**TERMS OF REFERENCE**

**CONSULTANCY SERVICES FOR THE GAS TO POWER FEASIBILITY ANALYSIS (COMPONENT II)**

**GUYANA**

**GY-T1147 – TAPPING THE PROMISSED LAND: GUYANA’S FUTURE AS AN OIL PRODUCER**

1. **Background**

Following the recent oil discoveries of approximately 2.75 billion oil-equivalent barrels offshore Guyana, the country is poised to become a major oil producer in the region by mid-2020. Moreover, the availability of indigenous natural gas reserves presents the opportunity for cleaner energy generation and the reduction of CO2 emissions, while also offering a medium-term path to increased reliance on renewables in accordance with the Government’s Green State Development Strategy.

Guyana is expected to experience a significant growth in electricity demand. Major economic and infrastructural transformation is expected over the long term, stemming from increased foreign direct investment, demand for goods and services, and foreign exchange earnings. As a consequence, real GDP growth is expected to grow 38.5 percent and 28.5 percent in 2020 and 2021 respectively[[1]](#footnote-1). Such growth scenarios within the context of an emerging oil and gas sector could alter recent electricity demand forecasts.

Guyana Power and Light (GPL), the main public supplier of electricity, is therefore faced with the challenge to produce, distribute and commercialize the necessary energy to supply that demand under adequate quality standards and economic conditions. Recent reports describe that reliability of electricity supply has been low, and characterized by frequent and long outages, load discharges and voltage variations. Poor reliability has been linked to dependence on old and obsolete equipment for power generation that need to be replaced in the short run. Additionally, electricity prices in Guyana are the third highest in the Caribbean due in large part to the country's reliance on expensive imported fuel oil for electricity generation. At present, the cost of fuel accounts for up to 52% of the total cost of electricity generation.

In order to identify guidelines for the development of the most adequate electrical infrastructure for generation and transmission expansion in the country, the Inter-American Development Bank (IADB) conducted in 2014 an Initial Study on System Expansion of the Generation and Transmission System of Guyana (Initial Study) and an Update of the Initial Study which was completed in June 2016. Currently, the Government of Guyana (GoG) is expected to commission a second update of the Expansion Study that will consider the option of natural gas-fired power generation facilities utilizing indigenous gas resources as part of an optimal generation mix. In this regard, and as a separate assignment Government of Guyana will undertake a comprehensive technical and economic assessment of potential gas to power generation options with the support of an experienced international consulting firm.

1. **Objective of this assignment**

Elaboration of a technical and economic study to analyze Guyana’s gas to power options. It will include: (i) the feasibility of using natural gas as a fuel source in a new power plant and/or in the conversion of existing ones; and (ii) the analysis of the impact of this development on the related infrastructure such as the onshore pipeline (from gas plant to power plant) and national transmission systems.

1. **Scope of work/Main Activities**

The following activities will be implemented:

**Part I – Preparatory activities**

1. Review related studies done by the GoG and partners including but not limited to, the 2016 Expansion Study, 2017 Energy Narrative NG Study, GPL’s Development and Expansion Study, 2017 National Energy Policy (Draft), 2017 Policy Guidelines for the Diversification of the Electricity Matrix.
2. Consult with main energy sector stakeholders including (i) The Ministry of Public Infrastructure; (ii) The Guyana Energy Agency; (iii) the Guyana Power and Light Inc. and the Ministry of Natural Resources to gain a broad perspective the current state of the sector, policies and strategies.
3. Analyze – and propose revisions when needed – on the main indicators of the Guyana power sector including the current and projected electricity demand, and current installed and effective power generation and transmission system capacity.
4. Review the information related to the gas supply (volume, chemical composition, supply contract, prices, other uses such as LPG, etc.) that would be available from offshore production.
5. Determine the technical considerations for converting existing oil-fired thermal power plants to natural gas and calculate the investments needed and associated timelines for the conversion.
6. Review best practices and lessons learned from other countries that have developed gas to power projects, in particular those in developing and emerging countries.
7. Establish the breakeven cost of electricity for the investment forecasts and its robustness against domestic and international gas price sensitivities for both the converted plants and the new plant.

**Part II – Technical and economic evaluation**

1. Assess the technical and economic feasibility of installing a new natural gas power plant by conducting at least the following activities:
   1. Analyze the current power generation system and associated infrastructure. Recommend an optimal natural gas power plant capacity (and its resulting cost of electricity), considering future developments of Renewable Energy power generation plants in the long run, and recent electricity demand projections.
   2. Establish potential locations for the proposed new gas-fired power plants considering space availability, plant layout options, proximity to transmission infrastructure, and potential environmental and social impacts. Estimate the required gas pipeline investments and associated construction terms to deliver natural gas to each of the future dual fuel power plants
   3. Propose alternatives with a cost-benefit analysis for the deployment of gas-fired power plants, including at least: (i) a combined-cycle of 200 MW, (ii) an open cycle of 100 MW, (iii) the conversion to gas of all existent power plants, (iv) an open cycle of 100 MW combined with the conversion to gas of all the existent power plants, or (v) any other combination that the consultant considers is appropriate.
   4. Determine the two best alternatives (and their trade-offs) to deploy natural gas to power, and make a recommendation on the best option, indicating for each one at least: (i) location and civil works investments, (ii) the cost break-down, (iii) construction timetables, (iv) detail of additional investments required (e.g. gas pipelines, transmission reinforcements), (v) economic and financial analysis, and (vi) emission reductions and climate benefits.

**Part III – Complementary analysis**

1. Assess all transmission and distribution upgrade requirements (transmission lines and substations) and their associated investment costs, considering electricity demand information including base-load versus peak-load.
2. Propose the commercial mechanisms and contract terms for the supply of natural gas (types of contract, main clauses, risks and mitigation measures) to have the plants operational and the supply contracts in place by 2021-2022.
3. Identify and describe the synergies and how the natural gas power plants will interact in the future with development of renewable energy projects in Guyana.
4. Screen the different GoG financing options and their attractiveness for the required investment profile in the power plants (new or convertible ones).
5. Develop a roadmap with the sequence of activities and timelines for the two best options.
6. Review and suggest the required regulatory framework for the natural gas power plants to be operational.
7. **Deliverables**

The core deliverable for this assignment is the provision of relevant technical advice and support required to execute the aforementioned scope of work and address the objective.

It includes a comprehensive feasibility study of: (i) converting existing HFO plants to Natural Gas; (ii) the installation of a new Natural Gas Power plant with modern technology such as combined cycle gas turbines (CCGT) together with required transmission system upgrades; and (iii) an investment scenario, and its resulting impact on the cost of electricity. The associated equity financing options for the investments required for the Government of Guyana will also be reviewed.

The expected outcome is to provide the Government of Guyana with high quality information that would lead to the selection of the optimal natural gas generation solution that would provide the greatest benefit for electricity consumers, GPL and the country.

1. **Reporting Obligations**

The following reports will have to be issued and approved by MoPI and the IADB:

1. Inception report
2. Interim Report with respective brief presentation
3. Final Report with respective presentation

All deliverables shall be submitted to the MoPI and the IADB for review and approval. Deliverables must be submitted in electronic and printed copy (2 copies) as required by the MoPI. Deliverables are expected to comply with the deadlines established.

1. **Duration of the assignment and schedule of payments**

The duration of the assignment is expected to be about 6 months. The consultant is requested to present a work plan and any assumptions made regarding the level of effort indicated in this TOR prior the start of the assignment. The payment terms will be based on the deliverables and follow this schedule:

* 40% at the completion and approval of the Interim Report and presentation
* 40% with the presentation of the Interim Report
* 20% at the completion and approval of the Final Report and presentation

1. **Expected consultancy experience/Qualifications of the Consultants**

The consulting company shortlisting criteria includes;

* It is expected that all members of the team or consortium of firms should have a post graduate level degree (Masters or Ph.D.) with a minimum of 10 years of experience in the field and, at least, 5 years of significant in-depth international expertise and regional knowledge of the Power sector and relevant consulting services advising National Governments.
* A track record of success in technical and commercial feasibility assessment of gas to power alternatives for countries with no natural gas infrastructure is also a requirement.
* The firm must have successfully completed at least 3 assignments of similar nature and complexity, over the past 10 years.
* Highly relevant and proven sector experience could in cases stand for in lieu of a post graduate degree. Fluency in English is a prerequisite for each team member.
* The consulting firm may propose the best team combination to achieve the overall goal. To be considered for the assignment, proposed team members should submit their respective CV’s.

1. Client support during the Implementation/Coordination

The MoPI will designate two Focal Points, one from GEA and one from GPL, each to work with the Consultants. The Consultant shall make its own arrangements for carrying out its services, including, documents reproduction, printing and reproduction of all reports. It is expected the consultants to be available – if needed – for one or two trips to Guyana to discuss the results of the study.

The MoPI Focal Points will provide existing documentation regarding the Gas to Power Project, nevertheless, the Consultant will be responsible for obtaining all the necessary public information required to perform the tasks included in this TOR. All reports to be provided under this assignment shall be sent to MoPI.

1. IMF Country Report No. 17/175 [↑](#footnote-ref-1)