SUPPORT FOR SUSTAINABLE ENERGY AND RESILIENT PROJECTS IN THE CARIBBEAN

RG-T3108

CERTIFICATION

I hereby certify that this operation was approved for financing under the **Knowledge Partnership Korea Fund for Technology and Innovation (KPK),** through a communication dated June 7, 2018 and signed by Byoung Kim. Also, I certify that resources from said fund are available for up to **US$700,000** in order to finance the activities described and budgeted in this document. This certification reserves resource for the referenced project for a period of four (4) calendar months counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, representing a risk that will not be absorbed by the Fund.

Certified by: Original signed — 10/05/2018

Sonia M. Rivera
Chief
Grants and Co-Financing Management Unit
ORP/GCM

Date

Approved by: Original signed — 10/05/2018

Rigoberto Ariel Yepez-Garcia
Division Chief
Energy Division
INE/ENE

Date

SUPPORT FOR SUSTAINABLE ENERGY AND RESILIENT PROJECTS IN THE CARIBBEAN

(RG-T3108)

I. BASIC PROJECT DATA

▪ Country/Region:	Regional
▪ TC Name:	Support for Sustainable Energy and Resilient Projects in the Caribbean
▪ TC Number:	RG-T3108
▪ Team Leader/Members:	Christiaan Gischler (INE/ENE) Team Leader, Malaika Masson (ENE/CJA), Co-Team Leader; Sangyong Chung, Cecilia Correa, Camila Gonzalez, Javier Cuervo, Natacha Marzolf, Jeanette Bonifaz, Stephanie Suber (INE/ENE); Veronica Rodrigues do Prado (ENE/CBA); Jaime Sologuren (ENE/CGY); Musheer Kamau (CCB/CJA); Betina Hennig (LEG/SGO); and Gerard Alleng (CSD/CCS)
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination.	Client Support (CS)
▪ Date of TC Abstract:	February, 2018
▪ Beneficiary (countries or entities which are the recipient of the technical assistance):	The Caribbean Development Bank (CDB), The Bahamas, Barbados, Guyana, Jamaica, Suriname, Trinidad and Tobago and the Eastern Caribbean Countries.
▪ Executing Agency	Inter-American Development Bank (IDB), through the Energy Division (INE/ENE)
▪ Source of Funding	Knowledge Partnership Korea Fund for Technology and Innovation
▪ IDB Funding Requested:	US$700,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period	48 months
▪ Required start date:	July 2017
▪ Types of consultants:	International consulting firm and individual consultants
▪ Prepared by Unit:	Energy Division (INE/ENE)
▪ Unit of Disbursement Responsibility:	Energy Division (INE/ENE)
▪ Included in Country Strategy (y/n);	n/a
▪ TC included in CPD (y/n):	n/a
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	The project will contribute to the goals of: (i) assisting borrowers in dealing with climate change; and (ii) supporting development in small and vulnerable countries

II. JUSTIFICATION AND OBJECTIVE

2.1 **Opportunity of Energy Matrix Transition.** Many Caribbean Countries (CC) share similar economic characteristics.[1] They are small economies, highly exposed to natural disasters and except for Trinidad and Tobago, they all are liquid fossil fuel importers for electricity generation, reaching as high as 92%[2] of fossil fuel dependency. CC has experienced growth stagnation in the last two decades.[3] As a result of slow economic growth in the United States (US) and Europe, which impacted on their economies and tourism industries. 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.[4] In net oil-importing countries the average oil imports doubled between 2005 and 2014, and accounted for an average deficit of almost 10% of Gross Domestic Product (GDP) in 2008 and of 3.7% of GDP in 2015.[5]

2.2 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.[6] Oil prices are susceptible to high volatility due to adjustments on the supply side, global demand recovery or geopolitical events and therefore (i) generates a high burden in CC's economies; (ii) reduces the competitiveness of the tourism sector, which is fundamental to the region; and (iii) drains household resources that could be used towards other expenditures such as health and education.

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

2.4 **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 Caribbean Community (CARICOM) region including biomass,

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1 Caribbean countries at the effect of this Technical Cooperation refers to The Bahamas, Barbados, Guyana, Jamaica, Suriname and Trinidad and Tobago.

2 IDB Energy Dossiers and IDB Energy Database: Compilation from International Energy Agency (IEA) World Energy Statistics and Balances and other sources.

3 Caribbean Small States: Challenges of high debt and low growth. International Monetary Fund (IMF).

4 *Anuario de 2017 Estadísticas Energéticas, OLADE*; Renewable Capacity Statistics 2017, IRENA.

5 Caribbean Energy: Macro-related Challenges, IMF

6 Alexander Ochs et al., *Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS): Baseline Report and Assessment* (Washington, DC: Worldwatch Institute, 2015)

waste to energy, geothermal, hydropower, ocean energy, solar, and wind.[7] Improving original resource assessments and performing additional and more detailed assessments, as well as promoting innovative business models in the CC can facilitate greater RE deployment in the region.

2.5 **EE potential in CC.** EE measures can be deployed across main economic sectors in the CC to reduce energy consumption without reducing productivity and comfort. Implementing EE measures is critical to reduce electricity demand and therefore reduce the region's vulnerability to oil prices. Important sectors across the CARICOM region, such as the tourism, mining, government and residential sectors, are highly energy intensive and/or inefficient and therefore present a significant potential for implementing EE measures.

2.6 **Potential for NG as a transition fuel in CC.** NG can provide a feasible alternative to reduce liquid 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 Liquified Natural Gas (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. Almost half of its natural gas production is designated for export, and the remaining is used for local primary energy supply.[8] Trinidad and Tobago electricity generation is almost totally based on natural gas.

2.7 **Promoting SE in the Caribbean.** In 2013, the CARICOM Nations approved CARICOM's Energy Policy (CEP)[9] and established regional targets for RE penetration in energy systems.[10] 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

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[7] According to the Caribbean Sustainable Energy Roadmap and Strategy (C-SERMS): Baseline Report and Assessment, The Bahamas has an estimated potential of 229 MW of wind power and 60 MW of Solar; Barbados 40 MW of Wind, 39.7 MW of Solar and 23.5 MW Biomass; Guyana 7,000 MW of Hydro, 575.8 million 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 1,700 MW of Hydro; and Trinidad and Tobago 50 MW of Wind and 308 MW of Solar.

[8] In 2012 the Trinidad and Tobago produced 689 kboe/day of natural gas and were exported 333 kboe/day. Energy Dossier: Trinidad and Tobago; Malte Humpert, Ramón Espinasa, Technical Note No. IDB-TN-938, February 2016.

[9] 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.

[10] 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.

Caribbean nations.[11] 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.

2.8 **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 RE technologies such as wind, solar Photovoltaic (PV) panels and energy storage to the point that they are competitive with fossil fuels.[12] 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 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.

2.9 **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.[13] 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.

2.10 Investing in SE technologies will have a positive impact on GDP in the long-run. The International Monetary Fund (IMF) 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.[14] 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. This also affects the capacity of governments to undertake large investments in SE and establish the necessary policies and regulatory framework for their implementation. Under investment 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

[11] This can be accessed at http://www.elysee.fr/assets/Uploads.
[12] Renewable Power Generation Costs in 2017, IRENA.
[13] Innovative financing refers to a range of non-traditional financing mechanisms such as public-private partnerships and micro-contributions.
[14] Caribbean Energy: Macro-related Challenges, IMF

(PPPs) to leverage private sector investment in SE projects. 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.

2.11 **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.[15] 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 hurricanes is high, above 10% per year, for most of the countries, with the Eastern Caribbean, Jamaica and Bahamas having the highest probability of hurricanes striking in any given year.[16] Therefore, the implementation of new SE technologies and infrastructure should be aligned with improving climate resilience in the Caribbean region.

2.12 The Caribbean Development Bank (CDB) acknowledges the energy challenges of the Caribbean, namely: high oil dependency, high electricity prices, high vulnerability to extreme weather events, lack of diversification of the energy matrix and limited penetration of low carbon vehicles. Since 2014, the IDB and CDB have established strong cooperation around SE. In July 2014, the IDB, the CDB and the Japan International Cooperation Agency signed a Memorandum of Cooperation to Promote RE and EE in the Eastern Caribbean Region. In May 2016, the IDB, CDB, CARICOM Secretariat and US Depart of Energy signed a Memorandum of Understanding for cooperation on RE and EE development in the Caribbean. In October 2015 CDB and IDB signed the Sustainable Energy Facility (SEF) for the Eastern Caribbean Programme to support the development of renewable energy and energy efficiency in the Eastern Caribbean, with emphasis on geothermal energy development. CDB is pursing the implementation of its energy sector policy and strategy which focusses on the promotion of RE and EE. Guided by this CDB has significantly increased its funding support sustainable energy projects and has also adopted an approach of strong cooperation with partners in maximizing the impact of its SE and climate resilience. This TC is an opportunity to expand that cooperation towards other forms of SE.

2.13 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.

2.14 This TC is consistent with the updated Institutional Strategy 2010-2020 (AB-3008) and is strategically aligned with (i) the development challenge of productivity and innovation, by promoting the use of RE technologies and EE measures; and (ii) the cross-cutting theme of climate change and environmental sustainability, by

[15] Future Caribbean Climates in a World of Rising Temperatures: The 1.5 vs 2.0 Dilemma. Taylor, Michael A., et al.

[16] Caribbean small states: Challenges of High Debt and Low Growth. International Monetary Fund.

promoting initiatives to reduce carbon emissions. The project is consistent with the Bank's Climate Change Sector Framework Document (GN-2835-3) as it focusses on climate resilience and will support the goal of reducing CO_2 emissions. This TC also promotes financial structures that enable coordination between the public and private sectors, and capacity strengthening to address climate change issues.

2.15 This TC is aligned and complementary to the TC ATN/OC-15218-RG, as this new TC will use the information developed during its execution as inputs for identifying potential SE projects and accelerating their implementation. Furthermore, this TC is expected to be complemented by the TC RG-T3281, which is currently under approval process. The latter will improve the available information on energy policies and regulations that will be an input for this TC's analysis.

III. DESCRIPTION OF ACTIVITIES AND OUTPUTS

3.1 **Component I. Support and expansion for resilient SE (US$150,000).** This component will finance and produce customized SE programs for each beneficiary country including: (i) analysis and evaluation of applicable SE technologies and identification of SE Pilot projects; (ii) recommendations for successful deployment and expansion of the identified SE Pilot projects technologies, including policy and regulatory aspects; and (iii) technical advice to governmental entities to enable project identification and structuring the incorporation of resilient design and the negotiation of PPPs with private sector actors.

3.2 **Component II. Design of sustainable and resilient pilot projects based on innovative financing (US$350,000).** Based on the list of projects identified in component I, this component will finance: (i) the elaboration of commercial and technical feasibility studies for at least three of the pilot projects that were identified in component I, which will be selected on a first-come, first-served basis; and (ii) the development of a diagnosis of the regulatory frameworks and other enabling regulatory and policy requirements for the construction and operation of the selected pilot projects. The feasibility studies will be based on innovative financing and consider resilient design. The outputs of this component are reports with the results of the commercial and technical feasibility studies and preliminary designs of cleaner and resilient SE pilot projects based on innovative financing mechanisms. The reports will also summarize the requirements for the execution of the projects according to the existing regulations and consider possible improvements to the regulatory framework and policy for the implementation of the resilient SE projects.

3.3 **Component III. Knowledge dissemination and awareness (US$200,000).** This component will finance: (i) workshops and trainings on innovative financing, SE technologies, SE projects and resilient design (for government officials from six CC); and (ii) seminars and work sessions on pilot projects identified in Component II.

IV. BUDGET

4.1 The total amount of this TC is US$700,000 and it will be financed by the Knowledge Partnership Korea Fund for Technology and Innovation administered by the Bank. The Table below summarizes the allocation of funding per component:

Table 1: Indicative Budget (in US$)

Activity/Component	Description	IDB
Component I	Support and Expansion for resilient Sustainable Energy	150,000
Component II	Design of sustainable and resilient pilot projects based on innovative financing	350,000
Component III	Knowledge Dissemination and Awareness	200,000
	TOTAL	**700,000**

V. EXECUTING AGENCY AND EXECUTION STRUCTURE

5.1 The Inter-American Development Bank (IDB), through its Energy Division (INE/ENE) will be the Executing Agency of this TC. The IDB's experience and strong collaboration with the participating countries will enable a successful implementation of the pilot projects, while it will facilitate the articulation among the different countries, stakeholders and donors in the region. The Bank will bring international experts to carry out specialized studies at the countries' level, and at the same time, will contribute with the harmonization of the projects at a regional level, by providing a linkage between all SE pilots, guaranteeing that all countries benefits from the experience of the others. Furthermore, the Bank, as the EA and focal point of this TC, will promote the scalability of the successful pilots at a regional level.

5.2 The Agreement establishing the IDB (Article III, Section 1) allows the Bank to finance the development of any of the member of the CDB, including the ones that are not IDB members, working through that organization. This provision include the Eastern Caribbean Countries included in this operation. In this TC, most of the proposed financing is directed toward activities that will provide common benefits to all the CARICOM countries, including both IDB members and non-members (Eastern Caribbean Countries). The country-specific and regional activities of the project indicate that the project benefits to non-member countries would be insignificant ("de minimis") relative to the total amount of the contribution. Therefore, the CDB intervention is not necessary.

5.3 The activities to be executed as part of this TC are included in the Procurement Plan and will be contracted in accordance with Bank policies as follows: (i) AM-650 for Individual consultants; (ii) GN-2765-1 and Guidelines OP-1155-4 for Consulting Firms for Services of an Intellectual Nature and; (iii) GN-2303-20 for the procurement of consulting services different from consultants.

VI. PROJECT RISKS AND ISSUES

6.1 Coordination risk due to multiple stakeholders and donors' active presence in the region will be mitigated by close work of the Bank in coordination with the RE/EE Unit of the CDB to engage existing mechanisms for donors' coordination in the Caribbean. Another identified risk is that changes in governments could affect the sustainability of the projects. Elections are expected during the TC execution for most of the countries and new authorities may not be aligned with the TC's objectives. To mitigate this risk, key stakeholders and members of the opposition parties will be included in the dissemination sessions and involved in the process. Also, some governments may not be aligned with the SE projects development, risk that will be mitigated by selecting pilot projects for component II on a first-in, first-come basis from the list of identified projects for the six countries.

VII. ENVIRONMENTAL AND SOCIAL CLASSIFICATION

7.1 According to the Environment and Safeguards Compliance Policy (OP-703), this TC has been classified as a Category C. No environmental assessment studies or consultations are required for Category "C" operations (see: Safeguard Policy Filter Report (SPF) and Safeguard Screening Form (SSF).

Required Annexes:

- Annex I: Request from the client
- Annex II: Results Matrix
- Annex III: Terms of Reference – Component I and Terms of Reference – Component II
- Annex IV: Procurement Plan