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Environmental and Social Review Summary
Banda Gas to Power Project (Downstream component)

This Environmental and Social Review Summary (ESRS) is prepared by IDA staff and disclosed prior to the date on which IDA's Board of Directors considers the proposed issuance of a Contract of Guarantee. Its purpose is to enhance the transparency of IDA's activities. This document should not be construed as presuming the outcome of the decision by IDA's Board of Directors. Board dates are estimates only.

Any documentation that is attached to this ESRS has been prepared by the project sponsor, and authorization has been given for public release. IDA has reviewed the attached documentation as provided by the applicant, and considers it of adequate quality to be released to the public, but does not endorse the content.

Country: Mauritania / Senegal / Mali
Project Name: Banda Gas to Power Project
Project Number: P107940 / P145657 / P145664
Environmental Category: A

Project Description

1. The larger Banda Gas-to-Power Project involves the development of (i) an upstream offshore gas field (the Banda gas field), offshore and on-shore pipelines and a gas processing facility, and (ii) the downstream construction of two power plants near Nouakchott in Mauritania and transmission lines to Nouadhibou and Tasiast to the North, and to Senegal to the south. The Banda Gas-to-Power Project seeks to develop natural gas resources from the Banda gas field, which will serve as the primary fuel source for power generation that will supply Mauritania's domestic, residential, and industrial (including extractive) sectors, as well as export power to Senegal and Mali. (Exports to Mali will not require the construction of new transmission infrastructure.)

2. The focus of this Environmental and Social Review Summary (ESRS) is on the downstream component. A separate ESRS covering the upstream component has been prepared and disclosed by the World Bank Group through the InfoShop.

3. The upstream: The upstream infrastructure component of the project is defined by the boundaries of the MIGA guarantee and IDA Partial Risk Guarantee to be agreed between Tullow, and MIGA and IDA respectively. The said infrastructure consists of a gas well, gas pipelines and on-shore technical facilities described below.

4. The Banda gas field is located approximately 55 km offshore of Nouakchott. It is owned by a consortium of investors, with Tullow Oil Plc (Tullow) as the majority shareholder and operator in the Joint Venture (JV). Other JV entities include: *Petroliam Nasional Berhad*

(Petronas), Kuwait Foreign Petroleum Exploration Company (Kufpec), and Premier Oil Plc. First gas is targeted for March 31, 2016.

5. Tullow acquired operatorship of the Banda field in November 2011 and declared the Banda field as a commercial discovery in September 2012. Tullow has prepared a field development plan which provides for production of up to 65 million standard cubic feet per day of gas over 20 years. It consists of the drilling and installation of two subsea wells1 tied back to an onshore gas processing plant via a subsea production manifold and a 10-inch sub-sea pipeline. Banda gas reserves are estimated at approximately 1 trillion cubic feet of gas, and gas recovery will be managed in accordance with market demand.

6. The Banda field is located about 20 km east of the neighboring Chinguetti oil field (producing). The Banda field is about 200-325 m below sea level. The wells will be drilled from a single drill center using a moored semi-submersible Mobile Offshore Drilling Unit (MODU). During drilling, an estimated two supply vessels per week will be used to transfer materials (mud, casings, tools and water) from the onshore supply base to the MODU for the duration of drilling. A 500 m temporary safety exclusion zone will be established around the MODU. Once drilling is complete, the MODU will be removed, and there will be no permanent surface infrastructure associated with the operation. An existing onshore support base located at the Port of Nouakchott will be used under a lease agreement. Production (Christmas) trees will be installed at seabed, and produced gas will be exported to shore via a 75 km 10-inch sub-sea pipeline. An umbilical line will be laid alongside the pipeline to supply electricity and communications, as well as necessary chemicals to the subsea wells. Sub-sea pipeline and umbilical line will be trenched or, where trenching is not possible, protected by rock dump. The processing plant will be located onshore approximately 9 km north of Nouakchott, within a 1 square kilometer plot which will also accommodate the downstream power plants. A 5.6 km onshore pipeline and umbilical line will connect the subsea pipeline and umbilical to the gas processing plant. The onshore pipeline and umbilical line will be trenched along their entire length to prevent accidental damage. The on-shore gas treatment plant will be designed to condition 65 million standard cubic feet per day of gas to fuel the adjacent power plant complex to be developed, owned and operated by a third party (*Société de Production d'Electricité à partir du Gaz*, SPEG). Stabilized condensate will be transported via road tanker to the storage facilities at Nouakchott port for onwards export for out-of-country refining.

7. The downstream: The downstream infrastructure component will benefit from two Partial Risk Guarantees provided by IDA to guarantee power export payments from the power utilities of Senegal and Mali[2] to SOMELEC, the Mauritanian electricity transmission and distribution utility. The downstream infrastructures will be developed by SPEG[3], as well as SOMELEC and SENELEC, respectively the Mauritanian and Senegalese power utilities. In early 2013, SPEG shareholders decided to phase the development of the SPEG power project in order to match the evolution of electricity demand and optimize capital allocation. The first phase of power generation includes the construction of two power plants at the same site: a 180 MW dual fuel

[1] Future provision will be made for the tie-in of a third gas production well if required to meet demand or improve reservoir performance; however, this third well is outside the scope of this ESRS and current Tullow ESIA.
[2] This transaction with Mali will entail some amount of power transmission but no new transmission lines will have to be built to that effect.
[3] SPEG is a special purpose vehicle formed by GoMR, SOMELEC, SNIM and Kinross Gold Corporation in September 2012, for the purpose of the generation, transmission, and sale of power using Banda gas.

thermal gas-fired power plant (being built and operated by the Finnish company Wartsila; commissioning of this plant is scheduled for March 2015), and a 120 MW combined cycle gas turbines (CCGT) the commissioning of which is scheduled for mid-2016. By 2020, SPEG's conceptual goal is to achieve 400-500 MW capacity by construction of a third power plant (which is outside the scope of this project and related MIGA/IDA guarantees). Phase 1 also includes, as part of the national grid, a high voltage transmission line to be constructed from the power plant to the North to serve the power grid of Nouadhibou and Tasiast, the site of the Kinross gold mine.

8. Also the project is considering the export of extra power capacity of up to 55 MW from the SPEG Power plants to Senegal through a new transmission line to be built in the context of the expansion of the regional power grid linking Senegal, Mauritania and Mali within the *Organisation de Mise en Valeur du fleuve Sénégal* (OMVS). This new high voltage transmission line (the South HV line) between Mauritania and Senegal, to be financed by AFD and IsDB, will have a capacity of 250 MW and will come in addition to the 80 MW carrying capacity of the existing Nouakchott-Dagana-Tobène OMVS transmission line. The South HV line will be built to accommodate future power exchanges between Mauritania and Senegal sourced from a number of projects including from phase 1 of the SPEG Power Project. It is expected that this new transmission line will be co-financed by the Islamic Development Bank and the French Development Agency (AFD), the latter applying environmental and social safeguards policies similar to that of IDA.

9. The Mauritania segment of the South HV line has been submitted to an ESIA and RPF. The ESIA has been reviewed by the Bank and found acceptable whereas the RPF has been merged with the North HV line RPF (disclosed in the info shop of the Bank on March 14th, 2014), in order to reduce potential confusion regarding relevant E & S reference documents.

10. The portion of the South HV Line located in Senegal will be owned and initially operated by SENELEC. It is within the Project's area of influence while recognizing that it is not under the direct control of any of the beneficiaries of the IDA Guarantees. As such, the assessment and mitigation of risks for this section takes into account the level of control and influence the Guarantee beneficiaries can exercise vis-à-vis SENELEC. In this case, the ESIA for this section has in fact been shared with the Bank and has been reviewed to assess the risks related to this linked infrastructure, particularly with regards to the corridor recommended for the Senegal segment of the South HV line. The RPF has also been shared with the Bank. Both ESIA and RPF for the Senegal segment of the south HV line will be disclosed.

11. The following four figures illustrate the linkages between the upstream and downstream components and the area of influence covered by the SPEG ESIA as well as by the south HV Line ESIA:

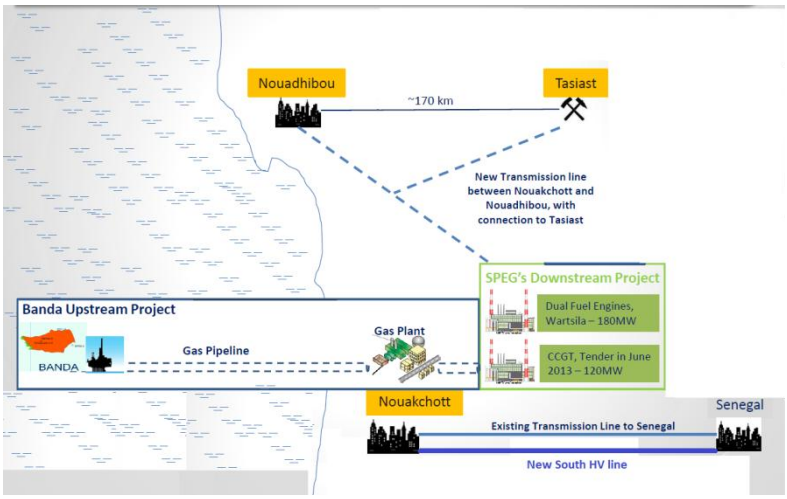
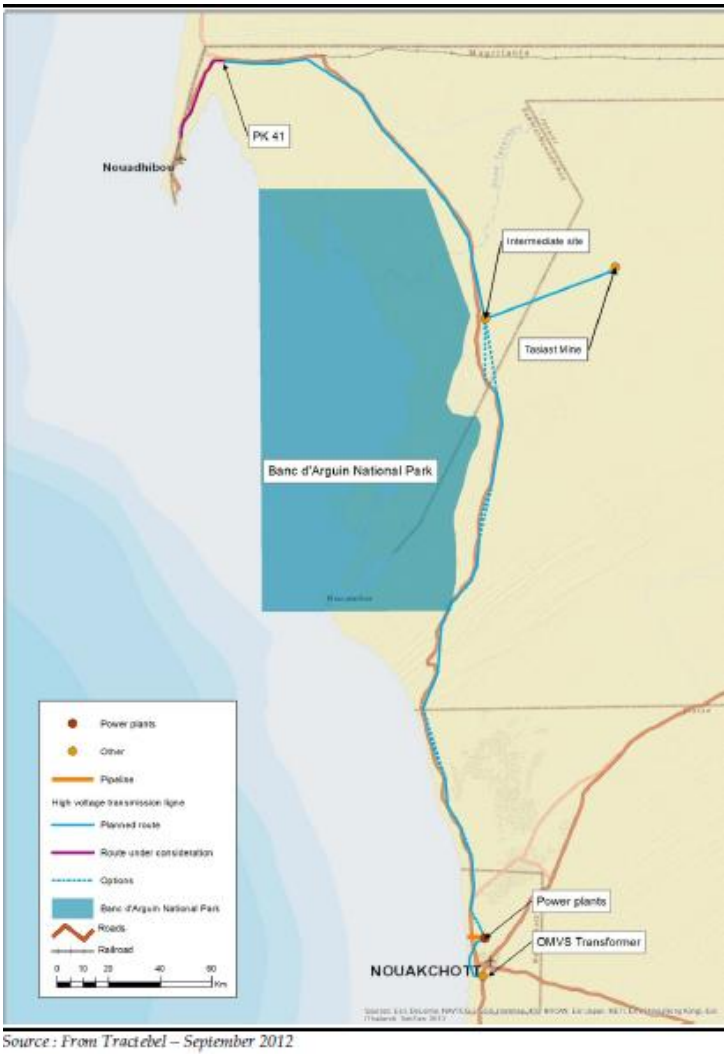


Figure 1: Overall schematic of the upstream and downstream components of the project



Source : From Tractebel – September 2012

Figure 2: Area of influence covered by the SPEG ESIA

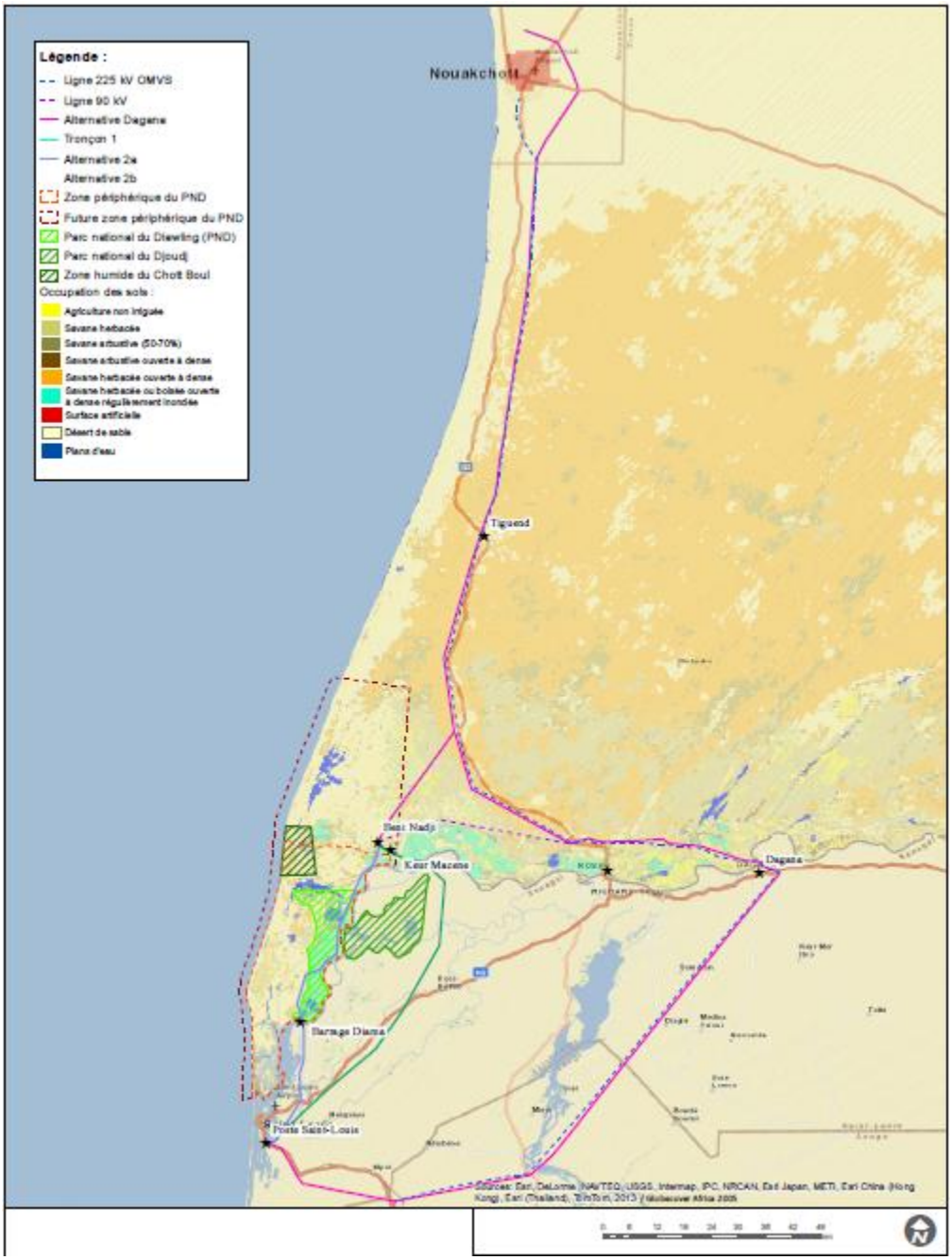


Figure 3: Options for the South HV Line on the Mauritania side and northern Senegal

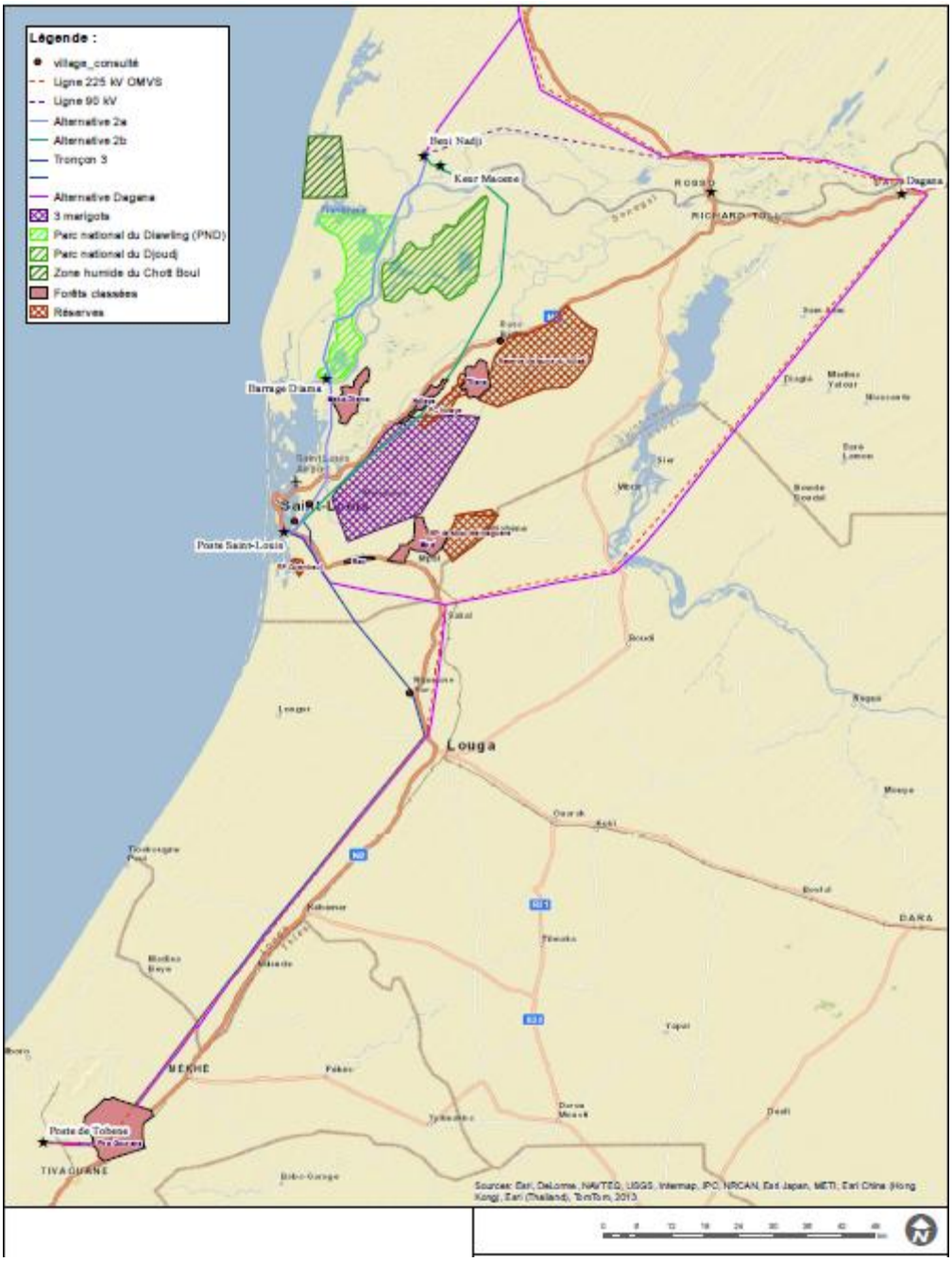


Figure 4: Options for the South HV Line on the Senegal side and southern Mauritania

Key Issues

12. An ESIA for the downstream component comprised of the SPEG power plants, a short transmission line from the power plant to the OMVS sub-station south of Nouakchott (about 20 km) and the North HV transmission line was conducted by the consulting firm ERM 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.

13. This ESIA was also found consistent with the World Bank Performance Standards 4.03 and with 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).

14. In the case of the South HV transmission line to Senegal, an ESIA has been prepared by the consulting arm of the company Tractebel that has also prepared the technical design for this infrastructure, in line with standards of the financial institutions who are funding the line (French Development Agency and Islamic Development Bank). This ESIA meets World Bank Group performance standards.

15. Key environmental issues for the project downstream component as defined above are being discussed according to the following breakdown:

- Power generation facilities
- North HV Transmission Line
- South HV Transmission Line (including Mauritian segment and Senegal segment)

16. The key environmental issues related to the Power generation facilities are; (i) the issue of noise and other nuisances to close by inhabited areas, and (ii) the issue of above standards emissions during the time the dual fuel plant will be operating without gas.

17. The key environmental issues related to the North HV Transmission Line are: (i) the land acquisition necessary for securing the right of way of the line; (ii) the proximity of the Banc d'Arguin National Park from the Transmission Line corridor and; (iii) the cumulative impacts of the project on other planned infrastructures in the vicinity of the project site such as the new Nouakchott international airport, the construction of the new university of Nouakchott scheduled to open in 2014, and; (iv) the impact of the high voltage wires on migratory birds.

18. The key environmental and social issues related to the new South HV Transmission Line are: (i) the land acquisition necessary for securing the right of way of the new Transmission Line both in Mauritania and in Senegal; (ii) the proximity of the Diawling National Park in Mauritania; (iii) the proximity of the ecological significant areas in Senegal such as the Djoudj national Park, and finally; (iv) the impact of the high voltage wires on migratory birds.

19. The project's key social impact is expected to be related to working conditions of workers in the power plants both during construction and operation and also, as indicated above, to the land acquisition necessary for securing the right of way for the transmission lines.

20. The Banda Gas to Power project is a Category A operation consistent with the prescriptions of Performance Standards applicable to IDA project (O.P. 4.03) because the project

has the potential for significant adverse environmental and social impacts that are diverse, irreversible, and unprecedented.

21. The following Performance Standards apply to the downstream component of the project as defined above:

- PS 1: Assessment and Management of Environmental and Social Risks and Impacts
- PS 2: Labor and Working Conditions
- PS 3: Resource Efficiency and Pollution Prevention
- PS 4: Community Health, Safety, and Security
- PS 5: Land Acquisition and Involuntary Resettlement
- PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- PS 8: Cultural Heritage

22. Performance Standard #7 (Indigenous People) is not applicable to this project because no indigenous people, as defined by the PS, live in the area of influence of the project.

Key Information Sources

23. The key documents reviewed by the Bank team included:

- An ESIA/ESMP covering the gas well, gas pipeline to shore and the gas treatment plant;
- An ESIA covering the SPEG power plants as well as the OMVS transmission line extension, North HV transmission line to Nouadhibou and to the Kinross mine; an RPF covering the SPEG power plants as well as the OMVS transmission line extension, North HV transmission line to Nouadhibou and to the Kinross mine, and the Mauritanian portion of the South HV transmission line; and
- An ESIA(in two volumes corresponding to the segments in each country) covering the South HV transmission line from Mauritania to Senegal, as well as the RPF for the Senegal portion of the transmission line.

24. As part of the due diligence process, social and environmental specialists visited the project site and proposed resettlement areas during the period 9 to 17 November 2013. Based on this review and due diligence, the project is expected to comply with Bank Performance Standards and relevant WBG Environmental, Health, and Safety Guidelines (EHSGs).

PS1: Assessment and Management of Environmental and Social Risks and Impacts

25. An Environmental and Social Impact Assessment (ESIA) for the SPEG power plants (including the North HV line) has been completed including consultation and has been disclosed on December 2, 2013. This part of the project is not expected to have major environmental impacts, except for an impact on air quality during the period the dual power plant will be running on heavy fuel oil. As soon as the SPEG power plants start running on natural gas in mid-2016, the air quality should improve significantly.

26. Finally a separate ESIA (in two volumes, one for the Mauritania side and one for the Senegal side) for the South HV line has been prepared and has been also reviewed by IDA for compliance with O.P. 4.03.

27. A joint MIGA and IDA Environmental and Social Review Summary (ESRS) has been prepared for the upstream gas production infrastructures. IDA has prepared this ESRS for the downstream infrastructures as defined above. These two ESRSs are being disclosed also at least 60 days before Board, along with the downstream ESIAs and RPF. Regarding also the downstream South HV Line, the ESIA for Mauritania has been disclosed, the RPF for Mauritania side of the south HV Line has been merged with the RPF for the downstream SPEG Power facilities and North HV line, and the ESIA and RPF for Senegal side have been shared with the Bank and commented upon and it is expected they will be disclosed when finalized.

28. The 180 MW dual fuel power plant currently being built and that will be operated for a period of five years by the company Wartsila has not been assessed specifically in this SPEG ESIA, but both the analysis of cumulative impacts and the hazards assessment have taken into consideration the impacts of its operation. SPEG is a new entity set-up by its shareholders (SOMELEC, Kinross and SNIM) for being the entity responsible of the new infrastructures covered by this ESRS with the notable mention that after their construction the North HV and South HV transmission lines' ownership will be transferred to SOMELEC, SENELEC and/or to OMVS. SPEG as well as SOMELEC have been found to have very limited capacity for overseeing the implementation of the environmental and social management plans and the resettlement plans and will have to consequently sub-contract these missions to external specialized firm or other capable government agencies. The two instruments above specify clearly the areas of influence and the monitoring objectives to be achieved and constitute and environmental management system that will ensure the environmental and social integrity of the project.

29. The SPEG ESIA includes a hazards assessment that covers the main risks of accident that could affect the power plant. It also includes an analysis of the four following alternatives; (i) "no project" option; (ii) choice of fuel and supplies; (iii) choice of power plant location and; and (iv) route selection for the transmission line.

30. The South HV line project has been segmented in three parts for the purpose of the assessment:

- 193km Segment 1: 225 kV line from the new power plant in Nouakchott to the Beni Nadji substation (Mauritania).
- 76km Segment 2: 225kV line from Beni Nadji (Mauritania) to Saint Louis substation (Senegal). For this segment three variants have been studied from a technical and environmental point of view as this segment of the line crosses the Senegal River.
- 144km Segment: from Saint Louis (Senegal) to Tobène (Senegal)

31. The inter-connection will necessitate the construction of a sub-station in Saint-Louis as well as an extension of the existing substations of Beni Nadji (Mauritania) and Tobène (Senegal).

32. The ESIA assessed several possible corridors and on the Mauritania side concluded that the best compromise between economic, social and environmental imperatives would to recommend a corridor that would avoid passing through the Diawling National Park, an

important migratory bird nesting place that made the park a recognized Ramsar site in 1994. However on the Senegal side it would be very difficult to avoid the Senegal River delta and avoid passing near sensitive ecological areas such as the Djoudj national Park. An alternative route (2b) is proposed in the ESIA in order to minimize the impact, particularly on birds, on the sensitive ecological zones mentioned as the line crosses the Senegal River. The extra length of line would be 11km.

33. The E & S management Plan and Monitoring Plan are exhaustive and cover the pre-construction phase, the construction phase and the post-construction phase and cover both the issue of bird collisions with the line. However, the capacity of SPEG, SOMELEC and SENELEC (SENELEC will have to implement the ESMP for the segment of the line on its territory) to implement the management plans contained in the above mentioned ESIAs is limited and would have to be enhanced through sub-contracting their implementation to a specialized entity or another competent governmental agency.

34. Social and Environmental Permitting Process, Community Engagement and Monitoring. The Ministry for Environment and Sustainable Development (*Ministère de l'Environnement et du Développement Durable*, 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 ESIAs, particularly in the environmental and social management plan (ESMP).

35. 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.

36. The main stages of the EIA process in Mauritania are:

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

37. The ESMP included in the SPEG ESIA provides 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 ESMP 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.

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

39. For each topic in the ESMP, 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.

40. 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 results of these meeting were reported in the local press.

41. For the South HV lines public consultations were organized during the periods 21 to 25 October 2013 in Mauritania and 17 to 19 of November 2013 in Senegal. These consultations were both conducted in the form of public presentations of the project as well as in the form of interviews with concerned stakeholders.

42. Environmental and social specialists from the Bank team met with several project affected people and members of the concerned communities during the site visit. These meetings confirmed that local people are well informed about the project impacts and the resettlement packages. Community consultation during the exploration and preparation of the ESIA and RAP stages has been sufficient and culturally appropriate. The project is broadly supported by the local community.

43. The project enterprise is committed to ongoing community engagement during construction and operations, and to annual reporting to the local community on the project's social, economic and environmental impacts. In addition to its own internal auditing, the company will make arrangements for independent auditing of its social and environmental performance on an annual basis, and expects to use local experts to help communicate the monitoring results to local communities in a culturally appropriate and understandable manner.

44. 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 dual fuel plant during operations with heavy fuel oil (before mid-2016, simultaneously with the construction phase of the CCGT plant) will cause a degradation of the air quality close to the ground for nitrogen oxides and sulphur oxides exceeding limits set by the Environmental, Health and Safety guidelines of the World Bank Group. 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-NOx) for the two plants. Moreover, once the gas is available, the operation of the CCGT plant with diesel should be limited to two weeks per year for the maintenance operations.

PS2: Labor and Working Conditions

45. The project proponents (Tullow Oil, SPEG and SOMELEC) will establish safe and healthy working conditions for their employees, promote fair treatment, non-discrimination and equal opportunity, promote compliance with national employment and labor laws, protect workers, especially vulnerable groups, will not employ children and avoid the use of forced labor. Adequate Environmental, Health and Safety Plans will be prepared and implemented by Tullow, SPEG and their contractors and sub-contractors.

46. This project (power plant and new transmission lines) is a green-field project and construction activities of the project will temporary 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. The project enterprise will also ensure relevant requirements of Performance Standard 2 will be applied to all non-employee (contracted) workers.

47. The South HV Line will employ up to 600 workers during the construction stage.

PS3: Resource Efficiency and Pollution Prevention

48. Tullow Oil, SPEG and SOMELEC will avoid or minimize impacts on human health and the environment by reducing pollution from project activities (waste management plans will be prepared as part of the EMPs). The clients will promote more sustainable use of natural resources, such as water and energy, and reduce project-related greenhouse gas (GHG) emissions.

49. Pollution Prevention and Resource Conservation. 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.

50. 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.

51. 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.

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

53. Heavy fuel oil and natural gas from the Tullow offshore gas wells will be the primary fuel source. At expected average operating load, the GHG emissions for the project in terms of

CO2 are estimated to be a little below 100,000 t/yr. Depending on the situation, it may be necessary to relocate some residents to avoid the most significant adverse impacts from air pollution.

54. Waste Management. 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.

55. Emergency Response Plans. Emergency response plans and teams have been established to address reagent and fuel spills, fires, and accidents requiring medical attention.

PS4: Community Health, Safety, and Security

56. The clients will anticipate and avoid impacts on human health and safety of nearby communities, personnel and property. Workers will be housed in Nouakchott, so that no separate worker camps will be needed. Tullow, SPEG and their contractors and sub-contractors will carry out HIV/Aids prevention activities.

57. Hazardous Materials and Infrastructure Safety. The project will require the transportation of construction materials and equipment, fuel, reagents, and other supplies to the site.

58. 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 products) and the operation of equipment under high pressure. Fire and explosion hazards have been assessed in the ESIA 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 fuel 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.

59. 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.

60. 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.

61. 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.

62. 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.

PS5: Land Acquisition and Involuntary Resettlement

63. The sponsor of the upstream portion of the project, Tullow Oil, has included compensation measures in the ESIA/ESMP. A Resettlement Policy Framework (RPF) for the SPEG Power Project, covering the power plant, North HV transmission line and the South HV transmission line in Mauritania has been prepared and disclosed in country and in the Bank's Infoshop at least 60 days before Board. This RPF also covers potential land acquisition and resettlement issues for the portion of the South HV line that is in Mauritania. When the final sites for the transmission lines have been selected and it has been identified that people will be affected a RAP will be prepared, consulted upon, and disclosed in country and in the Bank's Infoshop before any construction activity starts. A situation[4] identified during assessment has been clarified by the project developers. Tullow Oil and the Government of Mauritania have agreed that, whatever the outcome of the negotiations on compensation, any resolution of this matter will be undertaken in compliance with PS 5. This is being confirmed in writing to the Bank. For the South HV line in Senegal, a Resettlement Policy Framework has been shared with the Bank and will be disclosed once finalized. The line avoids urban centers, villages and hamlets to a great extent.

64. 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.

65. 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).

66. For both ESIAs (SPEG Power Plant and North HV Line as well as for the South HV Lines) the project proponents with the support of the consultants' teams conducted robust consultations with both institutional stakeholders and potentially affected populations. There was general agreement with the project with requests from consulted parties that the villages along the line would benefit from electric power and that monitoring would be significant and allow third parties to access results of the monitoring plans.

67. Project affected groups: For the SPEG ESIA, 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

[4] The onshore gas pipeline is expected to cross the private domain of Ribat Elbahr, a major business and housing development company, which owns 675 ha adjacent to the coastal zone. The land had been attributed by the government to this developer who has already completed a master plan for housing and business development infrastructure and works are scheduled to start soon. The ROW of the pipeline within Ribat Elbahr's private domain, not taking into the pipeline itself, is estimated at 60000 sqm (6 ha).

interactions are identified in the outskirts of Nouakchott, in peri-urban areas, mainly industrial areas or un-allotted land uses. In Nouadhibou, the line will be mainly located on land owned by the National Industrial and Mining Company (SNIM). 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.

68. For the south HV line the main social impacts would imply the compensation of farmers in the east of Nouakchott and for the option 2b relative to the crossing of the Senegal River some farmers will also have to be compensated for loss of production. In the case of the Dagana option farmers' losses would be more important as the farming area impacted is in the order of 50 ha. However these losses will be minimized by allowing farming and herding within the 50 m wide right of way along the transmission line. But of course construction of buildings will not be permitted within the right of way. For the remaining 90% of the transmission line length, it essentially traverses non-populated desert areas.

69. The implantation of the line will entail involuntary resettlement in the outskirts of Nouakchott although in limited numbers. Beyond the outskirts of Nouakchott the line will pass through desert terrain. Closer to the Senegal River there are also some land acquisition cases being reported. The ESIA report distinguishes between cases of temporary Resettlement (work and access during construction) and permanent occupation for the construction of the towers. The report confirms that farming and herding will be authorized after construction in the space between the towers and beneath the line which should help minimize the involuntary resettlement implications of the project.

70. An RPF for the Power plant/ North HV line and Mauritania portion of the South HV Line and a separate RPF for the Senegal portion of the South HV line been prepared to spell out the extent of anticipated involuntary resettlement /land acquisition as well as steps and procedures to be followed for compensation.

71. Monitoring mechanisms: Both ESIAs detail monitoring measures that should be implemented by the project proponent and that would include periodic consultations with the public particularly on the livelihood restoration and land acquisition aspects.

72. Community development efforts: The project sponsors are committed to provide social and physical infrastructure at resettlement sites not worse than the existing ones, and possibly better. Also HIV awareness and literacy programs already started are appreciated by the project affected people. Community development strategies will be developed through needs assessment and communities' participation. Water supply and sanitation facilities for the new resettlement sites will significantly improve the living conditions of the project affected people. In addition to water, education is among the priorities.

PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

73. 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, 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 1170 000 hectares north of Mamghar (i.e. about 150 km north of Nouakchott). The PNBA is a bio-geographical 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.

74. 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.

75. The North HV transmission line 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 power line in the Nouadhibou sector may pose a medium risk of collision for birds and 3.8 km stretch will pose a significant risk. Visual signaling 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.

76. For the South HV Line similar challenges have been reported. For instance, in the vicinity of Beni Nadji potential impacts on birds has been reported. Mitigating measures have been identified that could reduce birds collision with the line by 60 to 80%.

77. The report includes a discussion on consultation and analysis of alternatives. Consultation has been essentially with institutional stakeholders and through interviews of population representatives. The report recommends that another wave of consultation takes place when the project technical parameters are more definitive! It seems that there is an expectation from the population that when the transmission line will be built they will be connected (they are now served only by photovoltaic panels)

78. It is essentially for the mid-section of the line that alternative routes have been considered and alternative 2b has actually been assessed as the best compromise with manageable environmental and social impacts, presenting the best trade-off compared to the options 2a and 2c as it will avoid the two parks of Diawling-PND (Mauritania side of the river) and Djoudj-PNOD (Senegal side of the River) without entailing a significant detour through Dagana that passes through agricultural areas and for which significant involuntary resettlement (land acquisition) would have to take place.

79. It is to be noted that the whole area of the Senegal River delta has been recognized a Reserve of the biosphere (UNESCO 2005) and covers 186,908 Ha in Mauritania and 454,860 Ha in Senegal). This area is very rich in bird species (112 have been identified in PND for a

population of 230,000 - 252 are included in the IUCN red list, whereas in PNOD – a RAMSAR site- 400 species have been recorded for a population of 3 million)

80. On the other impacts the conclusion of the assessment on the Senegal side is similar to the one for the Mauritania side with issue of land acquisition and impacts on birds being the most significant.

81. Regarding public consultation, consultations were essentially carried out with institutional stakeholders and to some extent with local population either directly or through their traditional and/or elected representatives. The report also recommends holding another wave of consultation after the technical parameters of the projects are more precise. But in any case concerns expressed were essentially about the loss of agricultural land and encroachment on the parks.

PS8: Cultural Heritage

82. The Tullow ESIA has identified 13 cultural heritage Late Stone Age sites on the project footprint of the gas treatment plant. An adequate cultural heritage management plan has been developed as part of the Tullow ESMP.

83. The SPEG ESIA did not identify any cultural heritage sites in the project area.

84. In the case of the South HV line ESIA the presence of potential cultural heritage sites in relation to that infrastructure has not been assessed as significant.

Access to Client Documentation

85. The upstream ESIA was disclosed at the World Bank Infoshop and is available in country at Tullow Mauritania Ltd, Immeuble Emel, ZRA N°433, PO BOX 1551, Nouakchott, Mauritania, Phone: +222 4520 0300 (Chiva Julien, Team Assistant).

86. The downstream ESIAs and RPF for Mauritania for the project have been disclosed at the World Bank Infoshop and are available on the clients' project website at www.somelec.mr.