 Tcf; of which 124 Tcf are located in northern Rovuma. Through the use of international models, it is estimated that Mozambique has 148 Tcf additional undiscovered as shown in Table 2 below.

Table 2: Occurrence and estimation of natural gas in Mozambique

Name of the Region	Total evaluated TCFE	Discovered TCFE 3P	Undiscovered TCFE
Northern Rovuma Offshore Region	199,4	124,4	75,0
Southern Rovuma Offshore Region	36,0	0,0	36,0
Rovuma Onshore Region	3,1	0,0	3,1
Onshore Maniamba Basin	1,2	0,0	1,2
Central Offshore Region	17,9	0,0	17,9
Southern and Western Onshore Region	5,7	3,5	2,3
Southern Offshore Region	13,1	0,0	13,1
Total	276,5	127,9	148,1

Source: ICF

From 2010 to 2012 *Anadarko Petroleum* and *ENI*, announced the discovery of 33 and 38 Tcf of recoverable natural gas along the coast of the Rovuma basin, in the province of Cabo Delgado. Recent surveys suggest that the basin may contain over 200 Tcf of recoverable natural gas. Two other companies, *Statoil* of Norway and *Petronas* of Malaysia, hold licenses to areas south of *Anadarko*, with *ENI* currently in the final phase of research. *Sasol* continues with the exploration in the province of Inhambane, where there is great potential of this strategic natural resource.

Despite the fact that such discoveries represent an important economic gain for Mozambique, they also pose serious challenges for the government. These challenges lie on how the resources will be exploited to produce benefits for the country and its population.

3. Background of the Master Plan

The Government's Five-year Programme (2010-2014) outlines, as its main goal, *the fight against poverty with a view to improving the living standards of the Mozambican people in an environment of peace, harmony and tranquility*. This macro objective shall be achieved through the promotion of rapid, sustainable, inclusive and comprehensive socio-economic growth, with an incidence of actions in the area of agriculture and rural development, basic social services and infrastructure; creating employment opportunities and creating a favorable environment for private investment and development of the national business.

The Government's Five-Year Programme recognizes that Mozambique has the potential and diversity of mineral resources embodied by the huge reserves of natural gas, coal, mineral sands and other minerals whose exploitation must be conducted in a sustainable manner. To this end, the Government has been perfecting the institutional, political and legal aspects whose essential aspects are described below.

3.1. Institutional Framework

The Ministry of Mineral Resources (MIREM) is the government's institution responsible for promoting sustainable use of natural gas in Mozambique. Through the *National Petroleum Institute*, an organization under the auspices of the Minister of Mineral Resources, that regulates and oversees all the upstream oil related activities, the government manages oil resources and its operations for the benefit of the country, in compliance with the laws, policies and existing contractual commitments. The National Oil Company represents the State commercial interest in all the concessions.

Besides MIREM, the following ministries have a key role in the sustainable use of natural gas:

- a) Ministry of Energy;
- b) Ministry of Agriculture;
- c) Ministry of Trade and Industry;
- d) Ministry for Coordination of Environmental Affairs;
- e) Ministry of Finance;
- f) Ministry of Planning and Development;
- g) Ministry of Transport and Communications;
- h) Ministry of Education and;
- i) Ministry of Labour.

3.2. Policy Framework

In recent years, the Government of Mozambique has adopted several policy instruments and strategies with a view to promote the development and sustainable use of energy resources of the country. Key policies and strategies are noted below::

- a) Energy Policy: This policy was approved through Resolution No. 5/98 of 3rd March, of the Cabinet, with the following objectives (among others):
 - To Ensure a reliable supply of energy at the lowest possible cost in order to meet the current levels of consumption and economic development requirements;
 - To Increase availability of energy to the domestic sector, particularly, coal, kerosene, gas and electricity;
 - To promote reforestation of the country in order to increase the availability of firewood and charcoal;
 - To enhance institutional capacity of the leading energy supply agencies to improve their performance;
 - To promote economically viable investment programmes for the development of energy resources (hydropower, forests, charcoal and natural gas);
 - To promote the development of conversion technologies and environmentally beneficial energy uses (solar, wind and biomass).
- b) Renewable Energy Development Policy. Approved by Resolution No. 62/2009 of 14th October of the Cabinet. This policy's objectives are as follows:
 - To promote the delivery of new and renewable energy services at affordable prices, particularly in rural areas;
 - To promote the use of safe sources of new and renewable energy;
 - To strengthen local and national energy security;
 - To reduce local and global negative environmental impacts;
 - To advance the technological development of the subsector for new and renewable energies;
 - To create a competitive market for new and renewable energy;
 - To contribute to the generation of income and employment, including self-employment and the fight against poverty, at local and national level.
- c) Policy and Strategy for Biofuels, Approved by the Cabinet, through Resolution No. 22/2009 of 24th March. This policy sets the guidelines and relevant measures to the biofuels area consistently identifying the mechanisms for its implementation, in order to respond to Government's priorities in the fighting poverty and promoting energy security.

- d) Strategy for the Development of the Natural Gas Market in Mozambique. This strategy was approved by Resolution No. 64/2009 of 2nd November, by the Cabinet; aims at maximizing benefits for the country, reducing imports and preserving the environment.
- e) Energy Strategy. Approved through Resolution No. 9/2009 of 10 March, of the Cabinet. It aims at ensuring the availability of power nationwide, to meet the challenges posed to the sustainable socio-economic development of Mozambique. The Energy Strategy is guided by the following principles:
- Sustained increase in access to electricity and fuel;
 - Sustainable use of woody biomass;
 - Dissemination of new and renewable energies;
 - Diversification of the energy grid;
 - Encouraging the sustainable production of biofuels based on local energy resources to replace imported fuels;
 - Integrated planning of energy initiatives with the development programs of other sectors;
 - Sustainable development and environmental conservation;
 - Adoption of tariff schemes to reflect actual costs, including mitigation of adverse environmental effects.
- f) Industrial Policy and Strategy. This key instrument was approved through Resolution No. 38/2007 of 18th December, with the aim of guiding the industrial development. Accordingly, the Industrial Policy establishes a set of principles, measures and activities aimed at contributing to the economic and social development, by increasing the production, productivity and quality of industrial output. This Policy's goal is to establish a robust and highly competitive, globally relevant national industry, that enables the creation of human, institutional and technological capabilities, and satisfaction of the internal and external demand, through the enhancement of national production and greater regional integration.
- g) Strategy for the Development of Small and Medium Enterprises in Mozambique. This strategy was adopted through the 22nd Ordinary Cabinet Session of August 21, 2007; with the goal of creating a solid foundation for the development and growth of Small and Medium Enterprises, in the context of fighting poverty and promoting a sustainable economic growth.
- h) The Integrated Programme for Reforms in the Professional training (PIREP); with the goal of training the Mozambican workforce and promoting self employment, adopting a standards-based skills training strategy, to meet the needs for qualified personnel for the labour market.

- i) Strategic Plan for the Development of Agriculture (PEDSA). The mission of this plan is to contribute to food and nutritional security, and income of agricultural producers in a competitive manner, ensuring social and gender equity, in a 10-year time span. The PEDSA has the following objectives:
- Improve and increase access to inputs;
 - Facilitate access to markets;
 - Improve management of natural resources;
 - Increase efficiency and production, competitiveness and its contribution to food security and nutrition;
- j) Environmental Strategy for Sustainable Development. The Environmental Strategy for Sustainable Development, adopted at 9th Ordinary Cabinet Session of July 24, 2007, has the aim of creating, in Mozambique, a common goal for a sound environmental management, leading to a sustainable development, and contributing to the eradication of poverty and other woes afflicting Mozambican society; based on the principles and assumptions set forth in the Implementation Plan for Agenda 21 and NEPAD. The strategy outlines actions for all development partners, including NGOs, the private sector, the academic community, civil society and the international development partners.
- k) Strategy for the concession of oil operation areas, approved by Resolution 27/2009 of 31 March.

3.3. Legal Framework

Mozambique has a Legal Framework commensurate to the challenges facing the sustainable use of natural gas as described below. All activities related to the exploitation and use of natural gas must be compliant with the following laws:

- a) **Land Law (Law No. 19/97) of 1st October.** This Law establishes the terms under which the constitution operates, the exercise, modification, transfer and termination of rights and use, as well as, enjoyment of land in the Republic of Mozambique. Its general principle is that the land is owned by the state and, therefore, cannot be sold or in any way alienated, mortgaged or pledged.
- b) **Environment Law (Law No. 20/97) of 1st October.** This law applies to all public and private activities that may directly or indirectly influence environmental components. The law, also known as the Environmental Framework Law, has the objective of defining the legal basis for the correct use and management of the environment and its components, for the materialization of a sustainable development system in the country.
- c) **Law No. 3/2001, of 21 February (Petroleum Law).** Establishes the system for the allocation of rights to conduct petroleum operations in Mozambique. The law applies to petroleum operations, excluding oil refining, industrial use, distribution and marketing of derivative products.

- d) **Law No. 21/97, of 21 October (Electricity Law).** This law applies to the production, transport, distribution and commercialization of electricity in the territory of the Republic of Mozambique, as well as its import and export, to or from the country. The Law establishes that the State, its institutions and other public legal persons, have a leading role in promoting the enhancement of existing capabilities, to enable an increasingly wider access to the benefits of electricity, and contribute to the economic and social development of the country and the region.
- e) **Law No. 15/2011 of 10th August,** establishing the guidelines for the procurement, implementation and monitoring of public-private partnerships' ventures, large scale projects and business concessions.
- f) **Decree No. 24/2004, of 20th August;** Regulation for Petroleum Operations. Applies to petroleum operations under Law No. 3/2001, of 21st February, and establishes the rules for the concession of the right to exercise the respective activities, to ensure that petroleum operations are conducted in a systematic manner and in such way that it allows for a comprehensive and coordinated supervision.
- g) **Decree No. 15/2010, of 24th May,** approving the Regulation of Procurement of Public Works, Goods and Services by the State, and contemplating a contracting scheme and exclusive procedural facilitation for SMEs and also a minimum margin for domestic preference.
- h) **Decree No. 56/2010, of 22nd November (Environmental Regulation for Petroleum Operations).** This Regulation, the scope of which are oil operations of both the public and private sector, defines the procedures for the Environmental Impact Assessment of petroleum operations, and prevention, control, and mitigation measures, as well as the rehabilitation of the environment. This Regulation bases itself in, law 20/97 of 1 October (Environment Act); and law 3/2001, of 21 February (Petroleum Law).
- i) **Decree No. 16/2012 of 4th July,** which approves the Regulation of Law No. 15/2011 of 10th August. This regulation pertains to the process of hiring, implementing and monitoring undertaken in the mining and oil sector.
- j) **Regulation for the Licensing of Industrial Activities.** Approved by Decree No. 39/2003, of 26th November. The object of this Regulation is the licensing of all economic activity pertaining to the processing industry, pursuant to Section C of the Classifier of Economic Activities (EAC), in which the entire chemical industry is included, that will be the subject of development based on the use of natural gas, as a raw material source.
- k) **Ministerial Decree no. 4/2008,** approves the Regulation of the tax on oil production, provided for in Law no. 12/2007, of 27 June and repealing Decree no. 19/2004 of 2 June. This Regulation applies to all holders of the right to pursue oil operations and to produce petroleum in Mozambican territory,

including the territorial sea, the exclusive economic zone, and continental shelf, according to which, based on the international law, Mozambique has sovereign rights for purpose of research, exploration and extraction of its natural resources in these areas.

- l) **Ministerial Decree no. 272/2009**, which approves the Regulation of Licensing of Facilities and Petroleum Activities. This Regulation applies to the Concessionaires, Carriers, its contractors and subcontractors and other natural or legal persons involved in Oil Operations and in Petroleum Activities in National Territory.

The country has additional supplementary laws applicable in the natural gas sector; of which the following can be highlighted:

- Law No. 12/2007 of 27 June, updating the tax legislation, especially on the oil sector.
- Law No. 13/2007 of June 27, related to the revision of the tax incentive scheme of mining and oil sector.

The table below provides an overview of the compliance of Mozambique regarding key aspects of exploitation and sustainable use of natural gas.

Table 3: Natural Gas Legal Framework

Area	Essential Components	Mozambique Status
Government's Authority	Management of natural resources; powers conferred to government officials; enforcement; penalties and fines; authority to negotiate contracts; tax authority; authority for approvals.	Finalized and in force. Petroleum Law, decrees and regulations.
Access to Concession Areas	Size of the area of exploration and production; duration of rights of exploration and exploitation; use; cancellation or termination of a right; release or return of areas; work programs; minimum security of title to possession; the possibility of transfer of rights and mortgage; rates of surface	Finalized and in force. New Model-for Exploration and Production Concession Contract (EPCC). Land use law in force.
Rights and obligations of researching and	Size of the area of exploration and production; duration of rights of exploration and exploitation; use; cancellation or termination of a right; release or return of areas; work	Finalized and in force. CCPP2005. Unification not yet completed.

producing	programs; minimum security of title to possession; the possibility of transfer of rights and mortgage; rates of surface	
Environmental Protection	Assessment of environmental impacts; mitigation of environmental impact; social and community impact; monitoring; responsibility about the abandonment; recovery of land; environmental guarantee	Finalized and in force. Specific environmental regulations for petroleum activities.
Tax Terms	Participation of the State; tax on production; rate and basis for the sharing of production; customs duties; rate and basis of income tax; special taxes from oil; other taxes and fees; incentives for production of gas and other; delimitation; clauses of stability	Finalized, in force, and improving. Law of the Tax on Petroleum Activities (Lei 12/2007); Incentives to the mining and oil sector (Law 13/2007). Regulation of the Tax on Petroleum Production (Decree No. 4/2008).
Professional Training	Curriculum reform; analysis of the needs of the labour market; infrastructure rehabilitation, teacher training, employment promotion, financing of professional Training, and establishment of it creating the regulatory body.	Draft Law approved by the Government in 2013; Draft Law to be submitted for Parliament for approval.

4. Basis for a Master Plan

The fight against poverty and the creation of wealth are the main objectives of the Government of Mozambique. For this important challenge to be achieved, it is imperative that the country's natural resources are used in a sustainable manner; i.e. combining economic, social and environmental dimensions. In other words, natural resources must first meet the development needs of Mozambique.

Despite boasting abundant natural gas reserves, the provinces with the greatest occurrence, experience high levels of poverty, with an incipient industrial development and almost total lack of basic infrastructure. In fact, the main economic activity of Inhambane, Sofala and Cabo Delgado, in particular the districts of Inhassoro, Mabote, Buzi and Palma, respectively, remain the subsistence of agriculture, followed by artisanal fisheries. The table below adequately characterizes these places.

Table 4: Poverty index in districts with natural gas fields

	Palma	Buzi	Inhassoro	Vilanculos
Population	49.162	163.714	49.426	139.295
Poverty Index	32	36	62	59
Poor Population	15.732	58.937	30.644	82.184

Source: INE (2011)

The table clearly shows that, although the District of Inhassoro had the first commercial gas reserves explored in 2004, the impact of the natural gas still have not benefitted the poorest districts in the country. The same applies to the District of Vilanculos. Importantly, in addition to natural gas, Inhassoro has a huge tourist and fishing potential, which is not fully leveraged.

Therefore, there is a need for the natural gas to drive the development of other activities, particularly, of industrial and agro-industrial nature, as an important source of local and national employment; thus contributing to the development of human capital and the economy in general.

In Mozambique, the use of natural gas for domestic purposes dates back to 1992, when the National Oil Company (ENH) began to produce electricity on a small scale from the exploration of the Pande fields. The electricity was supplied through a 102-kilometre pipeline that was originally designated to supply their facilities in Vilanculos. In 1994, the same pipeline began to supply electricity to the populations of Vilanculo, Inhassoro and Nova Mambone.

Currently, the needs of the country are much higher. As an illustration of this fact, the agriculture, despite being the main economic activity of the country, continues, fundamentally, to be carried out without an intensive use of fertilizers by most of the population; a fact which contributes to the low levels of

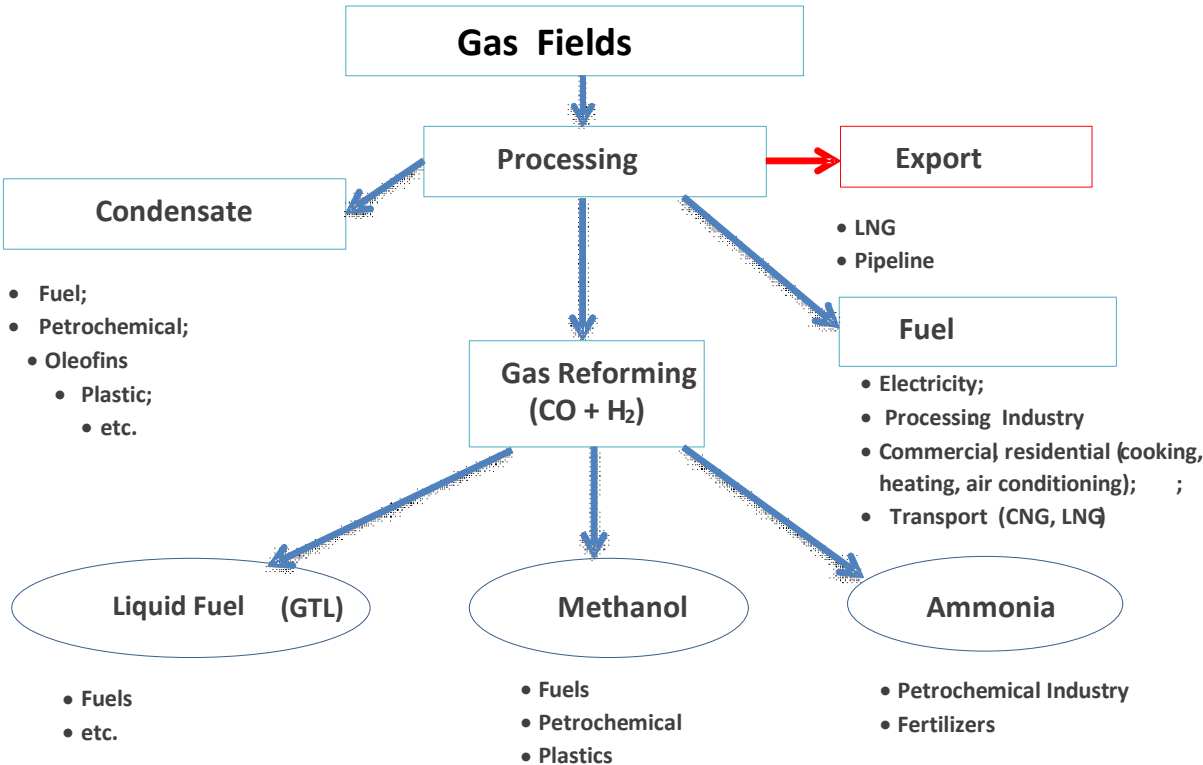
agricultural productivity, that is, in turn, a factor that adds to the food insecurity that still characterizes the country. The emergence of large agricultural projects will require the country's ability to provide all the inputs that will increase production and productivity, to fight hunger and poverty, while implementing the Strategic Plan for the Development of the Agricultural Sector, PEDSA. Natural gas has the potential to be a catalyst for the implementation of this strategy.

Electricity production in Nampula and Cabo Delgado is of particular importance in the scope of the rural electrification programme that the Government of Mozambique has undertaken.

The use of gas in the domestic industry and other sectors, in combination with other existing energy resources in the country, will reduce the country's long-term dependence on the importation of petroleum products, on which the national economy depends heavily.

The figure below shows the enormous potential that the natural gas, through its numerous derivatives, has for the country's sustainable development. When processed, natural gas provides important raw materials for agro-industrial development, including the production of liquid fuels, petrochemicals and electricity.

Figure 2: Natural Gas Value Chain



The natural gas market can be divided into three major sectors:

- a) **Use of natural gas for power generation.** This sector is of particular importance because the supply of electricity with good quality and safety levels is a basic need for the development of any project, regardless of its size.
- b) **Large industrial consumers.** These consumers use gas as a feedstock for the production of fertilizers (urea), methanol and liquefied gases, or in manufacturing processes for heating/electricity, aluminum smelting, steel mills, petrochemical plants, refining, etc.). This sector is generally considered a mega-project, given the huge amount of gas used.
- c) **Small and Medium Enterprises.** Promote industrial and commercial use in small quantities, primarily for process heating, drying, cooking, etc. This category includes use in road transport (buses, trucks, cars, etc.). Contrary to large users, this group tends to be located in urban areas, its main market.

With the discovery of huge natural gas reserves, Mozambique has become an important global benchmark, attracting the attention of several multinational companies and countries seeking safe and affordable sources of this important natural resource to meet their economic needs; as illustrated in the table below. It is important to note that requests for gas continue to be made by investors for the development of new projects.

Table 5: Expressions of interest for natural gas

Project	Investor	Project location	Quantity		Duration
			TCF	MGJ	
GTL	Italy	Palma	1.00	1053	25
GTL	RSA	Maputo	2.60	2737	25
GTL	RSA	Palma	0.40	400	25
GTL	South Korea	Palma	0.70	750	25
Fertilizers	Germany	Palma	0.60	680	20
Fertilizers	Norway	Palma	0.70	737	25
Fertilizers	Japan	Palma	0.20	247	20
Fertilizers, Ammonia, Urea		Palma	0.80	804	30
Fertilizers		Palma	0.80	840	30
Methanol	Japan	Palma	0.70	737	20
Methanol	India	Palma	1.40	1500	30
Methanol	Germany	Palma	13.00	13684	25
Methanol	Germany–Mozambique	Palma	1.00	1053	25
Energy	Various	Palma	1.90	1950	30
LPG	RSA	Pande & Temane	-	-	-
Tomato processing	United Kingdom	Chokwe	-	13	25
Iron – Steel		Palma	0.80	875	25
TOTAL			26.60	28,060	

Source: INP/ENH E. P.

Despite the huge and growing interest on Mozambican gas by the investors, the Government acknowledges and understands that this is the only opportunity for the industrialization of the country and that it is, therefore, necessary to ensure that part of the natural gas being produced in the Rovuma Basin is used for the industrialization of the country, at a price that allows the viability and competitiveness of industries.

The specific amount of gas needed for the domestic market depends on the types of industries the country will have in the future. So far, the proposed mega-projects, with the exception of electricity generation, are all export-oriented, and are therefore exposed to fluctuations in the world commodity prices and market volatility. Thus, any detailed forecast of gas demand in these industries might be considered speculative. However, given the need for the development of policies to regulate the natural gas sector, and purely as an illustration, the following scenario is expected for the domestic consumption of gas over the next 10 years:

- The gas from the Pande-Temane fields will be used for export to *Secunda* and to support at least two 150 MW gas power plants, whose opening is scheduled for a relatively near future (EDM / Sasol), and for the establishment of a methanol plant.
- In addition to the current demand from MGC of 3 million GJ/year, gas demand for SMEs can increase to approximately 500,000 GJ/year.
- Construction of two 150 MW power plants, in the short term, and a greater combined cycle 300-500 MW power plant, over the medium term, in northern Mozambique.
- Construction of a fertilizer plant of about 500,000 tons per year, in Cabo Delgado, to meet the agricultural needs of the country and the regional economy.
- Construction of a GTL plant (or gas/methanol to liquid), capable of producing 50,000 barrels/day, in northern Mozambique.

The expected gas demand for the scenario presented in this Natural Gas Master Plan is shown on Table 6, below.

The estimates of domestic demand presented below are provisional and the Government recognizes that this demand will only be confirmed after a detailed assessment of the projects actually submitted.

Table 6: Provisional Estimates of the Domestic Demand

	Gas Master Plan Estimate for the Domestic Demand for Natural Gas (million GJ/year)										
	Current demand of the MGC (of fields P-T)	Demand of the MGC for PME (of fields P-T)	South Power plants (of fields P-T)	North Power plants (Rovuma)	Fertilizers (Rovuma)	GTL (Rovuma)	Methanol (Rovuma)	Pipeline North-South	Total P-T	Total Rovuma	Grand total
2014	3	0.2	4						7.2		7.2
2015	3	0.25	10						13.3		13.3
2016	3	0.3	10						13.3		13.3
2017	3	0.37	21						24.4		24.4
2018	3	0.43	21	10				120	24.4	130	154.4
2019	3	0.5	21	10	9			120	24.5	139	163.5
2020	3	0.5	21	21	18	90	36	240	24.5	405	429.5
2021	3	0.5	21	21	18	175	36	240	24.5	490	514.5
2022	3	0.5	21	21	18	175	36	400	24.5	650	674.5
2023	3	0.5	21	21	18	175	36	400	24.5	650	674.5
2024	3	0.5	21	33	18	175	36	400	24.5	662	686.5
2025	3	0.5	21	44	18	175	36	400	24.5	673	697.5

Source: ICF

Mega-projects have the potential to create jobs, thus contributing to the increase in income. The table below presents a comparison of mega-industries, using the model developed for this work. The comparison is for the installation of standard size for each industry, with the exception of steel and cement, for which it thought that the use of the gas would be too low:

Table 7: Potential for a labor force generated by mega-projects

	Fertilizers	GTL	LNG	Methanol	Aluminium w/potency	150 MW Potency	250 MW Potency
Gas consumption (MMcfd)	43	402	627	49	172	25	42
Average annual direct and indirect jobs	300	2.700	2.300	420	1.300	90	150
Average long term direct and indirect jobs	190	1.600	1.300	320	940	70	120
Average induced long-term jobs	3.700	31.900	30.100	6.200	18.300	1.500	2.500
Average annual direct and indirect jobs by MMcfd of gas usage	7	6,7	3,4	8,6	7,6	3,6	3,6
Long term direct and indirect jobs by MMcfd of gas usage	4,5	4,0	1,9	6,5	5,5	2,8	2,9
Long term jobs induced by MMcfd of gas usage	86,7	79,3	44,6	126,2	106,5	59,7	59,7

Source: ICF

Thus, the Natural Gas Master Plan's aim is to serve as a guiding instrument for the national use of natural gas, in order to ensure its most effective and advantageous benefits for Mozambique and its population. The Plan's goal is to ensure that the natural gas becomes a true catalyst for the sustainable development of the country.

Apart from meeting the domestic and international demand in terms of gas consumption, Mozambique took significant international commitments, therefore placing itself under obligations to adopt policies that promote environmental preservation. The use of natural gas should also be seen in the light of the UN Framework Convention on Climate Change, to which Mozambique adhered, in 1994, and the Kyoto Protocol. Being natural gas a clean source of energy, its use should be preferred.

The replacement of traditional fuels like petrol and diesel in vehicles with natural gas contributes to the reduction of air pollution levels and, therefore, to a greater environmental preservation, also reducing respiratory and other diseases associated with poor air quality. Moreover, the price of gas is lower than petrol or diesel, which allows automobile users to save money on fuel expenses and contributes to less pollution of the environment.

Despite all the potential in the natural gas sector, there are some challenges remaining for this resource to fully impact the country's development, considering the following aspects:

- a) Number and location of additional natural gas reserves that will be developed in Mozambique. *Statoil* and *Petronas* are in the final phase of drilling in Areas 2&5 and 3&6 of the Rovuma Basin and, if successful, they may develop gas fields in the South of Palma, closer to developed areas of the country. On the other hand, these new findings may be located closer to the environmentally sensitive areas (e.g. off the Quirimbas National Park coast).

The 5Th licensing round for concession of areas will take place after the approval of the new Petroleum Law. This will ultimately update the Government regarding the potential of central offshore areas of the country. Sasol's surveying programme for the offshore area at the southern coast of the country also began very recently.

On the other hand, the opportunities to extract methane from coal deposits near Tete may be significant. The CBM (coal-bed methane) in Tete would be much more accessible to the central and southern parts of the country as well as to South Africa and other neighboring countries. This potential development in the gas sector has substantial effects for possible large investments in complementary infrastructure or mega-projects in the far north of the country.

- b) The world prices of oil and gas are subject to large uncertainties associated with demand and supply. This is important because the LNG and most mega-projects depend on the prices of oil and gas. The entry of potential new supplies of LNG from North America, Australia, Tanzania and Southeast Asia, can alter the demand and affect prices in the international market. Additionally, the development and production of shale gas in South Africa, China and India may reduce the need for gas imports by these countries, which may influence global and regional gas prices, hence the importance of adding value to gas in the country through the production and export of finished products (GTL, methanol, fertilizers, electricity, LPG, etc.).

5. Natural Gas Master Plan

The previous sections unequivocally show that Mozambique needs to have an instrument capable of directing all phases of natural gas development, from exploration and production to its ultimate end use.

5.1. *The vision of the Ministry of Mineral Resources*

“To be a leader in the promotion of economic, social and cultural development of the country, through transparent and sustainable management and exploitation of mineral resources.”

In this context, the Natural Gas Master Plan, with a time span of 20 years, seeks to ensure that the natural gas resources are developed to maximize the benefits to Mozambican society, in order to improve the living standards of its population, while minimizing the negative environmental impacts; by supporting the:

- a) Increasing the institutional capacities of the national public and private sectors;
- b) The growth of industries and national companies, in particular the industries of small and medium-scale projects;
- c) Strengthening the capacity of energy supply to the population;
- d) Increasing employment in the entire country, in particular in less developed provinces;
- e) Developing infrastructure to support the expansion of economic activities, in particular in less developed provinces; and
- f) Providing greater access to education and vocational training.

5.2. *Objectives of the Master Plan*

As was mentioned above, the Master Plan aspires to be the engine of integrated and sustainable development of the country, and the strategic objectives, to be achieved by 2030, can be divided into two strands:

- a) Gas Development:
 - Offshore Production in the Rovuma basin, supported by the Palma LNG infrastructure.
 - Continued exploration and production of gas from the onshore Rovuma Basin, Areas 2&5 and 3&6 in the offshore Rovuma Basin, Block M-10 for onshore; and development of CBM in Tete;
 - Continued gas exploration both onshore and offshore in Inhambane province, to increase the supply of gas in the southern part of Mozambique.

- Significant contribution of natural gas in the energy supply.
- Development of an industrial zone with integrated support services and business assistance in Palma, Pemba and Nacala; based on the availability of natural gas from the Rovuma Basin.
- Construction of the fertilizer plant, power plant, petro-chemical industry and GTL, based on the gas from the Rovuma Basin, and further development in the province of Inhambane;
- Construction of pipelines to support the expansion of Small and Medium Enterprises (SMEs). The pipeline will be developed on the basis of economic data, stimulated by major fixed charges, with a focus on expanding the existing pipeline to Maputo and Matola, and in developing a pipeline network in the provinces of Cabo Delgado and Nampula;
- Construction of the North-South pipeline (gas backbone) linking Maputo to Palma, advancing the emergence of industrial zones throughout the country.
- Gas distribution for the cities of Matola, Maputo, Palma, Pemba, Nacala, Nampula, Beira, Quelimane, Mocuba and Macuse Village, to increase its domestic consumption.

b) Development of the country based on gas revenues:

- Diversified economy, modernization of agriculture and greater electrification;
- Construction of major infrastructures, including roads, ports, railways, airports and power stations;
- Increased industrialization with the emergence of SMEs inspired by the mega-projects;
- Increased skilled labor. Increase in professional services (engineering, law, economics, management, design, accounting, etc.). National specialists begin to assume leadership positions in mega-projects;
- Mozambique is a major tourist destination; combining the potential from its culture, fauna, beaches, etc.

5.3. Pillars of the Strategic Plan

The Gas Master Plan focuses on three major aspects for development: economic and institutional aspects, financing and tax aspects and, environmental and social development issues. Indeed, sustainable development is characterized by the harmonious combination of these three dimensions, which are pillars of the Master Plan. The table below shows these pillars and their strategic objectives.

Table 8: Pillars of the Project and its strategic objectives

Pillars	Strategic Objectives
Economic and Institutional Aspects	Ensure the availability of gas for the domestic market, facilitating the industrialization of the country.
	Develop and implement a communication plan to increase transparency and manage expectations.
	Maximize national support for the development of natural gas projects.
	Encourage and support the use of natural gas in domestic industries.
	Increase institutional expertise in matters related to gas, including exploration, development and marketing of natural gas.
Financing and Tax Aspects	Establish and maintain a good business environment.
	Establish a financing mechanism for the development of gas projects and for local development initiatives.
	Improve the existing legal framework regarding natural gas
	Ensure the Government's share of gas, both in kind and in cash.
Environment and social development	Ensure that the local communities, in particular in the areas of exploration and production, are benefiting from natural gas-related activities
	Create and/or increase the environmental awareness of local communities.
	Prevent and/or mitigate environmental damage resulting from the production and use of natural gas.
	Strengthen institutional capacity for the implementation of environmental legislation.
	Training and capacity building of the national workforce.

5.4. Values

In the implementation of the Gas Master Plan, the Government should be guided by a set of values that stimulate the development of the country, namely:

- a) **Transparency.** All decisions to be taken, agreements to be concluded, and all other practices, should be transparent and designed to benefit the society in general. The Master Plan should strengthen the position of Mozambique as a

member of the Extractive Industry Transparency Initiative.

b) **Impartiality.**

Under no circumstances will the Government will adopt a position which in some way will benefit only a few while doing harm to others, in matters related to the natural gas. This value may not, however, prevent the Government from taking appropriate measures whenever the national interest is at stake.

c) **Social justice and equality.** None of the actions carried out within the scope of implementation of the Master Plan can promote social exclusion; and should, In particular, benefit the disadvantaged communities.

d) **Participation and information Access.** The Government should promote serious and compliant participation, according to the capacities of all stakeholders, on issues related to the sustainable use of gas. Any information that does not interfere with the sovereignty of the country will be freely accessible to stakeholders, either individually or collectively organized.

5.5. Guiding Principles

The Gas Master Plan observes the following principles, which by their nature are decisive for the harmonious development of the country:

- a) **Regulatory Clarity.** Clear definition of the responsibilities of regulators. This will have a positive impact on investment decisions, especially in downstream natural gas projects;
- b) **Sustainable use of revenues.** The gas revenues constitute a clear form of directing the gas use to the economy for the creation of added value for the industry, and expansion of economic development. On the other hand, there would be sufficient revenue for supporting infrastructure and economic development in a number of areas in addition to the natural gas sector
- c) **Identification of needs and coordination of infrastructure.** It is necessary to define how the necessary infrastructure for the development - ports, roads, airports - needs to be created based on the gas production and use to meet the needs of communities that will host these gas-oriented enterprises. In addition to the infrastructure for natural gas, there is also a need for coordination with the planning of electricity and the development of other infrastructure.

- d) Education and Training. The limited professional training and capacity building are a major obstacle to the employment of Mozambican workforce in the gas sector. Continuous efforts of technical training and education in general must be developed in the specialties that the industry will need;
- e) Regional Development. The gas discoveries made by Anadarko and ENI, in the Rovuma Basin, are located in Palma, in the far northeast region of Cabo Delgado. The largest employment figures would come from development centres near these major cities. However, Cabo Delgado is in urgent need of programs to stimulate development, as it is also one of the least developed areas of the country;
- f) Promotion and inclusion of SMEs. Natural gas is an attractive fuel for SMEs, for its uses in heat production and raw materials. It can also stimulate the production process that allows them to be internationally competitive. Appropriate mechanisms to encourage the use of gas for the development of SMEs should be adopted;
- g) Environmental Sustainability. Lessons learned from some countries shows that there can be no development if the exploitation of resources damages the environment and traditional livelihoods in an unacceptable manner. The Government's approach to the development of the gas market has been, and will be, implementing a policy of sustainability and environmental protection. This is doubly important where offshore projects are implemented, and may affect fisheries and tourism.
- h) Use of local resources: The use of local resources such as raw materials, national labour force and domestic enterprise services, should be prioritized in order to raise people's living standards and national, make national companies profitable and create internal capacity to operate, generate employment among nationals and ensure maintenance of the machinery and equipment used in the national Natural Gas operations.

5.6. *Cross-cutting Issues*

The Natural Gas Master Plan recognizes that these goals and objectives can only be achieved through an integrated approach that takes into account the "invisible aspects" of development, present in all of its phases. The combination of a good investment environment and compliance with environmental and social imperatives contributes to the sustainable development of the country. This section discusses in detail, the

determining cross-cutting issues to be addressed in order for the natural gas to meet the expectations of the country and its people.

a) National unity, peace and stability.

Several international experiences indicate that the abundance of natural resources, particularly minerals, can be an instability factor, in the absence of clear criteria for equitable sharing of the benefits deriving from the exploitation and sustainable usage of such resources.

The government shall ensure that existing natural gas in the country encourages sustainable development. The use of natural gas and the consequent sharing of its benefits should conform to a national dimension, without prejudice to the need to promote local development.

b) Investment Environment

The Government shall identify the essential elements of the business and investment environment needed to encourage investment in general, in the Mozambican economy, and that need to be in place and maintained in a transparent, stable and lasting way. Provided that the development of the gas resources will require huge investments, throughout periods that will stretch for decades, it is vital that this environment is sustained and ameliorated as necessary. The crucial factors for this are:

- Solid and stable macro-economic management;
- Investment in infrastructure to enable the provision of adequate services for national development projects;
- A transparent regulatory and legal framework that promotes the development of the natural gas industry;
- A banking and financial sector that enables the execution of local investments, indispensable for the growth of the Mozambican economy.

c) Environment

The exploitation of mineral resources is deeply associated with environmental degradation. This reality cannot, however, constitute an impediment as, currently, there are international practices ensuring the sustainable exploitation of natural gas.

The provinces of Inhambane and Cabo Delgado do possess a rich and attractive beaches and a marine environment which houses important coral reefs and marine mammals of global importance—many of them are protected species. The drilling of wells, as a

general rule, has adverse impacts on local marine resources. The intensification of navigation does interfere on marine life.

Environmental impacts arising from the construction of the potential mega-projects depend heavily on its exact location; and its appropriate setting may be crucial to avoid or minimize adverse impacts. The implementation of sound practices during construction also helps to minimize the impacts on soil, marine resources, water and air.

The Government will ensure that the exploitation of natural gas, its processing, and its use will be conducted in a sustainable manner, reducing to a minimum the negative impacts on both land and sea. All the operations related to the production, storage, and processing of natural gas shall be preceded by environmental impact studies, in accordance with national legislation. All the companies involved in the activities of the natural gas must have environmental management plans that include the mitigation of adverse effects on communities and the environment.

In the context of corporate social responsibility, companies should promote and implement plans of environmental recovery of degraded areas and also promote the education and awareness campaigns for the communities on the importance of environmental preservation.

In cases of absence of environmental quality standards, the companies involved must strictly observe the standards of the World Health Organization.

d) Gender and major groups

Traditionally in many mining projects, there is a persistent thought that, such activities are primarily carried out by men. However, nowadays, there have been positive experiences of women's involvement in mining operations worldwide. The Master Plan ensures the creation of equal opportunities for both genders, so that everyone, through the use of their best abilities, feels included.

The Government shall ensure that the Gas Master Plan will contribute to the development of major groups; namely: children, women and the elderly, without prejudice to the development of other groups.

5.7. *Specific Considerations*

The Government's specific considerations regarding the Natural Gas Master Plan are as follows:

5.7.1. Pricing Policy for Domestic Gas

The price of natural gas for domestic consumption should encourage its use for transportation, industries, cooking and other domestic uses. The Government recognizes that the promoters of projects other than the LNG projects would have difficulty using natural gas in the domestic market, due to the total netback value of gas.

Government intends to determine the domestic price of gas from Palma using an auction process, whose outlines are to be determined by the Government. The price of gas will be for the gas at the outlet of the gas processing plant at Palma. Transportation costs from Palma to other locations will be added to this price to yield a delivered domestic price from the high pressure gas transportation pipeline. Distribution of natural gas by low pressure distribution pipelines will have additional costs. These costs for transportation of gas will be set by the costs of building the pipeline network and the policies of the natural gas regulator.

The first auction for the Palma gas will be for domestic gas, whose availability is expected from 2018, and the auction will remain open for a period of 20 years. Eligible projects will provide bids for:

- The total volume of gas required in GJ, during a 20-year tender period;
- The bidding price in \$/GJ (nominal dollars);
- Annual bidding price Increase/adjust factors.

By conducting auctions, the Government intends to allow domestic gas prices to empower the local industry, so that Mozambique is not only an exporter of raw materials. The selection of qualified bidders who can participate in the auction process, will allow the Government to prioritize projects that add more value to gas and to ensure Mozambique gets the greatest development benefits.

For any newly discovered and produced gas for domestic use, the government shall adopt the same auction process with a specific domestic minimum price (MDP) for these fields, which may differ from the MDP for the offshore Rovuma gas.

To ensure the supply of gas for the industrialization of the country, the Government will ensure, with the Concessionaries, that at least 20% of the total gas produced and processed is dedicated to the domestic market (with the possibility for this percentage to increase, as the demand for domestic consumption gas grows), at a price deemed reasonable for the industries. This gas will be sold by the concessionaries to a single national entity. Such entity, upon notice to the relevant Ministry (MPD), shall then sell it to the mega-projects and other users in the domestic market.

It is Government policy, that the power plants that serve solely the domestic market, small and medium enterprises and households, receive gas at the MDP, plus pipeline and distribution costs. Large power stations, dedicated mainly to electricity export, have to bid in the tender process.

5.7.2. Mega-projects and Gas allocation policy

As mentioned above, the existence of vast amounts of natural gas in Mozambique is attractive to mega-project promoters. The Government and the ENH have received proposals from various promoters to build and operate mega-projects in Mozambique, which would use domestic natural gas as a feedstock to produce various products, including methanol, gas to liquids (GTL), fertilizers and electricity, and subsequent export of some of its products to the world market.

The implementation of mega-projects bears the great potential to generate significant tax revenues, and they are also the anchors needed to justify investment in pipelines and other gas infrastructure in urban areas, as it is not always possible for small and medium-sized enterprises (SMEs) to justify such huge investments. Once the infrastructure is established, depending on the mega-project economics, the SMEs will benefit from the availability of gas.

The table below provides an attempt to prioritize projects by industrial sectors, based on the current knowledge of the gas market.

Table 9: Priority Investment Areas based on Gas

Industrial Sectors		Project	Products	Reasoning
1. Fuel Sector		LNG (in the case of large deep-water reserves)	Liquefied Natural Gas	Large-scale LNG projects lead to the implementation of other potential downstream industrial projects.
	1	GTL Projects	Diesel /LPG/ Nafta	Reduces Mozambique's dependence on imported refined petroleum products.
				Potential for regional export of products derived from GTL.
				Stable demand for diesel fuel and its by-products
	2	Project for the distribution of gas through pipelines	Natural Gas	It is structuring and enables the fulfilment of the fuel demand for different sectors: industry, transport, commercial and residential
				Enables consistency in the supply of gas, relatively low operational costs
				Enables the formation, in a sustainable manner, of industrial hubs across the country.
	3	LPG Project	LPG	Reduces Mozambique's dependence on imported refined petroleum products.
				Replaces the more traditional fuels used in Mozambique in the domestic and commercial sector (wood and coal)
				Enables the introduction of natural gas in areas without pipelines
	4	DME Project	DME	Potential to replace other fuels, such as diesel fuel for electricity generation
	5	LNG	Liquefied Natural Gas	To export the surplus gas, once the domestic demand has been met
		Ammonia Project/	Ammonia/ Urea	The Government's strategies for the agricultural sector and the great international demand allow investments in this area

2. Base Chemicals Sector	1	Urea (Fertilizers)		Will provide a reduction in fertilizer imports.
				The urea plant in Mozambique can be the distribution centre for Africa.
	2	Methanol Project	Methanol /Various sub-products: (Paints, plastics, varnishes, resins, DME, etc)	Methanol is one of the most important basic chemicals in the petrochemical industry;
				It is the base material for a wide range of products used in almost all areas of modern life;
				It is among those that add most value to natural gas.
				Priority will be given to Methanol projects that produce, in the country, other sub-products.
	3	Olefins Project (C2/C3)	Polyethylene /polypropylene	International market demand
3. Power Sector	1	Combined-Cycle Gas Power Plant project	Electricity	The availability of reliable electricity will catalyze industrialization and rural electrification.
				There is currently a high demand for electricity in the country.
				Energy efficiency of its flexible operation
4. Raw materials sector	1	Steel Project	Steel	Strong domestic and regional demand
				Demand stability
	2	Aluminium project	Aluminium	Indirect benefit, workforce and value chain
	3	Cement production project	Cement	High domestic and regional demand
				Demand stability
	4	Carbon Black Project	Carbon Black	Potential demand growth (tyre factory)
	5	Glass production project	Glass	Indirect benefit; requiring, however, import of the main raw material (sodium carbonate)

To follow up on the submitted project proposals, the Government will establish a process to grant licenses for the development of mega-projects, based on a transparent qualification process, in addition to the tender process and in strict observance of all relevant Mozambican laws.

The criteria for determining the qualified projects are presented below. Each project submitted will be evaluated and rated in quantitative and qualitative terms:

1. **Project priorities.** The Government shall give priority to project proposals submitted in accordance with the table above, based on knowledge of the current market. Projects that produce electricity, fertilizer, gas to liquids and methanol, which produce in the country, other sub-products, will have a higher priority than others. However, this prioritization should be seen as a general guideline, as market conditions may change over time. Thus, this criterion does not intend to deter promoters of projects, of submitting several integrated projects that will generate other products than the ones listed above.
2. **Gas price greater than the MDGP.** Bidders must submit a price for the gas that they are willing to buy. This price should be higher than the MDGP (Minimum Domestic Gas Price). A mega-project that requests a greater price of gas will receive a higher rating, once other elements are weighed, including the project's impact on the national economy. The price bid submitted will be used in the tender market.
3. **Quantity of gas requested by the developer.** The volume of gas should be sufficient either by itself or in combination with other developers to support the construction of a pipeline to the proposed facilities. The developer will need to justify the economics for the pipeline connection, and propose a plan for its construction. A mega-project with large gas volume request and with economically consistent plans for pipeline development will be ranked higher. Project developers can coordinate with each other and also propose public-private partnerships for pipeline development. The Government will rank higher those pipeline projects with greater private sector participation. The volume of gas proposed by the project developers will be used in conjunction with the gas price in the market auction.
4. **Timeframe for project development.** The Government prioritizes those projects that can be constructed and come into operation as soon as gas is made available. Project developers who can use domestic gas as soon as possible will be ranked higher. Project developers are required to submit a timeframe for construction and operation of the project, along with a list of required permits and planned timeframe for obtaining them. They need to provide a list

of potential risks for delays and a risk management plan intended to ensure timely construction and operation

5. **Location of the mega-projects.** The Government believes that mega-projects should be located near population centers to maximize the potential for local labor at the mega-project and for support industries to grow up around the mega-projects and to support the construction of pipeline infrastructure. Those developers proposing projects near population centers south of Palma will be ranked higher, as long they can justify their economics.

The Government intends to conduct additional studies on potential locations to develop additional priorities. However, the Government also intends to allow private and public project developers to propose potential locations for mega-projects.

6. **Development in Palma.** The Government supports the development of some mega-projects in Palma. In particular, preference will be given to the development of a power plant in Palma consistent with the plans of EDM, and the development of a GTL or fertilizer plant (subject to the rest of the criteria in this list). However, the Government seeks to avoid a concentration of mega-projects in Palma that would not benefit other communities in Cabo Delgado or Nampula.
7. **Technical and financial qualifications of the proposer and project.** All proposals will be evaluated on the merits of their technical development and commercial plans. Proposers will be required to demonstrate the technical qualifications, including prior experience, and the specific engineering and technical plans for the proposed mega project. Proposers also will be required to demonstrate that they have the financial resources to undertake the investment in Mozambique and to demonstrate creditworthiness and may be required to submit letters of credit and other financial support. Proposers will also provide the commercial basis for their project. Details of these requirements will be developed by the relevant ministries.
8. **Developer's commitment to employ Mozambicans.** All mega-project proposals should have action plans for employing Mozambican citizens. Such plans should include a description of how the mega-project proposes to

increase Mozambicans in skilled labor categories over time. Project developers must submit the employment plans to the relevant Ministry, and they will then be analysed by the Ministry of Labour.

9. Developer's commitment to engage Mozambican suppliers of goods and services.

A major objective of the Government is to promote the growth of small and medium enterprises (SMEs). Developers must have action plans showing how they will engage existing SMEs to provide them with goods and services. They may also draw attention to the need to develop SMEs that do not yet exist in Mozambique, and propose ways in which the Government could support such SMEs in the supply chain. The action plans shall be reviewed by the relevant Ministry. Project proposals that undertake to engage a large number of Mozambican suppliers will receive a higher rating. Proposals that offer realistic action plans and make recommendations to the Government will receive a higher rating.

10. Developer's commitment to mitigate social and environmental impacts.

The government intends to minimize the negative impacts of development projects in local communities and the environment. Therefore, project developers should conduct the necessary environmental studies, in accordance to the existing, and commit to implement the necessary mitigation measures, as well as environmental management plans as approved by MICOA. At this stage, they will only have to provide preliminary assessments. However, if the developers is selected through the process of qualification and tender, then it will have to conduct full environmental and social analysis. The relevant ministries will advise MICOA on whether the initial environmental impact assessment is satisfactory.

11. Corporate Social Responsibility.

The Government intends for the mega-projects to positively benefit local and regional communities. Developers need to provide some initial plans for the kinds of activities that they may undertake as part of their corporate social responsibility, taking into account local community concerns and needs. Proposals that have realistic and reasonable plans for promoting social benefits to the local community will be ranked higher.

12. **Benefits to Mozambique.** Developer proposals must demonstrate how their projects will benefit Mozambique broadly. Benefits may include additions to employment, education, tax revenues, infrastructure development, and environmental enhancements. It is expected that proposals include both a quantitative and qualitative list of benefits. Those with higher benefits will be ranked higher.
13. **National Interest:** Proposals shall bear in its capital structure, with an initial national interest of at least 10% that should evolve in time through the placement of shares on the Mozambique Stock Exchange; holders must make the commitment not to pass them to foreign interest.
14. **Sales price of the final product in the domestic market:** The price of the final product in the domestic market should be lower, in comparison to similar imported products.

The classification of projects, determined by the 14 criteria outlined above, will be used to decide which project proposals will be eligible to enter the tender for the price of domestic gas.

The Government will give the highest rating to qualified energy projects that aim to provide electricity to domestic markets in Mozambique.

The Government will ensure that all companies adhere to the same rules, and that the criteria outlined above will be evaluated fairly, consistently and transparently.

5.7.3. Regulatory Policy for the Gas Sector

The development of the gas sector in Mozambique entails a clear, transparent and specific legislation. Such legislation should ensure that investors of the pipeline infrastructure get adequate returns relative to their investment; that a pipeline network operates in a reliable and transparent manner; that access to the pipeline is widely available and that rates are fair, reasonable, and based on cost of service.

The Government instructs MIREM/INP and the Ministry of Energy, to develop a proposed legislation for the regulation of the gas industry. Existing legislation includes the following elements:

1. Authorization for the INP to develop regulations, in order to receive and approve applications for the construction and operation of a high pressure transport pipeline; and for the Ministry of Energy for the construction and operation of a

low pressure transport pipeline. Such authorizations should take account of environmental, social and economic considerations. Additionally, the legislation allows the INP to receive applications for the construction and operation of LNG facilities.

2. Authorization for the INP to approve the fees and transportation tariffs for pipeline transmission, and such fees and charges shall be based on cost of service and shall be fair and reasonable. The Ministry of Energy will have the authority to approve tariffs for the distribution pipeline. In both cases, the operating rules are clearly defined, and provide public access to all potential transporters on the pipeline system.

The legislation should promote a pricing system whereby the cost of gas supplied to consumers explicitly separates production and processing, and pipeline distribution costs.

Apart from the above-mentioned competences, INP will retain its responsibility in granting concessions for the exploration and production of gas, as well as the responsibility to establish the MDP.

5.7.4. Communication Strategy

Communication is a very important key in the development process, as it ensures that all stakeholders are properly informed of the proceedings. This reality is even more relevant in the oil sector, which is new for Mozambique. The Government, through MIREM, shall develop a comprehensive communication strategy, to publicize the findings, guidelines and policies under this Natural Gas Master Plan, addressed to all Mozambican citizens and other stakeholders. The communication strategy will explain the nature of the development, as well as the realistic opportunities it will create for Mozambicans, in the short, medium and long term.

5.7.5. Business Environment for small and medium-sized enterprises (SMEs)

The development of natural gas infrastructure and mega projects has the potential to promote the widespread use of low-cost power in Mozambique, benefiting the development of SMEs. The Government shall continue to implement measures to eliminate or reduce barriers to the development of SMEs, to ensure the wider benefits of economic activities that may arise with greater access to natural gas. In this context, the location of the mega-projects should receive special attention from the Government.

5.7.6. Financial and Fiscal Management

The improvement of macro-economic and fiscal policies is a major priority for the Government of Mozambique, in order to contribute to the opportunities presented by the development of natural gas and, by extension, coal and other natural resources. The Government recognizes the need to improve the quality, effectiveness and efficiency of public services, and adopting policies that minimize the macro-economic distortions and improve the competitiveness of the economy, while promoting a more inclusive and horizontal economic growth.

The Government, through the Ministry of Finance will continue to implement the necessary institutional reforms that aim to support the increase of revenue streams, fiscal management and an effective public investment decision-making process; capacity building; develop policies and mechanisms to mitigate the effects of price volatility of raw materials in the domestic economy; mitigate the impacts of rising real effective exchange rate; develop fiscal and monetary policies to encourage savings for future investments, and develop policies for revenue sharing; in order to distribute wealth and the balanced economic growth through various geographical regions.

5.7.7. Action Plan

The achievement of the aforementioned goals requires a clear definition of roles and responsibilities of all institutions involved, either directly or indirectly, in the various forms of sustainable use of natural gas and its derivatives.

The following table presents, in the form of a logical framework, the activities, indicators and deadlines that must be met for the objectives of the Master Plan, translated into strategic objectives, to be achieved in its entirety. While recognizing that on many occasions, the ultimate decision is made by the Cabinet, the framework identifies government institutions that should lead the process of preparing the relevant decision tools. An important aspect that can be observed in this framework is the principle of efficient inter-institutional coordination.

Table 10: Logical Framework

Specific objectives of the Gas Master Plan	Activities	Responsibility	Potential Indicators	Term
The Development of Gas from the Rovuma basin and the LNG export through the expeditious conclusion of the negotiations.	Conclude on the negotiations for the development of LNG in Palma	MIREM and LNG Concessionaries (ENI and Anadarko) to negotiate and finalize the LNG development plan	MIREM announced an agreement with the developers of LNG for the production of natural gas in the Rovuma Basin and for the LNG in Palma.	12 Months
	Develop a plan to finance the capital position of the ENH in the project	ENH, Ministry of Finance, MIREM	ENH and the Ministry of Finance submit a funding proposal for approval by the Cabinet	12 Months
	Conclude negotiations with LNG off-takers	ENH and LNG Concessionaries	The investment decision is announced by the LNG Concessionaires	12 Months
Develop and implement a communication plan to increase transparency and manage expectations	To contract a specialized company to develop a communication plan regarding the Government's approach to gas exploration in the Rovuma Basin, along with information on revenue, a revenue allocation plan, benefits, schedule, etc.	MIREM	MIREM conducts a stakeholders' workshop to request contributions to the communication plan, and subsequently submits a communication plan for approval by the Cabinet.	12 Months
			Distribution of communication materials for the general public and relevant government officials.	6 Months
Maximize domestic support for the development of LNG	Establish programs and education and professional training centers, especially oriented towards areas involving construction, operation and other infrastructure related to offshore development, gas processing and LNG production.	Ministry of Education and Ministry of Labor.	Number of established training programmes; participation fees for training programs; number of trained personnel employed; establishment of a technical-professional training center in Palma.	12 Months

Implement the LNG project and promote the participation of the national business	Identify, assess and build the necessary infrastructure in Cabo Delgado for the development of LNG.	MIREM (COORDINATOR), ENH in collaboration with LNG concessionaries.	Infrastructure development plan, submitted for approval by the Cabinet.	12 Months
	Prepare terms of reference and hire a consultant to evaluate current and potential SMEs in Mozambique to support the gas industry and LNG.	MPD, MIC	Number of Mozambican SMEs involved in the gas industry.	6 Months
Support the use of natural gas in domestic industries	Evaluate the merits of the specific internal projects that require gas supply.	MPD, and MIC, ME, MINAG	The volume of gas to the domestic market is quantified.	6 Months
	Evaluate the initial demand for gas in Cabo Delgado	MPD and MIREM	Identification of gas needs and creation of mechanisms to satisfy such needs	6 Months
	Develop specific scenarios for the gas demand in Mozambique, including for electricity and other industries	MPD	The different scenarios for gas demand are modelled with the contribution of the Management Committee and stakeholders, and submitted to MIREM;	12 Months
	Assess the gas demand of small and medium enterprises (SMEs) based on the evaluation of its products, the typical firm size, cost, and power consumption by type and location.	MPD, MIC, and ME	Number of SMEs seeking gas supply in Cabo Delgado and Nampula.	6 Months
	Develop and implement a methodology to supply gas to various national industries	MPD	Industries obtain gas for domestic use	12 Months
	Develop a standard tariff table for the pipeline and regulations	MIREM	Publication of the standard tariff regulations for the pipeline	6 Months

Strengthen institutional capacity related to the management of revenues from natural gas, environmental management and acquisition of geological knowledge	Develop an institutional and procedural framework to direct revenues for development programs	MPD and MoF conduct a detailed study on the various options for better use of gas revenues (short and long term). MoF develops a framework and rules for the disbursement of gas revenues.		12 Months
	Establish a regulator for the transmission and distribution of natural gas.	MIREM and ME	INP for the high-pressure transmission networks and the Ministry of Energy for the low-pressure distribution networks.	3 Months
	Conduct a study on how the development of gas in Cabo Delgado may affect tourism, and evaluate mitigation measures.	MITUR	Finalized study and number of tourists visiting Cabo Delgado and other places quantified	12 Months
	Increase research funds for additional hydrocarbons. Suitable model contracts for CBM.	INP	Plan sanctioned by the Government. INP announces a new round of tender for other concession areas.	18 Months
Create and maintain a good business environment	Reassess entrepreneurial perception of the business environment in Mozambique.	Government	Business environment characterized; strengths and weaknesses thereof, identified.	12 Months
	Refine the framework pertaining to the business environment in order to provide investors with the security they need.	Government	Proposals for the amendment of relevant legislation approved by the Cabinet	12 Months
Ensure the share of gas to the domestic market	Negotiate with producers and ensure commercial gas for the domestic market	MIREM	Additional natural gas for the domestic market, secured (quantities and price that favors the domestic industry)	12 Months

Ensure the share of gas to the domestic market	Negotiate and complete a plan to transfer the share, in kind, for the Government.	MPD, MoF, MIREM and the LNG concessionaries	Approved plan indicating the modalities for gas delivery in kind to domestic customers	12 Months
	Additional studies (finalize a price proposal for calculating revenues from the gas processed in the Rovuma Basin for the domestic market)	MIREM and MoF	Basis of the gas price for calculating the Government's revenue finalized and published	12 Months
Ensure that local communities, particularly in exploitation areas benefit from the process of using natural gas	Design and implement a community development action plan	MIREM and project concessionaries	Number of projects designed and resources allocated for its implementation	12 Months
Create and/or increase environmental awareness of local communities	Develop and implement education and environmental awareness programmes	MICOA	Number of implemented programs and population covered	12 Months
Prevent and/or mitigate environmental damage resulting from the use of natural gas	Adapt the resettlement policy to the specificities of the mega-projects	MICOA and MOPH	Mega-projects act according to the guidelines of the resettlement policy	18 Months
	Develop and implement a monitoring plan for environmental quality, including air, water and soil, as well as environmental inspection	MICOA		18 Months
Strengthen institutional capacity for the implementation of environmental legislation, security and supervision of the marine environment	Devise a contingency plan for accidents resulting from petroleum activities	MTC, MIREM, MICOA MITUR and MP	Plan sanctioned by the Cabinet	12 Months
	Purchase equipment to monitor marine pollution by hydrocarbons, for maritime observation and equipment for surveys and production of navigational charts.	MICOA and MTC (INAMAR and INAHINA)	Equipment in use and data on environmental quality published periodically. Safer and more secure sea navigation.	12 Months

6. Further Studies

The logical framework presents activities considered as priorities for the natural gas to be used in a sustainable manner, for the benefit of Mozambique. It identifies the decisions to be taken by the Government within the established time limits.

The dynamics of the international oil market requires constant updating and further analysis of various important aspects and development catalysts. The table below identifies some of the studies to be conducted in order to equip the Government with better arguments to make future decisions about the use of natural gas, in its various forms, for the country's development.

Table 11: Further necessary studies

Activity	Authority in charge
Conduct a short-to-medium term study for the development options for the generation and transmission of electricity in Cabo Delgado and Nampula, to meet the growing demand.	MoE
Conduct an integrated study on energy for Mozambique and the Southern African region, taking into account all existing resources (coal, gas, water and renewable resources) and transmission options, to assess the role of gas-based industries. The study should include the results of the study mentioned above.	MoE
Conduct a study that proposes a practical and transient model for the inclusion of Mozambican SMEs in the supply chain for goods and services for gas concessionaires.	MIC
Conduct a study on the demand for gas for small and medium enterprises, with emphasis on the northern provinces, based on their outputs, size, cost, energy use, etc.	MPD, MIC & MoE
Conduct, regularly, a study projecting the gas needs of the domestic market.	MPD, MIREM & MIC.
Conduct a study on the design and operation of the tender, to determine the gas price, as well as an allocation process to evaluate the tenders for the supply of natural gas.	MPD, MoF & MIREM
Conduct a study on the rates of revenue and political incentives for mega-projects, in order to maximize government revenue.	MoF
Accelerate the development of the input-output matrix for the Mozambican economy.	MPD
A study on the development of gas may support the development of tourism.	MITUR
Conduct a study to assess the structure of the CCPP for the extraction and exploitation of methane from coal.	NPI
Conduct a detailed and thorough study on the infrastructure needs (and their cost) for specific projects or areas that could accommodate gas projects or gas-based projects.	MPD & MTC

7. Monitoring

The Ministry of Mineral Resources, through its auxiliary bodies, the National Petroleum Institute, is responsible Institution for monitoring the implementation of the Natural Gas Master Plan. Considering the multi-sectorial nature of the activities related to natural gas, an Inter-sectorial Monitoring Committee will be established, integrating government entities, whose responsibilities intersect with those of the natural gas entities; particularly in sectors such as energy, industry, environment, agriculture and labor.

The Natural Gas Master Plan, through existing mechanisms and institutions in the country, should also encourage the participation of civil society organizations and others in monitoring the exploitation and sustainable use of natural gas and its derivatives.