

**Non-technical summary of the
Environmental Impact Assessment for the
production and transmission of electricity
from gas project in Mauritania**



شركة إنتاج الكهرباء اعتمادا على الغاز
Société de production
d'Electricité à partir du Gaz

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SPEG - Electricity from Gas Production Company (*Société de Production d'Electricité à partir du Gaz*)

Environmental Impact Assessment for the production and transmission of electricity from gas project in Mauritania November 2013

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Name of the Project : Electricity production from gas (*Production d'Electricité à Partir du Gaz*)

Country: Mauritania

1.1

INTRODUCTION

This document presents the Environmental and Social Impact Assessment (ESIA) report for the proposed construction of a power plant north of the city of Nouakchott and of a high voltage transmission line up to the city of Nouadhibou and the Tasiast mine .

An initial version of this impact assessment study was produced by the company Tractebel in November 2012. At the request of the Electricity from Gas Production Company ie *Société de Production d'Electricité à partir du Gaz* (SPEG), Environmental Resources Management (ERM) has updated the content, between August 2013 and November 2013, to take into account certain changes to the configuration of the project and to meet the requirements of the Mauritanian environmental regulations.

The project proponent is the Electricity from Gas Production Company, *Société de Production d'Electricité à partir du Gaz* (SPEG).

SPEG is a limited company under Mauritanian law whose shareholders are the Mauritanian Electricity Company (*Société Mauritanienne d'Electricité*, SOMELEC), the National Industrial and Mining Company of Mauritania (*Société nationale Industrielle et Minière de Mauritanie*, SNIM), and KG POWER AG, a subsidiary of the company Kinross Gold. TMLD owner of the Tasiast gold mine, located in the center-west of the country, is also a subsidiary of Kinross Gold.

The ESIA was conducted to comply with Mauritanian law and in particular the Decree n°2004-094 of 4 November 2004 on environmental impact assessment, amended and supplemented by Decree n°2007-105 of 13 April 2007. According to this regulation, a project to install a power plant for electricity production is subject to the completion of an environmental impact notice if the power plant does not exceed 300MW. On the other hand, a project to install a high voltage transmission line is subjected to a full environmental impact assessment study.

This ESIA has also been carried out taking into account the requirements of the World Bank Group, January 2012 version. Particular attention was paid to the World Bank Group Environmental, Health and Safety Guidelines for Thermal Power Plants (2008) and Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution (2007).

1.2 PROJECT DESCRIPTION AND JUSTIFICATION

The Banda field is a hydrocarbon offshore field, associated with natural gas. The exploration and exploitation of this field has been entrusted to the company Tullow Petroleum Mauritania Pty Ltd (hereinafter "Tullow"). The gas extracted from the field will be transported to the coast by a submarine pipeline, to be delivered a few kilometers north of the city of Nouakchott, processed, and made available to SPEG.

SPEG aims to produce and distribute electricity from the gas produced from the Banda field.

The project planned by SPEG includes the implementation of several plants producing electricity from gas, with an initial capacity of 300 MW by 2016 and a total of 400 MW to 500 MW at the completion of project by 2020. It also includes the construction of a high voltage transmission line of electricity to the sites of energy consumption in the north of the country (cities of Nouadhibou and Zouérat, and the Tasiast mine), the construction of a power transmission line to the Senegal and the construction of a pipeline from north of Nouakchott to the north of the country (city of Zouérat).

By 2016, electricity demand in Mauritania should reach around 190MW during peak hours, and a 100MW basis (Tractebel estimates, 2012). Therefore, the project is expected to generate a surplus of electricity. In this context, Mauritania offers to export part of the excess power to Senegal (from 150 to 200MW) using a high voltage transmission line (included in the project?). This infrastructure will contribute to the profitable development of energy resources in Mauritania, and increase the country's energy independence, while allowing Senegal to import electricity at a competitive price within a short timeframe (2016).

The project will be carried out in several phases over a decade. Only the first phase is the subject of this EIA, which consists of building and operating a 120 MW thermal power plant north of Nouakchott in addition to the 180 MW currently under construction by SOMELEC. It also includes linking the power plants via a new high voltage transmission line (circumventing the city by the west) to a transformer located south of Nouakchott that connects to the line servicing the Manantali hydroelectric plant in Mali. The transformer is managed by the Office for the Development of the Senegal River Valley (*Office de Mise en Valeur de la Vallée du Fleuve Sénégal*, OMVS). The first phase of the project also includes a high voltage transmission line linking the plants in Nouakchott to the city of Nouadhibou, with a branch to the Tasiast mine and a power transmission line from Nouakchott to Tobene near Dakar in Senegal. This first phase should be completed in late 2016.

During the second phase, which is still at the stage of conceptual design and implementation timing is not fully determined, several electricity power plants should be added to the existing production capacities (total installed

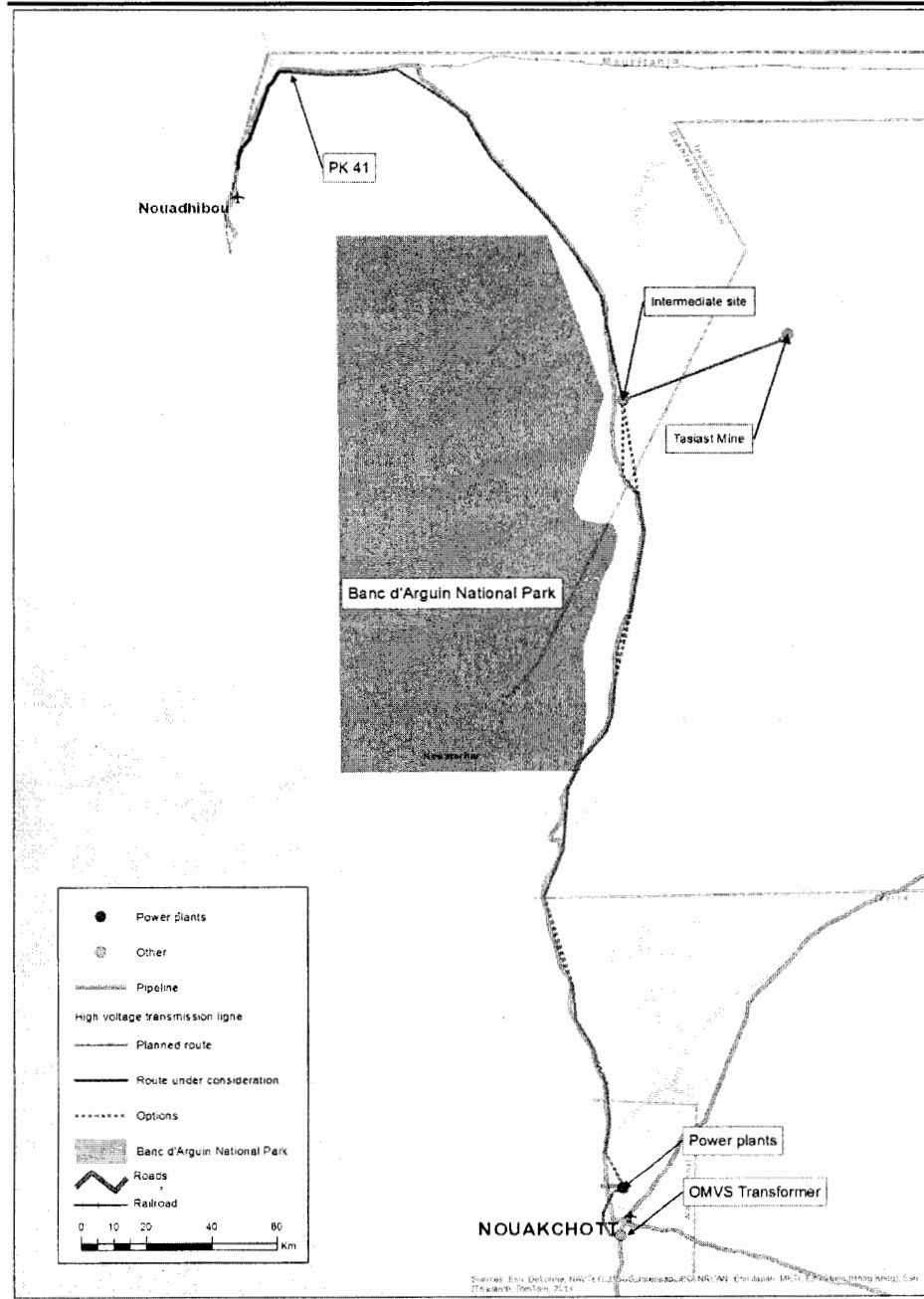
power of 400 MW to 500 MW). A pipeline to the north of the country is also proposed.

The EIA carried out concerns exclusively the facilities that will be operated by SPEG in the first phase of this project, with the exception of the power transmission line to the Senegal for which a specific EIA will be undertaken later. Facilities considered in the present EIA are a power plant in Nouakchott, the transmission line from the plants to the OMVS transformer, and the transmission line to the north. For the second phase, a new EIA will be carried out, in accordance with applicable regulations.

Furthermore, although the construction and operation of the SOMELEC 180 MW plant has not been subject to a prior EIA with regards of the Mauritanian regulation and is not under the control of SPEG, this plant was taken into account in the evaluation of cumulative impacts associated with the project.

The geographical area covered by the project is specified in Figure 1.1 below.

Figure 1.1 Geographical area covered by Phase 1 of the project



1.3 POLITICAL, LEGAL AND ADMINISTRATIVE FRAMEWORK

Data on this subject are provided in detail in *Chapter 2* of the EIA report.

The main authorities involved in the project or in the EIA procedure are summarized below. Many of them have been encountered by SPEG during consultations prior to the completion of this EIA.

1.3.1 *Administrative framework*

1.3.1.1 *Environmental authorities*

National Council for Environment and Sustainable Development (Conseil National Environnement et Développement Durable, CNEDD)

The CNEDD was established through Decree N° 156 of June 21, 2012 and supports collaborative planning, intersectoral coordination and follow-up actions for the protection and enhancement of the environment from a sustainable development perspective .

Ministry for Environment and Sustainable Development (Ministère de l'Environnement et du Développement Durable, MEDD)

The MEDD has three key departments for the implementation of environmental policy in Mauritania: The Environmental Control Department (*Direction du contrôle environnement, DCE*), the Protected and Coastal Areas Department (*Direction des Aires Protégées et du Littoral, DAPL*) and the Pollution and Environmental Emergencies Department (*Direction de la pollution et des urgences environnementales, DPUE*).

The DCE has a mandate to provide guidance and advice on the various measures necessary to complete an EIA and effective implementation of mitigation measures to attenuate the risks identified in the study, particularly in the environmental and social management plan (ESMP).

1.3.1.2 *Petroleum and Energy Authorities*

Ministry of Oil, Energy and Mines (Ministère du Pétrole, de l'Energie et des Mines, MPEM)

Its mission is to implement and formulate government policies on oil, mining and the energy sector in general. The government agency is responsible for issuing licenses and promulgating laws and regulations.

Electricity and Energy Department (Direction de l'Electricité et de la Maîtrise de l'Energie, DEME)

The roles and responsibilities of the DEME are defined through the Decree No. 050-2011 of 5 April 2011 establishing the responsibilities of the MPEM. The main tasks of the DEME are:

- to develop a comprehensive energy efficiency policy to favour economic growth;
- to develop action plans and provide support to decentralised services;
- to ensure the implementation of laws, standards and regulations relating to the production, transport and distribution of electrical energy;
- to undertake awareness campaigns regarding the requirements of energy saving;

- to develop and monitor the implementation of the regulations and standards of construction works; and
- to monitor the activities relating to generation, transmission and distribution of electricity.

1.3.1.3 Local administration

Local authorities are involved along the entire route of the transmission line with: the *Wali* (at *Wilaya* level/ Province level), the *Hakem* / Prefect (at *Moughataa* / Department level) and Mayor (at city level).

Infrastructure Projects are located in the areas of Nouakchott, Trarza, Inchiri and Dakhlet Nouadhibou. The municipalities of Nouakchott most affected by infrastructure (the power line and the power plant) include: El Mina, Sabkha, and Kasr and Tevrag-Zeina.

Affected villages on the road between Nouakchott and Nouadhibou are:

Sites	Demographic Indicators (Estimated number of households)
Agnodert PK 20 (outside NKC)	100 households
Tiwilit	Imraguen – 5 households
Mheijeratt (PK 100)	Imraguen - 15 households/ Population split between two locations of the same village (one at the coast and one close to the road)
KweijatTalh	Imraguen - 30-40 households/ seasonal migration related to the education of children.
Eneghre	Imraguen - 4 households
Kweij Lehmar	Imraguen - currently 3 households / seasonal migration related to the education of children. 20 households in summer.
Oum Lekaab (PK 188)	Imraguen – 6 households
Nesri Pk (PK 200)	12 households
Greid Goumyatt (PK 218)	20 households
Chami	Developing urban center - currently 80 households
Virage Tasiast	Location where a transmission line will be constructed towards the Tasiast mine - currently 10 households
WadiChebka	20 households
Chelka	15 households
Lehdeyba	14 households
Elbaragua	15 households
Bou Lanouar	Main urban center between Nouakchott et Nouadhibou – 350 households
Swaysi	40 households
Carrière	20 households

1.3.2 **Political environmental and social framework**

1.3.2.1 *Environmental policy*

Two texts adopted in 2006 have shaped Mauritanian environmental policy. These are:

- the *Stratégie Nationale de Développement Durable* [National Strategy for Sustainable Development] (SNDD) ; and
- the *Plan d'Action National pour l'Environnement* [National Action Plan for the Environment] (PANE).

Among the major programmes integrated into the implementation of the PANE, the following policies may be cited:

- National Action Programme to Combat Desertification (PAN / LCD);
- Action plan for the conservation of biodiversity;
- Initial National Communication on Climate Change; and
- Development of the Master Plan for the Mauritanian coastline (PDALM).

1.3.2.2 *Social policy*

In January 2001 Mauritania implemented a Strategic Framework for the Fight against Poverty (*Cadre stratégique de lutte contre la pauvreté*, CSLP) for the 2001-2015 period. A first action plan implementing the CSLP for the period 2001-2004 and a second plan (CSLP-2) for the period 2006-2010 have already been completed.

The CSLP sets guidelines and relies on inter-sectorial strategies, decentralization and integration of all contributors to the national economy to ensure sustained and shared economic growth able to reduce the incidence of poverty by half by 2015. The CSLP is distinguished by the priority given to poverty reduction, the ownership by national institutions and participation of civil society.

1.3.3 **Regulatory framework**

1.3.3.1 *Environmental Impact Assessment (EIA) legislation*

The EIA process in Mauritania is defined by Decree No. 2004-094 of 4 November 2004. It is the main text of the Code of the Environment (No. 2000-045 of 26 July 2000). In 2007, the Decree was supplemented and amended by Decree No. 2007-105 of 13 April 2007.

The main stages of the EIA process are:

- drafting of the Terms of Reference (ToR)
 - consultation of the institutions and the public;
 - approval of the ToR by the DCE;
- preparation and submission of the EIA;
- holding a public consultation exercise, and

- EIA review and decision issued by the DCE

1.3.3.2 *Environmental and social legislation*

The project will be conducted in accordance with applicable environmental regulations in Mauritania, including those relating to energy and hydrocarbons. A summary of applicable legislation is presented in *Chapter 2* of the EIA.

1.3.3.3 *International conventions and agreements ratified by Mauritania*

In addition to compliance with Mauritanian legislation, the Project will also take into account the international conventions ratified by Mauritania, described in *Chapter 2* of the EIA report.

1.3.3.4 *World Bank Group performance standards*

The World Bank Group objective is to support private sector growth in developing countries. The World Bank Group sustainability framework (updated on 1 January 2012), is generally considered one of the most comprehensive sets of standards in environmental and social management of investment projects.

The World Bank Group Performance Standards (PS) are a central element of this framework. These eight thematic standards lay down the principles of integration of environmental, health and safety aspects into projects. Their content is detailed in *Table 2.6* in *Chapter 2* of the EIA report.

1.3.3.5 *Environmental and social policies of the African Development Bank (AfDB)*

Procedures related to environmental studies for operators of the private sector of the AfDB (May 2000)

The Environmental and Social Impact Assessment procedures (ESIA) defined by AfDB are intended to ensure that projects, programs and plans of the bank have been designed to be environmentally and socially sustainable, and that they involved stakeholders and undertook adequate communication with the public.

Guidelines for integrated assessment of environmental and social impacts (October 2003)

The environmental assessment procedures of the AfDB covers the following cross-cutting themes: poverty, environment, population, health, gender issues, and stakeholder participation.

Involuntary Resettlement Policy (November 2003)

The overall objective of the AfDB policy on involuntary resettlement is to ensure that when people must be displaced they are treated fairly and that they share the benefits of the project.

1.4 DESCRIPTION OF THE PROJECT ENVIRONMENT

The baseline condition of the project area is described in *Chapter 4* of the EIA report. This chapter addresses the environment and economic and social issues.

1.4.1 *Environmental baseline in the project area of influence*

The area of influence of the project is vast, given the length of the transmission line between Nouakchott, Nouadhibou and Tasiast. The project is located in the northwest of Mauritania, an area of the Saharan desert characterized by severe aridity, scarcity of organic soils, a very sparse vegetation and a low floral and faunal diversity. The landscape of this part of Mauritania is characterized by rows of dunes orientated northwest to southeast. The dunes are separated by inter-dune depressions named sebkhas. In the coastal area, the project runs along the eastern boundary of the Banc d'Arguin (PNBA) National Park, a coastal shallow water and lagoon system extending over 1 170 000 hectares north of Mamghar (i.e. about 150 km north of Nouakchott). The PNBA is a biogeographical crossroads of primary importance, home to some two million Palearctic migratory birds during the winter, classified as a Ramsar site since 1983 and a World Heritage Site by UNESCO since 1989. The PNBA is also a permanent residence to Imraguen fishermen, a population group of approximately 1,500 people, whose traditional way of life is based on small-scale fishing in the shallow waters of the Banc d'Arguin. It is important to keep in mind that the project will not infringe into the PNBA. The transmission line will be located more than 15 km from Imraguen villages and the important bird sites of the PNBA.

The human environment of Mauritania is characterized by a very low population density (with a national average of about 0.2 inhabitants /km²). Outside Nouakchott (900,000 inhabitants), Nouadhibou (less than 100 000 inhabitants), the project will not impact the urban areas. This implies that, by its influence, it will only affect a very small number of people in relation to the extent of its area of influence during the operational phase. This is particularly true for the power plant in Nouakchott and along much of the power transmission line.

Because of the aridity, agriculture in this part of Mauritania is limited to small scale agriculture in the vicinity of urban areas (e.g. kitchen gardens in Nouakchott) and to oasis agriculture in the desert (crops and palm groves).

1.4.2 *Other development projects in the project area of influence*

Other projects under development in the area are described in *Chapter 3.7* of the EIA report.

Such developments include the current construction of the power plant SOMELEC, the installation of the gas reception station from the Banda field

pipeline, and construction of Tullow's gas terminal located on a site adjacent to the plants. There is also the construction work during the New International Airport Nouakchott (NAIN) and the construction of the new University of Nouakchott, the latter scheduled to open in 2014.

The cumulative effects of these different projects in their construction phase as well as their operational effects, have been considered in the EIA.

1.5 *MAIN ALTERNATIVES CONSIDERED*

The objective of the project is the transformation of the gas produced by the Banda field into electricity to meet the energy needs of Mauritania, Senegal and Mali. In the absence of other energy sources that can provide the desired power generation capacity in competitive economic conditions, creating new power plants and the creating or strengthening the power transmission capacities of the three countries is the only option considered by Mauritania in the short term.

Several project alternatives were considered:

- "no project" option;
- choice of fuel and supplies;
- choice of power plant location; and
- route selection for the transmission line.

1.5.1 *"No project" option*

The capacity of electricity generation in Mauritania, Senegal and Mali, the three countries involved in the project, are inadequate at present and electricity demand is increasing. Production capacity needs to be strengthened to cope with this demand. The total additional capacity planned for the project is approximately 400 MW to 500 MW at the completion of the second phase of the project. If gas from Banda was not used to generate electricity, other production capacities would need to be installed in each of the countries (Mauritania, Senegal and Mali). Most of the additional production to be built would require a supply of heavy fuel oil for economic reasons. This option presents disadvantages for the development of Mauritania which would see its dependence on imported oil increase, and a source of employment relocate outside the national territory. From an environmental point of view, the use of heavy fuel oil would have more impact than gas.

1.5.2 *Choice of fuel and supplies*

Several types of fuel could have been used for the proposed SPEG power plants: gas, heavy oil, diesel (light oil), coal.

Mauritania does not have commercial reserves of coal, the use of natural gas is the most cost effective and easiest solution to implement, due to the proximity of the Banda gas field, which will ensure safe and continuous supply with an

acceptable cost of development. Heavy fuel oil may, however, be used occasionally by the SOMELEC dual power plant and diesel by the SPEG power plant when gas supply disruption occurs or when annual maintenance activities for the gas terminal are scheduled (two weeks per year).

1.5.3 *Choice of power plant location*

The choices regarding positioning the power plant site were as follows:

- proximity to the source of combustible, therefore limiting the distance between the site and the Banda field (the gas terminal is on the same site as the power plants);
- proximity to the point of export of energy (OMVS transformer south of Nouakchott);
- proximity to significant area of consumption (Nouakchott);
- rapidity of implementation of the first phase of the project; and
- optimizing the expenditure of the budget required for the project (the pipeline to the north is not necessary in the first phase of the project and its cost can be distributed over the second phase).

1.5.4 *Route selection for the transmission line*

A route optimization study was carried out by Tractebel from 26th of February 2013 to 11th of March 2013 for the high voltage transmission lines.

Many selection criteria, both for environmental and social aspects were taken into account to optimize the layout of the line:

- maximize straight cable sections to limit the length of infrastructure required;
- avoid moving/ disturbing sand dune areas;
- keep overhead lines to a reasonable distance from the main asphalt road to facilitate quick access during the construction and operational phases;
- respect the boundaries of the PNBA (infrastructure should be at least 5km from its borders);
- avoid areas of wet sand or sebkha or areas with flood risk. In low areas which cannot be avoided, appropriate foundation design of the tower, platform work and access roads will be required;
- minimize environmental and social impacts in terms of visual and noise impacts;
- avoid small villages; buildings, gas stations;
- respect the exclusion zone of the airport under construction in Nouakchott ;
- avoid crossing the fenced properties; and
- consider the establishment of telephone relays to avoid interference to radio links.

Many variants have been studied in order to optimize the layout of the line. At present, the route of the transmission line inside the city of Nouadhibou

remains to be validated by SPEG as well as some minor sections in other parts of the route.

1.6 *POTENTIAL IMPACTS, MITIGATION AND IMPROVEMENT MEASURES*

The main sources of impacts identified in the EIA are described in Chapters 5 and 6 of the EIA. They are the following:

- Significant socio-economic benefits are expected from the project. They are mainly related to the improvement of energy infrastructure in Mauritania since the power plants will increase the availability of energy for industries and Mauritanian households. The use of natural gas as a primary source of energy will help reduce the country's dependence on refined oil imports. In addition, construction activities of the project will temporarily create jobs for nearly 800 workers: 250 for each plant, and 110 jobs for the construction of the transmission lines. Finally, the project will generate about 150 direct permanent jobs during the operational phase.
- Emissions from the combustion turbines of the combined cycle power plant will have a negative impact on the quality of ambient air. Modelling of atmospheric dispersion for the plants in Nouakchott was conducted as part of the EIA. It was shown that emissions from the SOMELEC plant during operations with heavy fuel oil (before mid 2016, simultaneously with the construction phase of the SPEG plant) will cause a degradation of the air quality close to the ground for nitrogen oxides and sulphur oxides exceeding limits set by the standards of the IFC. The area affected by this pollution is mainly that of the university under construction (approximately 240 hours per year on average showed exceedances for NO₂ and 121 days showed exceedances on average for SO₂ according to the modelling results). For the closest houses of Nouakchott, exceedances will not be very frequent (a few hours to a few days per year). Full compliance is expected to be restored after the completion of the SPEG plants when both systems operate on gas from Banda (mid 2016).

Key mitigation measures include the use of low nitrogen oxide emission burners (low-NO_x) for the two plants. Moreover, once the gas is available, the operation of the SPEG plant with diesel should be limited to two weeks per year for the maintenance operations.

- The physical presence of project infrastructure, from construction to operation, can potentially have a limited impact on ecosystems and biodiversity.

The proposed site for the power plant in Nouakchott is in an area of suburban desert without any remarkable ecosystems or species of flora and fauna. This was confirmed during field studies for the assessment of the proposed processing unit onshore for the Banda Gas project in 2012-2013.

The transmission line project will cross desert areas having only limited specific environmental sensitivities. The line will not penetrate the PNBA. The configuration of the power line and pylons should limit the collisions and electrocutions of birds. A total of 34.7 km stretch of powerline in the Nouadhibou sector may pose a medium risk of collision for birds and 3.8 km stretch will pose a significant risk. Visual signalling devices will be set up on each of these cable portions so as to limit the risk of collision for migratory birds.

The main mitigation measures are to avoid sensitive natural areas such as the PNBA, to minimize the influence of activities on the natural environment, to limit the disturbance of flora and fauna during construction, operational/maintenance and decommissioning activities, and to confine the traffic to existing roads and trails.

Given that the route of the transmission line will be optimized to avoid residential and agricultural areas, the project is not expected to result in a need for the displacement of dwellings or agricultural activities. The only potential interactions are identified in the outskirts of Nouakchott, in peri-urban areas, mainly industrial areas or unallotted land uses. In Nouadhibou, the line will be mainly located on land owned by the National Industrial and Mining Company (SNIM). Although the project will not induce significant displacement or compensation to external stakeholders, a framework for the management of these displacements and compensations for any affected entity has been developed in *Chapter 11* of the EIA report.

Subsistence activities in the vicinity of the Nouakchott plant are limited to camel breeding, in a very large area that is much larger than the power plant's area of influence. The impact of limiting access to the area due to the presence of the power plant will remain negligible.

- Fresh water consumption is a potential impact in this part of the world where this resource is scarce. Usage of water has been optimized at the design stage of the project. The technique of air cooling, while needing a larger surface compared to water cooling was chosen in order to reduce water consumption.
- The generation of liquid effluents and the risk of accidental spillage of fuel or chemicals may generate potential impacts on surface and groundwater. All water discharges associated with the project will be treated in an oil/water separator and evaporated (process water and regeneration of demineralization installations) or treated in a septic tank and left to seep into the ground (domestic effluent). Given the low volume of effluent expected, the lack of surface water in the vicinity of the project sites, and the natural protection of important groundwater aquifers, impacts should be limited.

Key mitigation measures include the application of international best practices to minimize the risk of contamination of soil and groundwater by fuel, stored chemicals and waste, through the use of appropriate soil protection (e.g. concrete surfaces) and adequate retention devices.

The project will also ensure that none of the proposed infrastructure is located in potentially flooded areas.

- Power plants typically pose a potential risk to the safety of the workforce and communities due to the use and storage of flammable / explosive gas (natural gas / oil) and the operation of equipment under high pressure. Fire and explosion hazards have been assessed in the EIA in *Chapter 7*. It appears from this study that all hazards related to Lethal Effect Threshold and Significant Lethal Effects Threshold remain contained within the site boundaries. Only one scenario, the Boil -Over of a heavy fuel oil tank (dual power plant) models the radius of influence i.e. the Threshold of Irreversible Effects (SEI) to human health, exceed the site boundaries by a few meters. Apart from this scenario, no irreversible consequence (serious effects to humans) is likely to occur outside the site boundaries. In case of accident, serious damage to people outside the site is not expected.

A calculation was also undertaken for the future pipeline for gas transport planned in Phase 2. Although the pipeline is not subject to the EIA, the likely risks were studied in order to enhance the accuracy of ongoing studies regarding future project implementation and to minimize the consequences of a potential accident for the human environment and existing equipment.

- Visual impacts / impacts on landscape from power plants and transmission lines are significant although these installations are located in peri-urban areas of Nouakchott or Nouadhibou or in uninhabited desert areas. Impacts are therefore anticipated to be limited.
- Noise will be limited due to the distance from sensitive receptors. In particular, Nouakchott and the intermediary site will be located more than 1,500 meters from the nearest houses. Moreover, for the Nouakchott site, the major noise impact in the area will be represented by traffic from the new airport for Nouakchott, located about 10 km north of the site.
- Impacts generated by dust during construction will be very limited due to the remoteness of the project to populated areas and sensitive ecosystems. The whole area of influence of the project is characterized by high levels of dust, because of the climatic conditions of the Sahara.
- Solid waste are planned by SPEG to be managed carefully with an approach aiming at minimizing their generation, separating waste streams generated, and storing the waste in a dedicated area at the site of each plant. There is no formal waste management system organized in Mauritania. Although very limited quantities of hazardous waste are

expected (mainly oily waste related equipment maintenance operations), this waste stream should be stored appropriately on sites in dedicated storage facilities, until acceptable disposal options are identified.

- The cumulative effects of other projects under construction or planned are most significant relative to air quality up until 2016, when gas becomes available (operation of the SOMELEC plant with heavy fuel oil and construction of the SPEG plant at the same time). However, it should be noted that the maximum impact on air quality will be located in an uninhabited area and that this negative effect will cease once gas is made available. Concerning positive cumulative impacts, creation of employment opportunities is most significant.

1.7 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The Environmental Management Plan (EMP) is detailed in *Chapter 9* of the EIA report. It was prepared at the end of the EIA process, in order to comply with Mauritanian law and with international standards, including World Bank Group and AfDB requirements.

The purpose of the EMP is to provide a framework for environmental management of the project, translating the mitigation measures specified in the EIA into an action plan for the Project. Thus, the EMP includes the following information:

- Plan to reduce impacts including mitigation measures to be implemented for each phase of the project's implementation, in order to comply with the Mauritanian law and international standards. The plan also details monitoring measures and associated costs and responsibilities;
- Surveillance and monitoring plan for the environmental performance of the project;
- Training and institutional support plan, and
- Planning for the implementation of environmental and social management.

The EMP defines the roles and responsibilities for environmental management for each component of the Project and for the of construction and operation phases.

1.8 ENVIRONMENTAL MONITORING

For each topic in the EMP, a performance indicator and approach to monitoring the effectiveness of the mitigation measure or compensation is proposed (measures of effluent quality, the quality of the ambient air, etc.). SPEG will ensure regular communication with all stakeholders identified regarding the results obtained.

1.9 PUBLIC CONSULTATIONS AND DIFFUSION OF INFORMATION

1.9.1 Meetings with institutional stakeholder

SPEG met the institutions involved in the project in the preparation of this EIA. The people met by ERM and SPEG and the results of these meetings are detailed in *Chapter 10* of the EIA report.

The purpose of these meetings was to present the details of the project and its timetable and collect questions and contact information regarding projects in SPEG's area of influence. A presentation of the project was formally submitted to the following institutions and organisations by SPEG.

- the Ministry of Environment and Sustainable Development (MEDD)
- the Ministry of Housing, Urban and Regional Planning;
- the Ministry of Equipment and Transport;
- National Park Banc d'Arguin (PNBA);
- the National Industrial and Mining Company (SNIM);
- Free Economic Zone Nouadhibou; and
- the Urban Community of Nouakchott.

1.9.2 Public consultations

Meetings organized for public consultation as defined in the mauritanian legislation were held on the 10th of November at Nouakchott and on the 12th of November at Bou Lanouar in the wilaya of Dakhlet Nouadhibou.

The SPEG's team, the Project developer, participating to these consultations was constituted with :

- Mamadou Amadou Kane –General Director of SPEG;
- M. Amar Cheibany – Technical Director of SPEG;
- M. Dah Mohamed El Hafed Ehmedane – Legal Advisor of SPEG; and
- M. Law Kaw – Technical Advisor of SPEG.

This team was supported by the consultancy firm ERM with:

- M. Bernard Vanlieferinghen, Project Manager;
- M. Andrea Amici, Socio-economic specialized Consultant ; and
- M. Moustapha Ould Taleb, Local Social Expert and translator.

To ensure a good circulation of the information related to the Project, SPEG prepared the following communication tools :

- Registration Card: all those present at the meeting are recorded with their name, affiliation and institutional function ;
- Registry of consultations: anyone present could write their questions, comments or observations in an official register of consultation available to the public;
- Electronic presentation: SPEG and ERM prepared a graphical presentation of the results of the EIA that has been projected and discussed during the meeting. This presentation included a detailed description of the project

and expected impacts with a quantification of these both socially and environmentally. Maps and diagrams were used to illustrate the communication made. The consultation process and the mode of interaction between communities and the Project have been the subject of a specific presentation ;

- Banner and press: a large banner was installed at the sites of public meetings (Atlantis Hotel in Nouakchott and Ezza in Bou el Raha Lanouar) to ensure the dissemination of information, and
- The journalists have issued a report of these meetings in the national press.

A summary of the main questions and answers is given in Table 1.1 below :

Table 1.1: Summary of main questions asked and answers

Topics raised	Answers
<p>Effectiveness of mitigation measures identified: Some stakeholders have emphasized the need to focus on mitigation and adopt solutions of high technology to reduce the negative impacts (especially in terms of environmental pollution and public health)</p> <p>Site plants : Some stakeholders have expressed concern for the decision to install the plant site near the city and the new University of Nouakchott for sites further away from the urbanized centers</p>	<p>ERM : <i>Mitigation measures are provided throughout the ESIA in line with international best practices. However, there remain significant residual impacts (eg air emissions)</i></p> <p>ERM : <i>The power plants site location has been defined through a process of consultation and evaluation of alternatives following stakeholder consultations and considerations of technical and economic feasibility.</i></p>
<p>Emission of pollutants and gas effects on public health: Some stakeholders have expressed concerns in relation to exceeding the tolerance limits of SOx and NOx in the area of the new University of Nouakchott and they fear a negative impact on public health due to air pollution and creating magnetic fields.</p>	<p>ERM : <i>Atmospheric emissions represent a significant potential impact on public health but temporary (related to the operation of the dual power plant with heavy fuel oil until mid-2016). The number of people potentially exposed can not be estimated at this time because the occupation of the university being built is not known at the end of 2015-2016. The creation of magnetic and other impacts on public health fields have been considered and not assessed significant. 2016).</i></p>
<p>Technical capabilities of SPEG and the Government agency: Some stakeholders have emphasized the</p>	<p>SPEG : <i>SPEG considers the socio-economic and environmental management a key issue. Consequently, SPEG is</i></p>

<p>need to strengthen the technical and institutional capacity of SPEG and the Mauritanian Government to ensure the implementation of management plans and environmental and socio-economic monitoring.</p> <p>Resettlement and household vulnerability : Some stakeholders have expressed concern for the needs of relocating communities without compensation and fear the degradation of living conditions of the most vulnerable households.</p>	<p><i>committed to develop the technical capacity to ensure the implementation and monitoring of the defined plans for socio-economic and environmental management (through internal recruitment or external consultants)</i></p> <p>ERM : <i>Given the location of the project facilities, a significant involuntary displacement of persons or business is unlikely. However, if this should be considered in some cases, ERM drafted in the EIA a policy framework for resettlement and compensation to define the principles to be applied. However, it is not expected in this project phase physical relocation of households.</i></p> <p><i>Whatever the impact finally found an action plan for resettlement and compensation will be prepared in accordance with with the policy set out in the EIA.</i></p>
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1.10

CONCLUSION

SPEG’s ambitious project is part of Mauritania’s development policy. It aims to enable the country to be independent from an energy point of view and to enable the export of energy for the benefit of the entire sub-region.

Institutions and communities were consulted and their opinions or questions were addressed in this EIA.

Environmental and social impacts of SPEG’s project were identified and evaluated to define mitigation or most appropriate improvement measures.

The monitoring and reporting on the implementation of these measures will be provided by SPEG throughout the project lifespan. SPEG is committed to putting in place all the means necessary for the complete implementation of the management plans defined in the framework of its Project. It may be called as required to strengthen the current team of SPEG, or subcontracting under future contracts for the construction and operation of facilities, or contracting external specialized consultants.

All the measures to be provided for mitigation of impacts are described in the Environmental Management Plan integrated into the EIA report.

The residual impacts from the project will be addressed and otherwise compensated to make them acceptable in the entire area of influence of the project.

1.11 **REFERENCES AND CONTACTS**

For any questions about this EIA:

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