

Chapter 15

Cumulative Impacts

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15.1 INTRODUCTION

Impacts directly associated with the Project are discussed in the preceding sections. In this section, the potential impacts associated with the cumulative effects of the Project and other developments in the area and region are described. Evaluation of potential cumulative impacts is an integral element of an impact assessment.

Cumulative impacts occur when a Project activity acts together with other activities (other projects or third party activities) to impact on the same environmental or social resource or receptor. The IFC defines cumulative impacts as *'impacts that result from the incremental impact, on areas or resources used or directly impact by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted'*. Significant cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Past and present activities were considered in developing the environmental and social baseline against which the Project is assessed. For example, the terrestrial ecology baseline takes into account past agricultural practices that have transformed the natural landscape and resulted in an alteration of the habitat for various fauna species. Thus, such previous activities have already been considered in this EIA and used as the baseline to assess the potential impacts of the proposed Project activities. Beyond the past and present activities, the following have been identified as 'reasonably defined' activities that could act together with the Project to cumulatively affect the environment:

- establishment of an Industrial Development Zone (IDZ) by the Government of Mozambique in the vicinity of, or incorporating, the Afungi Project Site; and
- future phases of exploration and development of hydrocarbon resources by AMA1, eni and others.

15.1.1 *Limitations and Mitigation*

Cumulative effects are difficult to predict as they are the result of complex interactions between multiple projects or activities. This difficulty is compounded by the fact that details of the future development are largely unknown at this stage. Moreover, whether or not a potential future development actually occurs is dependent on a number of factors that are unknown at the time of this assessment. Consequently, cumulative impacts are qualitatively assessed herein, ie high-level descriptions of the potential impact are provided.

Mitigation and management of cumulative impacts often require cooperation with other stakeholders or at a government level, and are frequently beyond the ability of a single project development to control solely. In line with international good practice, mitigation should be commensurate with the level of contribution to the cumulative impact by the developer.

The initial phase of the Project could result in an overall investment of approximately USD25 to 30 billion, making this potentially the largest investment project in Mozambique to date. The Government of Mozambique should see a significant increase in the GDP and through its royalty, tax and equity gas rights. The economic benefits can be compounded several times as the Project expands into future phases. Mozambique is likely to benefit from a substantial increase in Government revenue for the next several decades. This economic benefit could be used to improve the health, education and quality of life of the people of Mozambique.

Given the level of oil and gas development activity in the Rovuma Basin and the sensitivity of the biophysical and social environment, the planning of future hydrocarbon development in the Rovuma Basin would benefit from strategic planning by the Government of Mozambique to fully evaluate the costs and benefits of hydrocarbon development, as well as the other development in the area. It is the intention of the Government of Mozambique to use the natural gas in the Rovuma Basin to encourage industrial development and further expand the social and economic benefits derived from development of Mozambique's offshore natural gas resources. To address the issues associated with the potential future development of Mozambique's hydrocarbon reserves, the Government is developing a Natural Gas Master Plan ⁽¹⁾. This Master Plan will address the challenges associated with encouraging the development of hydrocarbon resources (onshore and offshore) in a way that brings the greatest benefit to Mozambique. At present, the Master Plan is in draft form; however, the intent is outlined in below.

(1) The Natural Gas Master Plan for Mozambique Interim Report was submitted to the Government of Mozambique Steering Committee on 8 June 2012, and a Stakeholder Workshop was held in Maputo on 5 and 6 September 2012.

Box 15.1 *Draft Vision Statement for the Gas Master Plan*

Develop natural gas resources in a manner that maximizes benefits to Mozambique society by supporting --

- growth in domestic public and private sector institutional competencies;*
- growth in domestic industry and businesses, especially small and medium scale industries;*
- increased employment across the country, especially in the less-developed provinces;*
- infrastructure to support expanded economic activities, especially in less-developed provinces; and*
- expanded access to training and education*

in order to improve the quality of life for the people of Mozambique, while minimizing adverse social and environmental impacts.

Source: Draft Vision Statement for the Gas Master Plan as presented in the Stakeholder Workshop, held in Maputo on 5 and 6 September 2012.

15.1.2 *Potential Resources and Receptors*

Specific resources and receptors will vary but, in general, potentially affected resources and receptors could include:

- air quality (through emissions);
- visual and noise;
- surface water;
- groundwater;
- marine ecology;
- terrestrial ecology;
- community health and safety;
- livelihoods and businesses (agriculture, fishing, tourism, employment, etc);
- physical structures and infrastructure (eg homes, roads, etc); and
- sociocultural structures (eg ethnolinguistic groups).

15.2 CUMULATIVE IMPACT OF THE PROPOSED INDUSTRIAL DEVELOPMENT ZONE

15.2.1 *Overview*

Information currently available related to the location, extent or timing of the establishment of the potential IDZ by the Government of Mozambique is sparse. It is understood that the Government wishes to promote the involvement of domestic investors in megaprojects in the hydrocarbon sector and has established Empresa Nacional de Hidrocarbonetos Logistics (ENHL) to build two ports in Cabo Delgado Province (one in Palma and another in Pemba). It is assumed that the Palma location will be part of the establishment of this IDZ in the vicinity of the Project area, or possibly incorporating the Project area. The IDZ will serve as the area within which future industrial activity (onshore) will be located. The aim, as currently understood, is to consolidate infrastructure and services in one area and to avoid impacts of discreet projects occurring in different areas over a wider area. In addition, during the Maputo public meeting held on 09 September 2013, ENH noted their preference was to have a single LNG park consolidated within the 7,000 ha DUAT area on Afungi peninsula. Other developments within the IDZ may be subject to separate EIA's.

The proposed development of the IDZ could transform a relatively large area from its current rural/agricultural state to facilitate industrial use. Such transformation may result in the alteration of natural watercourses and displacement of native fauna, and may potentially restrict access or otherwise alter the traditional livelihoods of the local communities reliant on the land. These potential impacts are quite similar to those discussed in association with the land acquisition for the proposed LNG Project. However, it is difficult to quantify the extent of the potential impacts at this stage as the scale, timing and other details relating to the IDZ are unknown.

15.2.2 *Assessment and Mitigation/Management*

Because the specifics of the proposed IDZ and the associated operating scenarios are unknown at this stage, quantifying the potential cumulative impact is not possible. On a qualitative level, it is expected that the IDZ, if managed properly, could have an overall positive impact on both biophysical resources and on socio-economic receptors at the regional level, given that the hydrocarbon resources in this region of the country will undoubtedly be developed. While there may be direct and indirect environmental and social impacts at the local level, in the long term, consolidating this development within the IDZ will ensure impacts are largely concentrated in one area and easier to manage. The IDZ also offers the opportunity for careful thought to be applied to spatial, strategic planning such that potentially conflicting land uses or businesses (eg tourism and industrial development) can be supported in a planned, coordinated fashion, thereby maximising the economic potential of northern Mozambique and minimising negative impacts as far as possible.

Should the IDZ be located adjacent to or incorporating the Afungi Project Site, the Project may share non-proprietary data and information with third parties (such as ENHL and its contractors) to support the impact assessment and consolidated mitigation/management measures that should be used as part of the IDZ planning. Collaboration among local operators in the oil and gas sector and supporting industries, as well as between these sectors and the Government of Mozambique and NGOs, is likely to prove mutually beneficial to all parties operating in the vicinity of Palma District and Cabo Delgado Province.

15.3 *CUMULATIVE IMPACT OF FUTURE EXPLORATION AND DEVELOPMENT*

15.3.1 *Overview*

In addition to the proposed Project, several other oil and gas exploration activities are currently underway or scheduled to occur within the vicinity of Offshore Area 1, which may contribute to cumulative effect on the environment.

Exploration activities (seismic and drilling) have recently been carried out for the following oil and gas operators in the vicinity of the offshore Rovuma Basin:

- Onshore Area 1 (AMA1);
- Offshore Area 1 (AMA1);
- Offshore Area 4 (Eni);
- Offshore Areas 2 and 5 (Statoil); and
- Offshore Areas 3 and 6 (PCMRB).

AMA1 completed seismic exploration in Onshore Area 1 in April 2013 and intends to commence exploratory drilling of up to three wells in April 2014.

Eni has drilled several offshore wells and has made significant gas discoveries in Area 4 (adjacent to Area 1). Eni intends to continue this exploration campaign to better characterise the hydrocarbon resources in Area 4 throughout 2014.

Statoil concluded seismic activities in 2011 and submitted EIAs for exploratory drilling in Areas 2 and 5. Statoil drilled two wells, in 2013 and intends to conduct further 3D seismic acquisition in the south of Area 2, as well as drilling of an additional four wells further offshore in Areas 2 and 5.

PCMRB has requested permission to drill a minimum of two wells in Areas 3 and 6, the first one of which was drilled in late 2012. The timing of the operations associated with the drilling of the second well has not been planned.

All these projects have the potential to cause positive and negative cumulative impacts. The above potential developments are likely to result in an increase in population, supporting industries and services that would increase pressure on infrastructure and services in northern Mozambique. The positive cumulative impacts would be related to the significant economic development of Cabo Delgado Province and the country. The primary negative cumulative impacts would be the gradual transformation of the relatively undeveloped area with associated impacts on ecological functioning of some ecosystems. From a sociocultural perspective, the positive cumulative impact would be associated with economic development. Other potential cumulative impacts would be changes to the local culture and livelihoods, and this could be perceived as positive or negative.

Specific potential cumulative aspects associated with future exploration and development include:

- community development and economic benefit;
- increased conversion of natural landscape to accommodate the construction of increasing numbers of facilities;
- the current lack of waste, water and electricity infrastructure to support developments;
- the need for skilled labour and training facilities;
- increased shipping and air traffic;
- impacts to the tourism industry; and
- planned and unplanned in-migration of people, with associated impacts on biodiversity, health, crime and levels of intercultural/inter-ethnic conflict.

Enhancement measures will include measures to increase employment, train people and develop supporting infrastructure. Mitigation and management of the negative cumulative impacts depend on effective management strategies to reduce risk to the environmental resources and social receptors, and to offset impacts where mitigation is not possible.

The proposed LNG Project is the first project in what could be a significant development initiative in northern Mozambique by the oil and gas industry. Strategic spatial planning by the Government of Mozambique and its agencies at this early stage is important to ensure development in the region is promoted, while maintaining ecosystem functions and services and social well-being. AMA1 and eni expect to contribute to such planning by

cooperating with Government and other developers in the region, and leading by establishing good management practices.