CARIBBEAN DEVELOPMENT BANK

TECHNICAL ASSISTANCE – ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR GRENADA'S GEOTHERMAL ENERGY DEVELOPMENT – TEST-DRILLING PHASE

Considered at the Two Hundred and Seventy-Sixth Meeting of the Board of Directors on May 22, 2017

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MAY 2017

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CARIBBEAN DEVELOPMENT BANK

TWO HUNDRED AND SEVENTY-SIXTH MEETING OF THE BOARD OF DIRECTORS
TO BE HELD IN THE TURKS AND CAICOS ISLANDS
MAY 22, 2017

PAPER BD 50/17

TECHNICAL ASSISTANCE – ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR GRENADA'S GEOTHERMAL ENERGY DEVELOPMENT – TEST-DRILLING PHASE

1. APPLICATION

1.01 The Caribbean Development Bank (CDB) received a letter of request from the Government of Grenada (GOGR) in April 2017 for funding support for conducting an environmental and social impact assessment (ESIA) of the target area for a geothermal energy (GE) project, which the Government is pursuing. The beneficiary is GOGR and the Ministry of Finance and Energy (MOFE) will implement the technical assistance (TA) project.

1.02 The total cost of the project is estimated at three hundred and ninety-nine thousand three hundred United States dollars (USD399,300), to be financed by a CDB Grant, for an amount not exceeding USD339,400 or 85% of the total cost, with counterpart financing provided by GOGR.

2. BACKGROUND

2.01 Grenada is overwhelmingly dependent on imported petroleum products to satisfy its growing energy demand. Petroleum products imported in 2014 cost approximately USD67million (mn), representing 7% of gross domestic product. The high dependence on imported fuels underpins the country's lack of energy security and renders the economy a hostage to price volatility and other vagaries of the international oil market. This undermines economic stability and national efforts for long-term planning. The over-reliance on imported fuels is also a source of balance of payment challenges, and the associated foreign currency demand causes a drain on the country's foreign exchange reserves. This is also the key source of high energy prices in Grenada over the years. Average electricity tariffs remain relatively high at USD0.27 per kilowatt-hour (/kWh) in 2016, even in the wake of the steep fall in the price of oil on the international market since 2014. This compared to an average tariff of USD0.10/kWh in the United States of America. The relatively high electricity costs over time have negatively affected the country's economic competitiveness and the livelihood of citizens, especially the poorer segments of the population.

2.02 Against this background, Grenada, like the majority of CDB's Borrowing Member Countries (BMCs) is seeking to reduce its dependence on imported fossil fuel, improve national energy security and its competitiveness through increasing the deployment of sustainable energy options, *viz.* renewable energy (RE) and energy efficiency (EE). In this regard, GOGR has undertaken a number of steps over the past six years, including, inter alia, the approval of a National Energy Policy. The Policy focuses on the promotion of RE and EE, and the setting of ambitious EE, RE and carbon emission reduction targets (30% by 2025) as part of its Nationally Determined Contribution (NDC) commitment, under the Paris Climate Change Accord 2015.

2.03 Of the RE options, it is believed that GE holds the greatest prospect for transforming the country's energy matrix, directly displacing diesel fuel-based generation. As a result, GOGR is pursuing the development of a GE project[1], beginning with exploration of its GE potential. In 2015, a comprehensive geothermal pre-drilling surface exploration programme was completed, and supported by international development partners such as Governments of New Zealand and Japan. The results provide good indications that a geothermal resource suitable for power generation is to be found in Grenada and could possibly support a plant of 15 megawatts (MW). A plant of this capacity could displace 55% of the total electricity generation from diesel, contributing to reduction/stability in tariffs, and enhanced energy security.

2.04 A Geothermal Development Roadmap has been prepared, which outlines the major steps, timelines and budgets required to realise geothermal power in Grenada. The next major step is for exploration test drilling[2] (slim-hole drilling) to test the conceptual models of the geothermal system and verify the existence, temperature, permeability and extent of the resource. In addition to the Geothermal Project Management Unit (GPMU), which is being established[3] within the Energy Division of MOFE, the Roadmap calls for the completion of an ESIA for the drilling project before actual test drilling can commence.

2.05 The main components of the exploration test-drilling phase in the targeted area are:

(a) Reconstruction of existing roads for the transport of machinery, and materials for the drilling activities.

(b) Construction of a drilling platform, including a settling pond for water disposal and space for the heavy machinery and offices.

(c) Construction of a water supply system comprised of water tanks, water supply pipelines and pumping houses.

(d) Construction of workers' accommodations and material storage yard.

(e) Exploration drilling services.

The focus of this TA Project is the funding of a consultancy to conduct an ESIA (pre-drilling) in the project area.

2.06 GOGR is seeking grant financing for the ESIA consultancy in order to advance GE development to the exploratory drilling phase. CDB proposes to support this phase, utilising Grenada's allocation of Global Environmental Facility (GEF) resources available under the Sustainable Energy Facility (SEF) for the Eastern Caribbean Programme funded by the Inter-American Development Bank (IDB). To date, CDB has approved TA grants to fund the positions of Project Coordinator, Geothermal Energy (PC-GE) and Community Liaison Officer (CLO) for the GPMU. Procurement has commenced for the PC-GE, and that

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1/ The GE Development Project consists of the following phases: (a) Surface Exploration and Conceptualisation, (b) Exploration Test- Drilling (slim-hole drilling), and Concession Tender and Award, (c) Appraisal Drilling and Bankable Feasibility, and Final Investment Decision, (d) Production Drilling and Construction, and (e) Operation.

2/ Exploratory test drilling can refer to drilling of: (a) slim-hole/slim-wells, or (b) full size exploration wells. For the Grenada GE Project the former is being pursued to prove the GE resources. Therefore, the term 'exploratory test drilling' used interchangeably with 'slim-hole drilling' in this Paper.

3/ Procurement of PC-GE has commenced, and the procurement of CLO to commence May 2017.

for the CLO will commence in May 2017. As the GE development progresses, it is intended that some of the funding requirements will be met from resources mobilised under the CDB GeoSmart Initiative[4].

3. THE PROPOSAL

3.01 It is proposed that CDB approve a TA grant to GOGR in an amount not exceeding USD339,400, from its Special Funds Resources (SFR) to fund a consultancy for an ESIA in Grenada.

3.02 The Consultants shall possess the relevant knowledge, skills and experience to fulfil the requirements of the Terms of Reference (TORs) presented at Appendix 1.

4. OBJECTIVES

4.01 The objective of this TA project is to provide critical evidence-based environmental and social information for decisions required for the exploratory test-drilling phase of GE development at the targeted sites in Grenada, through the conduct of an ESIA.

4.02 In this regard, the Study will identify, analyse, and make recommendations on baseline environmental and social conditions, environmental, social and gender impacts, mitigation measures, facilitate public consultation and collection of information on views of the proposed project from stakeholders and communities. The ESIA will therefore support decision makers in determining how to proceed sustainably with the project development, including:

(a) Selecting the best location for the exploratory test wells.

(b) Considering the impact on environmental resources.

(c) Considering the impacts on social dimensions, including poverty, gender and employment or livelihoods.

4.03 The expected outcome of this TA project is enhanced capacity of GOGR to consider environmental and social impacts in the design of a GE exploratory test-drilling project, and for developing a framework to manage its implementation sustainably. Appendix 2 outlines the Design and Results Monitoring Matrix.

5. PROJECT DESCRIPTION

5.01 This TA project involves the provision of consultancy services for an ESIA prior to understanding GE development in Grenada. The ESIA will provide critical information to GOGR to facilitate decision making required for the exploratory test-drilling phase. The Ministries of Education, Human Resource Development and the Environment; Finance and Energy; Agriculture, Forestry and Fisheries; Social Development; Communication, Works, Physical Development, Public Utilities, Information and Communications Technology and Community Development; and Health, Social Security and International Business, along with other relevant Government agencies would be directly involved during execution of the ESIA.

4/ CDB GeoSmart Initiative is CDB's response to the need for risk mitigation to facilitate GE development, and seeks to mobilise adequate and suitable resources (grants, contingent grants, loans, and technical assistance) to address risks characteristic of the various stages of the GE project cycle.

6. JUSTIFICATION/BENEFITS

6.01 GOGR is seeking to improve the country's energy security, as well as the sustainability of the energy sector, to address related macro-economic challenges, and to achieve improved economic competiveness. Accordingly, GOGR intends to explore and develop its indigenous RE options, including its GE potential. It has been determined that GE has the potential of making the single greatest impact in transforming the country's energy sector[5]. Therefore, GOGR has commenced the process of exploring its GE potential towards establishing a viable plant.

6.02 GE development can have significant impacts on the natural and human environment, which should be comprehensively assessed to guide the investment decision and sustainably manage implementation. The ESIA will assess in detail the environmental, social and gender impacts that would result from the exploratory drilling exercise. It will provide a framework for managing potential impacts of the project on air quality, sustainability of water resources, gender, relocation and land acquisition. Timely execution of the ESIA is consistent with the CDB Environmental and Social Review Procedures, as well as international standards[6]. It will also help to build GOGR's capacity to review an ESIA for a GE project, which will be repeated at subsequent stages of GE development.

6.03 The proposed TA is consistent with the CDB Strategic Objectives, Priorities, Policies and Strategies, shown below.

(a) CDB's Strategic Objective of Supporting Inclusive Sustainable Growth and Development within its BMCs.

(b) CDB's Corporate Priorities of Strengthening and Modernising Economic and Social Infrastructure and Promoting Environmental Sustainability.

(c) CDB's Energy Sector Policy and Strategy, which has an overarching focus on the promotion of RE for more affordable and stable energy costs.

(d) CDB's Climate Resilience Strategy, which promotes environmental sustainability and climate compatibility.

(e) CDB's Gender Equality Policy and Operational Strategy.

(f) CDB's Technical Assistance Policy and Operational Strategy of commitment to strengthening the synergies between TA operations and CDB investment lending.

6.04 The proposed TA is also consistent with the following:

(a) Grenada's National Energy Policy, 2011.

(b) The Caribbean Community Energy Policy 2013.

5/ Inter-American Development Bank (IDB) 2014.

6/ International Finance Corporation (IFC) Environmental and Social Performance Standards and World Bank's Environmental, Health, and Safety Guidelines; IFC and World Bank Safeguard Policy.

(c) The United Nation's Sustainable Development Goals (SDGs), in particular Goal 7 to: "Ensure access to affordable, reliable, sustainable and modern energy for all".

(d) Grenada's NDC for carbon emission reduction.

6.05 Based on CDB's performance-rating system, there was a Satisfactory assessment of the Project, with a score of 3.5, suggesting that it is likely to contribute to development effectiveness. Appendix 3 presents the scores for the four core criteria and the justification for each score.

6.06 The Project's assessment rating is, gender mainstreamed (GM), based on CDB's Gender Marker. The Gender Marker is summarised in Table 1 below and Appendix 4 shows the Gender Marker Analysis.

TABLE 1: SUMMARY GENDER MARKER ANALYSIS

Gender Marker	Analysis	Design	Score	Code
	1	2	3	GM

7. EXECUTION/IMPLEMENTATION

7.01 MOFE of Grenada will be the Implementing Agency for the Project with an estimated project completion period of 12 months. The GPMU that is being established in the Energy Division of MOFE, will be led by the PC-GE and supported by the CLO, and will have overall coordination responsibility for the Consultancy. There will also be facilitating inputs to the ESIA from key ministries, such as the Ministry of Education, Human Resource Development and the Environment, and the Ministry of Social Development, as well as from other relevant Ministries and agencies of Government.

7.02 The Consultants will be located in MOFE and will report to PC-GE, and are expected to work closely with CLO, Environmental Specialist from the Ministry of Education, Human Resource Development and the Environment, and Social Specialists from the Ministry of Social Development, as well as with other relevant Ministries/agencies in order to effectively execute the ESIA. The CLO will promote an inclusive and gender-balanced approach to the implementation of the recommendations from the ESIA. In addition, a working group will be established by the GPMU to ensure that all relevant agencies are consulted and their inputs are received in a timely manner.

7.03 The CDB Grant will finance the Consultants specified at paragraph 3.01. GOGR will provide in-kind counterpart resources consisting of the time of an existing member of staff of the Environment Division as a focal point to support the GPMU, Energy Division in the overall oversight of the consultancy. The Energy Division staff will also provide oversight, administrative support, office space, and organise and cover the costs of local transportation for the staging of stakeholder meetings.

7.04 The Environment Division will provide relevant documentation, review the outputs of the Consultancy, and participate in the Oversight Working Group.

8. RISK ASSESSMENT AND MITIGATION

8.01 One significant risk has been identified which could have an effect on the implementation of the proposed Project. This risk and the relevant mitigation actions are presented in Table 2 below.

TABLE 2: RISK ASSESSMENT AND MITIGATION

Category	Risks	Mitigation
Implementation Risks	Inadequate participation of community and other stakeholders.	CDB is funding the position of PC-GE, which will head the GPMU, and the post of the CLO. These will coordinate consultation efforts and promote the objectives of the project among stakeholders. Participatory techniques will be utilised to increase likelihood of participation. Furthermore, facilitative measures will be implemented, for example, provision of childcare, providing transportation to venues, and hosting of the stakeholders' meeting at convenient times. The Consultant will be required to provide focus on addressing this risk using relevant participatory techniques.

9. COST AND FINANCING

9.01 The total cost of the project is estimated at USD399,300. Table 3 provides a summary of the proposed financing with details of the budget set out at Appendix 5.

TABLE 3: FINANCING PLAN FOR THE SERVICES
(USD)

	CDB Grant	GOGR Contribution	Total
	339,400	**59,900**	**399,300**
Percentage	85	15	100

10. FUNDING SOURCE

10.01 CDB's contribution of not more than USD339,400 is eligible for financing from CDB's SFR/Other Special Funds (OSF). Funds are available within existing resources under CDB/IDB/SEF, specifically from the GEF grant resources allocated to Grenada. Appendix 6 shows a summary description of SEF.

11. PROCUREMENT

11.01 The procurement of consultants shall be in accordance with CDB's Guidelines for the Selection and Engagement of Consultants by Recipients of CDB Financing (October 2011). A Procurement Plan is presented at Appendix 7.

11.02 Financing will be provided from the SEF and, accordingly, in line with the Finance Agreement signed with IDB (Board Paper BD 100/15), eligibility shall be extended to IDB member countries, which are not CDB member countries.

12. RECOMMENDATION

12.01 It is recommended that the Board of Directors approve a grant to GOGR from CDB's SFR of an amount not exceeding the equivalent of three hundred and thirty-nine thousand four hundred United States dollars (USD339,400) (the Grant) allocated from resources provided to CDB by IDB (acting as an administrator of the IDB/GEF) under the SEF, for the purpose of financing consultancy services to conduct an environmental and social impact assessment of the target area for geothermal development (the Project), on CDB's standard terms and conditions, and on the following terms and conditions:

(a) Disbursement

Except as CDB may otherwise agree, payment of the Grant shall be made as follows:

(i) an amount not exceeding the equivalent of fifty thousand United States dollars (USD50,000) shall be paid as an advance (the Advance) on account of expenditures in respect of the Grant, following receipt by CDB of:

(aa) a request in writing from GOGR for such funds; and

(bb) a copy of the signed contract between GOGR and the Consultant; and

(ii) the balance of the Grant shall be paid periodically, after receipt by CDB of an account and documentation satisfactory to CDB, in support of expenditures incurred in respect of, and in connection with, the Project , provided however, that CDB shall not be under any obligation to make:

(aa) the first such payment pursuant to paragraph (a)(ii) above, until CDB shall have received an account and documentation satisfactory to CDB, in support of expenditures incurred by GOGR with respect to the Advance;

(bb) any payment pursuant to paragraph (a)(ii) above, until CDB shall have received the requisite number of copies of the reports or other deliverables, in form and substance acceptable to CDB, required to be submitted by the consultant to GOGR and CDB for the time being, in accordance with the TOR; and

(iii) payments exceeding the equivalent of three hundred and five thousand four hundred and sixty United States dollars (USD 305,460), representing ninety percent of the Grant, until CDB shall have received:

(aa) the requisite number of copies of the final reports, in form and substance acceptable to CDB, required to be submitted by the consultant to GOGR and CDB; and

(bb) a certified statement of the expenditures incurred by GOGR in respect of, and in connection with, the Project.

(b) Period of Disbursement

The first payment of the Grant shall be made by October 31, 2017, and the Grant shall be fully disbursed by December 31, 2018, or such later dates as CDB may specify in writing.

(c) Procurement

(i) Subject to paragraph (ii) below, procurement shall be in accordance with the procedures set out and/or referred to in the Grant Agreement between CDB and GOGR, or such other procedures as CDB may from time to time specify in writing.

(ii) Country Eligibility for procurement of the Consultants shall be extended to IDB member countries that are not members of CDB.

(iii) The Procurement Plan approved by CDB is set out at Appendix 7. Any revisions to the Procurement Plan shall require CDB's prior approval in writing.

(d) Other Conditions

(i) Except as CDB may otherwise agree, the Project shall be executed by GOGR through the GPMU Energy Division of MOFE.

(ii) The MOFE shall establish and maintain during the Project an Oversight Working Group as described in paragraph 7.01.

(iii) GOGR shall:

(aa) assign a member of staff of the Environment Division as a focal point to support the GPMU, Energy Division in the overall oversight of the consultancy; and

(bb) procure that the Energy Division staff also provide oversight, administrative support, provide any office space and equipment necessary for the successful completion of the Project.

(iv) GOGR shall in accordance with the procurement procedures applicable to the Grant, select and engage the consultant who shall be responsible for providing the services set out in the TOR at Appendix 1. The Consultant shall report to the PC-GE.

(v) GOGR shall:

(aa) insert, as applicable, the CDB, GEF and IDB logos on all documents and publications financed under the Project; and make reference to CDB, GEF and IDB, as applicable, as the source of financing in any meeting, press conference or communication in which reference is made to the financing of the consultants for the Project; and

(bb) preserve the original records of the Project for a minimum period of three (3) years after the expiration date of the period of disbursement referred to in paragraph 12.01 (b) or any extension thereof. Such documents and records shall be maintained adequately in order to:

(i) substantiate Project-related activities, decisions and transactions, including all expenditures incurred; and

(ii) show the correlation of the expenditures incurred under the Project to the respective disbursements made by CDB.

(vi) Except as CDB may otherwise agree, GOGR shall meet, or cause to be met:

(i) the cost of the items designated for financing by GOGR in the budget set out in Appendix 5 (the Budget);

(ii) any amount by which the cost of the Project exceeds the estimated costs set out in the Budget; and

(iii) the cost of any other items needed for the purpose of, or in connection with, the Project;

and shall provide all other inputs required for the punctual and efficient carrying out of the Project not being financed by CDB.

(vii) CDB shall be entitled to suspend, cancel or require a refund, if the SEF funding, or any part thereof is suspended, cancelled or required to be refunded, and if at any time CDB determines that any representative of GOGR has engaged in Prohibited Practices in connection with the use of the Grant without GOGR having taken timely and appropriate action satisfactory to CDB to address such practices when they occur, except that GOGR shall not be required to refund any amount already expended in connection with the Project and not recoverable by GOGR.

SUPPORTING DOCUMENTATION:

Appendix 1 – Terms of Reference for Environmental and Social Impact Assessment
Appendix 2 – Design and Results Monitoring Matrix
Appendix 3 – Performance Assessment Scoring
Appendix 4 – Gender Marker Analysis
Appendix 5 – Budget
Appendix 6 – IDB/CDB Sustainable Energy Facility for the Eastern Caribbean
Appendix 7 – Procurement Plan

APPENDIX 1

DRAFT TERMS OF REFERENCE

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
GOVERNMENT OF GRENADA
GEOTHERMAL RESOURCE DEVELOPMENT PROJECT
(EXPLORATORY TEST-DRILLING PHASE)

1. BACKGROUND

1.01 Grenada is overwhelmingly dependent on imported petroleum products to satisfy its growing energy demand. Petroleum products imported in 2014 cost approximately USD67 million (mn), representing 7% of gross domestic product. The high dependence on imported fuels underpins the country's lack of energy security and renders the economy hostage to price volatility and other vagaries of the international oil market. This in turn undermines economic stability and national efforts for long-term planning. The over-reliance on imported fuels is also a source of balance of payment challenges, and the associated foreign currency demand, caused a drain on the country's foreign exchange reserves.

1.02 The small and isolated nature of Grenada's electricity market, is a major factor inhibiting the achievement of economies of scale in the production and distribution of electricity, resulting in a higher unit cost. The average peak electricity demand in 2015 for Grenada for the past three years was 31 megawatts (MW). The current average electricity tariff in Grenada is relatively high at USD0.27 per kilowatt hour (/kWh), even in the wake of the steep fall in the price of oil on the international market since 2014. This is high when compared to an average tariff of USD0.10/kWh in the United States of America (USA). The relatively high electricity costs over time have negatively impacted the country's economic competitiveness, and the livelihoods of citizens especially the poorer segments of the population.

1.03 One of the energy sector's mandates in Grenada is to reduce its dependence on imported fossil fuel, improve national energy security, and improve competitiveness through increasing the deployment of sustainable energy options, *viz.* renewable energy (RE) and energy efficiency (EE). In this regard, the government of Grenada (GOGR) approved its National Energy Policy (since 2011), and has set ambitious EE and RE targets. This is consistent with plans outlined in its Nationally Determined Contributions, to reduce its Greenhouse gas emissions by 30% of 2010 emissions target by 2025, and an indicative reduction of 40% of 2010 emissions target by 2030. Some of this reduced emissions is expected to be derived from renewables including 10MW from solar, 15MW from geothermal and 2MW from wind by 2025. The Electricity Supply Act was revised in 2015 and a new regulatory framework established, which, in part, created an environment that is more conducive to renewables. A draft Geothermal Resource Development Bill was prepared to reflect GOGR's priority focus in this form of energy.

1.04 In line with its energy policy, GOGR is seeking to explore all viable RE options for electricity generation, including solar, wind, and geothermal energy (GE). However, the potential contribution from GE is considered to hold the greatest prospect for transforming the country's energy matrix, directly displacing diesel fuel-based generation. As a result, the GOGR has commenced exploration of its GE potential, with support from various international development partners. In 2015, the Governments of New Zealand and Japan provided technical assistance to complete a comprehensive geothermal predrilling surface exploration programme. The results provided good indications that a geothermal resource suitable for power generation is to be found in Grenada and could support a plant of 15 MW. A plant of this capacity could displace 55% of the total electricity generation from diesel, contributing to stability in tariffs and enhanced energy security.

1.05 A Geothermal Development Roadmap prepared by GOGR outlines the major steps, timelines and budget required to realise geothermal power in Grenada. A key requirement is the establishment of a Geothermal Project Management Unit (GPMU) to provide dedicated resources to support the advancement of the GE development initiative.[1] The next major step is for exploration drilling to test the conceptual models of the geothermal system and verify the existence, temperature, permeability and extent of the

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[1/] A Project Coordinator, Geothermal Energy (PC-GE) is being recruited to lead the Unit, develop the drilling project and oversee the necessary works to achieve the Government's objectives.

resource. Geothermal power generation involves drilling deep exploration and production wells into the Earth's crust to harness the thermal energy contained in underground reservoirs of geothermal waters or steam.[2]

1.06 GOGR wishes to pursue the development of a potential geothermal resource and has requested grant resources to undertake the first phase of exploratory test-drilling, (slim-hole exploration) of up to three wells. This would allow the Government to delineate and gazette a geothermal resource area and then assign the development rights for this area to a legal entity through a process of competitive bidding. This legal entity would then complete the drilling required, develop the steam field, build and operate the power plant.

1.07 The main components of the exploration test-drilling phase in the targeted area are: (i) new roads and or reconstruction of existing roads for the transport of machinery, and materials for the drilling activities; (ii) construction of three drilling platforms, including a settling pond for water disposal; and easement for the heavy machinery and offices; (iii) water supply system comprised of water tanks, water supply pipelines and pumping houses; (iv) workers' accommodations and material storage yard; and (v) exploration drilling campaign over 45 – 60 days per well.

1.08 However, before actual test-drilling can commence, an environmental and social impact assessment (ESIA) must be completed to identify and mitigate the potential significant adverse environmental and social impacts associated with the slim-hole drilling phase.

Study Area and Impact Zones

1.09 Three locations in Northern Grenada, are targeted for the exploratory test-drilling. The exploration drilling campaign will comprise the drilling of three slim-hole wells to a nominal depth of 1500 meters (m). Drilling will be undertaken from three distinct locations in the northern half of Grenada at elevations of 400m above sea level. The proposed drilling locations are on private agricultural land(s) and as such, land leasing or acquisition will be required. Each of the sites is physically separated from the other (two sites are approx. 1 kilometre (km) apart, with the third approx. 4km away), with separate access ways and located within different water catchments and communities. All sites are located nearby, but outside the Central Forest Reserve area. Access is mostly via tarmacked public roads with the last sections (up to 0.5 km) comprising of well-formed four-wheel drive tracks, which will require upgrading. Some works will be required on the public roads to widen corners and allow passage of trucks and the drilling rig.

1.10 A preliminary scoping study assessment was undertaken by the Japan International Cooperation Agency (JICA) in 2015, which identified a provisional list of potential impacts and issues. Environmental impacts are to be expected on air quality, water quality, waste, noise, protected area, ecosystem/flora and fauna, hydrology, topography, geology, landscape, and climate change. In addition, social impacts are also expected on low income populations, like, the local economy and livelihood, land use and utilisation of local resources, water use, infectious diseases (HIV/AIDS, etc.) and the workers environment (including occupational safety). Further studies are required to assess ground subsidence and cultural and historical heritages and resettlement based on details of the drilling plan.

2. OBJECTIVE OF THE ASSIGNMENT

2.01 The general objective of the assignment is to undertake an ESIA for exploratory test-drilling in the three selected Project sites to ensure that:

2/ Wells are drilled in clusters/groups; each drill pad/site typically comprising of two to five wells/boreholes. These wells bring a mixture of steam, gas and water (otherwise known as brine) to the surface where the steam can be separated and used to power turbines to produce electricity. Brine and condensate removed by separators are often returned to ground at the production stage via reinjection wells.

(a) Any potential environmental and social impacts associated with geothermal exploration activities are clearly identified and any impacts which may occur post-exploration are also highlighted and considered. Civil works and drilling activities should be clearly distinguished.

(b) All geothermal exploration activities are managed in order to avoid or minimise negative environmental and social impacts.

(c) Opportunities for creating/enhancing environmental and social effects/benefits, which will assist with any mitigation are identified.

(d) Stakeholders have opportunities to contribute to the process of environmental assessment and management and are kept informed of its progress through on-going consultations.

(e) Any potential impacts on the development caused by environmental conditions are also identified.

3. SCOPE OF WORK

3.01 The scope of work is understood to cover all activities necessary to accomplish the objectives of the consultancy, whether or not a specific activity is cited in these terms of reference (TORs). In carrying out the assignment, the Consulting Firm will exercise the levels of professional skills and care in accordance with international standards and best practices. ESIA must comply with GOGR's national laws and regulations and must be consistent with the requirements of the International Finance Corporation's Environmental and Social Performance Standards and Guidance Notes.[3] Consultations with stakeholders will be held throughout the process guided by the stakeholder engagement plan. In fulfilment of the objectives, the Consultant will undertake the following tasks.

Task 1: Baseline Assessment

3.02 Prepare a baseline report on existing social and environmental conditions within the Project area and present in the form of a scoping report. A desktop review (including the preliminary scoping report prepared by JICA) and field-based data and information will be used to undertake the baseline assessment. The scoping report should cover the physical, biological, archaeological/cultural and socio-economic aspects of the Project area of interest. The report should also include a description of the overall approach to the ESIA, the definition of the direct and indirect areas of influence, an initial qualitative assessment of the potential impacts of the Project, the scope for mitigation and where impacts are considered likely to be significant. In completing the baseline assessment, the Consultant should consider the relevant physical, biophysical, archaeological/cultural and socio-economic aspects of the project area of interest. This is likely to include, but not be limited to:

(a) A full description of all project components and activities.

(b) Air and Noise Quality: Baseline data on pollution, noise and vibration shall be collected, and identification made of particular pollutants including hydrogen sulphide and greenhouse gas emissions. Baseline noise levels shall be used for the purpose of assessing potential noise impacts (day and night) against national standards and those of the World Bank/IFC.

3/ IFC Environmental and Social Performance Standards and World Bank's Environmental, Health, and Safety Guidelines; IFC and World Bank Safeguard Policy.

(c) Climatological and meteorological data will also be collected. This is important to enable quantitative air quality modelling for later dispersion of air pollutants during exploration activities. Identify natural hazards that might occur in the project area and the area of influence. Types of natural hazards that have the potential to occur in the project area include earthquakes, landslides, and various meteorological natural hazards including floods, heavy rainfall events and hurricanes.

(d) Water and Hydrology: Existing hydrology and hydrogeological studies shall be compiled, identifying and mapping water quality, flow, use and potentials, surface water (streams and rivers), groundwater, analysis of chemical and micro-biological parameters. Water supply is necessary for geothermal projects, both while drilling and for the operation of the power plant (cooling towers). The study shall identify potential water sources and to determine the sustainability of the supply.

(e) Geology, Land-use and Visual: site and surrounding land use, land cover, landscape character, visual assessment from key visual receptors (such as residential properties and tourist destinations including archaeological/heritage sites). Existing geological, geochemical and geophysical studies shall be compiled resulting in the mapping and modelling of the geothermal reservoir.

(f) Biological Environment: ecological habitat assessment of project sites and immediate surrounding area identifying any significant or important species (flora and fauna), habitats including breeding grounds and access corridors for food and shelter, rare and endangered species.

(g) Waste generation and management: Potential sources of waste shall be identified, including different types of wastes including geothermal fluids and sediments, and volumes. Strategies for managing the wastes shall be outlined with considerations for measures for waste reduction, reuse and recycling; identification of measures for minimisation of waste generation and safe disposal of construction, operation and decommissioning waste. All hazardous substances used or produced during the project should be considered.

(h) Socioeconomic Environment: baseline data/information on socio-economic factors including demographics, gender issues, education, public health, land ownership, agricultural activities within the project area, non-agricultural practices (such as poultry, cattle raising etc.), economic profile, income profile with sources of income, other economic activities, social/economic infrastructure, land acquisition; formal and informal human settlements including persons along the right-of-way and labourers residing on agricultural lands, and workers safety, etc.

(i) Legislative and Regulatory Considerations: undertake a review of the legal/regulatory framework to identify and consider national environmental laws and regulations policies, plans and institutional requirements that are relevant to the proposed test drilling and that may influence the conduct of the ESIA. This should include agreements that have been ratified by Grenada. Applicable international performance standards must also be referenced.

Task 2: Environmental and Social Impact Assessment

3.03 **Impact Identification:** Impact significance is invariably subjective despite the presence of clear-cut criteria, government policy, standards and international conventions. A potential impact will be evaluated and analysed based on its nature/characteristics, location and extent, magnitude, timing, duration, reversibility, probability, significance and whether it is direct, indirect and or cumulative. For cumulative impacts, the assessment will consider the possible impacts of other activities in and around the

Project area (inclusive of hazard impact on the facilities and possible secondary effects). Potential impacts include:

(a) public health and safety;
(b) natural hazard impact potential;
(c) aesthetics;
(d) pollution of potable, surface, and groundwater and soils, from drilling fluids, geothermal fluids, muds, and cuttings associated to any wells drilled and construction waste;
(e) water demand from drilling, and construction activities;
(f) air pollution;
(g) noise;
(h) solid and hazardous waste generated from construction activities and/or accidental spills;
(i) transportation of heavy equipment and machinery and increased hazards thereof;
(j) occupational health and safety;
(k) impacts associated with the easement and expansion of existing access roads;
(l) loss of natural features, habitats and species by construction and operations; and
(m) socio-economic and cultural impacts.

3.04 **Impact Significance:** The significance of the impacts shall be based on:

(a) social and economic importance;
(b) ecological importance;
(c) environmental standards and regulatory status;[4]
(d) impact analysis and prediction/assessment;
(e) conclusion of findings/research;
(f) outcomes of the Consultation (overall support to or overall opposition on the project);
(g) area of influence;
(h) persistence of impacts; and
(i) status of resources to be affected.[5]

Table 1 demonstrates the impact significance assessment that may be used.

TABLE 1: IMPACT SIGNIFICANCE MATRIX

Concept	Clarification
Significantly positive (++)	Positive influence on a large area and/or are positive for many people. Impacts are usually permanent.
Moderate positive (+)	Impacts do not influence a large area but the area may be sensitive to changes. The impacts may be positive for the area and for many people. The impacts are permanent or sometimes reversible.
Insignificant/minor (0)	The impacts are minor with regard to the extent of the area and its sensitivity for change. Temporary and mostly reversible impacts.
Moderate negative (-)	The impacts do not influence a large area but it can be sensitive for changes. The impacts may be negative and can interrupt and disrupt many people. The impacts are permanent and sometimes irreversible.
Significantly negative (--)	The impacts have negative influence on a large area and/or a sensitive area. They have negative effect on many people. The impacts are permanent and usually irreversible.
Uncertainty (U)	No information on characteristics or extent of the project due to lack of data. It might be possible to provide this information, i.e. by monitoring or research.

4/ A project within or close to a protected area will increase significance.
5/ For instance, water resource in water scarce area will increase its significance.

Summary of Impacts and Alternatives

3.05 A Summary of potential impacts, mitigation alternatives and residual impacts shall be provided, including:

(a) activity description;
(b) potential impacts;
(c) sensitivity;
(d) magnitude;
(e) impact significance;
(f) mitigation measures; and
(g) residual impacts.

Task 3: Development of the Environmental and Social Management Plan (ESMP)

3.06 Develop an ESMP, which considers options to manage adverse environmental and social impacts benefits associated with the project and identified under Task 2. ESMP will contain appropriate monitoring measures and performance indicators to ensure that appropriate management of potential environmental impacts are being achieved. Relevant plans to monitor the implementation of the mitigation measures and impacts of the project will be included, e.g., disaster risk management plan; emergency response plan; waste management plan; and noise management plan. Issues related to future management of the site in the event of (i) a decommissioning plan (ii) if the resource is not proven for further development and the wells need to be closed; and (iii) the resource is found, the plant becomes operational, but then reaches the end of its lifecycle after 40-60 years.

Task 4: Development of Stakeholder Engagement Plan

3.07 Undertake a stakeholder analysis to determine the scope for participation and consultation during project preparation, with a subsequent stakeholder engagement plan (SEP) to coordinate and collate the views of interested and affected parties and to provide relevant materials to the public in a timely manner. Implement the SEP, keeping records of meetings and issues arising. The SEP is a dynamic, constantly updated plan necessary for the conduct of the ESIA and will be implemented throughout the pre-drilling stage. It is also an invaluable foundation document and will be integrated, refined and further developed as part of the ongoing work of the CLO, GPMU. World Bank/IFC guidelines for stakeholder engagement will be used to prepare the SEP.

Task 5: Development of Resettlement Policy Framework

3.08 A Resettlement Policy Plan will be prepared be in accordance with the World Bank/IFC Handbook requirements for preparing a Resettlement Action Plan.

4. REPORTING REQUIREMENTS AND DELIVERABLES

4.01 The Consultant will produce the following deliverables:

(a) An Inception Report providing a detailed work plan for coordination of the various activities, a preliminary review of obstacles to completing all the studies and a proposed approach to overcoming these obstacles within four weeks from the commencement date, submitted to PC-GE, and CDB for “no-objection”.

(b) Baseline Assessment Studies (BAS) Report submitted to PC-GE, and CDB for “no-objection” within 12 weeks of receipt by the Consultant of the Inception Report.

(c) A Draft ESIA Report ready for public consultation (including SEP, ESMP, and RPF) within 16 weeks of completion of the BAS Report.

(d) A Final ESIA Report revised having regard to comments from public consultation, government agencies and CDB within eight weeks of receipt of GOGR and CDB comments.

5. QUALIFICATIONS AND EXPERIENCE

5.01 The minimum required qualifications and experience of the Consulting Firm are:

(a) At least ten years' experience in ESIAs of infrastructural projects.

(b) Experience and proven track record of conducting ESIA for geothermal development.

(c) At least two successfully completed projects in environmental and social impact assessment in a similar terrain.

(d) Experience in the Caribbean or similar Small Island Developing States working on similar assignments.

(e) Experience and track record in community field work, differential participatory methods, gender analysis and social safeguards.

(f) Fluency in English (oral and written).

5.02 The Consulting team should include four key professionals, namely:

(a) Environmental Specialist (Team leader).

(b) Social and Gender Assessment Specialist.

(c) Ecologist/Biodiversity Specialist.

(d) Hydrologist/Hydrogeologist.

In addition, the composition of the team should reflect any other relevant expertise to successfully execute the project and achieve the expected goals.

Key Professional 1: ESIA Project Manager/Team Leader

5.03 Qualifications: Advanced University (Masters or higher) Degree in Environmental Management or Impact Assessment or similar qualification. Experience: not less than 10 years in the conduct of pre-feasibility studies for natural resource development (geothermal, oil, gas or mining) and engineering design for geothermal power plants. Demonstrable leadership skills and substantial team leadership experience.

Key Professional 2: Social and Gender Assessment Specialist

5.04 Advanced University (Masters or higher) Degree in Social Sciences, Gender Studies or Social Anthropology or similar discipline. Minimum of ten years' professional experience in social impact assessment/review related to large development projects and mitigation plan preparation. Minimum of five years professional experience in gender analysis, differential participatory methods and community development. Thorough working knowledge of CDB's Policy on Involuntary Resettlement.

Key Professional 3: Ecologist/Biodiversity Specialist

5.05 Advanced University (Masters or higher) Degree in Ecology, Biological Sciences, or similar discipline. Minimum of ten years' professional experience in natural habitat, flora and fauna research, fisheries, ecological management and mitigation plan preparation. Expertise in identifying plant species for conservation.

Key Professional 4: Hydrologist/Hydrogeologist

5.06 Advanced University (Masters or higher) Degree in Hydrogeology, Hydrologic Sciences, or a related discipline; minimum of ten years' professional experience in underground water investigation, underground water modelling and downstream hydrological impact; demonstrated expertise working on similar geothermal flow characteristics.

6. DURATION

6.01 The Consultancy will be implemented over a period of ten months.

DESIGN AND RESULTS MONITORING MATRIX

Narrative Summary	Performance Indicators/Targets	Data Sources/Reporting	Assumptions
1. IMPACT: Drilling for the GE Project successfully completed with minimal impact on natural and human environment.	N/A	N/A	N/A
2. OUTCOME: Enhanced capacity of GOGR to consider environmental and social impacts in the design of a GE exploratory test-drilling project, and for developing a framework to manage its implementation sustainably.	Project proposal incorporating recommendations of ESIA Report. Target: by Q2 2018.	GOGR project proposal	GE development remains a priority for GOGR.
3. OUTPUTS: ESIA Report including: (a) Stakeholder Engagement Plan. (b) Resettlement Policy Framework. (c) Environmental and Social Management Plan.	ESIA Report accepted by GOGR and CDB. Target is end of Q1 2018.	Publication on website of Ministry of Education, Human Resource Development and the Environment, Grenada.	Adequate participation in the review process by stakeholders.
4. INPUTS:	**USD ('000)**		

Item	**CDB/ GEF**	**Counterpart GOGR**	**Total**
Professional fees, and international travel	339,400	-	339,400
Office, local transport, consultation, admin support.		59,900	59,900
Total	**339,400**	**59,900**	**399,300**

APPENDIX 2

APPENDIX 3

PERFORMANCE ASSESSMENT SCORE

Criteria	Score	Justification
Relevance	4	The TA intervention aligns with Grenada's energy sector policy and Climate Change mitigation objectives. It also contributes to CDB's Strategic Objective of Supporting Inclusive Sustainable Growth and Development within its BMCs. It is aligned with CDB's Energy Sector Policy and Strategy, which has strong focus on the promotion of RE for more affordable and stable energy costs and with GOGR's priorities for the energy sector, including international commitments.
Effectiveness	4	The objectives of the TA are expected to be achieved, as the intervention of the ESIA is conducted at the required standard, will yield the relevant information for decisions to be made. Therefore, the TA will support decision-making efforts of GOGR in their GE development, and enhance their capacity review ESIA. This will directly enhance the implementation of GE programme, and have a direct positive impact on key energy sector and climate change outcomes. This includes an increase in the contribution of RE to the national energy matrix, and a consequential reduction in emissions.
Efficiency	3	The approach of utilising international consultants with requisite knowledge, skills, and experience, to work with local actors in government, represents an efficient means of delivering inputs (activities) and achieving quality outputs towards the targeted outcomes. In addition, the approach of utilising the GPMU to coordinate the contribution of government and other stakeholders can ensure that the various inputs are available in a timely manner.
Sustainability	3	The ESIA is an essential step in undertaking GE development, as it will allow for sound decisions in relation to advancement of the GE investment, and will ensure that development proceeds based on sustainability principles, i.e. due consideration of the economic, social, and environmental aspects. Capacity of the Ministry to review an ESIA relevant to GE development will increase and local government officials will be able to monitor activities in the future. In addition, the CLO based in GPMU, will work closely with the Consultants and promote an inclusive and gender-balanced approach to the implementation of the recommendations from the ESIA.
Overall Score	**3.5**	**Satisfactory**

APPENDIX 4

GENDER MARKER ANALYSIS

Analysis: Background	**Sex-disaggregated data included in the background analysis, and/or baselines and indicators, or collection of sex-disaggregated data required in TOR.** **Socioeconomic/Sector/Institutional analysis considers gender disparities, or TOR require the identification of socioeconomic, sectoral and institutional gender issues.**	**1** **0**
Design: Project Proposal / Definition / Objective	TA interventions are designed, or will be identified as part of the project, that address gender disparities or enhance gender capacities. Project objective / outcome includes the enhancement of gender capacities, gender data collection, gender equality or the design of gender-responsive policies or guidelines.	1 0
Maximum Score:		**2**

Scoring Code
Gender Specific (GS) or Gender Mainstreamed (GM): 3 - 4 points. **Marginally Mainstreamed (MM):** if 2 points. **NO:** if projects score 0-1, if NO give justification why or indicate Not Applicable.

The project is scored as MM. The project has limited potential to contribute significantly to gender equality.

APPENDIX 5

BUDGET
(USD)

	CDB Grant	**GOGR Contribution**	**Total**
	339,400	**59,900**	**399,300**
Percentage	85	15	100

APPENDIX 6

THE CDB/IDB SUSTAINABLE ENERGY FACILITY FOR THE EASTERN CARIBBEAN

1. In October 2015, CDB and IDB signed three Agreements as part of a Sustainable Energy Facility (SEF) for the Eastern Caribbean Programme representing a total sum of forty-two million and sixty-three thousand, six hundred and ninety-eight United States dollars (USD42,063,698). The SEF comprises a Global Credit Loan, a Clean Technology Fund Grant and a Global Environment Facility Trust Fund Grant, for contributing to the diversification of the energy matrix in Eastern Caribbean countries (ECC). The overall focus of the SEF is in RE and EE interventions, but particular emphasis is placed on GE development. A counterpart contribution of USD29,435,000 is available within CDB's existing resources for the relevant disbursement period to finance projects, which meet SEF objectives, including for private sector electric utilities and at least one energy sector policy loan for at least one of the beneficiary countries.

2. SEF has three components viz.:

(a) Component I: Energy Efficiency – Grants and loans for promotion of EE measures.

(b) Component II: Regulatory Framework, Institutional Strengthening, and Capacity building – Non-reimbursable technical assistance support to governments to support institutional strengthening objectives, and for project development and preparation.

(c) Component III: Renewable Energy – RE investment projects with emphasis on GE development.

3. Component III of the SEF programme provides concessional loans to governments and special purpose vehicles (SPVs), established under public/private partnerships (PPPs) for development of baseload RE, such as GE.

4. As with SEF, CDB is mobilising appropriate resources and providing a range of financial instruments for GE development, to governments and SPVs operating as PPPs. The activities to be financed are:

(a) pre-investment activities, for which grants are best suited to unlock investments, including surface studies (geology, geophysics and geochemistry), environmental and social impact assessments; and drilling of exploration test wells;

(b) exploration activities, for which risk mitigation instruments are suited, such as contingent recovery grants, concessional loans and/or guarantees; and

(c) field and power plant development activities.

APPENDIX 7

PROCUREMENT PLAN

A. General

1. **Project Information:**

   Country: Grenada

   Project Name: **Technical Assistance – Consultancy Services for Environmental and Social Impact Assessment for Grenada's Geothermal Energy Development Test-Drilling Phase**

   Beneficiary: Government of Grenada

   Project Executing Agency: Ministry of Finance and Energy

2. **Bank's Approval Date of the Procurement Plan:** May 22, 2017

3. **Period covered by this Procurement Plan:** June 1, 2017 to December 31, 2018

B. Consultancy Services

1. **Prior Review Threshold:** Procurement decision subject to prior review by the Bank as stated in Appendix 1 to the Guidelines for the Selection and Engagement of Consultants:

	Selection Method	Prior Review Threshold	Comments
1.	QCBS		

2. **Shortlist comprising entirely of national consultants:** N/A.

3. **Reference to (if any) Project Operational/Procurement Manual**: CDB Guidelines for Selection and Engagement of Consultants (October 2011).

4. **Any Other Special Procurement Arrangements**: eligibility shall be extended to IDB member countries that are not CDB member countries.

5. **Procurement Packages with Selection Methods and Time Schedule:**

Ref No.	Contract (Description)	Estimated Cost (000 USD)	Selection Method	Review by Bank (Prior/Post)	Expected Bid -Opening Date	Comments
1	Consultants for ESIA		QCBS	Prior	Sept 1, 2017	

C. Implementing Agency Capacity Building Activities with Time Schedule

CDB online Procurement Training for selected staff of Energy Division, and virtual meeting on procurement via video-conferencing.

This information is withheld in accordance with one or more of the exceptions to disclosure under the Bank's Information Disclosure Policy.