Caribbean

Technical Cooperation RG-T3018

Support for Sustainable Energy and Resilient Projects in the Caribbean

**TERMS OF REFERENCE (2)**

Design of a Sustainable and Resilient Pilot SE Project Based on Innovative Financing

**I. BACKGROUND**

**1.1 Opportunity of Energy Matrix Transition.** Many Caribbean Countries (CC) share similar economic characteristics.[[1]](#footnote-2) They are small economies, highly exposed to natural disasters and except for the commodity importer countries,[[2]](#footnote-3) they had experienced growth stagnation in the last two decades. [[3]](#footnote-4) Slow economic growth in the US and Europe has impacted on the CC economies and tourism industries. The CC, except for Trinidad (who is a Natural Gas (NG) consumer), depend heavily on imported liquid fossil fuels for power generation with average dependency on these fuels for electricity generation reaching as high as 92%.[[4]](#footnote-5) By the end of 2016, the Bahamas had almost 100% dependency on imported fossil fuels, Jamaica’s energy matrix was still over 80% reliant on oil imports, and Guyana counted on approximately 83% of the installed electricity generation capacity sourced from fossil fuels. [[5]](#footnote-6) In net oil-importing countries the average oil imports doubled between 2005 and 2014, and accounted an average deficit of almost 10% of GDP (Gross Domestic Product) in 2008 and of 3.7% of GDP in 2015. [[6]](#footnote-7)

**1.2** The CC need to improve their competitiveness which is tied to the costs of production and services, especially the electricity costs. CC, in contrast with other countries in the LAC region, are subject to high electricity tariffs. Except for Suriname and Trinidad and Tobago, Caribbean electricity prices rank among the highest in the world, creating a burden for companies and households and affecting overall private sector competitiveness. [[7]](#footnote-8) The fuel surcharge represented almost 70% of the average cost of electricity generation in countries with high dependence on oil imports.[[8]](#footnote-9) Oil prices are susceptible to unexpectedly increase to higher historic levels due to adjustments on the supply side, global demand recovery or geopolitical events. The burden of high oil imports bills in CC is destabilizing for government finances, reduces the competitiveness of the tourism sector, which is fundamental to the region, and drains household resources that could be used towards other expenditures such as health and education.

**1.3** There is an opportunity for the CC to accelerate the shift away from liquid fossil fuels by introducing Energy Efficiency (EE) measures, Renewable Energy (RE) technology and cleaner fuels as a transition to a sustainable energy matrix. The path towards a resilient energy sector and with more independence from volatile oil prices should use region’s potential for the development of Sustainable Energy (SE), which for the purpose of this document refers to deployment of RE, EE, and Cleaner Transition Fuels (CF).

**1.4 RE potential in CC.** Currently, RE plays a relatively minor role in the region despite the significant potential that many of the CC have. Existing RE assessments demonstrate there is considerable potential for development and deployment of renewables in the CARICOM region including biomass, waste to energy, geothermal, hydropower, ocean energy, solar, and wind. [[9]](#footnote-10) Improving original and performing additional and more detailed resource assessments in the CC can facilitate greater RE deployment in the region.

**1.5 EE Potential in CC.** EE measures can be deployed across main economic sectors in the CC to reduce energy consumption without reducing productivity, comfort and social needs. Implementing EE measures is critical to reduce electricity demand and therefore reduce the vulnerability of the region to oil prices. Across the CARICOM region tourism, mining, government and the residential sectors represent the largest share of the region’s energy consumption. These areas are either highly energy intensive or inefficient thus present a significant potential for implementing EE measures.

**1.6 Potential for NG as a transition fuel in CC.** NG can provide a feasible alternative to reduce fossil fuels dependency in the CC, diversify the energy matrix and contribute to the reduction of electricity prices. NG has attributes that make it an attractive transition fuel as the CC moves towards increased RE penetration in their power systems. Given its abundant supply, due to the emergence of the US as a main producer and exporter of LNG, and the trend towards reduced transportation and regasification costs, NG could be a reliable and price-competitive source of energy. Moreover, dispatchable NG power plants can be used as peak technologies that can provide flexibility and grid stability to help manage the intermittency of RE sources like solar and wind in the transition period towards high RE penetration. Currently, only Jamaica and Barbados import LNG. Jamaica imports LNG for power generation using regular LNG vessels while Barbados imports LNG in iso-containers for distribution to the island’s NG residential, commercial and industrial users. Trinidad and Tobago, on the other side, is the fourth largest natural gas producer in the western basin and the only country in the Caribbean that exports LNG. A bit less than half of its natural gas production is designated for export, and the remaining is used for local primary energy supply. [[10]](#footnote-11) Trinidad and Tobago electricity generation is almost totally based on natural gas.

**1.7 Promoting SE in the Caribbean.** In 2013, the Caribbean Community (CARICOM) Nations approved CARICOM’s Energy Policy (CEP) [[11]](#footnote-12) and established regional targets for RE penetration in energy systems. [[12]](#footnote-13) These targets were set as part of the broader IDB supported Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS), which provides a strategic framework for the implementation of the SE dimensions of the CEP. Additionally, CC recently joined positions on climate change when the “Appel de Fort-de-France” was released on behalf of all Caribbean nations. [[13]](#footnote-14) Finally, CARICOM countries have submitted the respective Intended Nationally Determined Contributions (INDC) to the United Nations Framework Convention on Climate Change (UNFCCC) identifying future actions that the countries are willing to implement towards reducing Greenhouse Gas (GHG) emissions in various sectors, including energy and transport, and defining nationally agreed targets in terms of emission reduction.

**1.8 Opportunity from global trend and advance in SE technologies.** Technological changes and increase in competition in the SE sector in the recent years have lowered the costs of renewable energy (RE) technologies such as wind, solar photovoltaic (PV) panels and energy storage to the point that they are competitive with fossil fuels. [[14]](#footnote-15) These advances also include the merge of information technologies with electricity networks, resulting in Smart Grids and Buildings that optimize the resources management. NG technology advances now allow for Mini Liquified Natural Gas (LNG) plants with dedicated smaller LNG vessels. The CC can highly benefit from this trend, which will allow countries to reduce oil import bills. This progress could dramatically change the structure of the energy sector in the region but will require large and long-term investments from both, the public and private sectors, and will present challenges on the operational, financial, regulatory and commercial areas. Therefore, the Caribbean region is encouraged to design and implement active and practical strategies to overcome the financial market and regulatory challenges. The countries should take advantage of the favorable global trends in SE technologies to boost the transition of its energy sector towards a sustainable path.

**1.9 Collaboration between Private and Public sectors.** The development of EE and RE measures across the Caribbean gives the countries the opportunity to explore innovative finance and contractual schemes, including mechanisms for generating additional resources and mechanisms to catalyze private investments. [[15]](#footnote-16) This, at the same time, will enhance countries to explore new regulatory and fiscal frameworks to invigorate the SE market, by promoting collaboration between private and public sector, and promoting private sectors investment.

**1.10** Investing in SE technologies will have a positive impact on GDP in the long-run. The International Monetary Fund estimates that an improvement of 15% and 30% in EE and RE would be accompanied by an increase in GDP in the long run of 2% and 1% respectively. [[16]](#footnote-17) CARICOM member states have set ambitious targets and adopted a strategy for transitioning to RE and adopting EE (¶2.7) that includes not only investments in EE and diversification of the energy mix but also policy reforms and the development of regulatory frameworks. High indebtedness and low economic growth rates in CC significantly curtail fiscal space. These also affect the capacity of governments to undertake large investments in SE and establish the necessary policies and regulatory framework for their implementation. Underinvestment in RE perpetuates dependence on imported fossil fuels and tightens the effect on the fiscal space. The IDB Group can play a significant role by leveraging donor resources and promoting a holistic approach to reform the energy sector, by providing knowledge and encouraging Public-Private Partnerships (PPPs) to leverage private sector investment in SE projects. The governments in the region are turning to PPPs to develop and maintain infrastructure that support national economic growth and deliver basic services to their citizens.

**1.11 Climate resilience.** The Caribbean islands are highly exposed and vulnerable to extreme weather events which are expected to increase in frequency and intensity, due to climate change. [[17]](#footnote-18) Strong storms and hurricanes cause severe damages to infrastructure assets, affecting energy services and resulting in substantial financial losses and impact on CC economies. The probability of hurricane is high, above 10% per year, for most of the countries, with Jamaica and Bahamas having the highest probability of hurricane striking in any given year. [[18]](#footnote-19) Therefore, the implementation of new SE technologies and infrastructure should be aligned with improving climate resilience in the Caribbean region.

**1.12** **The general objective of this Technical Cooperation (TC) - Support for Sustainable Energy and Resilient Projects in the Caribbean (SERP)** - is to help the CC reduce their dependency on fossil fuels, diversify their energy matrices and increase resiliency in the energy sector by accelerating the implementation of SE technologies. The TC will have the following specific objectives: (i) study convergence of SE innovations and technological advances that could boost SE deployment; (ii) examine the feasibility for deployment of resilient SE technologies (¶2.8); (iii) identify and design resilient SE pilot projects; and (iv) draft recommendations for policy reform and regulatory work to enable development of SE projects using PPPs.

**II. CONSULTANCY’S OBJECTIVE**

2.1 The main objective of this consultancy is to identify, design, and conduct a feasibility study of a SE pilot project based on innovative financing, including PPPs, for the region and considering resilience measures; and (to examine the regulatory frameworks and other enabling regulatory and policy requirement for the pilot projects to operate.

The outputs of this component are: (i) documents containing identification and design of the SE pilot project based on innovative financing mechanism with conducting individual project’s commercial and technical feasibility. As for the financing mechanism, PPP model will be considered preferentially. (ii) documents collecting existing regulations and suggestions of regulatory framework and policy for implementation of the identified project.

**III. MAIN ACTIVITIES**

3.1 Under the supervision of the Team Leader, the activities for this consultancy include, but are not limited to, the following:

1. Analyze and understand the report of the assessment on best applicable SE technologies.
2. Identify 1 pilot SE project in the Caribbean.
3. Deepen the assessment of standards and regulations applicable to the projects. Conduct an analysis of the permitting requirements.
4. Elaborate a basic engineering design for the pilot project according to current standards, norms and regulations applicable for the country. When this information is not available, appropriated international standards and industries best practices should be applied.
5. Assess and quantify the investment cost of implementation of the selected pilot project and estimate the all-in cost.
6. Conduct commercial and technical feasibility study for the pilot project
7. Identify the corresponding reduction in carbon emissions to be achieved in implementing the SE pilot project.
8. Evaluate and economically quantify additional resilience practices that could be included as in the SE pilot project.
9. Identify the benefited population and estimate, based on current tariff setting mechanisms in each of the identified beneficiary countries, the Cost of energy (US$/MWh) and monthly energy bills (US$/month) for final users including households, small, medium and large enterprises, and by sector (government buildings, tourism sector, commercial, SMEs, large enterprises, etc.) required for implementing the pilot.
10. Design innovative financing mechanism including PPP that could be implemented for the pilot project development. Recommend the financing mechanism to be used.
11. Examine and recommend enabling regulatory and policy environment for the implementation of the pilot project
12. Assist the organization of workshops, seminars and trainings to disseminate the findings of the study and increase knowledge on innovative financing, SE technologies, EE projects and resilient design.

**IV. REPORTS / OUTPUTS**

4.1 The output of this component will be the delivery of a report with the design, technical and economic viability of the pilot resilient SE projects and financial mechanisms for its implementation. The report should expand on the topics listed in section 4.

4.2 Deliverables:

• First deliverable: Inception Report; a report including the work plan for the consultancy. (7 calendar days from contract signature)

• Second deliverable: Draft Report of the design, technical and economic viability of the resilient SE pilot project. The report should include the results of all the activities performed during the consultancy and should address the activities in the objectives and scope of the TORs. (180 calendar days from the submission of the comments by the IDB)

• Third deliverable: Final report. The report should include the results of all the activities performed during the consultancy and should address the activities in the objectives of the TORs. This report will follow a validation with IDB. It should be accompanied by a presentation with a review of the activities included in the report, main findings, conclusions and recommendations. (120 calendar days from the submission of the comments by the IDB)

4.3 The report should be written in English. Every report must be submitted to the Bank in one electronic file. Report should include cover, main document, and all annexes. (Zip files won’t be accepted as final reports, due to regulations from the Records Management Section)

**V. SUPERVISION AND COORDINATION**

5.1 INE/ENE will have the coordination responsibility of the execution of this consultancy as well as the approval of the products prepared by the consulting firms. In representation of the IDB, the technical coordination for this consultancy rests with Mr. Christiaan Gischler, Energy Specialist of the Energy Division of the Inter-American Development Bank [phone: (202) 623-3411; fax (202) 623-2064; e-mail: christiaang@iadb.org].

**VI. CHARACTERISTICS OF THE CONSULTANCY**

• Consultancy Category & Modality: Firm Consultancy;

• Contract Duration: 12 months

• Place(s) of work: Consultant’s place of work and Caribbean Countries

**VII. QUALIFICATIONS:**

7.1 The work is expected to be carried out by a consulting firm or consortium of firms with specific experiences in: (i) project development, and technical and commercial feasibility studies related to SE technologies in the Caribbean or in similar island environments, and (ii) working with international organizations, including UN, World Bank, or a regional MDB (Multi-Development Bank) in project development or program design related to SE technologies.

7.2 Fluency in English is a prerequisite for each team member. Familiarity with IDB documents and procedures is desirable. A core team of four (4) members is here suggested:

The team should include at least (i) a Project Leader who should have a post graduate level degree (Masters or Ph.D.) in business, finance, or engineering, and have a minimum of 10 years of experience in the field of development and implementation of SE projects; (ii) one SE technology or renewable energy Expert who should have a Bachelor’s/Master’s degree in Engineering and have a minimum of 10 years of experience in the field of project design and development related to SE or renewable energy; (iii) financial analyst who should have a post graduate level degree (Masters or Ph.D.) in business or finance, and have a minimum of 10 years of experience in the field of design and development of PPPs and SE projects; (iv) Project management Expert who should have a Bachelor’s/Master’s degree in Business, Finance, or Science and have a minimum of 10 years of experience in the field of project management preferably related to SE or renewable energy.

**VIII. EXPECTED DELIVERABLES AND PAYMENT:**

8.1 Payments will be made upon approval of deliverables as detailed below:

• 20% at the delivery and approval by the Bank of the First deliverable: Inception Report; a report including the work plan for the consultancy

• 40% at the delivery and approval by the Bank of the Second deliverable: Draft Report

• 40% at the delivery and approval by the Bank of the Third deliverable: Final Report

**IX. PAYMENT AND CONDITIONS OF EMPLOYMENT**

9.1 Compensation will be determined in accordance with Bank’s policies and procedures. In addition, candidates must be citizens of an IDB member country.

1. Caribbean countries at the effect of this Technical Cooperation refers to The Bahamas, Barbados, Guyana, Jamaica, Suriname and Trinidad and Tobago. [↑](#footnote-ref-2)
2. Guyana, Suriname and Trinidad and Tobago. [↑](#footnote-ref-3)
3. [Caribbean Small States: Challenges of high debt and low growth. International Monetary Fund (IMF).](https://www.imf.org/external/np/pp/eng/2013/022013b.pdf) [↑](#footnote-ref-4)
4. [IDB Energy Dossiers and IDB Energy Database: Compilation from International Energy Agency (IEA) World Energy Statistics and Balances and other sources.](https://www.iadb.org/en/dataset-energy-database) [↑](#footnote-ref-5)
5. [Anuario de 2017 Estadísticas Energéticas, OLADE](http://www.olade.org/publicaciones/anuario-estadisticas-energeticas-2017/); [Renewable Capacity Statistics 2017, IRENA.](http://www.irena.org/publications/2017/Mar/Renewable-Capacity-Statistics-2017) [↑](#footnote-ref-6)
6. [Caribbean Energy: Macro-related Challenges, IMF](https://www.imf.org/external/pubs/ft/wp/2016/wp1653.pdf) [↑](#footnote-ref-7)
7. [Alexander Ochs et al.,](http://www.worldwatch.org/system/files/C-SERMS_Full_PDF.pdf) *[Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS): Baseline Report and Assessment](http://www.worldwatch.org/system/files/C-SERMS_Full_PDF.pdf)* [(Washington, DC: Worldwatch Institute, 2015)](http://www.worldwatch.org/system/files/C-SERMS_Full_PDF.pdf) [↑](#footnote-ref-8)
8. [Caribbean Energy: Macro-related Challenges, IMF](https://www.imf.org/external/pubs/ft/wp/2016/wp1653.pdf) [↑](#footnote-ref-9)
9. According to the [Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS): Baseline Report and Assessment](http://www.worldwatch.org/system/files/C-SERMS_Full_PDF.pdf), The Bahamas has an estimated potential of 229MW of wind power and 60MW of Solar; Barbados 40MW of Wind, 39.7MW of Solar and 23.5MW Biomass; Guyana 7,000 MW of Hydro, 575.8million MWh/year of Solar and 60.2 GWh of Biomass; Jamaica up to 56 MW of Hydro, up to 1,313 MW of Wind, 1,876 MW of Solar and 192 MW from Biomass; Suriname 1,700MW of Hydro; and Trinidad and Tobago 50 MW of Wind and 308 MW of Solar. [↑](#footnote-ref-10)
10. In 2012 the Trinidad and Tobago produced 689 kboe/day of natural gas and were exported 333kboe/day. [Energy Dossier: Trinidad and Tobago; Malte Humpert, Ramón Espinasa, Technical Note No. IDB-TN-938, February 2016.](https://publications.iadb.org/handle/11319/7447) [↑](#footnote-ref-11)
11. The policy promotes a shift towards sustainable energy through increased use of RE and increased EE in response to the region’s high electricity cost and overdependence on imported fossil fuels. [↑](#footnote-ref-12)
12. The targets that have been set for the contribution of RE to total electricity generation are: 20%, 28% and 47% for years 2017, 2022 and 2027 respectively. [↑](#footnote-ref-13)
13. This can be accessed at [http://www.elysee.fr/assets/Uploads](http://www.elysee.fr/assets/Uploads/Appel-de-Fort-de-France-a-telecharger.pdf). [↑](#footnote-ref-14)
14. [Renewable Power Generation Costs in 2017, IRENA.](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Jan/IRENA_2017_Power_Costs_2018.pdf) [↑](#footnote-ref-15)
15. Innovative financing refers to a range of non-traditional financing mechanisms such as public-private partnerships and micro-contributions. [↑](#footnote-ref-16)
16. [Caribbean Energy: Macro-related Challenges, IMF](https://www.imf.org/external/pubs/ft/wp/2016/wp1653.pdf) [↑](#footnote-ref-17)
17. [Future Caribbean Climates in a World of Rising Temperatures: The 1.5 vs 2.0 Dilemma. Taylor, Michael A., et al.](https://unfccc.int/sites/default/files/resource/63_Taylor%201.5%20Paper.pdf) [↑](#footnote-ref-18)
18. [Caribbean small states: Challenges of High Debt and Low Growth. International Monetary Fund.](https://www.imf.org/external/np/pp/eng/2013/022013b.pdf) [↑](#footnote-ref-19)